COMBINED SEWER AND STORMWATER MANAGEMENT PROGRAMS

National Pollution Discharge Elimination System (NPDES) Permits
Nos. PA0026689, PA0026662, PA0026671, PA 0054712

CSO Reporting Period January 1st 2007 to June 30th 2008
Stormwater Reporting Period July 1st 2007 to June 30th 2008

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

ACSP	Audubon Cooperative Sanctuary Program
AIS	Aquatic Invasive Species
ANS	Academy of Natural Science
API	Application Programming Interface
BCWSA	Bucks County Water & Sewer Authority
BEHI	Bank Erosion Hazard Index
BLS	Bureau of Laboratory Services, Philadelphia Water Department
BMP	Best Management Practice
BMP	Best Management Practices
CAC	Citizens Advisory Council
CCHL	Cobbs Creek High Level
CCIWMP	Cobbs Creek Integrated Watershed Management Plan
CCLL	Cobbs Creek Low Level
CCTV	Closed-circuit television
CIP	Capital Improvement Projects
CNPP	Coastal Non-Point Pollution Program
COA	Consent Order Agreement
CPCs	Compounds of Potential Concern
CSES	Central Schuylkill East Side
CSO	Combined Sewer Overflow
CSOMP	Combined Sewer Overflow Management Program
CSPS	Central Schuylkill Pump Station
CSWS	Central Schuylkill West Side
CWP	Clean Water Partners
DCNR	Department of Conservation and Natural Resources
DELCORA	Delaware County Regional Water Control Authority
DEP	Department of Environmental Protection
DMR	Discharge Monitoring Report
DRBC	Delaware River Basin Commission
DSS	Decision Support System
DWO	Dry Weather Overflow
E&S	Erosion and Sedimentation
EDCs	Endocrine Disrupting Compounds
EWS	Early Warning System
FGM	Fluvial Geomorphology
FHL	Frankford High Level
FOW	Friends of the Wissahickon
FPC	Fairmount Park Commission
FWWIC	Fairmount Water Works Interpretive Center
GIS	Geographic Information Systems
HHW	Household Hazardous Waste

HSI	Habitat Suitability Index
ICE	Instream Comprehensive Evaluation
IPM	Integrated Pest Management
IR	Infrared
IWMP	Integrated Watershed Management Plan
IWU	Industrial Waste Unit
LDLL	Lower Delaware Low Level
LFLL	Lower Frankford Low Level
LSES	Lower Schuylkill East Side
LTCP	Long-term Control Plan
LTCPU	Long-term Control Plan Update
MRP	Modified Regulator Plan
MS4	Municipal Separate Storm Sewer System
NASSCO	National Association of Sewer Service Companies
NBS	Near Bank Stress
NCSD	Natural Stream Channel Design
NEDD	Northeast Drainage District
NEWPCP	Northeast Water Pollution Control Plant
NEWPCP	Southwest Water Pollution Control Plant
NMC	Nine Minimum Controls
NPDES	National Pollution Discharge Elimination System
O	Oregon Ave Interceptor
O&M	Operation and Maintenance
OOW	Office of Watersheds
PACP	Pipeline Assessment & Certification Program
PADEP	Pennsylvania Department of Environmental Protection
PCB	Polychlorinated Biphenyl
PCIWMP	Pennypack Creek Integrated Watershed Management Plan
PCSMP	Pre-Construction Stormwater Management Plan
PCWCCR	Pennypack Creek Watershed Comprehensive Characterization Report
PDE	Partnership for the Delaware Estuary
PFBC	Pennsylvania Fish and Boat Commission
PHL	Philadelphia Airport
PIDC	Philadelphia Industrial Development Corporation
PMP	Pollutant Minimization Plan
POTW	Publicly owned treatment works
PWD	Philadelphia Water Department
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAM	River Assessment and Monitoring
RAS	Return Activated Sludge
RBP	Rapid Bioassessment Protocol
RCP	River Conservation Plan
RDI/I	Rainfall Dependant Inflow and Infiltration
RTC	Real Time Control

RTU	Remote Telemetry Units
S	Somerset
SAN	Schuylkill Action Network
SAP	Sewer Assessment Program
SCADA	Supervisory Control And Data Acquisition
SCEE	Schuylkill Center for Environmental Education
SEC	Senior Environmental Corps
SEPTA	Southeastern Pennsylvania Transportation Authority
SFR	Strom Flood Relief
SIAC	System Inventory and Characterization report
SIU	Significant Industrial Users
SMP	Stormwater Management Program
SOP	Standard Operating Procedure
SWDD	Southwest Drainage District
SWIG	Schuylkill Watershed Initiative Grant
SWMG	Southwest Main Gravity
SWMM	Stormwater Management Model
SYTF	Scrap Yard Task Force
T	Tacony
TBM	Tunnel Boring Machine
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
TTF	Tookany/Tacony-Frankford
TTFIWMP	Tookany/Tacony-Frankford Integrated Watershed Management Plan
UDLL	Upper Delaware Low Level
UFLL	Upper Frankford Low Level
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency, Region III
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
WCIWMP	Wissahickon Creek Integrated Watershed Management Plan
WCWCCR	Wissahickon Creek Watershed Comprehensive Characterization Report
WMR	Watershed Mitigation Registry
WPCP	Water Pollution Control Plant
WRT	Waterways Restoration Team

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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 0026662, 0026671, and 0026689; 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 January 1st, 2007 through June 30th, 2008, to manage and reduce the combined sewer overflows (CSOs) permitted to discharge to waters of the Commonwealth of Pennsylvania.

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II Implementation of the Nine Minimum Controls

In the first phase of the PWD's CSO strategy, and in accordance with its NPDES permits, the PWD submitted to the Pennsylvania Department of Environmental Protection on September 27, 1995, "CSO Documentation: Implementation of Nine Minimum Controls". The nine minimum controls 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. In general, PWD's NMC program includes comprehensive, aggressive measures to maximize water quality improvements through the following measures:

1. Review and improvement of on-going operation and maintenance programs

2. Measures to maximize the use of the collection system for storage

3. Review and modification of PWD's industrial pretreatment program

4. Measures to maximize flow to the wastewater treatment facilities

5. Measures to detect and eliminate dry weather overflows

6. Control of the discharge of solid and floatable materials

7. Implementation of programs to prevent generation and discharge of pollutants at the source

8. Public Notification of CSO impacts

9. Comprehensive inspection and monitoring programs to characterize and report overflows and other conditions in the combined sewer system.

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

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

In 2005 The Philadelphia Water Department 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. The conversion project consisted of extracting data from over 250,000 engineering documents that exist in digital format and have been indexed by location.

The project was executed in three phases. The Initiation Phase included a series of workshops designed to ensure that the conversion process properly utilized the 85 different types of source documents maintained by the department. It also included customization of data conversion tools to meet the project's data specifications, the development of a detailed conversion work plan, and conversion of the data for a 2-block area within the city. The Pilot Phase included further definition of the project's data dictionary and conversion tools and applied both to data from 2 of the City's 121 map tiles. The third or Production Phase, included conversion of the remaining tiles and the establishment of links between the GIS data, and legacy databases related to valves, hydrants and storm sewer inlets.

The project was supported through the use of customized conversion tools for data collection, data scrubbing, data entry, graphical placement, and quality control. Conflicts and anomalies in the data were tracked using a web-based tool and database.

PWD expects to utilize the GIS coverages as the foundation for many of their operations including maintenance management, capital improvements, and hydraulic modeling.

To make sure that PWD's investment in GIS and data conversion does not go to waste; a comprehensive maintenance plan has been put into practice to ensure that the data is as accurate and up to date as possible. Edits and improvements are made on a daily basis to the data. Using a web based application, GIS editors are able to check out work and check it back in when it's complete. The application tracks all changes made out in the field that are recorded on as-built plans. RTK accurate GPS devices are also employed for high spatial accuracy for new construction projects.

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

PWD has implemented a comprehensive sewer assessment program (SAP) to provide for continued inspection and maintenance of the collection system using closed circuit television. The SAP program was developed by PWD and consultants and was finalized in March 2006. This program development encompassed 2.5 years and cost over $6 million.

The major goals of the SAP development project were to:

Develop new sewer evaluation protocol and prioritization system that integrates with new and existing computerized databases

Develop recommendations and schedules for an on-going sewer inspection program

Create training tools and train PWD personnel

Apply techniques to pilot areas in the City totaling 7% of the total collection system

A few selected highlights of the SAP project are:

Development of unique "smart" GIS manhole numbering system

Implementation of National Association of Sewer Service Companies (NASSCO) standard protocol for uniform evaluation of sewers called Pipeline Assessment & Certification Program (PACP)

Development of rating and scoring system to prioritize segments for repairs or replacement.

Development of Intranet-based viewer for digital CCTV inspection projects and structural scores with GIS front-end (SINSPECT)

Development of Intranet-based CCTV Inspection Request and Tracking System with GIS front-end (SAPReq)

Development of Pre-Inspection (CCTV) Program

Creation of internal monthly sewer defect review committee (SAP Committee-5)

Any infiltration observed during the on-going CCTV sewer inspection program is coded as part of the NASSCO Pipeline Assessment and Certification Program. The infiltration is categorized based on a range of 5 levels: Weepers, Drippers, Light Runners, Heavy Runners, or Gushers. All occurrences of Heavy Runners or Gushers are reported to PWD's Water Conveyance Leak Detection Unit immediately for investigation.

The SAP is being used to guide the capital improvement program to ensure that the existing sewer systems are adequately maintained, rehabilitated, and reconstructed. For the period of January 2007 – June 2008, the length of TV inspections averaged about 4 ½ miles a month for a total of 82 inspected miles.

Table II.A-1 Monthly TV Inspections

Date	Miles Inspected
Jan-07	5.28
Feb-07	2.14
Mar-07	4.31
Apr-07	3.86
May-07	5.71
Jun-07	4.67
Jul-07	4.15
Aug-07	4.26
Sep-07	3.95
Oct-07	5.15
Nov-07	5.89
Dec-07	4.01
Jan-08	5.07
Feb-08	4.64
Mar-08	5.14
Apr-08	4.76
May-08	5.12
Jun-08	3.96
Average	4.6
Total	**82**

A.3 Other Initiatives

CSO Regulator Inspection & Maintenance Program

Annual summaries of the comprehensive and preventative maintenance activities completed in the combined sewer system over the past year are detailed in **Appendix A** and any changes are discussed below.

In response to the CSO compliance inspection performed by DEP in November 2002, PWD has committed to demonstrating an improved follow-up response to sites experiencing a DWO. PWD has 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.

Tide Gate Inspection and Maintenance Program

Summaries of the tide gate inspection and maintenance completed during fiscal year 2008 are found in **Appendix A**, which documents the locations where preventative maintenance was performed on the tide gates.

Somerset Grit Chamber Cleaning

PWD regularly monitors the sediment accumulation in the grit trap at the origin of the Somerset Intercepting Sewer and in locations downstream to determine appropriate cleaning intervals for the girt trap and downstream interceptor. Driven by the monitoring program, the grit basin is cleaned periodically and debris quantities tracked to further refine the frequency of cleaning so as to maintain adequate capacity in the Somerset Intercepting sewer.

Somerset Grit Chamber cleaning details, specifically tonnage removed and dates of cleaning during fiscal year 2008 are available in **Appendix A**.

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

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

B.1.1 Monitoring

PWD maintains an extensive monitoring network through the combined sewer system, rain gages, pump stations and connections from all adjacent outlying communities. The following tables provide basic information on the monitoring network.

Table II.B-1 - Listing of Monitored Outlying Community Connections

Monitored Outlying Community Connections			
ID	**Township**	**Location**	**Address**
MA2	Abington	Pine Road & Pennypack Creek	8700 Pine Rd
MB1	Bucks Co.	Totem Rd. & Neshaminy Cr.	-
MBE1	Bensalem	Byberry Grounds	16000 Carter Rd
MBE2	Bensalem	Dunks Ferry Road	1400 Worthington
MBE5	Bensalem	Grant & James	5050 Grant Av
MBE6	Bensalem	Gravel Pike @ Poquessing Creek	4800 Byberry Rd
MBE7	Bensalem	Townsend Road @ Poquessing Creek	13000 Townsend Rd
MC1	Cheltenham	Bouvier & Cheltenham	1900 Cheltenham Av
MC2	Cheltenham	Tookany Creek & Cheltenham	194 E Cheltenham Av
MD1	Delaware Co.	DELCORA	SWWPC Plant
ML1	Lower Merion	51st Street & City Line	2490 N 51St St
ML3	Lower Merion	63rd Street & City Line	2139 N 63Rd St
ML4	Lower Merion	66th Street & City Line	6600 City Line Av
ML5	Lower Merion	73rd Street & City Line	7268 City Line Av
ML6	Lower Merion	Conshohocken & City Line	4900 City Line
ML7	Lower Merion	Presidential & City Line	3499 City Line
MLM1	Lower Moreland	Philmont & Byberry	Woodhaven
MLM2	Lower Moreland	Lower Moreland PS @ Welsh & Huntington Pk	-
MPNBC1	PIDC - PNBC	Phila. Naval Business Ctr. @ PS 796	4801 S. 13Th Street
MS2	Springfield	Northwestern & Wissahickon Cr.	9404 Northwestern
MS3	Springfield	Erdenheim & Stenton	Erdenheim & Stenton
MS6	Springfield	Woodbrook & Stenton	7601 Stenton Av
MSH1	Southhampton	Trevose Rd. & Poquessing Creek E side	Trevose Rd & Stream Ridge Ln.
MUD1-N	Upper Darby	60Th & Cobbs Creek	6001 S. Cobbs Creek Pky.
MUD1-O	Upper Darby	60Th & Cobbs Creek Overflow	6001 S. Cobbs Creek Pky.
MUD1-S	Upper Darby	60Th & Cobbs Creek	6001 S. Cobbs Creek Pky.
MC3	Abington	Fillmore & Shelmire (Abington flow)	7400 Fillmore

Table II.B-2 - Listing of Combined Sewer Monitors

Combined Sewer Monitors		
Site	**Interceptor**	**Waterbody**
C01	Cobbs Creek High Level	Cobbs
C02	Cobbs Creek High Level	Cobbs
C04	Cobbs Creek High Level	Cobbs
C04A	Cobbs Creek High Level	Cobbs
C05	Cobbs Creek High Level	Cobbs
C06	Cobbs Creek High Level	Cobbs
C07	Cobbs Creek High Level	Cobbs
C09	Cobbs Creek High Level	Cobbs
C10	Cobbs Creek High Level	Cobbs
C11	Cobbs Creek High Level	Cobbs
C12	Cobbs Creek High Level	Cobbs
C13	Cobbs Creek High Level	Cobbs
C14	Cobbs Creek High Level	Cobbs
C15	Cobbs Creek High Level	Cobbs
C16	Cobbs Creek High Level	Cobbs
C17	Cobbs Creek High Level	Cobbs
C18	Cobbs Creek High Level	Cobbs
C19	Cobbs Creek Low Level	Cobbs
C20	Cobbs Creek Low Level	Cobbs
C21	Cobbs Creek Low Level	Cobbs
C22	Cobbs Creek Low Level	Cobbs
C23	Cobbs Creek Low Level	Cobbs
C24	Cobbs Creek Low Level	Cobbs
C26	Cobbs Creek Low Level	Cobbs
C28A	Cobbs Creek Low Level	Cobbs
C29	Cobbs Creek Low Level	Cobbs
C30	Cobbs Creek Low Level	Cobbs
C31	Cobbs Creek High Level	Cobbs
C32	Cobbs Creek High Level	Cobbs
C33	Cobbs Creek High Level	Cobbs
C34	Cobbs Creek High Level	Cobbs
C35	Cobbs Creek High Level	Cobbs
C36	Cobbs Creek High Level	Cobbs
C37	Cobbs Creek High Level	Cobbs
D02	Upper Delaware Low Level	Delaware
D03	Upper Delaware Low Level	Delaware
D04	Upper Delaware Low Level	Delaware
D05	Upper Delaware Low Level	Delaware
D06	Upper Delaware Low Level	Delaware
D07	Upper Delaware Low Level	Delaware
D08	Upper Delaware Low Level	Delaware

D09	Upper Delaware Low Level	Delaware
D11	Upper Delaware Low Level	Delaware
D12	Upper Delaware Low Level	Delaware
D13	Upper Delaware Low Level	Delaware
D15	Upper Delaware Low Level	Delaware
D17	Somerset	Delaware
D18	Somerset	Delaware
D19	Somerset	Delaware
D20	Somerset	Delaware
D21	Somerset	Delaware
D22	Somerset	Delaware
D24	Somerset	Delaware
D25	Somerset	Delaware
D37	Lower Delaware Low Level	Delaware
D38	Lower Delaware Low Level	Delaware
D39	Lower Delaware Low Level	Delaware
D40	Lower Delaware Low Level	Delaware
D41	Lower Delaware Low Level	Delaware
D44	Lower Delaware Low Level	Delaware
D45	Lower Delaware Low Level	Delaware
D46	Lower Delaware Low Level	Delaware
D47	Lower Delaware Low Level	Delaware
D48	Lower Delaware Low Level	Delaware
D49	Lower Delaware Low Level	Delaware
D50	Lower Delaware Low Level	Delaware
D51	Lower Delaware Low Level	Delaware
D52	Lower Delaware Low Level	Delaware
D53	Lower Delaware Low Level	Delaware
D54	Lower Delaware Low Level	Delaware
D58	Lower Delaware Low Level	Delaware
D61	Lower Delaware Low Level	Delaware
D62	Lower Delaware Low Level	Delaware
D63	Lower Delaware Low Level	Delaware
D64	Lower Delaware Low Level	Delaware
D65	Lower Delaware Low Level	Delaware
D66	Lower Delaware Low Level	Delaware
D67	Lower Delaware Low Level	Delaware
D68	Oregon Ave.	Delaware
D69	Oregon Ave.	Delaware
D70	Oregon Ave.	Delaware
D71	Oregon Ave.	Delaware
D72	Oregon Ave.	Delaware
D73	Lower Delaware Low Level	Delaware
F03	Upper Frankford Low Level	Tacony/Frankford

F05	Upper Frankford Low Level	Tacony/Frankford
F06	Upper Frankford Low Level	Tacony/Frankford
F07	Upper Frankford Low Level	Tacony/Frankford
F08	Upper Frankford Low Level	Tacony/Frankford
F09	Upper Frankford Low Level	Tacony/Frankford
F10	Upper Frankford Low Level	Tacony/Frankford
F12	Upper Frankford Low Level	Tacony/Frankford
F13	Lower Frankford Low Level	Tacony/Frankford
F14	Lower Frankford Low Level	Tacony/Frankford
F21	Lower Frankford Low Level	Tacony/Frankford
F23	Lower Frankford Low Level	Tacony/Frankford
F24	Lower Frankford Low Level	Tacony/Frankford
F25	Lower Frankford Low Level	Tacony/Frankford
P01	PennyPack Interceptor	Pennypack
P02	PennyPack Interceptor	Pennypack
P03	PennyPack Interceptor	Pennypack
P04	PennyPack Interceptor	Pennypack
P05	PennyPack Interceptor	Pennypack
R06	Cobbs Creek High Level	Cobbs
R07	Somerset	Delaware
R12	Central Schuylkill East Side	Schulkill
R13	Lower Frankford Low Level	Tacony/Frankford
R14	Lower Frankford Low Level	Tacony/Frankford
R15	Tacony	Tacony/Frankford
R18	Tacony	Tacony/Frankford
R20	Central Schuylkill East Side	Schuylkill
R24	Cobbs Creek High Level	Cobbs
S05	Central Schuylkill East Side	Schuylkill
S06	Central Schuylkill East Side	Schuylkill
S07	Central Schuylkill East Side	Schuylkill
S08	Central Schuylkill East Side	Schuylkill
S09	Central Schuylkill East Side	Schuylkill
S10	Central Schuylkill East Side	Schuylkill
S11	Central Schuylkill West Side	Schuylkill
S12	Central Schuylkill East Side	Schuylkill
S12A	Central Schuylkill East Side	Schuylkill
S15	Central Schuylkill East Side	Schuylkill
S16	Central Schuylkill East Side	Schuylkill
S18	Central Schuylkill East Side	Schuylkill
S19	Central Schuylkill East Side	Schuylkill
S21	Central Schuylkill East Side	Schuylkill
S22	Central Schuylkill West Side	Schuylkill
S23	Central Schuylkill East Side	Schuylkill
S24	Central Schuylkill West Side	Schuylkill

S25	Central Schuylkill East Side	Schuylkill
S26	Central Schuylkill East Side	Schuylkill
S27	South West Main Gravity	Schuylkill
S28	South West Main Gravity	Schuylkill
S30	South West Main Gravity	Schuylkill
S31	Lower Schuylkill East Side	Schuylkill
S32	Lower Schuylkill West Side	Schuylkill
S33	Lower Schuylkill West Side	Schuylkill
S34	South West Main Gravity	Schuylkill
S35	Lower Schuylkill East Side	Schuylkill
S36	Lower Schuylkill East Side	Schuylkill
S36A	Lower Schuylkill East Side	Schuylkill
S37	Lower Schuylkill East Side	Schuylkill
S38	Lower Schuylkill West Side	Schuylkill
S39	South West Main Gravity	Schuylkill
S40	South West Main Gravity	Schuylkill
S42	Lower Schuylkill East Side	Schuylkill
S42A	Lower Schuylkill East Side	Schuylkill
S43	South West Main Gravity	Schuylkill
S44	Lower Schuylkill East Side	Schuylkill
S45	Lower Schuylkill West Side	Schuylkill
S46	Lower Schuylkill East Side	Schuylkill
S47	South West Main Gravity	Schuylkill
S50	South West Main Gravity	Schuylkill
S51	South West Main Gravity	Schuylkill
T01	Tacony	Tacony/Frankford
T03	Tacony	Tacony/Frankford
T04	Tacony	Tacony/Frankford
T05	Tacony	Tacony/Frankford
T06	Tacony	Tacony/Frankford
T07	Tacony	Tacony/Frankford
T08	Tacony	Tacony/Frankford
T09	Tacony	Tacony/Frankford
T10	Tacony	Tacony/Frankford
T11	Tacony	Tacony/Frankford
T12	Tacony	Tacony/Frankford
T13	Tacony	Tacony/Frankford
T14	Tacony	Tacony/Frankford
T15	Tacony	Tacony/Frankford
CCHLC07	Cobbs Creek High Level	Cobbs
CCHLC12	Cobbs Creek High Level	Cobbs
CCHLC13	Cobbs Creek High Level	Cobbs
CCHLC14	Cobbs Creek High Level	Cobbs
CCHLC17	Cobbs Creek High Level	Cobbs

CCHLC18	Cobbs Creek High Level	Cobbs
CCHLC34	Cobbs Creek High Level	Cobbs
CCHLH18	Cobbs Creek High Level	Cobbs
CCLLC19	Cobbs Creek Low Level	Cobbs
CCLLC20	Cobbs Creek Low Level	Cobbs
CCLLC22	Cobbs Creek Low Level	Cobbs
CCLLC24	Cobbs Creek Low Level	Cobbs
CCLLC26	Cobbs Creek Low Level	Cobbs
CSESS09	Central Schuylkill East Side	Schuylkill
CSESS26	Central Schuylkill East Side	Schuylkill
FHLTT08	Frankford High Level	Tacony/Frankford
FHLTT15	Frankford High Level	Tacony/Frankford
LDLLD45	Lower Delaware Low Level	Delaware
LDLLD47	Lower Delaware Low Level	Delaware
LDLLD53	Lower Delaware Low Level	Delaware
LDLLD62	Lower Delaware Low Level	Delaware
LDLLD69	Lower Delaware Low Level	Delaware
LDLLD70	Lower Delaware Low Level	Delaware
LFCH07	Lower Frankford Low Level	Tacony/Frankford
LFCH19	Lower Frankford Low Level	Tacony/Frankford
LFLLF08	Lower Frankford Low Level	Tacony/Frankford
LFLLF10	Lower Frankford Low Level	Tacony/Frankford
LSESS36	Lower Schuylkill East Side	Schuylkill
LSWSS33	Lower Schuylkill West Side	Schuylkill
LSWSS38	Lower Schuylkill West Side	Schuylkill
LSWSS45	Lower Schuylkill West Side	Schuylkill
SWMGH17	South West Main Gravity	Schuylkill
SWMGH20	South West Main Gravity	Schuylkill
SWMGS28	South West Main Gravity	Schuylkill
SWMGS34	South West Main Gravity	Schuylkill
SWMGS43	South West Main Gravity	Schuylkill
SWMGS47	South West Main Gravity	Schuylkill
SWMGS51	South West Main Gravity	Schuylkill
UDLLD08	Upper Delaware Low Level	Delaware
UDLLH04	Upper Delaware Low Level	Delaware
UDLLH07	Upper Delaware Low Level	Delaware
UDLLH14	Upper Delaware Low Level	Delaware
H02	Lower Delaware Low Level	Delaware
H09	Upper Delaware Low Level	Delaware
H13	Lower Delaware Low Level	Delaware
H16	Lower Delaware Low Level	Delaware
H21	Central Schuylkill East Side	Schuylkill

Table II.B-3 Listing of all Rain Gages

Rain Gage Network				
Rain Gage	**% Working**	**Sensor #1**	**Sensor #2**	**Sensor #3**
RG01	100%	31	31	31
RG02	100%	31	31	31
RG03	100%	31	31	31
RG04	100%	31	31	31
RG05	84%	26	26	26
RG06	100%	31	31	31
RG07	100%	31	31	31
RG08	100%	31	31	31
RG09	100%	31	31	31
RG10	100%	31	31	31
RG11	100%	31	31	31
RG12	100%	31	31	31
RG13	68%	21	21	21
RG14	100%	31	31	31
RG15	100%	31	31	31
RG16	100%	31	31	31
RG17	100%	31	31	31
RG18	100%	31	31	31
RG19	100%	31	31	31
RG20	100%	31	31	31
RG21	90%	28	28	28
RG22	100%	31	31	31
RG23	100%	31	31	31
RG24	100%	31	31	31

Table II.B-4 Listing of Pumping Station Monitoring Locations

Wastewater Stations	Location	Address	Owner
BANK ST	Bank St. & Elbow Lane	15 S BANK ST.	PWD
BELFRY DRIVE	Belfry Dr. & Steeple Dr.	751 S MANATAWNA ST.	PWD
CSPS	University Ave. & 34th St. Bridge	600 UNIVERSITY AVE.	PWD
FORD ROAD	Ford Rd. across from West Park Hospital	3800 FORD AVE.	PWD
HOG ISLAND	Hog Island Rd. east of Airport control tower	#3 HOG ISLAND RD.	PWD
LINDEN AV	Linden Ave. & Milnor St.	5200 LINDEN AVE.	PWD
LOCKART ST	Lockart St. & Lockart Lane @ drainage right of way	10778 LOCART RD.	PWD
MILNOR ST	Milnor St. between Grant Ave. & Eden St.	9647 MILNOR ST.	PWD
NEILL DRIVE	Fairmount Park at Neil Drive & Falls Road	4000 NEILL DR.	PWD

PNBC 796 MAIN	Philadelphia Naval Business Center	4801 S. 13th Street	PIDC
PNBC 542	Philadelphia Naval Business Center	1601 Langley Street	PIDC
PNBC 120	Philadelphia Naval Business Center	1700 Langley Street	PIDC
PNBC 603	Philadelphia Naval Business Center	2000 Langley Ave.	PIDC
POLICE ACADEMY	8501 State Rd. in the Police Academy grounds	8501 STATE RD.	Police Dept
RENNARD ST	Philmont Shopping Center grounds	11064 RENNARD ST.	PWD
SPRING LANE	Spring Lane Meadows	9021 Buttonwood Pl. 19128	PWD
42ND ST	42nd St & 43rd Street	761 S. 43RD Street	PWD
Stormwater Stations	**Location**	**Address**	**Owner**
BROAD & BLVD.	Underpass at Roosevelt Blvd. & Broad St.	4251 N. BROAD ST.	Penn Dot
MINGO CREEK	Schuylkill River under the Platt Bridge	7000 PENROSE AVE.	PWD
26TH AND VARE	Underpass at Vare & 26th St.	26TH AND VARE AVE.	Penn Dot

B.1.2 Modeling

The U.S. EPA's Storm Water Management Model (SWMM) was used to develop the watershed-scale model for the PWD combined sewer system. The components of the SWMM model used in the development of the Philadelphia watershed and wastewater conveyance model were the RUNOFF and EXTRAN modules.

The RUNOFF module was developed to simulate the quantity and quality of runoff in a drainage basin and the routing of flows and contaminants to sewers or receiving water. The program can accept an arbitrary precipitation (rainfall or snowfall) hyetograph and performs a step by step accounting of snowmelt, infiltration losses in pervious areas, surface detention, overland flow, channel flow, and water quality constituents leading to the calculation of one or more hydrographs and/or pollutagraphs at a certain geographic point such as a sewer inlet. The driving force of the RUNOFF module is precipitation, which may be a continuous record, single measured event, or artificial design event. The RUNOFF module also simulates Rainfall Dependant Inflow and Infiltration (RDI/I) in separate sanitary area using three sets of unit hydrographs defined by R, T, and K values to represent the shape of the RDI/I hydrograph response to the input precipitation hyetograph.

The EXTRAN module was developed to simulate hydraulic flow routing for open channel and/or closed conduit systems. The EXTRAN module receives hydrograph inputs at specific nodal locations by interface file transfer from an upstream module (e.g. the RUNOFF module) and/or by direct user input. The module performs dynamic routing of stormwater and wastewater flows through drainage systems and receiving streams.

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

The Philadelphia Water Department continues to maintain a CSO Monitoring network and temporary monitoring programs to support planning for further CSO control projects and to minimize dry weather overflows and tidal inflows. PWD will continue to review, replace, and update network equipment in order to continue to support the above functions.

B.2.1 Permanent Flow Monitoring Program

In fiscal year 2008 the Department purchased and installed a new data acquisition system and RTU's (remote telemetry units) manufactured by Telog Enterprise. This new system replaces a customized solution that was unreliable and difficult to maintain and offers better communications options and system diagnostics which should allow PWD to greatly increase the data capture rate. Thus far 30 RTU's have been switched out to the new system with the balance expected to be completed in fiscal year 2009. As of the end of fiscal year 2008, the 287 remote monitoring sites are 80.5% operational.

B.2.2 Temporary Flow Monitoring Program

The PWD temporary flow-monitoring program was initiated in July 1999 with the deployment of portable flow meters throughout targeted Philadelphia sewershed areas to quantify wastewater flow through sanitary sewers and characterize the tributary sewersheds. The identification and quantification of rainfall dependent inflow/infiltration (RDII) into sanitary sewers contributing to the City of Philadelphia's service area is a key component in assessing potential reductions in combined sewer overflow (CSO) impacts.

The data collected allows for the quantification of wet and dry weather flows in separate sanitary sewers for a specified list of sites over a given period. The flow monitoring data is subjected to rigorous QA/QC procedures resulting in consistently good data quality over the monitoring period. Further analysis of the flow monitoring data is performed using hydrograph separation techniques in order identify the primary flow components.

In 2007, the PWD temporary flow monitoring program continued to monitor and maintain twenty three (23) previously installed flow monitoring sites. Eight (8) monitors in support of the Thomas Run Relief project, four (4) monitors in support of PC30, one (1) monitor in support of R20, one (1) monitor on an un-metered outlying community connection, one (1) monitor in support of an LTCP project, two (2) monitors in support of storm flood relief, one (1) monitor for CSO model calibration, and five in support of Flow Control projects.

In addition, PWD monitored thirty one (31) un-metered connections from outlying community service areas, eighteen (18) sites in support of PC30, model calibration and RDII identification, four (4) sites in support of CSO model calibration, one (1) site in support of Storm Flood Relief, two (2) sites in support of Wakeling Relief project, and one (1) site in support of R20 through a contract with CSL Services, Inc.

In 2008, PWD continued its temporary monitoring program until August 2008. All PWD maintained temporary monitoring sites were uninstalled by August 2008. Five (5) essential sites were turned over to CSL for continued monitoring through the present. Two (2) additional sites were added in support of a Seepage Tank at 47th and Fairmount. PWD continues its temporary flow monitoring program through a contract with CSL Services, Inc.

Table II.B-5 Listing of all Temporary Flow Monitors deployed

Deployment	Site Name	Start	End	Maintained By	Project
1	Saylors Grove	6/19/07	5/1/08	PWD	Flow Control
2	Cathedral Run	7/1/07	7/3/07	PWD	Flow Control
3	Monoshone	7/11/07	7/19/07	PWD	Flow Control
5	Creshiem Valley	1/28/08	5/1/08	PWD	Flow Control
6	Gorgas Lane	10/26/07	12/27/07	PWD	Flow Control
11	Main and Shurs	1/31/01	replaced by permanent	PWD	R20
90	Southampton	10/6/04	6/13/08	PWD	outlying community connection
95	H09 Byberry	3/28/07	present	PWD	PC-30
96	H09 Poquessing	3/13/07	present	PWD	PC-30
98	Holy Family	3/13/07	present	PWD	PC-30
99	18th and Oregon	9/9/05	9/3/07	PWD	Storm Flood Relief
101	16th and Passyunk	9/19/05	3/7/07	PWD	Storm Flood Relief
106	Lebanon and Haverford	1/24/07	8/1/08	PWD	CSO model calibration
107	56th and Walnut	1/30/07	8/1/08	PWD	Thomas Run
108	D72 North / South	4/2/07	8/1/08	PWD	LTCP Project
109	56th and Spruce (R3)	5/14/07	8/1/08	PWD	Thomas Run
110	56th and Spruce (R2)	5/7/07	8/1/08	PWD	Thomas Run
110	Torresdale	11/27/07	4/17/08	PWD	PC-30
111	56th and Cedar	4/5/07	8/1/08	PWD	Thomas Run
112	56th and Pine	4/3/07	8/1/08	PWD	Thomas Run
113	Florence and Cobbs Creek	5/16/07	8/1/08	PWD	Thomas Run
114	56th and Webster	5/13/07	11/14/07	PWD	Thomas Run
115	56th and Webster	9/23/05	8/1/08	PWD	Thomas Run
116	47th and Aspen	3/18/08	present	PWD	47th Fairmount Seepage Tank
117	47th and Fairmount	4/1/08	present	PWD	47th Fairmount Seepage Tank
Fall07	MA-1	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MA-3	8/27/07	11/9/07	CSL	outlying community connection

Fall07	MA-4	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MCX-1	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MCX-2	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MCX-3	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MCX-4	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MCX-5	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MCX-6	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MCX-7	8/27/07	11/9/07	CSL	outlying community connection
Fall07	ML-2	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MLM-3	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MLM-4	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MLM-5	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MLM-6	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MLM-7	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MS-1	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MS-4	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MS-5	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MS-6	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MS-7	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MS-1	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MS-4	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MS-5	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MS-7	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MS-8	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MSH-2	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MSHX-1	8/27/07	11/9/07	CSL	outlying community connection
Fall07	MSHX-2	8/27/07	11/9/07	CSL	outlying community connection

Winter07	BC0010	11/16/07	present	CSL	PC-30
Winter07	D39-110	11/16/07	present	CSL	PC-30
Winter07	D-45	11/16/07	present	CSL	CSO model calibration
Winter07	MH-A	11/16/07	present	CSL	I/I
Winter07	MH-B	11/16/07	present	CSL	I/I
Winter07	MH-C	11/16/07	present	CSL	I/I
Winter07	MH-D	11/16/07	present	CSL	I/I
Winter07	MH-E	11/16/07	present	CSL	I/I
Winter07	MH-F	11/16/07	present	CSL	I/I
Winter07	ML-2	11/16/07	present	CSL	outlying community connection
Winter07	ML-3	11/16/07	present	CSL	outlying community connection
Winter07	BC0010	11/16/07	present	CSL	PC-30
Winter07	PC0045	11/16/07	present	CSL	PC-30
Winter07	PC0920	11/16/07	present	CSL	PC-30
Winter07	Q107-05-S0010	11/16/07	present	CSL	I/I
Winter07	Q107-06-S0010	11/16/07	present	CSL	I/I
Winter07	Q120-03-S0010	11/16/07	present	CSL	I/I
Winter07	Q120-08-S0010	11/16/07	present	CSL	I/I
Winter07	Q120-10-S0010	11/16/07	present	CSL	I/I
Winter07	Q120-11-S0010	11/16/07	present	CSL	I/I
Winter07	Q121-01-S0010	11/16/07	present	CSL	I/I
Winter07	Q121-05-S0010	11/16/07	present	CSL	I/I
Winter07	R13	11/16/07	present	CSL	Wakeling Relief
Winter07	R14	11/16/07	present	CSL	Wakeling Relief
Winter07	S42-130	11/16/07	present	CSL	Storm Flood Relief
Winter07	S45	11/16/07	present	CSL	CSO model calibration
Winter07	S20	11/16/07	present	CSL	CSO model calibration
Winter07	S27	11/16/07	present	CSL	CSO model calibration
Winter07	Site 47	11/16/07	present	CSL	R20

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

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.

These scenarios include combinations of traditional large scale infrastructure improvement projects based on increased transmission, storage and treatment of combined sewer flows, as well as, system-wide implementation of low impact development and green infrastructure source control projects utilizing decentralized storage, infiltration, evapo-transpiration, and slow release of stormwater before it enters the combined sewer system.

PC-30 Extreme Wet Weather Overflow

Modeling work was performed in support of the project to remediate Poquessing Creek Interceptor Extreme Wet Weather Overflows at manhole PC-30. Modeling was used to help design the construction and operation of a relief sewer structure to transmit extreme wet weather flows from the Poquessing Creek Interceptor sanitary sewer system to the Northeast Water Pollution Control Plant (NEWPCP).

Storm Flood Relief

The PWD has made a significant investment in detailed hydraulic modeling and analyses that were performed in order to design and evaluate Storm Flood Relief (SFR) projects in several combined sewer areas of Philadelphia. Several system improvement scenarios were proposed based on model simulations in order to effectively relieve basement backups during extreme wet weather events. Additionally, modifications to proposed SFR projects designed to increase capture and treatment of combined sewage flows during small to moderate storm events were also evaluated using system hydraulic modeling.

Real Time Control Evaluation

The PWD has proposed the installation of an inflatable dam in the Rock Run Relief Sewer and a crest gate in the trunk sewer of regulating structure T14 ("I" St. and Ramona Avenue) to reduce Combined Sewer Overflow (CSO) discharges to the Tacony Creek as part of the Long-Term CSO Control Plan (LTCP). These capital projects achieve reductions in CSO volumes through utilization of in-system storage in the Rock Run Relief and T14 trunk sewer in a cost-effective manner.

Modeling analyses were performed to evaluate control logics for the inflatable dam and gate that optimize storage utilization and minimize flooding impacts of the projects. Analyses were also performed to develop control logics for the projects' drain-down control gates and to size Dry Weather Outlet (DWO) pipes for the Rock Run Relief project.

System hydraulic modeling was performed to evaluate the performance benefit of Real Time Control (RTC) projects in the Southwest Drainage District (SWDD). These projects included the completed phase of raising the overflow dam height and DWO pipes size at Cobbs Creek High Level Interceptor CSO regulating chamber C17. Ongoing projects phases also evaluated using system hydraulic models include reconstruction of the triple barrel gravity sewer dispersion chamber control gates and increasing the DWO pipe size at the Lower Schuylkill West Side Interceptor regulating chamber S45 in order to deliver more wet weather flow to the Southwest Water Pollution Control Plant (NEWPCP) for treatment.

System hydraulic modeling was performed to evaluate the performance improvements realized through implementation of the Main Relief Inflatable Dam project.

Other Capital Project Support
Hydraulic modeling was performed to evaluate conveyance improvements to the Northeast Drainage District (NEDD) Frankford High Level (FHL) Interceptor system including removing transmission bottlenecks and sealing an existing out of service gravity sewer for pressurization in order to bring more wet weather flow to the NEWPCP.

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

The construction of the Collector System Real Time Control Center (RTC) building was completed in the summer of 2003. The Real Time Control Center became operational in September 2006. The center, located at the Collector System Headquarters at Fox St. and Abbottsford Rd., is currently attended to during the day shift and for major storm events. The 24 ft. by 46 ft. room incorporates a two high by three wide matrix of video projection cubes for a total video screen wall of 89.4 square feet (6.7 ft H x 13.35 ft W). The ergonomically designed room and furniture layout enables large groups of people to simultaneously view the display screens.

The display screens make use of the Decision Support System (DSS) that has been under development since 2002. This web-based application consolidates many of PWD's information sources into one application making real-time and static information easier for the decision maker to use. Some of the information sources currently in use are: pump station and CSO control site SCADA and alarm systems, Collector System monitoring network data, the Department's wide variety of GIS data, sewer system and equipment scanned drawings, CCTV inspections video and reports, Collector Systems work order management systems, weather and tide predictions to name a few.

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

Main Relief
The Main Relief Inflatable Dam storage project was completed in fiscal year 2007. The Department continues to maintain and monitor this in-line collection system storage site.

Please also refer to "Construction and Implementation of Main Relief Sewer Storage and Real-time Control" for more information on the operation and maintenance of the Main Relief Inflatable Dam.

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

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 permits all significant industrial users (SIUs) in its service area, which includes SIUs in both separate and combined sewer systems. These permits are site-specific and are intended to control the introduction of pollutants from the industrial users which may pass through or interfere with wastewater treatment processes.

The City has done an analysis on the issuance of general permits for industrial dischargers and concluded that there would be no additional benefit over the site-specific permits that are currently issued. These site-specific permits regulate all wastewater discharged from the facility, which includes contaminated storm water (i.e. rainfall contaminated by products, by-products, waste products, or other materials). Additionally all SIUs are required to monitor their flow to the sewer system. Due to the large amount of regulatory changes that would be necessary to enact the use of general permits, namely it would require a change to the City's Wastewater Control Regulations, the EPA's approval, and promulgation into City Law, the City would like to continue to use the site-specific permits and will continue to demonstrate that there is no detriment in using the site-specific permits over the general permits.

The Industrial Waste Unit is currently phasing in an addition to their inspection form, a section dedicated to Stormwater handling. During the inspection of the facilities, inspectors note things such as potential sources of pollutants stored outside that could possibly impact storm water, whether activities are performed to minimize or prevent pollutant contact with storm water, how the dike water is handled, whether tanks are in a contained area, and similar observations that try to ascertain whether stormwater contamination is an issue at the facility.

Through the Pretreatment Program, the City inspects each of its SIUs at least once per year. These inspections provide an opportunity to give guidance on possible pollution prevention activities. Pollution prevention is reducing or eliminating waste at the source by modifying production processes, promoting the use of non-toxic or less-toxic substances, implementing conservation techniques, and re-using materials rather than putting them into the waste stream. Pollution prevention is viewed as a win-win situation for both the City and its SIUs. In such, the City intends to provide industrial storm water BMP guidance to its SIUs and evaluating those efforts during inspections.

C.2 Incorporate guidance on BMPs for industrial stormwater discharges into Stormwater Management Regulations guidance

The Stormwater Management Guidance Manual incorporates guidance on BMPs for industrial stormwater dischargers. The Stormwater Management Guidance Manual is intended to guide the developer in meeting the requirements of the Stormwater Regulations. The Manual is laid out to guide the developer through the entire site design process, beginning with initial site design considerations, through the Post-Construction Stormwater Management Plan (PCSMP) submittal elements, and ultimately PWD prerequisite approval on Building Permit approval. Tools are provided to assist in completion and submittal of a PCSMP consistent with the intent of PWD. These tools work together to address stormwater management on the development site from concept to completion.

One of the tools in the Guidance is the Stormwater Management Practice Design Guidelines, which presents technical design guidance for managing stormwater and specifications for structural SMPs. These SMPs include technologies such as Green Roofs, Rain Barrels and Cisterns, Filters, Bioinfiltration / Bioretention, Detention Basins, Porous Pavement, etc. Each of the technologies is described and shows what potential applications it would be appropriate for, such as Residential Subdivisions, Commercial, Ultra Urban, Industrial, Retrofit, or a Highway Road. This helps assist industrial stormwater dischargers decide which BMPs are most appropriate for industrial applications.

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

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, as well as create blight in City neighborhoods, and contribute to short dumping and other environmental harms to area waterways, the City will: (1) continue to participate with the USEPA and PADEP in a multi-governmental task force to conduct random inspections of these facilities; (2) provide compliance assistance to scrap yard operators on the various laws and regulations; (3) provide educational assistance on measures that can be undertaken by the industry to control runoff from storage or transport areas; and (4) where necessary, support comprehensive enforcement actions in cases where facilities are unwilling to cooperate.

The SYTF operated during the reporting period from January 2007 until February 2008, when the turnover in the city government and the loss of the lead organizer of the task force caused all operations to cease. The SYTF did not make any new inspections during the rest of the fiscal year. Since then the task force has been reorganized and inspections began on September 5, 2008. Vince Dougherty from the city Commerce Department has taken over as the new head chairman of the SYTF. Inspections and meetings will be more frequent in the new SYTF, each taking place once a month rather than once every two months, in an effort to reach more scrap yards and get them into compliance. A geodatabase has been created that displays in GIS the location and outline of all scrap yard parcels in the city. The geodatabase contains information about the scrap yards that will be important in the future operation of the task force, such as: the address, owner, surface area, when it was last inspected, and previous violations. Currently, there are 209 licensed scrap yards, 174 are auto salvage yards and 35 are junk yards. It is the intent of the SYTF to be more efficient by operating frequently, knowing the scrap yards better, and following up on the results of the inspections.

During the fiscal year identified as the period from January 1, 2007 to June 30, 2008, the SYTF conducted inspections five times and inspected 28 scrap yards. Violations notices were issued to 16 of them. Three sites were shut down for having stolen vehicles on the site. One scrap yard that had been operating illegally at 520 W. Annsbury Street was shut down and the owner has been in court facing charges since the cease of operations. This will continue as the SYTF takes further strides toward becoming more involved in scrap yard activities throughout the city.

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Section D Maximization of Flow to the Publicly Owned Treatment Works for Treatment (NMC 4)

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

Modified Regulator Plan

The basic strategy of flow maximization, or Modified Regulator Plan (MRP) was to deliver more flow to the WPCPs more frequently, to enable greater pollutant removals. The results of the hydraulic modeling of the interceptor sewers under the flow maximization scenarios indicate that significantly higher rates of flow can be delivered to the WPCPs more frequently than under current conditions. To date, 100% of the projected flow increase associated with the Modified Regulator Plan has been implemented. Some additional modifications might be made in the future to prioritize certain overflows, or to reflect an improved understanding of the collection system dynamics as identified throughout the ongoing modeling work, but no additional capture is expected to result on a system wide basis.

Maximization of Wet Weather Treatment in the LTCPU

Increasing the treatment capacity of the WPCPs and increasing the transmission of flows to the WPCPs is being analyzed as past of the LTCPU. Please refer to "Evaluate Stress Test Report options in the LTCPU" for more information on this analysis.

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 has encouraged three of its satellite suburban customers of its wastewater system to reduce its peak wet weather flows to its wastewater treatment plants.

Delaware County Regional Water Quality Control Authority

The Delaware County Regional Water Quality Control Authority "DELCORA" has been advised that a new contract with PWD is contingent upon DELCORA reducing its peak flows to PWD's Southwest Water Pollution Control Plant. To that end the Authority has notified its twenty three contributing municipalities of the need to identify and eliminate sources of Infiltration and Inflow. DELCORA has undertaken measures to meter flows from each community to DELCORA and is attempting to use financial incentives in an effort to reduce peak flows. PWD is satisfied with DELCORA's efforts to date.

Bucks County Water & Sewer Authority

Bensalem Township's wastewater is delivered to PWD's system under a contract assumed several years ago by the Bucks County Water & Sewer Authority "BCWSA". Under the terms of a recently negotiated agreement with PWD, BCWSA is undertaking the installation of meters at all connection points not currently monitored.

In addition, BCWSA has agreed to a timetable for the construction of a 1.8 million gallon surge tank and pump station. The terms of the agreement provide for the completion of this facility no later than September 19, 2010. This effort has been proposed by BCWSA as an effective manner in which to address high peak flows to PWD's system.

Lower Southampton

Lower Southampton Township was notified that its peak flows were in excess of contractual limits. The Township has agreed to identify and eliminate sources of I/I which contribute to these peaks. Additionally, Lower Southampton has agreed to pay its fair share of a new sewer in State Road in the city which will mitigate its peak flows which contribute to surcharging of the Poquessing Interceptor. PWD is currently satisfied with the efforts taken by Lower Southampton.

Table II.D-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		9.542		
Bensalem	6.133		11.740	5,340	3,734
Bucks	24.000	37.00	85.080	13,400	13,400
Cheltenham	13.380		20.750		
Lower Moreland	1.450	2.900	8.970	568	592
Lower Southampton	7.140		15.790	3,651	3,651
Southwest Plant					
Delcora	50.000	75.000	155.000		
Lower Merion	14.500		31.570	6,871	7,250
Springfield (Erden.)	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

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

Monitoring and Modeling

PWD is currently aware of 61 connections from outlying communities. Presently, permanent flow monitors are installed at 26 connections and 35 are unmonitored. Through temporary deployments, average flow statistics were determined. The following table lists all known connections, their location and weather or not the connection is permanently monitored.

Table II.D-2 Listing of Flow Monitors at Outlying Community Connections

Site ID	Connection Type	Township	Location	Address
MA1	STD*	Abington	Buckly Drive & Pine Rd	9650 Pine Rd.
MA2	MTR**	Abington	Pine Road & Pennypack Creek	8700 Pine Rd
MA3	STD	Abington	Shady Lane & Pine Road	8400 Pine Rd.
MA4	STD	Abington	Pine Road & Lee Lynn La.	9200 Pine Rd.
MB1	MTR	Bucks Co.	Totem Rd. & Neshaminy Cr.	
MBE1	MTR	Bensalem	Byberry Grounds	16000 Carter Rd
MBE10	STD	Bensalem	Colonial Ave	
MBE11	STD	Bensalem	Betz Laboratories	
MBE12	STD	Bensalem	Creekside Apartments North	
MBE13	-	Bensalem	Rt 1 West Side of Highway	
MBE14	-	Bensalem	Old Lincoln Hwy & Old Trevose Rd	
MBE15	-	Bensalem	Knights Rd & Poquessinng Creek	
MBE16	STD	Bensalem	Creekside Apartments South	
MBE2	MTR	Bensalem	Dunks Ferry Road	1400 Worthington
MBE3	STD	Bensalem	Emerson & Evelyn	Emerson
MBE4	STD	Bensalem	Red Lion & Frankford	490 Bristol Rd.
MBE5	MTR	Bensalem	Grant & James	5050 Grant Av
MBE6	MTR	Bensalem	Gravel Pike @ Poquessing Creek	4800 Byberry Rd
MBE7	MTR	Bensalem	Townsend Road @ Poquessing Ck.	13000 Townsend Rd
MBE8	STD	Bensalem	Bensalem Shopping Ctr.	
MBE9	STD	Bensalem	Elmwood Apartments	
MC1	MTR	Cheltenham	Bouvier & Cheltenham	1900 Cheltenham Av
MC2	MTR	Cheltenham	Tookany Creek & Cheltenham	194 E Cheltenham Av
MC3	MTR	Abington	Fillmore & Shelmire (Abington)	7400 Fillmore
MCx1	STD	Cheltenham	Cottman (Out)	
MCx2	STD	Cheltenham	County Line & Franklin (Out)	

MCx3	STD	Cheltenham	County Line & Washington (Out)	Washington & Hasbrook
MCx4	STD	Cheltenham	Kerper (Out)	Unruh & Hasbrook
MCx5	STD	Cheltenham	Passmore (Out)	
MCx6	STD	Cheltenham	Devereaux (Out)	
MCx7	STD	Cheltenham	Comly (Out)	
MD1	MTR	Delaware Co.	DELCORA	SWWPC Plant
ML1	MTR	Lower Merion	51st Street & City Line	2490 N 51St St
ML2	STD	Lower Merion	59th Street & City Line	5868 City Line
ML3	MTR	Lower Merion	63rd Street & City Line	2139 N 63Rd St
ML4	MTR	Lower Merion	66th Street & City Line	6600 City Line Av
ML5	MTR	Lower Merion	73rd Street & City Line	7268 City Line Av
ML6	MTR	Lower Merion	Conshohocken & City Line	4900 City Line
ML7	MTR	Lower Merion	Presidential & City Line	3499 City Line
MLM1	MTR	Lower Moreland	Philmont & Byberry	Woodhaven
MLM2	MTR	Lower Moreland	Lower Moreland PS @ Welsh & Hunt. Pk	
MLM3	STD	Lower Moreland	Ramage Run & City Boundry	
MLM4	STD	Lower Moreland	Moreland Rd. & Pine Rd.	
MLM5	STD	Lower Moreland	Jonathan place	
MLM6	STD	Lower Moreland	Pine & Radburn Rd	
MLM7	STD	Lower Moreland	Welsh Road and City Line	
MPNBC1	MTR	PIDC - PNBC	Phila. Naval Business Ctr. @ PS 796	4801 S. 13Th Street
MS1	STD	Springfield	Thomas & Northwestern	198 W. Northwestern
MS2	MTR	Springfield	Northwestern & Wissahickon Cr.	9404 Northwestern
MS3	MTR	Springfield	Erdenheim & Stenton	Erdenheim & Stenton
MS4	STD	Springfield	Mermaid La. & Stenton	7700 Stenton
MS5	STD	Springfield	Winston & Stenton	8200 Stenton
MS6	MTR	Springfield	Woodbrook & Stenton	7601 Stenton Av
MS7	STD	Springfield	Willow Grove	
MS8	STD	Springfield	Ridge Ave Connections	Ridge & Northwestern
MSH1	MTR	Southampton	Trevose Rd. & Poquessing Ck. East	Trevose Rd & Stream Ridge Ln.
MSH2	STD	Southampton	Lukens St. & Trevose Rd.	Trevose Rd & Lukens St.
MSHX_1	STD	Southampton	Overhill Ave & Cty. Line Rd (Out)	
MSHX_2	STD	Southampton	County Line & Trevose Rd. (Out)	
MUD1-N	MTR	Upper Darby	60Th & Cobbs Creek	6001 S. Cobbs Creek Pky.
MUD1-O	MTR	Upper Darby	60Th & Cobbs Creek Overflow	6001 S. Cobbs Creek Pky.
MUD1-S	MTR	Upper Darby	60Th & Cobbs Creek	6001 S. Cobbs Creek Pky.

*STD – temporary flow monitor
**MTR – Permanent monitor

The following temporary flow monitoring deployments were performed on outlying community connections in the past year.

Table II.D-3 Listing of Temporary Flow Monitors at Outlying Community Connections

Deployment	Site Name	Start	End	Maintained By
Fall07	MA-1	8/27/2007	11/9/2007	CSL
Fall07	MA-3	8/27/2007	11/9/2007	CSL
Fall07	MA-4	8/27/2007	11/9/2007	CSL
Fall07	MCX-1	8/27/2007	11/9/2007	CSL
Fall07	MCX-2	8/27/2007	11/9/2007	CSL
Fall07	MCX-3	8/27/2007	11/9/2007	CSL
Fall07	MCX-4	8/27/2007	11/9/2007	CSL
Fall07	MCX-5	8/27/2007	11/9/2007	CSL
Fall07	MCX-6	8/27/2007	11/9/2007	CSL
Fall07	MCX-7	8/27/2007	11/9/2007	CSL
Fall07	ML-2	8/27/2007	11/9/2007	CSL
Fall07	MLM-3	8/27/2007	11/9/2007	CSL
Fall07	MLM-4	8/27/2007	11/9/2007	CSL
Fall07	MLM-5	8/27/2007	11/9/2007	CSL
Fall07	MLM-6	8/27/2007	11/9/2007	CSL
Fall07	MLM-7	8/27/2007	11/9/2007	CSL
Fall07	MS-1	8/27/2007	11/9/2007	CSL
Fall07	MS-4	8/27/2007	11/9/2007	CSL
Fall07	MS-5	8/27/2007	11/9/2007	CSL
Fall07	MS-6	8/27/2007	11/9/2007	CSL
Fall07	MS-7	8/27/2007	11/9/2007	CSL
Fall07	MS-1	8/27/2007	11/9/2007	CSL
Fall07	MS-4	8/27/2007	11/9/2007	CSL
Fall07	MS-5	8/27/2007	11/9/2007	CSL
Fall07	MS-7	8/27/2007	11/9/2007	CSL
Fall07	MS-8	8/27/2007	11/9/2007	CSL
Fall07	MSH-2	8/27/2007	11/9/2007	CSL
Fall07	MSHX-1	8/27/2007	11/9/2007	CSL
Fall07	MSHX-2	8/27/2007	11/9/2007	CSL

The U.S. EPA's Storm Water Management Model (SWMM) was used to develop the watershed-scale model for the PWD combined sewer system. The components of the SWMM model used in the development of the Philadelphia watershed and wastewater conveyance model were the RUNOFF and EXTRAN modules. 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.

Outlying Community Contracts

PWD has developed with each outlying community a contract to accept and treat their flows. The contracts are designed to limit high wet weather flows. Contract limits are based on the permanent flow monitors where available. 32 unmonitored connections have standardized contract limits.

Table II.D-4 Listing of Outlying Community Contract Limits

Site ID	Short Term MGD *	Daily MGD	Township Total CFS	Township Total MGD
MA1				
MA2	4.973	3.784		
MA3	0.884	0.659		
MA4			9.542	4.453
MB1	54.989	24	85.08	24
MBE1	0.569	0.434		
MBE2	0.246	0.185		
MBE3	0.248	0.189		
MBE4	0.437	0.328		
MBE5	0.278	0.282		
MBE6	1.758	1.327		
MBE7	0.543	0.412		
MBE8	0.246	0.185		
MBE9	0.375	0.278		
MBE10	0.104	0.078		
MBE11	0.239	0.18		
MBE12	0.246	0.185		
MBE13				
MBE14				
MBE15	0.246	0.185		
MBE16			11.74	6.134
MC1	1.777	1.7		
MC2	11.634	11.68		
MC3				
MCx1				
MCx2				
MCx3				
MCx4				
MCx5				
MCx6				
MCx7			20.75	13.38
MD1			155	50

ML1	5.474	5.474		
ML2	0.213	0.213		
ML3	1.48	1.48		
ML4	10.264	10.264		
ML5	1.848	1.848		
ML6	0.252	0.252		
ML7	0.84	0.84	31.57	14.5
MLM1	0.268	0.173		
MLM2		67% of total	5.441	0.8
MLM3				
MLM4				
MLM5				
MLM6				
MLM7			0.675	0.282
MS1				
MS2	0.129	0.1		
MS3	2.585	2.15		
MS4				
MS5				
MS6	1.247	1		
MS7				
MS8			6.13	3.25
MSH1	10.205	7.14		
MSH2				
MSHX_1				
MSHX_2			15.79	7.14
MUD1-N	22.621	17		
MUD1-S	Combined	Combined		
MUD1-O			35	17
MPNBC1				

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Section E Prohibition of CSOs during Dry Weather (NMC 5)

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

Dry weather discharges at CSO outfalls can occur in any combined sewer system on either a chronic (i.e., regular or even frequent) basis or on a random basis (i.e., as a result of unusual conditions, or equipment malfunction). Random dry weather discharges can occur at virtually any CSO outfall following sudden clogging by unusual debris in the sewer, structural failure of the regulator, or hydraulic overloading by an unusual discharge of flow by a combined sewer system user. Chronic dry weather discharges can and should be prevented from occurring at all CSO outfalls. Random discharges cannot be prevented, but they can and must be promptly eliminated by cleaning repair, and/or identification and elimination of any excessive flow and/or debris sources.

Regular and reactive inspections and maintenance of the CSO regulators are performed throughout the City. These programs ensure that sediment accumulations and/or blockages are identified and corrected immediately to avoid dry weather overflows. The CSO maintenance group utilizes the remote monitoring network system daily as a tool to help identify the locations that are showing abnormal flow patterns. By using the system in this manner the crews are able to correct many partial blockages before they become a dry weather discharge. The detailed inspection report summaries are included **Appendix A**.

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

The control of floatables and solids in CSO discharges addresses aesthetic quality concerns of the receiving waters. The ultimate goal of NMC No. 6 is, where feasible, to reduce, if not eliminate, by relatively simple means, the discharge of floatables and coarse solids from combined sewer overflows to the receiving waters. The initial phase of the NMC process has and will continue to focus on the implementation of, at a minimum, technology-based, non-capital intensive control measures.

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

The Inlet Cleaning Unit's primary responsibility is the inspection and cleaning of approximately 79,159 stormwater inlets throughout the City of Philadelphia. The group is also responsible for maintenance of inlet covers (retrieving, replacing and locking) and relieving choked inlet traps.

About 80% of inlet cleaning work orders are scheduled jobs, while the remaining 20% are in response to customer calls or requests from other departments. Scheduled cleaning routes for an area are created by the crew chief and assigned to the crews.

For the period of January 2007 – June 2008, 130,453 inlets were examined or examined and cleaned. This is an average of every inlet being examined or examined and cleaned 1.6 times during this period.

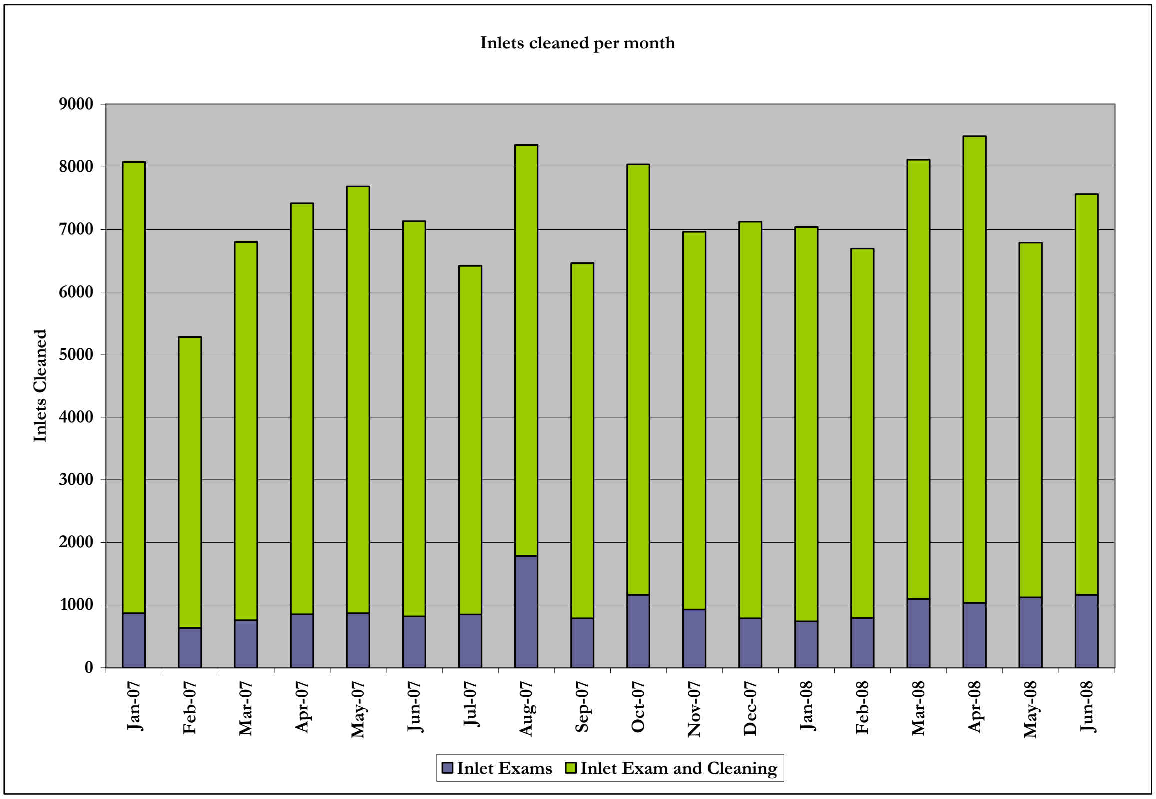

Figure II.F-1 Monthly Inlet Cleaning Statistics

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 removing large trash – cars, shopping carts, and other short dumped debris - from the 100 miles of stream systems that define our City neighborhoods. This crew is also restoring eroded streambanks and streambeds around outfall pipes and in tributaries as a part of PWD's goal to naturally restore our streams while meeting Clean Water Act permit requirements. The team is focused on the completion of in-stream restoration work that protects the department's sewer infrastructure in the banks and beds of our streams, while also using Natural Stream Channel Design to restore these streams to a habitat supporting waterway and a community amenity. The Waterways Restoration Team works in partnership with the FPC staff and the various Friends of the Parks groups to maximize resources and the positive impacts to our communities.

The WRT performs stream clean up work throughout the city, in the city's streams – Cobbs, Wissahickon, Tacony, Pennypack, and Poquessing creeks, and their tributaries, along the banks of the non-tidal Schuylkill River, in addition to the Manayunk Canal.

Typical tasks for the WRT include:

Debris and Trash Removal - This is one of the most basic tasks of the WRT – the removal of trash and large debris from our waterways. In addition to satisfying one of the primary goals of the Clean Water Act, ensuring that our streams and rivers are clean and beautiful enhances public stewardship as people will only seek and value waterways and parks that look and smell good. Public willingness to pay for the protection of our waterways is intricately linked to the recognition that these waterways are being maintained and valued by the City. Residents care little about the quality of the water emptying into our streams if the streams are smelly eyesores. If the public does not have a desire to go to these waterways, they will not care about them.

Watershed assessments - WRT watershed assessments include visual inspections of the banks of Cobbs, Wissahickon, Pennypack, Poquessing and Tacony Creeks, are completed 1 time per year. This field survey work essentially involves the inspection of stream segments (upstream to downstream) to check for evidence of exposed or damaged infrastructure, chronic pollution sources, dry weather sewer overflows along Cobbs and Tacony Creek. These assessments also support the implementation of the completed watershed management plans for these stream systems.

Sanitary Discharge Clean-ups - The WRT is recruited to clean up sanitary discharges to our streams or parks.

Property Restoration Repair - The WRT is recruited to restore natural areas on public and private land impacted by water main breaks.

Operation of PWD Floatables Pontoon Boat in spring/summer/fall

Restoration projects such as plunge pool removals and stream restorations

Inspection of Intake Walls

Woody Debris Removal

General Maintenance

General Maintenance responsibilities include the fish ladder, PWD plunge pool and streambank restoration projects, and other PWD land-based stormwater management facilities. Currently, the WRT performs ongoing maintenance at the following habitat improvement or best management practice sites:

Saylor Grove Stormwater Treatment Wetland

Fairmount Fish ladder

Marshall Road Streambank Restoration Project in the Cobbs

Wises Mill Streambank Restoration Project in the Wissahickon

West Mill Creek Tree Trenches

Mill Creek Urban Farm Street Runoff Diversion

Manayunk Canal Boom Maintenance and Algae Removal

From January 2007 – June 2008, the team removed approximately 593 tons of debris from our waterways, debris which includes cars and car parts, appliances, shopping carts and tires.

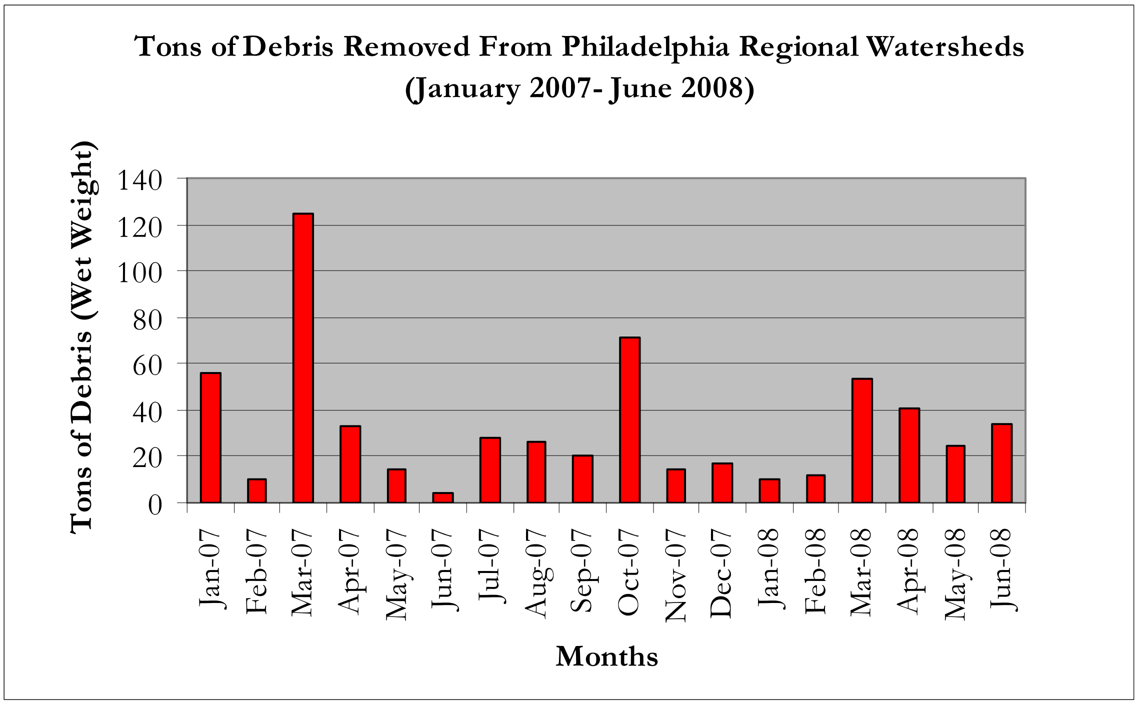

Figure II.F-2 Waterways Restoration Team Monthly Debris Removal Statistics

Table II.F-1 Summary of Waterways Restoration Team Jan 07- June 08 Debris Removal

Tons of Debris Removed	593
Cars Removed	44
Tires Removed	2026
Shopping Carts Removed	90

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

Reduction in floatables improves both water quality and aesthetics of receiving streams. The use of a skimmer vessel also allows for a mobile control program capable of managing debris at various locations, increasing the effectiveness of this control measure. In addition, the boat will be a visible control, and will increase the public awareness and education of floatables impacts.

Floatables Skimming Vessel – R.E. Roy

The Philadelphia Water Department's large skimming vessel is a 39-ft, front-end loader, single hull, shallow draft, debris skimming vessel with a hydraulically controlled grated bucket and a 5.6 cubic yard on-board hold equipped with a main diesel engine, Caterpillar Model 3056 205-hp.

Figure II.F-3 Floatables Skimming Vessel in operation

Construction of the floatables skimming vessel was initiated in June 2004 and was completed and the vessel delivered to PWD in July 2005. The total cost of the vessel was $526,690. The vessel (Figure II.F-3), now known as the R. E. Roy, was operated in-house, by Philadelphia Water Department personnel from delivery until April 2006. During this time, PWD was also in the process of securing a contractor for the permanent operation of the skimming vessel. River Associates was the contractor selected for the operations of the vessel and they have been operating it since April 2006.

The vessel is operated approximately five days per week, 8 months of the year. The vessel's main purpose is to perform general debris collection and removal on both the Delaware and Schuylkill Rivers. The vessel is also used to clean up for and serve as a public relations highlight at events such as the Schuylkill Regatta.

During the 2007-2008 period of record, the skimmer vessel was in operation in 2007 from April through December before shutting down for winter maintenance, and then began operation again in March 2008. The total amount of debris collected in FY 2008 from January 1st, 2007 to June 30th, 2008 was 47.24 tons. The weights of debris collected during each month are displayed in Table II.F-2 below:

Table II.F-2 Debris Collected by R.E. Roy Skimming Vessel

Month	Tons of Debris Collected
April 2007	5.02
May 2007	6.41
June 2007	5.33
July 2007	4.51
August 2007	2.63
September 2007	1.49
October 2007	3.24
November 2007	7.2
December 2007	2.43
March 2008	1.76
April 2008	2.46
May 2008	2.54
June 2008	2.22
FY 2008 Total	47.24

The skimming vessel participated in several public events during 2007 and 2008. Events the vessel was involved in during 2007 include demonstrations for students on the Schuylkill River and during Coast Day, the 4th of July cleanup, and the dedication ceremony of the new fireboat Independence. The boat has also been involved in the Penn's Landing Safe Boating Day, was on display at the Fairmount Waterworks during the Shad Tour demonstrations, and conducted demonstrations for students of the Maritime Charter School at the Frankford Arsenal dock. It is the intention of the Water Department for the skimming vessel to continue to serve as a tool for public awareness and outreach.

Floatables Pontoon Vessel

The Philadelphia Water Department has purchased a pontoon vessel that is being used as a workboat on the Upper Schuylkill, Lower Schuylkill, and Delaware Rivers within Philadelphia. The vessel will is used to retrieve floating trash and debris from the waterways within the service area. The debris is hand netted from the water surface by employees standing on the vessel deck. The hand nets are emptied into 30-gallon debris containers on the deck, and the containers are offloaded by hand. The pontoon vessel can be utilized in tight spaces found in marinas, among piers, and in near shore areas. This small pontoon vessel is to be used as a companion vessel to the larger floatables skimming vessel already being operated in Philadelphia.

Figure II.F-4 Floatables Pontoon Vessel in operation

The operational area of the Pontoon Vessel will include:

1. The Lower Schuylkill above Fairmount Dam up to Flatrock Dam (7.2 miles)

2. The Lower Tidal Schuylkill down to the confluence with the Delaware River (8.1 miles)

3. The Delaware River from the confluence up to the Philadelphia City Boundary (18.8 miles)

The pontoon vessel was acquired by PWD in June 2006. Throughout the 2007-2008 swimming season, PWD managed a skimming operation for floatable debris on the non-tidal Schuylkill through use of the pontoon vessel. This program was an extension of the large debris removal already occurring on the tidal portions of the Delaware and Schuylkill rivers. Due to the high visibility of the project, it received excellent public feedback throughout the season.

Once a week, a crew of three operated the office's pontoon vessel, collecting an average of 2.5 yd^3 per day. During Fiscal Year 2008 the pontoon vessel was operated 15 times removing a total of 38.5 cubic yards of trash from the Non-Tidal Schuylkill River. The chart below details the composition of the debris collected. The majority of this debris was collected along Kelly Drive each week, covering only 25% of the anticipated project area.

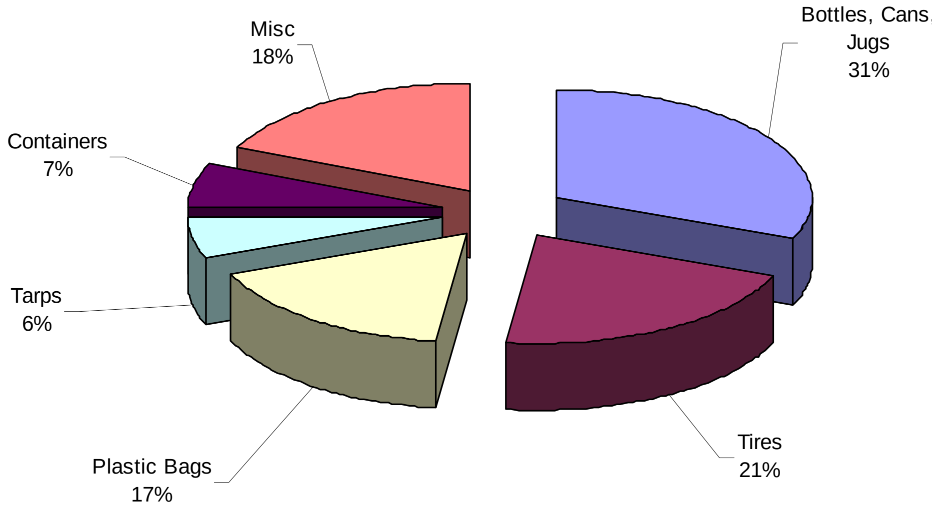

Figure II.F-5 Percent Composition of Recovered Debris Jan. 2007 – June 2008

The pontoon vessel participated in public events this year including the Philly Spring Cleanup and the Earth Day cleanup at Lloyd Hall. The public outreach of the pontoon skimming vessel is its greatest asset. The Water Department is considering the option of getting citizens to volunteer to work on the pontoon vessel and in doing so provide great public participation in cleaning the City.

Adequately covering the proposed area will require a three person crew operating the pontoon boat at least twice a week throughout the swimming season. The sustainability of this project will depend on increased staffing within the Waterways Restoration Team as well as future public participation.

F.4 Other Initiatives

Pilot Netting Facility

A pilot, in-line, floatables netting chamber was constructed as part of a sewer reconstruction project at CSO T4 Rising Sun Ave. E. of Tacony Creek. The construction of the chamber was completed in March of 1997 and the netting system continues to operate. The quantity of material collected is weighed with each net change.

The City has compared the floatables removed from the net with other floatables control technologies employed. More specifically, on an area weighted basis the inlet cleaning program data suggests that street surface litter dominates the volume of material that can enter the sewer system. The pilot in-line netting system installed at T4 has also been shown to capture debris on the same order as the WPCP influent screens indicating that effective floatables control needs to target street surface litter in order to effectively reduce the quantity of debris likely to cause aesthetic concerns in receiving streams.

The dates and amount of debris captured from this facility during the reporting period are available in **Appendix A**.

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 then become lodged in a tide gate thus causing inflow to occur. Additionally, these debris grills provide entry restriction, and some degree of floatables control. The list of the debris grills receiving preventative maintenance is available in **Appendix A**.

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Section G Pollution Prevention (NMC 7)

Most of the city ordinances related to this minimum control are housekeeping practices that help to prohibit litter and debris from actually being deposited on the streets and within the watershed area. These include litter ordinances, hazardous waste collection, illegal dumping policies and enforcement, bulk refuse disposal practices, and recycling programs. If these pollutant parameters eventually accumulate within the watershed, practices such as street sweeping and regular maintenance of catch basins can help to reduce the amount of pollutants entering the combined system and ultimately, the receiving water. Examples of these programs are ongoing and were presented in the NMC document. The City will continue to provide public information about the litter and stormwater inlets as part of its implementing this minimum control as well as continue to develop the following new programs.

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

The Philadelphia Water Department (PWD) began the development of an extensive CSO LTCPU Public Participation Program in Spring, 2007. The program consists of the production of educational materials on the LTCPU and outreach to the public through meetings, other events and our website. The below components of the Public Participation Program have been completed thus far.

1. Backgrounders– The eight page Backgrounders are designed for a general audience (the public) and serve to provide an introduction to the CSO LTCP, along with the history, background and approach taken by the City to address CSOs. The Backgrounders are distributed to our partners, the CSO LTCPU advisory committee and to the public at advisory committee meetings, public meetings, additional public events and through the CSO LTCPU website.

The Backgrounders developed thus far, include:

Backgrounder I: The CSO Long Term Control Plan – History & Background (**Appendix B**).

Backgrounder II: The CSO Long Term Control Plan Update – Clean Water Benefits & The Balanced Approach (**Appendix C**).

2. Bill Stuffers – The bill stuffers are newsletters inserted into the water bill of the estimated one-half million customers of the Philadelphia Water Department. The below bill stuffers have been developed under the CSO LTCPU Public Participation Program and have been distributed throughout the City at advisory committee meetings, public meetings, and other public events, in addition to the water bill.

Billstuffer I: The Combined Sewer Overflow Program: A Long Term Control Plan for Our Rivers & Clean Water, Green City: Long Term Control Plan Update (**Appendix D**).

Water Wheel I: CSO Public Notification Means You're in the Know (**Appendix E**).

Water Wheel II (in Water Quality Report): Green Cities, Clean Waters Program (**Appendix F**).

3. Fact Sheets – The fact sheets highlight projects designed and/or implemented by PWD to address CSO discharges. The fact sheets are distributed to our partners, the CSO LTCPU advisory committee and to the public at steering committee meetings, public meetings, additional public events and through the CSO LTCPU website.

The Fact Sheets distributed at LTCPU public meetings thus far, include (See **Appendix G** to view each complete fact sheet):

Factsheet: Main Relief

Factsheet: T14 - Tacony Creek Storage

Factsheet: WRT

Factsheet: RTC Center

Factsheet: Marshall Rd

Factsheet: Penn Alexander

Factsheet: Green Roof Cross-section

Factsheet: Venice Island Pumping Station with Green Roof

Brochure: Saylor Grove Wetland tour guide

Brochure: Floatable skimming vessel

Brochure: Homeowner's Stormwater Manual

4. Website – The website was created to provide the public with all updated CSO LTCPU –related information and materials, such as reports, maps, photographs, fact sheets, event dates and details, meeting minutes and background information. The URL is http://www.phillyriverinfo.org/CSOLTCPU/Welcome.aspx.

5. Advisory Committee: The Advisory Committee is comprised of City and state environmental experts, as well as leaders of local, regional and national environmental organizations. The committee guides the Public Participation Program, by providing input to the Public Participation Program Team on the communication strategies, public

information and products and materials developed to ensure successful public participation. The committee meets at least twice per year.

The most active committee members include the below representatives:

Howard Neukrug	Office of Watersheds - Philadelphia Water Department
David Burke	Pennsylvania Department of Environmental Protection
Joan Blaustein	Fairmount Park Commission
Christine Knapp	PennFuture
Robin Mann	Sierra Club
Sarah Robb Greco	Tookany/Tacony-Frankford Watershed Partnership
Sarah Thorp	Delaware River City Corp
Thu B. Tran	Community Legal Services
Sam Simpkin	Washington West Civic Association
Patrick Starr	Pennsylvania Environmental Council
Joe Syrnick	Schuylkill River Development Corporation

The committee meetings held thus far include:

Advisory Committee Meeting #1:
November 13, 2007, 10:00 a.m. – 12:00 p.m.
Fairmount Water Works Interpretive Center, Philadelphia

Advisory Committee Meeting #2:
February 20, 2008, 10:00 a.m. – 12: 00 p.m.
Fairmount Water Works Interpretive Center, Philadelphia

6. Public Meetings: Public meetings are held throughout the development of the LTCPU in order to keep the public apprised of the progress of the plan and to garner feedback on the plan. For the first public meeting, the event was held in three separate locations in Philadelphia in order to maximize the likelihood of attendance for the residents of the City. An Information Fair was also integrated into each meeting. The Information Fair included posters on CSO LTCPU-related projects, fact sheets and a rain barrel.

This first round of meetings took place on the following dates:

Public Meeting #1:
April 2, 2008, 5:45 p.m. -7:45 p.m., Port Richmond Library, Philadelphia

Public Meeting #2:
April 10, 2008, 6:00 p.m. – 8:00 p.m., Fels Community Center, Philadelphia

Public Meeting #3:
- April 24, 2008, 6:00 p.m. – 8:00 p.m., School of the Future, Philadelphia

7. Planning is underway for the "Green Cities, Clean Waters" Exhibit at the Fairmount Water Works Interpretive Center. The "Green Cities, Clean Waters" exhibit will open on September 23, 2008, at the Fairmount Water Works Interpretive Center. This one-of-a-kind exhibit includes two major components: The first component comprises of informational posters on the history of CSOs, on what homeowners can do to contribute to the reduction of CSOs, and on what the City and its partners are doing to reduce CSOs. The second component of the exhibit provides an artistic interpretation of the "Green Cities, Clean Waters" program by Bill Kelly, a local artist that focuses on the environment in his artwork.

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

G.2.1 Phillywatersheds.org / phillyriverinfo.org

OOW is in the process of developing a new website, www.phillywatersheds.org, that will replace the existing www.Phillyriverinfo.org and act as a hub for all of the related OOW and partnership websites. The website will feature updates from all of the sub departments of OOW, educational tools, public meeting records, maps, as well as all of the existing data and reports currently available on Phillyriverinfo.org. Phillyriverinfo.org functioned as the main website for OOW through 2007 and will continue to fill that role until the new website is ready.

One new aspect of the website that is being developed is interactive mapping. These maps are based off of the freely available Google Maps API. It allows for the dynamic loading of geographically referenced data that can be viewed with a user-friendly interface. Each group within OOW will have a base map featuring selected data representative of their focus, allowing for greater disbursement of information to the public.

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 that is retrieved from PWD's sewer monitoring network. The map is available 24 hours a day and displays the most up-to-date data available.

The first pilot section of the new website to launch was the Rain Barrel Workshop site. This site allows citizens to register for PWD's rain barrel workshops and to find out more information about rain barrels. It also features a map showing the locations of the all the rain barrels that have been given out through the workshop program. The site has been used successfully for 2 workshops so far and has received great feedback from the community.

G.2.2 Rivercast

Philly Rivercast (phillyrivercast.org) is an online forecast system that predicts Schuylkill River quality in the area upstream of Fairmount Dam in Philadelphia. Rivercast has received over 100,000 hits since its release in June 2005. Some administrative features have been added during the reporting period. PWD users are now able to manually over-ride the water quality rating in case of a major incident or spill that would not automatically be detected by the system. PWD users are also able to generate a historical record of Rivercast ratings and view the criteria that triggered the ratings. PWD staff check Rivercast daily to ensure the rating is displayed correctly. PWD staff also respond to questions from Rivercast users.

G.2.3 Schuylkill Action Network

The Schuylkill Action Network (SAN) website is being redesigned by a web consulting firm with input from PWD and the SAN Planning and Education and Outreach committees. The new website will include an internal component that allows for improved communication among SAN workgroup members and facilitate on-the-ground work. It will also include a public component that will convey SAN's message about protecting and improving the Schuylkill River to outside audiences. The new website is due to be completed by December 2008. The SAN website, together with phillyriverinfo.org, has taken the place of the Source Water Assessment Program websites in providing data and reports from the source water assessments for the Schuylkill River.

G.2.4 Early Warning System

The Early Warning System is a web and telephone system that facilitates communication among water suppliers and industrial intakes of spills and other incidents in the lower Delaware watershed. Enhancements during the reporting period included integrating the CodeRED mass notification system, significantly reducing the time required to notify users of incidents via phone. Over 1,000 voice files in the telephone menu tree were professionally recorded. Other enhancements included automated daily test of CodeRED system, streamlined telephone tree options, notification number removed from Login Page for security reasons, additional intakes added, reset password feature more secure with e-mail of new password to user, and new administrator tools for communication, usage tracking, and events management.

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

G.3.1 Billstuffers

Please refer to section "Continue to Develop and Share a Variety of Public Information Materials Concerning the CSO LTCP" for more information on the Billstuffers that have been distributed.

G.3.2 Waterwheel Watershed Newsletters

The Water Department's watershed newsletters are usually published on bi-annual basis and target specific information to the residents living within a particular watershed. In this manner, citizens can be kept informed of departmental water pollution control initiatives specific to the watershed they live in. Issues are sometimes published in the form of billstuffers and sometimes as a brochure (when combined with the annual drinking water quality report).

Please refer to section "Continue to Develop and Share a Variety of Public Information Materials Concerning the CSO LTCP" for more information on the Waterwheel Newsletters that have been distributed.

G.3.3 Additional PWD and Partner Sponsored Events

Southeastern Pennsylvania Coast Day & Fishing Event

Please refer to the Stormwater Management Annual Report section "PWD Public Education and Outreach" for information on the 6th Annual Southeastern Pennsylvania Coast Day Event.

2007 Philly FUN Fishing Fest

Please refer to the Stormwater Management Annual Report section "PWD Public Education and Outreach" for information on the 2007 and 2008 Philly FUN Fishing Fest.

"Clean Water Begins and Ends with You"

Please refer to the Stormwater Management Annual Report section "PWD Public Education and Outreach" for information on the 2008 "Clean Water Begins and Ends with You" drawing contest.

2007 Urban Watersheds Revitalization Conference

In the spring of 2007, PWD, along with its partners – Philadelphia University, American Water Resources Association, Villanova University, and Montgomery County Conservation District - hosted the 3rd annual Urban Watersheds Revitalization Conference. The event was held on May 3rd at Philadelphia University. The event was free of charge. The conference targeted the urban and suburban (or mostly developed) communities in southeastern Pennsylvania. The audience was diverse – comprised of local planners, activists and engineers, among others, with an attendance of approximately 130 participants. The theme was stormwater management. Panelists, such as local, state and federal representatives, discussed recent stormwater management regulations and requirements, while panelists from the design community and local municipalities responded to the regulators with the realities behind the implementation of such regulations and requirements. Specific topics discussed at the conference included the perceptions, realities and responses to the NPDES requirements, stormwater rate structure reallocation, flood control minimization, retrofit funding mechanisms and the other programs and initiatives that aim to demonstrate the environmental, economic and social benefits that arise from sustainable watershed management. The event also included a poster session. The posters represented the projects that were awarded through the Stormwater BMP Recognition Program. Furthermore, an awards ceremony for the Stormwater BMP Recognition Program participants took place after the panel discussion. For more information, visit: http://www.stormwaterbmp.org/conference.

2008 Urban Watersheds Revitalization Conference

Please refer to the Stormwater Management Annual Report section "PWD Public Education and Outreach" for information on the 2008 Urban Watersheds Revitalization Conference.

Activity Books & Watershed Maps

Please refer to the Stormwater Management Annual Report section "PWD Public Education and Outreach" for information on PWD's activity books and watershed maps.

Annual Earth Day Service Project

Please refer to the Stormwater Management Annual Report section "PWD Public Education and Outreach" for information on the annual Earth Day service project.

Clean Water Theatre

Please refer to the Stormwater Management Annual Report section "PWD Public Education and Outreach" for information on the Clean Water Theatre's "All Washed Up" program.

Philadelphia Flower Show – PWD Exhibit

2007 Philadelphia Flower Show – PWD Exhibit: March 4-11, 2007

PWD and the Partnership for the Delaware Estuary sponsored an exhibit at the Philadelphia Flower Show, where "Legends of Ireland" was the year's theme. The display, entitled "Soften the Urban Landscape, Improve Water Resources," featured solutions homeowners can use to prevent stormwater runoff pollution. Examples included a rain barrel, rain garden, infiltration trench and porous pavers. Over 200,000 people attend the Philadelphia Flower Show annually.

2008 Philadelphia Flower Show – PWD Exhibit: March 2-9, 2008

Please refer to the Stormwater Management Annual Report section “PWD Public Education and Outreach” for information on the 2008 Philadelphia Flower Show – PWD Exhibit.

Safe Boating Program

Please refer to the Stormwater Management Annual Report section “PWD Public Education and Outreach” for information on the safe boating program.

"Stormy Weather" Video

Please refer to the Stormwater Management Annual Report section “PWD Public Education and Outreach” for information on the “Stormy Weather” video.

Annual Water Quality Report

Every year the PWD publishes an annual drinking water quality report. This report is mailed to every resident in the city and contains a wealth of information regarding the source, safety, and contents of the City’s drinking water. This report is also available year-round on the City’s website www.phila.gov.

Watershed Tours

The City continues to conduct watershed tours in Philadelphia’s nine (9) watersheds (Tacony, Frankford, Poquessing, Pennypack, Wissahickon, Cobbs, Darby, Schuylkill, and Delaware) to further enhance the public’s understanding and appreciation of watershed issues. Tour guides describe the watershed concept, point out natural and manmade stormwater features and infrastructure, anthropogenic impacts on receiving water quality, benthic and ichthyfaunal assessments, and watershed protection practices.

Senior Citizen Corps (SEC)

The Water Department continues to work with the Senior Citizen Corps to address stormwater pollution problems and water quality monitoring programs for the Monoshone Creek, a tributary to the Wissahickon Creek and to the Tookany Creek. The SEC performs biomonitoring, collects water samples, and conducts physical assessments of the stream. The Water Department assists SEC efforts through the provision of municipal services, education about stormwater runoff and the department’s Defective Lateral Program, and mapping services such as GIS. The Corps has also partnered with PWD on its Saylor Grove Wetland Demonstration Project, assisting with public education and outreach, and providing tours to local students beginning fall 2006. The SEC, in partnership with Chestnut Hill College, also began water quality monitoring at the Saylor Grove Wetland in summer 2006.

Rain Barrel Workshops

The Philadelphia Water Department is providing rain barrels to residents of Philadelphia’s watersheds free of charge in order to promote the reduction of stormwater flows to our sewer system and creeks. This project consists of the implementation of rain barrels as a method of reduction of stormwater runoff on resident’s personal property. The primary goal of this project is to implement a property-level Best Management Practice (BMP) to aid in reducing the volume of stormwater reaching the receiving stream or to increase the length of time it takes the stormwater to reach the receiving stream.

At the workshop, residents are instructed how to install and properly use and maintain their rain barrel. They also learn about the environmental benefits of operating a rain barrel and how stormwater affects the sewer system and local waterways. After successfully completing the workshop, they receive their rain barrel. This program has been a huge success and there is great demand to continue and expand this program.

G.4 Continue to Support the Fairmount Water Works Interpretive Center

Please refer to the Stormwater Management Annual Report section "PWD Public Education and Outreach" for information on PWD's continued support of the Fairmount Water Works Interpretive Center.

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

As discussed in Section 7 of the above report, the Water Department had developed and will continue to develop a series of informational brochures and other materials about its CSO discharges and the potential affect on the receiving waters. The brochures provide phone contacts for additional information. Also, the opportunity to recruit citizen volunteers to check or adopt CSO outfalls in their watersheds (i.e., notifying the PWD of dry weather overflows, etc.) will be explored through the watershed partnership framework. Brochures and other educational materials discuss the detrimental affects of these overflows and request that the public report these incidences to the department. In addition, the Water Department has enlisted watershed organizations to assist it with this endeavor. PWD will continue with this focus to continue to raise the level of awareness in its citizens about the function of combined and stormwater outfalls through a variety of educational mediums. The watershed partnerships will also continue to be used for this type of education.

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 give the public information on the locations of CSOs, information on hazards, and potential public actions.

Please refer to NMC7 – "Continue to Provide Annual Information to City Residents about Programs via Traditional PWD Publications" for additional information on PWD's public notification.

Please refer to "Interpretive Signage" for information on the pilot CSO signage project.

Please refer to "Continue to Maintain Watershed Management and Source Water Protection Partnership Websites" for information on the OOW website development.

Please refer to "Continue to Maintain Watershed Management and Source Water Protection Partnership Websites" for information on the web and telephone based Early Warning System for water suppliers and industrial users.

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

The Philadelphia Water Department developed a unique, web-based water quality forecasting system for the Schuylkill River called RiverCast. Based on real-time turbidity, flow, and rainfall data, it provides up-to-the-hour public service information on the estimated current fecal coliform concentrations in the river and the acceptable types of recreation based on those conditions. The system is designed to maximize accuracy while avoiding recommendations that suggest water quality is better than it is likely to be (avoidance of false positives). The Philly RiverCast is a forecast of water quality that predicts potential levels of pathogens in the Schuylkill River between Flat Rock Dam and Fairmount Dam (i.e., between Manayunk and Boathouse Row).

In order to expand RiverCast, the PWD has developed another internet-based notification system called CSOcast, 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 up to a period of 24 hours following the rainfall event, it is unsafe to recreate in the water body due to possible pollutant contamination. The data on the website is updated daily.

Instead of using water quality parameters to forecast conditions, CSOcast relies on a network of flow sensors throughout the city to notify the public when overflows are occurring. This public notification system is based on PWD analysis of monitoring network data which is used to determine the likelihood of combined sewer overflows. The PWD has maintained an extensive permanent monitoring network since 1995 including level sensors which record data throughout the combined sewer system. PWD currently operates and maintains monitoring equipment at, or near, the 164 CSO outfalls throughout the city.

The Philadelphia Combined Sewer Overflow Public Notification System is a pilot program. The 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.

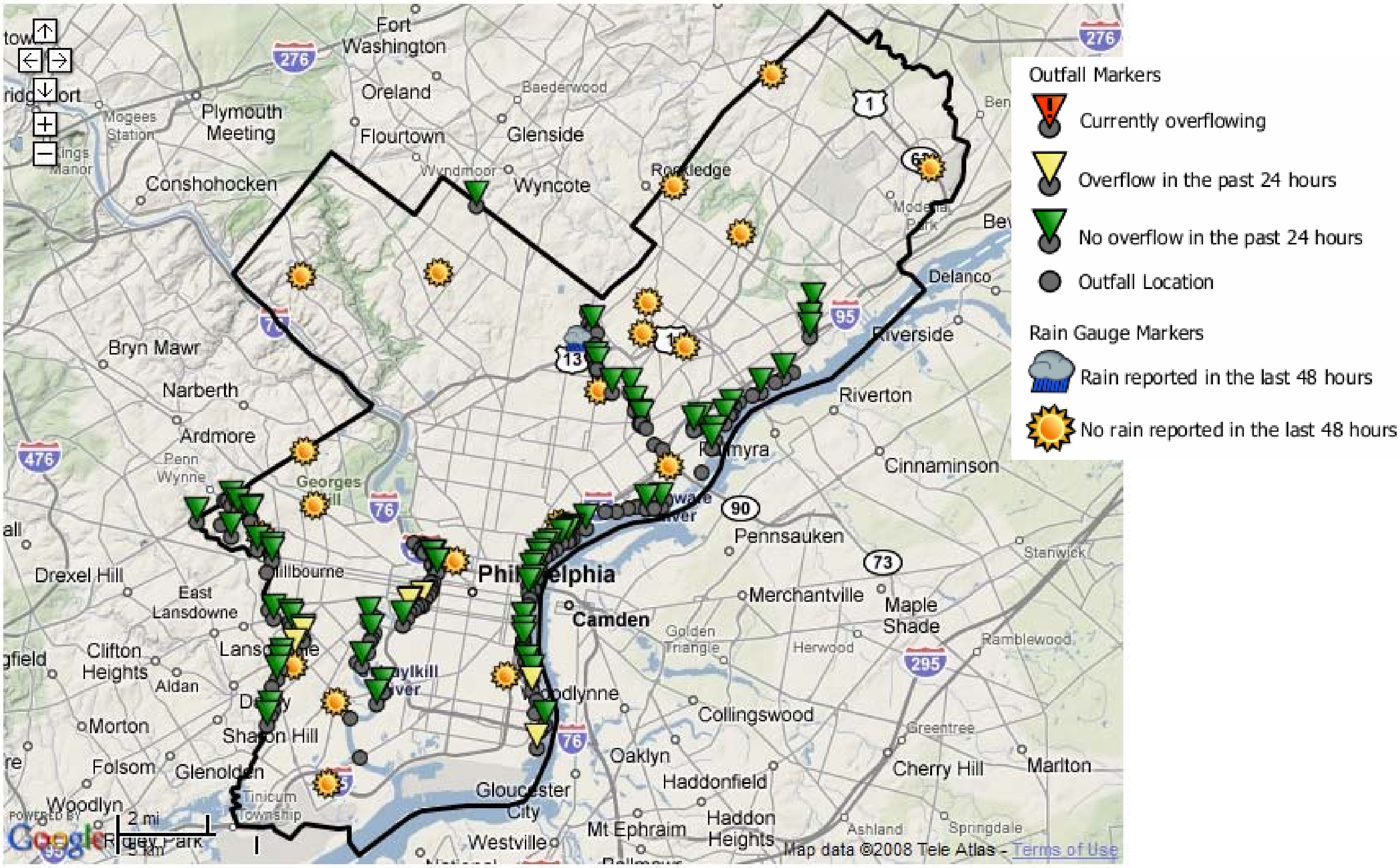

Figure II.H-2 Screen capture of the CSOcast website

The Green icon represents an outfall that has not overflowed in the last 24 hours. The Yellow icon represents an outfall that has overflowed in the last 24 hours but is not necessarily currently overflowing. The Red icon represents an outfall that is currently overflowing. The Gray icon represents an outfall where data is not currently available – for these sites, outfalls in close proximity can be referenced for an approximation of overflow status.

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

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

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

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III Implementation of the LTCP

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Section A CSO LTCP Update

PWD is updating its CSO Long Term Control Plan and capital improvement program to provide additional projects that reduce CSO frequency and volume while supporting PWD's larger watershed-based program to restore aquatic resources and improve urban quality of life. The Long Term Control Plan Update (LTCPU) will be submitted to PADEP by September 1, 2009. Work through June 2008 included analysis of source control, storage, treatment, and transmission alternatives sufficient to ensure compliance with EPA's 1994 National Combined Sewer Overflow Control Policy and the Clean Water Act. The evaluation of alternative control measures is following guidance provided in Chapter 3 of the Combined Sewer Overflows: Guidance for Long-Term Control Plan, Office of Water EPA 832-B-95-002, September, 1995 ("Guidance for LTCP") including the following:

a. Analysis of monitoring data and application of hydrologic and hydraulic computer models of the drainage area and collection system to assess the performance of the CSO control alternatives and results on water quality and living resources.

b. Assessment of a range of sizes of each alternative considered and an evaluation of the technical applicability and feasibility of the full range of alternatives and sizes to each CSO, or each logical grouping of CSOs, in the combined sewer system. Alternatives include projects that:

i. Link the City's development and land management practices to achieve CSO reductions through the application of innovative stormwater management regulations and low impact development and re-development practices.

ii. Directly restore aquatic ecosystems through stream rehabilitation and wetland construction.

iii. Expand its collection and treatment systems to increase the capture and treatment of combined sewage and ensure adequate transport capacity for dry and wet weather flows.

c. An assessment of the watershed wide reductions in pollutant loads achieved by the CSO controls and other controls as developed in the watershed management plans.

d. An evaluation of the costs and benefits for each alternative

e. Continued participation in watershed partnerships for evaluation and prioritization of measures to address problems caused by sources outside Philadelphia and sources other than CSOs.

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Section 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 water quality. PWD will continue to implement CSO capital improvement projects that were planned during the previous permit cycle and plan to develop, propose, and implement additional capital projects to continue to increase the capture and treatment of combined sewage.

B.1 On-going Capital Improvement Projects

B.1.1 Completion and Operation of the Real-time Control Center

The Real Time Control center construction is complete and the facility is currently in operation. Please refer to NMC2 – "Fully Integrate the Real-Time Control Facility into the Operations of PWD" for a description of the operations of this facility.

B.1.2 Rehabilitate and Maintain the Monitoring Network

PWD is constantly working to maintain and rehabilitate the monitoring network. Please refer to NMC2 – "Continue to Operate and Maintain a Network of Permanent and Temporary Flow Monitoring Equipment" for a description of this program.

B.1.3 WPCP Wet Weather Treatment Maximization (NE)

The plant stress-testing project established:

Maximum and average flows that should be treated in various unit processes for current and future operations;

Ranges of hydraulic, solids and BOD5 loads that could be applied to the various unit processes and yet obtain maximum removal efficiencies in each unit process;

Changes in plant processes and operations (such as increased loads, MLSS levels, changes in sludge wasting, return activated sludge (RAS) ratios, detention times, etc.) that would increase removal efficiencies; and

Magnitudes of excess capacity, if any, in each unit operation of the plant (increased flow through plant process units) that could be achieved and still meet the discharge permit requirements for each plant.

The results of stress testing allow for a determination of existing and future optimum flows, loads, and operations of the various unit processes. The identification of choke points, deficiencies and unit process capacities are provided in the stress testing summary report that has been developed for each WPCP. Specific WPCP Capital Improvement Projects (CIP) have been identified as potential projects resulting from the findings of the stress testing which were provided as part of the summary reports. The actual need for additional CIPs, and the resulting prioritization of the CIPs and the budgeting, appropriation of monies, scheduling and actual implementation of the CIPs was accomplished within the context of the overall watershed approach to CSO abatement defined in the LTCP.

CH2MHill submitted the Final Reports for each of the three WPCPs on May 1, 2001. The reports provided the following information: project objectives and methodology, current performance, maximum instantaneous flow, current sustainable treatment capacity and potential upgrades. The report also included hydraulic and treatment throughput capacities for each plant process, capacity limiting factors, and the potential operating modifications or capital projects whose purpose would be to increase plant throughput.

Recommended modifications or upgrades were prioritized and categorized into those potential projects that could be considered for either immediate implementation, resulting in enhanced treatment, or capital improvement projects that could also increase treatment capability but would require PWD expenditures. The various CIPs were also categorized by four treatment objectives including: process improvements, peak primary treatment capacity, peak secondary treatment capacity, and wet weather treatment capacity. This second categorization provided anticipated combined CIP costs for each of the treatment objectives as well as the peak treatment capacities.

Table III.B-1 Potential Upgrade Options at the NE Plant identified in the Stress Test

Option Number	Description	Priority Classification	Estimated Conceptual Cost
1	Improve mixing in mixed liquor channel to secondary clarifiers 9 through 16	A	$472,000
2	Polymer addition on Set 1 secondary clarifiers to maintain effluent quality	B	$22,000
3	Separate flow measurement of secondary effluent from sets 1 and 2	C	currently undetermined
4	Automation of step feed operation for aeration tanks	A/B	$161,000
5	Modify Set 2 secondary effluent channels to reduce hydraulic restrictions under high flow conditions	B/D	$223,000
6	Modify the existing RAS system in the secondary clarifiers	C	$2,183,000
7	Provide a second conduit to the Set 2 primary clarifiers to convey additional flow to Set 2 Primary tanks	D	$3,312,000
8	Reduce losses and increase capacity between the grit tanks and Set 1 clarifiers by installing another conduit and venturi meter	D	$707,000
9	Provide a bypass from the primary effluent channels to the chlorine contact chamber	D	$8,291,000
10	Provide separate primary sludge thickening	D	$12,254,000
11	Reuse abandoned ABCD tanks in wet weather treatment facility	C	$5.0 - 10.0 million
12	Increase raw sewage pumping and screening by:	D	-
12a	50 mgd	D	$10.0 - 20.0 million
12b	150 mgd	-	$20.0 - 24.0 million
12c	300 mgd	-	$36.0 - 40.0 million

B.1.3.1 Evaluate Stress Test Report options in the LTCPU

The goal of this task is to provide a forward-looking framework for the evaluation and selection of cost-effective wet-weather treatment technologies at the three existing WPCPs to support the development of a long-term wet-weather treatment strategy. The project is evaluating a range of wet-weather treatment options for each facility and providing an overall treatment strategy sufficient to support the PWD CSO LTCP Update process. The project is confined to examining treatment technologies that can be reasonably applied on the existing plant footprint and within reasonably obtainable land adjacent to the WPCPs. The project is providing baseline information that can be used for the future development of a long-term wet-weather treatment facility plan for the Northeast, Southeast, and Southwest WPCPs.

The objectives of the planning-level study are to:

1. Document existing conditions at the plants utilizing information in the existing stress test reports (dated 2001) and the NE Plant Expansion Study (March 2007) and noting capital and operational changes made to these facilitates subsequent to these reports.

2. Identify and review the range of technologies applicable to the treatment of wet-weather flows, up to the maximum limits imposed by available land

3. Perform a preliminary screening and recommend technologies for further evaluation across a full range of criteria

4. Short-list treatment options to carry forward for further evaluation

5. Conduct site visits, as appropriate, for technologies selected

6. Select preferred technologies and develop concept-level sizing and performance criteria along a range of incrementally higher flows

7. Prepare conceptual-level design, capital, and operating cost estimates

8. Integrate the wet-weather treatment plan into the overall LTCPU approach and plan

B.1.3.2 Implement Options 1, 2, and 4 from the Stress Test Report

Options 1, 2, and 4 from the Stress Test Report have been implemented.

Option 2 - Polymer addition on Set 1 secondary clarifiers to maintain effluent quality was completed in 2000 and has been in operation since that time.

Option 1 – Improve mixing in mixed liquor channel to secondary clarifiers 9 through 16 and Option 4 - Improve step feed modes during wet weather events by converting the manual gate operators to motor driven operators work was done under PWD Work #71033 – General construction for aeration system rehabilitation at northeast water pollution control plant and #71034 - Electrical work for aeration system rehabilitation at northeast water pollution control plant. The purpose of this project was to renew the secondary treatment system which includes new air grid system and diffusors, selector technology, and restoration of Set III final tanks. Course bubble diffusers were installed in both Final Sedimentation Tank - Set 2 mixed liquor channels. New motor gate operators were installed on the "A" and "C" bay inlet gates on the west side of the aeration tanks. The Mechanical work was done by C&T Associates, Inc. for a total cost of $9,483,859.31. The electrical work was done by Philips Bros. Elec. Contrs., Inc. for a total cost of $800,439.90. The Notice to Proceed for this project was issued in February 2003 and the construction was complete by January 2006.

B.1.3.3 Plan, Design, and Construct Options 5 & 7 of the Stress Test Report to Increase the Secondary Plant Capacity to 435 MGD

The Northeast WPCP Stress Test report, completed in 2000, included as upgrade option #5 the modification of Set 2 secondary effluent channels to reduce hydraulic restrictions under high flow conditions. This was to be accomplished through the modification or elimination of the "double decker" effluent channel in order to reduce head loss. After conducting an in-depth hydraulic analysis, including computation flow dynamic (CFD) modeling, the observed head loss was determined to be attributable instead to the bulkhead and the nonsymmetrical conduit base elevations. These observed restrictions can be removed through the rerouting of the return activated sludge (RAS) piping and the construction of a new effluent conduit. This solution will address the hydraulic restriction identified in the Stress Test report but is considerably more involved than the formerly expected solution. The rerouting of the RAS and the construction of a new effluent conduit is currently being designed and it is anticipated that the design will be complete by January of 2009 with construction between August and September of 2010.

Identified as upgrade option #7 (provide a second conduit to the Set 2 Primary clarifiers to convey additional flow to Set 2 Primary tanks) in the 2000 Northeast WPCP Stress Test, the purpose of this project was to increase the hydraulic throughput capacity of the Set 2 primary clarifiers by constructing a second conduit. This would be accomplished by installing a 60 inch prestressed concrete pipe from junction chamber C to the Set 2 primary influent channel, and by installing a weir box 54 ft long by 10 ft wide by 10 ft deep. After conducting a detailed hydraulic analysis it was determined that a single conduit would not fit into the existing hydraulic regime. Instead, four smaller 48" diameter conduits will be added which will more uniformly introduce flow to the clarifiers. This upgrade will be designed by December of 2008 and constructed by December of 2009.

B.1.3.4 Explore increasing the preliminary treatment primary treatment and final effluent disinfection treatment capacities in excess of the existing secondary treatment capacity at the WPCP

In order to increase primary treatment and final effluent disinfection treatment capacities, PWD will first significantly increase the flow into the plant by rehabbing an existing force main in the Frankford high-level sewer. A new pretreatment facility will also be designed and constructed to remove grit and screenings from the additional flow through Frankford high-level sewer. Following pretreatment, the increased flow into the plant will then enter the Set 2 clarifiers. Disinfection will be achieved in the bypass itself and in the chlorine contact chamber at the effluent of the plant. A detailed study, utilizing computation fluid dynamic (CFD) modeling, is currently being completed for the chlorine contact chamber and the final effluent pier. The force main rehab is currently in design and the design is due to be completed in November of 2008. Another consultant is under contract for the design and construction of the pretreatment facility. A conceptual design has already been submitted for this facility, including a site layout plan. Due to land area constraints, additional land will be need to be acquired for this facility. After the necessary land is acquired, the final design will be completed in 6 months, followed by construction within a year and a half. All of this work is being done in support of the above referenced "showing" which will occur by February of 2009.

B.1.3.5 Initiate the Facility Planning and Design for the By-pass Conduit

Identified as Option 9 in the 2000 NE WPCP Stress Test report, this upgrade will include the construction of bypass conduits connecting the Set 1 and Set 2 primary effluent channels directly to the chlorine contact chamber. This upgrade will enable the bypass of secondary treatment during high flow events will ensuring solids removal and disinfection. The conduits have been sited and are pending the construction of the pretreatment facility. These upgrades are anticipated to be complete by December of 2017.

B.1.3.6 Report to the DEP the Status of these Projects in the Annual Status Reports when Major Work Elements are Completed

Please refer also to section "Monitoring to Effectively Characterize CSO Impacts and the Efficacy of CSO Controls (NMC 9)" for information on annual status reporting.

B.1.4 85% Capture (NE)

B.1.4.1 85% Flow Capture Technical Report

The technical memo documenting 85% capture in the Pennypack was completed in August 2008 and submitted to the DEP on August 15, 2008. This technical memo documents the completed alterations to the CSO system and models the estimated capture using high, median, and low flow estimates. Based on the modeling results, the percent capture from the Pennypack CSOs is between 70% to 92% capture using the High and Low modeling estimates. The median estimate shows approximately an 85% CSO capture in the Pennypack. The report entitles "Pennypack 85 Percent Capture Technical Memo" is attached as **Appendix H**.

B.1.5 In-Line System Storage Projects (NE)

B.1.5.1 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. Currently, CSO outfall T-14, a very large sewer (21' by 24'), discharges into the Tacony Creek during periods of moderate to heavier rainfall. T-14 has a volume of approximately 10 million gallons and to use as much of this storage as possible, a control structure is needed in the sewer. Installation of a crest gate is proposed in order to retain flow within the sewer. This gate will reduce 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 still 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.

This project will reduce the discharge of combined sewage into Tacony Creek, one of the more-sensitive water bodies exposed to CSO discharges in the City of Philadelphia. The gate installation at T-14, combined with the Rock Run project, will result in a reduction of roughly 600MG of CSO discharges annually which correlates to a 12% reduction in the average annual volume of CSO and a significant reduction in the associated pollutants (bacteria and organic matter from untreated wastes, litter and other solid materials in both wastewater and stormwater runoff, etc.) discharged into Tacony Creek at this location, near Juniata Park and Tacony Creek Park, in an area where golfing and other recreational activities frequently occur. Since this project modifies an existing structure (the T14 Trunk Sewer) rather than constructing a new one, it provides control very cost-effectively.

The engineering firm of O'Brien & Gere completed the bid documents for this project in December of 2007. Projects Control advertised this project in July 2008. Bids will be received in August 2008. The Engineers estimate for this project is approximately $4.5 million.

B.1.5.2 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). Currently, CSOs discharge into the Tacony Creek at the Rock Run Relief Sewer outfall – an 11' by 14' sewer - during periods of moderate or greater rainfall. Installation of an inflatable dam in the Rock Run Relief Sewer allows for utilization of approximately 2.3 million gallons (MG) of in-system storage to retain combined flows during a majority of these 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 provides an additional margin of protection against dry weather overflows while still maintaining flood protection for upstream areas.

This project will reduce the discharge of combined sewage into Tacony Creek, one of the more-sensitive water bodies exposed to CSO discharges in the City of Philadelphia. An estimated average annual reduction in CSO volume of 190 MG/year, from 1040 to 850 MG/year, is achieved at the Rock Run Relief Sewer outfall through use of the available in-system storage volume. This represents a reduction of roughly 20% in the average annual volume of CSO and a significant reduction in the associated pollutants (bacteria and organic matter from untreated wastes, litter and other solid materials in both wastewater and stormwater runoff, etc.) discharged into Tacony Creek at this location, near Nedro Avenue and Hammond Street in Tacony Creek Park, an area where golfing and other recreational activities may occur. Since this project modifies an existing structure (the Rock Run Relief Sewer) rather than constructing a new one, it provides control very cost-effectively.

A design memorandum was completed that documents the expected environmental benefits of the Rock Run Relief Project, quantifies the flooding risks associated with the project, and documents the recommended control logic for the inflatable dam's operation and drain-down control. In support of this memorandum, 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 affects of the project at other CSO regulators on the Tacony Creek. Hatch Mott MacDonald was the design engineer on this project.

On June 13, 2006, the project construction bid was awarded to AP Construction in the amount of $3,665,000. Authorization to start work was held until to 12/13/2006. By the end of 2006, the contractor performed site clearing and some excavation work. As of July 2008, the control vault and most of the mechanical and electrical equipment required to operate the inflatable gate has been installed. The telephone and power wiring has been installed. PWD is still waiting on PECO to energize the line. All of the required piping, conduit and sewer connections have been installed. Provided there are no PECO delays in energizing the power line, the testing of the inflatable gate could be started by the end of August 2008. Most of the restoration work in the Park including the bike path paving, landscaping and culvert installation is complete.

B.1.6 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 the Real Time Control (RTC) and Flow Optimization for the Southwest Drainage (SW) which will be discussed further in this report.

B.1.7 WPCP Wet Weather Treatment Maximization (SW)

B.1.7.1 Implementation of the Southwest Plant Stress Test Report Option 1

The SW Stress Test identified 7 potential upgrade options at the Southwest WPCP.

Table III.B-2 Potential upgrade options at the SW Plant as identified in the Stress Test

Option Number	Description	Priority Classification	Estimated Conceptual Cost
1	Replace caulking on secondary clarifier launders to improve flow distribution	A	$1,640,000
2	Provide preliminary treatment for the BRC centrate that is recycled in the plant	B/C	$8,585,000
3	Modify existing RAS system in the secondary clarifiers	C	$4,256,000
4	Provide primary effluent bypass to secondary clarifiers	D	$902,000
5	Provide separate facilities for primary sludge thickening	D	$9,892,000
6	Resolve hydraulic limitations between primary clarifiers and aeration basin	D	$5,429,000
7	Provide and additional effluent pump at the effluent pumping station	D	$806,000

The purpose of this project was to implement Option 1 - to inspect and repair leaking weirs and concrete surfaces in the final sedimentation tanks at the Southwest Plant. The leaking through the weirs was causing short circuiting through the tanks and thus adversely impacting solids settling. This work was done under PWD Work #73018 – SW Concrete Repairs in Final Sedimentation Tanks. The contractor for the construction was Ross Araco Corp. The Notice to Proceed was issued in August of 2000 and the project was completed by April 2002. The total cost of the project was $1,640,980.

B.1.7.2 Analyze wet weather treatment capacity expansion as part of LTCPU

Wet weather Treatment capacity expansion at the Southwest Plant is also being analyzed as one of the options in the Long-term Control Plan Update. Please refer to "Evaluate Stress Test Report options in the LTCPU" for more information on the analysis of the Stress Test reports in the Long-term Control Plan.

B.1.8 Real Time Control (RTC) and Flow Optimization for the Southwest Drainage (SW)

A number of interrelated 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. Each of the high-level interceptor systems that discharge to the SWWPCP can influence the hydraulic capacity and treatment rate of the other high-level interceptor systems, as they compete for capacity in the Southwest Main Gravity (SWMG) into the plant. Therefore, several integrated projects were proposed together to establish a protocol for prioritizing flow from each interceptor system. The RTC system will control the Triple Barrel reach of the SWMG, and will control the diversion from the SWMG to the Lower Schuylkill West Side Interceptor (LSWS), thereby enabling use of the full capacities of these interconnected conduits during wet-weather.

The SWDD RTC conceptual design memorandum outlines recommendations for the modifications to the SWDD collection system in three phases. Phase I includes enlarging of the DWO pipe and raising the diversion dam at the C_17 regulator, modifying the operation of CSPS based on the level in the CCLL interceptor, and regulating inflows from S_27 to the SWMG using a DWO sluice gate under RTC. In addition, installation of a side-overflow weir at the West Barrel at the 70th & Dicks Triple Barrel and opening the East and Center Barrels open for dry weather flow is encompassed in Phase I of the RTC project. Phase II concentrates on decreasing overflows in the LSWS by enlarging the S_45 DWO pipe and regulating inflows using a gate. The strategy for Phase II also incorporates closing of DWO shutter gates at S_43 and S_47. The 3rd phase of the RTC conceptual design is enlargement of the S38 DWO pipe and regulating flows using a computer-controlled DWO gate.

<u>Phase I</u>

C17

The contract award for this project was $1.7 million. On 8/19/05, the gate on the 66 inch reinforced concrete DWO pipe was installed and functioning to specification. On 1/9/06, the old dam and 20 inch DWO pipe upstream of the new gate & dam were sealed and removed from service. The project was closed out on September 3, 2006.

Central Schuylkill Pump Station (CSPS)

Operation changes to the pump station will be evaluated after construction is complete on the 70th and Dicks Triple Barrel.

S27

This regulator is currently operating under local control. Future modifications will be evaluated after completion of the work done on S45.

70th and Dicks Triple Barrel (Projects # 75021 & 75022)

The design for the rehabilitation of the DWO sluice gate chamber was completed with the aid of the consulting engineering firm of Gannett Fleming, and was bid through Projects Control in April of 2006. The bid was awarded to JPC Group in the amount of $1,729,530.

The scope of work includes the following: The three sluice gates will be replaced with new sluice gates. The current gates are not motorized. Under this contract, each gate will get a new electric actuator and become motorized again. The gates will be controlled from the RTC at Flow Control, but there will also be a small electrical box installed so that the gates can be controlled locally from street level at 70th and Dicks. The box will be installed on the side lawn of 2700 South 70th St. There are also some other small items being done under this contract (i.e. new sump pumps to pump water out of the control chamber where the actuators are located, new seals and hatches to prevent sewer water from penetrating control chamber).

A construction Notice-to-Proceed was issued in October 2006. As of June 2008, the first sluice gate has been installed. Construction was delayed slightly due to dewatering issues.

Phase II

S45

The S-45 chamber at 67th Street regulates the flow of combined sewage into the LSWS interceptor. The proposed chamber modifications include the upsizing of the DWO pipe from 24 to 36 inches and the installation of a manual gate to control inflows into the LSWS interceptor. Design was complete by 2008 by the consultant engineering firm of Hatch Mott MacDonald. Bid documents were forwarded to Projects Control in January 2008. Projects Control advertised this project in June 2008. Bidding on this project will be open in July 2008. This project will be advertised and bid in conjunction with the T-14 gate project. The Engineer's estimate for construction is $610,000.

S43 & S47

Modifications to S43 and S47 will be evaluated after completion of the work done on S45.

Phase III

S38

After extensive hydrologic and hydraulic modeling, it was determined that modifications to S38 were unnecessary. The goal of maximizing flow to the SW Plant through the Lower Schuylkill West Side Interceptor can be achieved solely through modifications to the S45 regulating chamber.

B.1.9 RTC/Main Relief Sewer Storage (SW)

In the Combined Sewer Overflow (CSO) Long-term Control Plan submitted by the Philadelphia Water Department (PWD) to the Pennsylvania DEP in 1997, one of the listed capital projects was to implement a project in the Main Relief Sewer. In PWD's NPDES permit #0026671 issued in 2007, we were required to complete the construction and implementation of this in-line storage project, which is currently underway, by PID+12 months or 08/15/2008. The Main Relief sewer project has been constructed and is currently in operation.

The Main Relief Sewer provides flood relief to combined sewer areas in all three of PWD's drainage districts (Northeast, Southeast and Southwest). The Main Relief Sewer discharges to the Schuylkill River at Fairmount Park, a highly visible recreational area. Previously CSO was released into the river at the Main Relief Sewer outfalls during periods of moderate or greater rainfall. There exists within the single large (13.5′ by 13.5′ box) sewer above these outfalls a potential storage volume of approximately 4.0 million gallons (MG), and during all but the largest rainfalls most or all of this volume is available to store the overflow that otherwise discharges to the river. In order to use this storage, an inflatable dam was installed in the box sewer just above the Main Relief Sewer outfalls to the Schuylkill River. This dam will reduce CSO discharges to the Schuylkill River by utilizing the relief sewer's in-system storage. This control technology provides an additional margin of protection against dry weather overflows while still maintaining flood protection for upstream communities. The inflatable dam maintains the stored flow in the relief sewer and a new connecting sewer drains the stored flow to an existing, nearby interceptor. This project will reduce the discharge of combined sewer overflow (CSO) into the Schuylkill River through the use of the available in-system storage volume.

In November of 2003, the project was advertised and bid. The bid was awarded in mid-December to Ross Arrco for an amount of $1,029,919. The project construction was initiated on 9/16/2004 with the issuance of the Notice to Proceed. Field work began on 12/15/2004 and was substantially completed on 11/3/2005. Following a lengthy system start up/ tune-up period, the project was closed out at a final total cost of $1,068,031 on 5/10/2007. The dam did not become fully automated until the Dauphin Street job, which used a portion of the Main Relief Sewer as a bypass during construction, was completed in the fall of 2006.

The current operational set-points for the inflatable dam are; >7 ft the bag fully inflates; at 16 ft +- 0.25" the dam modulates to maintain 16 ft; at 24 ft the dam fully deflates in failsafe mode. All levels are measured from the invert of the trunk sewer approx 20 feet upstream of the centerline of the dam. The designed level of 20 feet dam modulation was never achieved without failure so the level was reduced to 16 feet, which is a more realistic capture level. This 16 feet is still much higher than any other Bridgestone installation. The failures at the 20 foot dam height included surges to well over the 24 ft failsafe before the bag would react, constant stretching of the rubber resulting in bolt loosening and allowing water into the bag, and dislodging of level sensors due to the violent turbulence.

In a typical year, the operation of the dam prevents about 31 to 22 million gallons (high and low estimates) of combined from overflowing to the Schuylkill River and facilitates capture of about 47 to 34 million gallons in the Southwest drainage district.

B.1.10 Eliminate CSO/Dobsons Run Project (SW)

Stokely & Roberts (R_ 22) - Dobson's Run Phase I

This project will eliminate two of the City's intercepting chambers and will completely eliminate CSO overflows at R_22, resulting in a 173-MG reduction of overflow volume on an average annual basis.

This project entails the reconstruction of the storm and sanitary sewer from Wissahickon Ave. to Roberts Ave. and elimination of the overflow chamber located at Stokely & Roberts (R_22). The contract was awarded to A.P. Construction and construction commenced on 7/18/1996. The construction, including the elimination of the R_22 chamber, was completed on 10/4/1998 at a total cost of $7,040,000. (The estimated construction cost was $ 5.8 million).

Kelly Drive (S_01T) - Dobson's Run Phase II & Phase III

Phase II of the Dobson's Run Reconstruction consists of the sewer reach from Henry Ave. to Kelly Drive and eliminates branch sewer contributions of sanitary sewage from reaching temporary CSO S_01T. Phase III will eliminate all CSO discharge from occurring at S_01T. In order to take advantage of economies of scale, design work for Phase II and III of Dobson's Run has been combined into one project because both phases involve tunneling.

The Design Engineer was CMX (former Schoor DePalma), Dawn Engineering. The project was bid on December 5th, 2006 with the low bidder being the joint venture of JPC/JAY DEE at the amount of $36.4 million. The contract was awarded in February 2007 for a bid price was $36.4 million, with a contingency that brings the limit of contract to $38.5 million.

Currently, the vertical tunnel shaft excavation at the upper end of the project (3500 Scotts Lane) has been ongoing. To increase productivity, the contractor requested to use drilling and blasting to advance the shaft excavation when he reached the hard rock strata. A successful test blast was conducted at the upper-end tunnel shaft on May 20th, 2008. The contractor has continued to drill and blast to advance the shaft excavation through the rock. The upper-end vertical tunnel shaft is expected to be complete by the first week of August, 2008. The contractor expects to complete the horizontal starter tunnel by the end of August. The tunnel boring machine (TBM) is scheduled to start arriving at the site the second week of August. It will take several weeks to ship the parts and several weeks to assemble the TBM on site. The upper-end (32nd St. ROW) tunnel launch is planned to start by the end of September, 2008.

As of July, 2008 the outfall work on the WS (river side) of Kelly Drive is substantially complete with the exception of the architectural work at the overlook. The construction of the Kelly Drive tunnel shaft is expected to start fall, 2008. The Kelly Drive tunnel launch is tentatively scheduled to start in February, 2009.

B.1.11 Eliminate CSO/Main and Shurs Off-Line Storage (SW)

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, R-20 into a storm sewer upstream of storm water outfall S-052-5. To abate the hydraulic overload conditions in the Main Interceptor Sewer, the PWD has proposed the construction of a three million gallon offline storage tank which will capture and store excess flows thereby eliminating surcharges and preventing overflow conditions at relief point R-20. The 3 million gallon concrete storage tank, head house building, and a performing arts center are to be 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. Placed back on top of the tank after construction will be several recreation areas, a new performing arts center, and a head house building to provide public space in the Manayunk region of Philadelphia.

Drawings, approximately 90% complete, were submitted for by H&S to PWD for review in May 2008. PWD reviewed the drawings and provided comments back. Specifications, approximately 90-95% complete, are anticipated to be submitted in August 2008 for the PWD's review.

Project construction initiation is dependent on many permits and approvals. The ACOE/PADEP Joint Permit was approved as of May 2008. The DRBC issued an approved docket in July 2008. The U.S. Coast Guard issued an approval letter in April 2008. As of July 2008, approvals on several of the permits are still outstanding, including the Final Stormwater Approval from the PWD, PADEP Stormwater approval which is contingent on PWD approval, PADEP Soil Erosion approval which is contingent on PWD approval, PADEP Joint Application awaiting the approvals of preceding items, the PADEP Water Quality Management Permit Part II Application, and the PADEP Submerged Lands License Agreement. In addition, the project must also receive approval from many city agencies. The Art Commission approval was granted in August 2007, the Streets Department has granted approval, the Planning Commission has granted approval, the approval from the Zoning Commission is still outstanding due to a need for a submerged lands license agreement from the DEP and the L&I Building permit is outstanding due to the need for the Zoning approval.

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

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

The PWD has begun implementation of a comprehensive asset and capacity management program. Please refer to the following sections for more information on our programs.

Please refer to NMC1 – "Implement a Comprehensive Geographic Information System (GIS) of the City sewer system".

Please refer to NMC1 – "Implement a Comprehensive Sewer Assessment Program (SAP).

Please refer to NMC2 – "Continue to Institutionalize a Comprehensive Monitoring and Modeling Program".

B.2.2 Inflow/Infiltration (I/I) Controls

Opportunities exist to reduce CSO impacts by means of reducing the entry of stormwater runoff, rainfall-derived I/I, and groundwater infiltration into the sewer system. Appropriate measures will be identified, evaluated, and implemented, where appropriate and cost-effective. There are four basic approaches to CSO control through I/I reduction:

1. Reduce the entry of stormwater runoff (including perennial stream baseflow) into the combined sewer system by diverting streamflow directly to a receiving stream.

2. Reduce the entry of groundwater infiltration to the combined sewers, interceptor sewers, and/or upstream separate sanitary sewers.

3. Reduce the entry of rainfall-derived I/I from upstream sanitary sewer systems.

4. Monitor and study the tidal inflows from river levels exceeding emergency overflow weir elevations at tide gates.

Each of the above methods enables CSO reduction by effectively increasing the capacity in the intercepting sewers and WPCPs available for the capture and treatment of combined wastewater.

Since I/I is relatively clean water that occupies conveyance and treatment capacity, eliminating it from the system frees up capacity for the relatively more concentrated combined wastewater. This reduces CSO discharges and enables greater pollutant capture throughout the combined sewer system. An additional benefit of reduced infiltration (and diversion of any perennial streamflow) is the reduction in the operating costs associated with continuously pumping and treating these flows.

Tide Inflow

The System Inventory and Characterization Report (SIAC) identified 88 CSOs influenced by the tides. Many of these sites have openings above the tide gate. During extreme high tides inflow into the trunk sewer can occur. During these events, significant quantities of additional flow can be conveyed to the treatment plant and thus reduce capacity for storm flow, as well as increasing treatment costs. A program was previously implemented to install tide gates, or other backflow prevention structures, at regulators having an emergency overflow weir above the tide gate. This program was completed in June of 1999 and protected all openings up to 1.5' City Datum and resulted in significant inflow reductions. We currently inspect and maintain the tide gates to ensure their continued performance. Please refer to "Tide Gate Inspection and Maintenance Program"

Sewer Assessment Program

The permittee has implemented a comprehensive sewer assessment program (SAP) to provide for continued inspection and maintenance of the collection system using closed circuit television. The SAP is one of the tools used to guide the capital improvement program to ensure that the existing sewer systems are adequately maintained, rehabilitated and reconstructed. Please refer to "Implement a Comprehensive Sewer Assessment Program (SAP)" for more information on this program.

City Wide GIS Mapping

The PWD utilizes the comprehensive Geographic Information System (GIS) of the City sewer system to target locations for inspection and potential maintenance where I/I may be a problem. Two such examples, are intake walls; locations where springs and creeks directly enter the sewer system, and creek crossings; locations where sewers travel directly under a waterbody.

Infrastructure Assessments

PWD actively conducts efforts to inventory and prioritize sewerage infrastructure by collecting spatial location data for all points that either hydraulically alter the flow of the creek, or, infrastructure points affected by the stream migration for both infiltration or exfiltration. These studies have identified over 300 points in the Cobbs Watershed (completed in 2002), 1000 points in the Tookany/Tacony-Frankford Watershed (2004), over 2000 points in Wissahickon Watershed (2005-2006), over 3000 points in Pennypack Watershed (2007-2008) and approximately 1200 points of infrastructure in the Poquessing Watershed (2008).

The data collected includes the spatial locations of all bridges, channelized portions, confluences, culverted portions, dams, manholes, outfalls, and pipes within the Watershed. In addition to spatial locations, and depending on the type of infrastructure point, the following information is also collected: Size, Material, Length and Height of Exposed Portion, Condition, Presence and Quality of Dry Weather Flow, Bank Location, Level of Submergence, Dimensions – Height, Width, Length (Channels and Culverts only), Digital Photos and Descriptions, and Additional Field Notes.

Corrective actions are taken when points of concern are identified.

Interceptor Relining

Planning and Design is underway for the relining of the entire length of interceptor within Philadelphia in the Tacony-Frankford Watershed. For planning purposes, the interceptor was split into 5 sections approximately 1.5 miles in length, with plans to reline one section per year. The relining will take place between 2008 and 2012. The total estimated cost of this project is estimated at $20,000,000.

In prioritizing segments for relining in the Tacony-Frankford, we considered other projects in the watershed that would run concurrently with the sewer relining. The first and second sections planned for relining in the Tacony-Frankford Watershed corresponds with stream restoration and in-system storage projects being completed in Tacony-Frankford. We are also trying to work in conjunction with Cheltenham Township with regards to them relining their sewers so the entire watershed gets completed.

Planning and Design is also underway for the relining of the entire length of interceptor within Philadelphia in the Darby-Cobbs Watershed. For planning purposes, the interceptor was split into 6 sections approximately 1.5 miles in length, with plans to reline one section per year. Two of these segments have already been relined, one in 1999 and the other in 2004 at a cost of $3,500,000. The remaining relining will take place between 2008 and 2011. The total estimated cost of this project is estimated at $11,500,000.

In prioritizing segments for relining in the Cobbs, we considered other projects in the watershed that would run concurrently with the sewer relining. The first segment planned for relining in the Darby-Cobbs Watershed corresponds with a stream restoration project planned for Darby-Cobbs. We are trying to work in conjunction with Delaware County with regards to them relining their sewers so the entire watershed gets completed.

Some of the projected benefits of this project are:

Decrease pollutant loads to surface waters by decreasing exfiltration

Decrease amount of flow in sewer system by decreasing Inflow/Infiltration (I/I)

Rehabilitation of sewers will increase the efficiency of the sewer system

Will help us to achieve Target A of the Watershed Management Plan – Dry Weather Water Quality and Aesthetics

Mill Creek Diversion Project

The PWD is working with the Philadelphia division of the United States Army Corp of Engineers (USACE) to conduct a feasibility study to keep stream flow from entering into the Mill Creek combined sewer. The proposed project is to divert and attenuate the stream flow generated in Montgomery County from the combined sewer by constructing an alternate channel to either the Schuylkill River via City Line Avenue or to the East Branch of Indian Creek. Diverting the flows from the combined sewer to the East Branch of Indian Creek will increase base flows in the Indian Creek, possibly improving habitat conditions and water quality, while decreasing the quantity of CSO discharge to the Schuylkill River during storm events.

B.2.3 Sewer Separation

Sewer separation is currently being studied and modeled as one of the options in the LTCPU.

No other sewer separation projects have been identified or implemented during the reporting period.

B.2.4 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 annual volume of CSO captured and treated.

Venice Island Storage Tank

Please refer to "Construction and Implementation of the Main and Shurs Off-line Storage Project" for information on the 3MG storage tank being constructed on Venice Island.

Tacony-Frankford Storage Feasibility Study

PWD is currently working with the Army Corp of Engineers on a feasibility study to identify options for reducing wet weather water pollution and peak flow volumes from the PWD's combined sewer system to the Tacony-Frankford Watershed in a cost-effective manner. Two of the options that this feasibility study is considering are off-line storage facilities. The first is a 60MG storage tank is what is currently known as "Logan Triangle", an area where sinking homes were demolished and still stands empty. This storage facility would reduce combined sewer discharges to the Tacony Creek by 600 million gallons per year from the largest combined sewer in the City of Philadelphia, eliminate the need for approximately $26 million in costs for bringing new fill to the site, and provide a stable environment for future redevelopment of the neighborhood.

The second tank option being considered is 13.5MG storage tank under "Old Frankford Creek". Currently there are four regulators with outfalls along Old Frankford Creek: F21, F23, F24 and F25. Collecting these outfalls in a storage tank beneath the creek would potentially reduce overflows from these outfalls by 600 MG per year.

A third, non-storage option, the dechannelization of the bottom of lower Frankford Creek is also being studied.

B.3 Watershed-Based Management

B.3.1 Continue to Apply the Watershed Management Planning Process and Produce and Update to the Watershed Implementation Plans

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. The City of Philadelphia has embraced a comprehensive watershed characterization, planning, and management program committed to address a multitude of overlapping regulatory requirements including EPA's Combined Sewer Overflow (CSO) Control Policy, Phase I and Phase II Stormwater Regulations, Storm Water Management PA Act 167, TMDL(s), PA Act 537 Sewage Facilities Planning and drinking water source protection programs. Coordination of these different programs has been greatly facilitated by PWD's creation of the Office of Watersheds (OOW). This organization is composed of staff from the PWD's planning and research, CSO, collector systems, laboratory services, and other key functional groups, allowing the organization to combine resources to realize the common goal of watershed protection. OOW is responsible for characterization and analysis of existing conditions in local watersheds to provide a basis for long-term watershed planning and management.

The City of Philadelphia has committed to developing an Integrated Watershed Management Plan (IWMP) for each of the 5 major waterways that drain to the City of Philadelphia, including the Cobbs, Tookany/Tacony-Frankford, Wissahickon, Pennypack and Poquessing as well as Implementation Plans (IPs) for the Schuylkill and Delaware Rivers.

PWD's IWMP planning process is based on a carefully developed approach to meet the challenges of watershed management in an urban setting. It is designed to meet the goals and objectives of numerous water resources related regulations and programs, and it utilizes adaptive management approaches to prescribe implementation recommendations. Its focus is on attaining priority environmental goals in a phased approach, making use of the consolidated goals of the numerous existing programs that directly or indirectly require watershed planning. They are designed to meet the goals and objectives of numerous water resource related regulations and programs and draw from the similarities contained in many watershed-based planning approaches authored by the Pennsylvania Department of Environmental Protection (PADEP) and the U.S. Environmental Protection Agency (USEPA). Further, watershed planning is mandated by the CSO Policy and guidance documents and also is consistent with the current Clean Water Act (CWA) and its regulations, as well as the priorities announced by EPA's Office of Water (See EPA's Watershed Approach Framework, Office of Water, June 1996).

Water bodies receiving CSO discharges in the PWD service area include the Cobbs/Darby Creeks, the Pennypack Creek, the Tacony/Frankford Creeks, the

Schuylkill River and the Delaware River. Although they do not have CSO discharges, the Wissahickon and Poquessing Creeks are important waterways within the PWD service area and PWD has committed to developing integrated watershed management planning approaches for each of these watersheds through the City's Stormwater Permit. There are 164 point sources of CSO discharge from the PWD sewer system to these waterways. Table III.B-3 below indicates the number of CSO point sources and the number of major separate stormwater outfalls on each waterway, as identified in the City's NPDES permits.

Table III.B-3 - CSO and Stormwater Point Source Discharges to Tributaries

Waterway	Number of CSO Point Sources	Number of Major Stormwater Outfalls
Delaware/Schuylkill Rivers (tidal)	94	30
Cobbs/Darby Creeks	34	3
Tacony/Frankford Creeks	31	35
Pennypack Creek	5	130
Schuylkill River (non-tidal)	0	32
Poquessing Creek	0	141
Wissahickon	0	63

Watershed planning includes various tasks ranging from monitoring and resources assessment to technology evaluation and public participation. PWD has established a Planning Approach for developing IWMPs that addresses requirements of each of the following programs including TMDL(s), Phase I and Phase II Stormwater Regulations, PA Act 537 Sewage Facilities Planning, Storm Water Management PA Act 167, EPA's Combined Sewer Overflow (CSO) Control Policy and drinking water source protection program. This IWMP development process is outlined below:

B.3.1.1 Establishment of Watershed Stakeholder Partnership

Stakeholder support is critical to the success of this type of regional planning initiative. A diversity of stakeholder perspectives must be involved with the development of each stage in the planning process in order to ensure that the plan is representative of stakeholder interests. This stakeholder buy-in is most critical to ensuring ultimate implementation of the plan. Recognizing this, PWD has helped to develop stakeholder watershed partnerships for each watershed where an IWMP is being initiated. At a minimum, a Watershed Partnership should be comprised of representatives from each of the following: federal, state, and local government agencies, industries, local businesses, nonprofit organizations and watershed residents, as well as any other interested stakeholders in the shed.

Table III.B-4 Watershed Partnerships and Status

Watershed Partnership	Status
Darby-Cobbs Watershed Partnership	Initiated in 1999; Public Education and Outreach Committee and Steering Committees convened on a quarterly basis
Tookany/Tacony-Frankford Watershed Partnership	Initiated in 2000; as of 2007 this partnership had evolved into an independent 501(c)3 nonprofit organization with a mission of implementing the Integrated Watershed Management Plan for the TTF Watershed
Pennypack Creek Watershed Partnership	Initiated in 2004 for the development of a River Conservation Plan; re-convened in 2008 for the development of an Integrated Watershed Management Plan
Wissahickon Creek Watershed Partnership	Initiated in 2005 for the development of an Integrated Watershed Management Plan
Poquessing Creek Watershed Partnership	Initiated in 2006 for the development of a River Conservation Plan; to be reconvened in 2009 for the development of an Integrated Watershed Management Plan
Delaware Direct Stakeholder Partnership	Initiated in 2007 for the development of a River Conservation Plan for the Delaware Direct drainage area of the City of Philadelphia
Schuylkill Action Network	Large-scale stakeholder initiative initiated in 2003; supported by PWD.

The Watershed Partnerships are designed to provide a forum for stakeholders to work together to develop strategies that embrace the dual focus of improving stream water quality and the quality of life within their communities. The Partnership is charged with driving the process and ensuring that the process remains representative of the diversity of stakeholder perspectives. The partnerships discuss priorities and the actions necessary to make the plan successful. These actions become a part of the implementation strategy, and address the desire to improve the water and land environment through a number of avenues. The ultimate goal is to cultivate a partnership committed to implementing the plan once completed.

B.3.1.1.1 Tookany/Tacony-Frankford Watershed Partnership

This Partnership has elected a Board of Directors and has received its tax-exempt status as the first multi-municipal Watershed Partnership in the region and this year hired its first Executive Director of the organization. The Executive Director began working for the organization in the spring of 2007. The mission of the Partnership is the implementation of the watershed management plan.

The Mission of the TTF Watershed Partnership is "To increase public understanding of the importance of a clean and healthy watershed; To instill a sense of appreciation and stewardship among residents for the natural environment; and to improve and enhance our parks, streams, and surrounding communities in the Tookany/Tacony-Frankford watershed."

Current members of Tookany-Tacony/Frankford Partnership:

Abington Township	Ogontz Avenue Revitalization Corporation
Awbury Arboretum	PA DEP
Cheltenham Township	PA Environmental Council
FPC, Env. Stewardship and Ed. Division	PA Horticultural Society
Frankford Group Ministry	Philadelphia Water Department
Friends of Tacony Creek Park	Rockledge Borough
Jenkintown Borough	Senior Environmental Corps.
Melrose Park Neighbors Association	US Environmental Protection Agency
Montgomery County Commissioners	US National Park Service
Montgomery County Conservation District	

This nonprofit organization has begun to organize itself into various working committees under the direction of the Board of Directors. Thus far, the committees consist of the Executive Committee and Planning and Performance. This organization has applied for several grants and funding programs over the past year, including the National Park Service's Community Planning Grant – which funds the development of a "Communications Plan" for the group. The Partnership also applied to the USEPA's Targeted Watershed Initiative Grant for project implementation funding.

The Education and Outreach Committee of the Tookany/Tacony Frankford Watershed Partnership developed the below programs and/or participated in the below events.

2007 Treasures of the TTF Watershed Bus Tour

2008 Treasures of the TTF Watershed Bus Tour; June 27, 2008

TTF Model Neighborhood Project

Communications Plan for TTF Model Neighborhood Project

Brochure on TTF Model Neighborhood Project

Stream Clean-Up at Wall Park; September 15, 2007

Stream Clean-Up at Wall Park; April 19, 2008

TTF Watershed Lessons taught at Taylor Elementary School (1/22/08) and Emlen Elementary School (3/12/08)

Rain Barrel Workshops (a total of 235 rain barrels were distributed)

November 15, 2007, Awbury Arboretum, One Awbury Rd., Philadelphia, PA 19138

December 13, 2007, Frankford Group Ministry, 4620 Griscom St., Philadelphia, PA 19124

April 16, 2008, Glenside-Weldon Elementary School, 423 N. Easton Road, Glenside, PA 19038

April 26, 2008, Cedarbrook Middle School, 300 Longfellow Rd., Wyncote, PA, 19095

Additional 2007-2008 Partnership activities include:

June 3: Hosted a table at Friends of HS Park's Arts in the Park event

June 15: Spoke at the Frankford Creek Greenway Master Plan Kickoff at Womrath Park

August 17: Hosted a table at Rep. Tony Payton's Senior Fair at New Frankford Community YMCA

August 29: Presented at the EarthForce educators training day in Cheltenham

September 15: Hosted Stream Clean-Up at Wall Park

September 15: Hosted a table at Glenside Street Fair

October 27: Hosted a table at the Cliveden Park Ribbon-Cutting

October 27: Hosted a table at the Awbury Halloween Festival

November 15: Held a rain Barrel workshop at Awbury Arboretum

December 3: Hosted a rain barrel workshop at the Frankford Group Ministry

December 20: Facilitated a Student Leadership Project--10 high school students removing invasive species from Awbury Pond

May 14, 2008: Facilitated clean-up and invasive removal by City Year volunteers at Tacony Creek Park with FPC staff member, Jackie Olsen.

B.3.1.1.2 Darby – Cobbs Watershed Partnership

In 1999, the Philadelphia Water Department initiated the Darby-Cobbs Watershed Partnership in an effort to connect residents, businesses, and government as neighbors and stewards of the watershed. Since then, the Partnership has been active in developing a vision for the watershed and guiding and supporting subsequent planning activities within the watershed. The Partnership functions as a consortium of proactive environmental groups, community groups, government agencies, businesses, residents and other stakeholders who have an interest in improving the Darby-Cobbs Watershed.

The mission of the Darby-Cobbs Watershed Partnership is to improve the environmental health and safe enjoyment of the Darby-Cobbs watershed by sharing resources through cooperation of the residents and other stakeholders in the watershed. The goals of the initiative are to protect, enhance, and restore the beneficial uses of the Darby-Cobbs waterways and riparian areas.

The Education and Outreach Committee of the Darby Cobbs Watershed Partnership met on the below dates and developed the below programs.

Meetings include:

February, 14, 2008, Upper Darby Township Welcome Center

March 20, 2008, Upper Darby Township Building

April 15, 2008, Cobbs Creek Community Environmental Education Center

April 10, 2008 Conference Call

Programs include:

Indian Creek Walk/Bus Tour – May 17, 2008

Upper Darby Rain Barrel Workshop – May 29, 2008

Christ Lutheran Church, 7240 Walnut Street, Upper Darby, PA 19082

Forty-five barrels were distributed

Darby Cobbs Watershed Unit Program (Science Teacher Partnership)

Resources produced in the past year include:

Membership services brochure: a brochure developed to illustrate the benefits of participation in the Darby-Cobbs Watershed Partnership. Highlighted workshops and resources that the partnership has provided to partners – especially calling out those that would assist municipal partners in meeting MS4 requirements

Darby-Cobbs Watershed Status Update: a public friendly publication intended to highlight some of the implementation projects initiated since the inception of the first 5-year Implementation plan for the watershed.

Both of these publications are available for download on PWD's Watershed Information Center at www.phillyriverinfo.org.

B.3.1.1.3 Pennypack Creek Watershed Partnership

The Pennypack Watershed covers 56 square miles and covers portions of 11 municipalities and the City of Philadelphia. The watershed is located within the lower Delaware River Basin and discharges into the Delaware River in the City of Philadelphia. PWD led an effort to develop a RCP for this watershed, which was completed in 2005.

PWD reconvened the Pennypack Watershed Partnership in December 2007 to begin the development of an IWMP for this watershed. The Pennypack Partnership has been convened twice in FY08, December 11th and May 21st. PWD will continue to convene the partnership over the coming years as an Integrated Watershed Management Plan for this watershed is developed.

The Pennypack Watersheds Partnership Education and Outreach Committee was convened in February, 2008. Below is a list of the meetings and events that have occurred, since it began.

Meetings/Events include:

January 26, 2008, Rain Barrel Workshop, Pennypack Environmental Center

February 6, 2008, Kick-Off Education & Outreach Committee Meeting, Pennypack Ecological Restoration Trust

March 27, 2008, Education & Outreach Committee Meeting, Pennypack Ecological Restoration Trust

May 2008, Backyard Buffer Presentation

B.3.1.1.4 Poquessing Creek Watershed Partnership

The final Poquessing Creek Watershed River Conservation Plan (RCP) was completed in July, 2007. The final RCP report was submitted to the Department of Conservation and Natural Resources in the winter of 2007 to be considered for the Pennsylvania Rivers Registry.

Prior to the completion of the report, a photo contest was held in the summer of 2006 to build awareness of the beauty of the Poquessing Watershed. The winning photographs from the contest were subsequently placed in the 2008 Poquessing RCP Calendar, which was developed by the RCP Team in the fall of 2007 as an additional outreach tool. The calendar includes the recommendations that resulted from the RCP, along with the Executive Summary of the Plan. It was distributed widely, to every RCP participant and partner in the watershed.

The following public meetings/events took place in the last phase of the RCP, in the spring of 2007:

1. RCP Public Meeting #2/ History of Watershed Presentation

    - April 5, 2007

    - Community College of Philadelphia, Philadelphia

2. RCP Public Meeting #3/Land Management Workshop

    - April 25, 2007

    - Community College of Philadelphia, Philadelphia

3. RCP Public Meeting #4/Native Plants Workshop & Rain Barrel Workshop

    - May 5, 2007

    - Academy Ave. & Torrey Road, Philadelphia

The following steering committee meetings took place in the last phase of the RCP:

1. Steering Committee Meeting #7

    - February 7, 2007

    - Glen Ford Mansion, Philadelphia

2. Steering Committee Meeting #8

    - July 10, 2007

    - Glen Ford Mansion, Philadelphia

A Backyard Buffer presentation was also presented to the Friends of Poquessing on June 5, 2008 at the Community College of Philadelphia.

B.3.1.1.5 Delaware River Direct Watershed River Conservation Plan Steering Committee (Partnership)

In the spring of 2007, the consultants (Cahill Associates and Pennsylvania Horticultural Society) were hired by Philadelphia Water Department to lead the Delaware Direct RCP. By the end of June, 2007, the RCP Team (PWD and consultants) determined that a unique RCP strategy would be desirable for this watershed due to the number of planning efforts currently in place and the complexity of issues in and along Philadelphia's waterfront. As a result, the RCP Team modified the scope of the RCP in order for it to include an emphasis on the implementation of the Philadelphia GreenPlan recommendations. The first phase of this project (data collection and public participation) commenced in the fall of 2007.

The following meetings and events have taken place in the first phase of the Delaware Direct Watershed River Conservation Plan:

1. Steering Committee Meeting #1

- November 15, 2007

- Pennsylvania Horticultural Society

2. Steering Committee Meeting #2

- February 20, 2008

- Pennsylvania Horticultural Society

3. Focus Group/Workshop #1: Ecology and Riverfront Design –

Case Study Pulaski Park

- April 30, 2008

- Pennsylvania Horticultural Society

4. Focus Group/Workshop #2: The Built Environment –

Advanced Parking Lot Design

- June 4, 2008

- Independent Seaport Museum

5. Focus Group/Workshop #3: Mobility and Connections

- July 31, 2008

- Penn Treaty Park

6. Rain Barrel Workshop

- May 13, 2008

- St. Michael's Church, Northern Liberties

- 49 rain barrels were distributed

B.3.1.1.6 Wissahickon Creek Watershed Partnership

The Wissahickon Watershed Partnership was convened in 2005 for the purposes of guiding the development of a watershed-wide Integrated Watershed Management Plan. Over the past 3 years it has been determined that due to the complexity of regulatory obligations facing this drainage area, PWD would move forward with developing a watershed plan for the portion of the drainage area within its' jurisdiction while the upstream portion of the watershed concludes a number of ongoing initiatives. PWD will continue to convene the Wissahickon Watershed Partnership over the coming years in hopes that the upstream portion of the watershed will come together to formulate a complimentary implantation approach in order to realize a watershed-wide restoration vision.

The Wissahickon Watershed Partnership is convened on a quarterly basis.

Wissahickon Watershed Partnership Meeting Attendees:

Abington Township	PA Department of Environmental Protection
Ambler Wastewater Treatment Plant	PA Environmental Council
Clean Water Action	Philadelphia University
Fairmount Park Commission	Philadelphia Water Department
Friends of the Wissahickon	Schuylkill Center for Environmental Education
F X Browne, Inc.	Schuylkill Riverkeeper
Lansdale Borough	Senior Environmental Corps, Center in the Park
Lower Gwynedd Township	Temple University, Center for Sustainable Communities
McNeil CSP	Upper Dublin Township
Merck, Inc.	Upper Gwynedd Township
Montgomery County Conservation District	US Environmental Protection Agency
Montgomery County Planning Commission	Whitemarsh Township
Morris Arboretum	Whitpain Township
North Wales Borough	Wissahickon Restoration Volunteers
North Wales Water Authority	Wissahickon Valley Watershed Association

The Wissahickon Partnership was convened a number of times over the past year as this group continues to drive the development of the IWMP for this watershed area.

The Education and Outreach Committee of the Wissahickon Watershed Partnership continues to meet and develop materials and programs.

Since July, 2008, the Education & Outreach Committee has met on the below dates:

- January 16, 2007, Morris Arboretum

- February 28, 2007, Morris Arboretum

- June 6, 2007, Morris Arboretum

- August 22, 2007, Morris Arboretum

- March 19, 2008, Morris Arboretum

- April 24, 2008, Morris Arboretum

The Committee also developed the below products and organized the following events:

Wissahickon Watershed Stormwater Best Management Practices (BMP) Bus Tour

Wonders of the Wissahickon Watershed Brochure

Wonders of the Wissahickon Watershed Brochure Celebration

Municipal Yard Make-Over Contest (Rain Garden Program), leading to the design and implementation of three rain gardens in the Wissahickon Watershed

Municipal Rain Garden Workshop (with accompanying PowerPoint)

Homeowners' Rain Garden Workshop

Pennsylvania Rain Garden Brochure

Stormwater Basin-Retrofit Program

Stormwater Bain Retrofit Workshop

Rain Barrel Workshops

Wissahickon Creek Detention Basin Inventory and Retrofit Program

PWD developed a replicable approach for generating an inventory of existing stormwater management facilities within a watershed and then prioritizing the facilities for retrofit with structural and nonstructural stormwater best management practices aimed at enhancing groundwater recharge and water quality treatment of stormwater runoff and implemented it in the Wissahickon Creek Watershed. The study area for this initiative was limited to the sub-watershed drainage areas of the tributary streams flowing to the Wissahickon Creek, specifically excluding basins draining to the mainstem. The study focused on first and second order stream locations where implementation benefits could be maximized. (Funding for this study was provided by a US EPA 104b3 grant administered by PA DEP.)

The initiative involved development of a process in which a desktop analysis of Geographic Information Systems (GIS) data layers was utilized to identify a preliminary set of basins and a field assessment protocol was developed to visit each basin to collect information relevant to retrofit priority. Data collected about each basin was fed into an evaluative matrix program where fifteen weighted criteria were applied to each basin to prioritize the 153 basins in the inventory for retrofit. A ranked output was produced at both the watershed-wide as well as the individual municipal level; basins were ranked with high, medium and lower priority for retrofit. Information about three types of basin retrofits and benefits associated with each type for a given basin size. It will be up to the implementers of each basin retrofit to evaluate the appropriate measures for implementation in a basin given the existing conditions of the basin.

For more information on this initiative, a copy of the final report and all appendices as well as downloadable GIS data, please visit www.watershedscience.info/basininventory

Wissahickon Detention Basin Retrofit and Technical Assistance Program

PWD funded a Technical Assistance Program to follow up on the recently completed *Inventory of Existing Stormwater Management Facilities with Retrofit Potential within the Wissahickon Creek* designed to assist watershed stakeholders (specifically municipalities) in making use of the information in moving toward implementation of basin retrofits. The Basin Inventory initiative concluded by stating that all basins considered for retrofit would require a detailed, site-specific feasibility study and engineering design in order to proceed and that existing conditions such as flooding, groundwater contamination, karst geology, proximity to drinking water intakes, groundwater wells, and many other factors must be considered in order to deem the basin appropriate for retrofit implementation. This program was intended to provide stakeholders with the tools necessary to perform such site specific feasibility studies.

Technical assistance is provided to partners in the form of site visits, conceptual and final project designs, workshops, and a brochure. Three or four municipally-owned facilities will be guided through the site assessment and design process to prepare for retrofit implementation. This Technical Assistance Program was initiated in the spring of 2008 and came to a close on June 30th, 2008. At the close of this initiative, the Pennsylvania Environmental Council secured additional funds to continue this program in the coming year and actually construct 2-3 retrofits within the Wissahickon Creek Watershed.

Upper Wissahickon Critical Area Resource Plan/Special Area Management Plan Pilot Project

A Critical Areas Resource Plan (CARP) Pilot is being developed for the Upper Wissahickon Watershed in Montgomery County to demonstrate the critical area planning process established under Act 220 of 2002—The Pennsylvania Water Resources Planning Act—and the special area management plan process recommended through the Pennsylvania Coastal Zone Management Program. The plan's focus was on water supply but also pulled together many of the different water resource activities currently being pursued in the watershed. Though the study area for this initiative only included the Upper Wissahickon (which covered the headwaters through just below the confluence with the Sandy Run Creek tributary)

PWD supported the development of this plan. PWD provided technical data to the planning team and provided staff resources to attend multiple planning meetings and for draft plan review.

B.3.1.2 Assessment of Current Watershed Status; Identification of Problems

PWD implements a detailed monitoring program in each planning shed that includes chemical, biological and physical assessments to characterize the current state of the watershed and identify existing problems and their sources.

Data Collection, Organization and Analysis

Development of the CCR includes the collection and organization of existing data on surface water hydrology and quality, wastewater collection and treatment, stormwater control, land use, stream habitat and biological conditions, and historic and cultural resources in order to gain an understanding of existing data, which will serve as a historic reference data set for comparison against newly collected information. Additionally, existing ordinances, regulations, and guidelines pertaining to watershed management at federal, state, basin commission, county, and municipal levels are examined for coherence and completeness in facilitating the achievement of watershed planning goals. (Data are collected from various agencies and organizations in a variety of forms, ranging from reports to databases and Geographic Information System (GIS) files.)

This data is then supplemented by PWD's extensive physical, chemical and biological monitoring program, which is initiated for roughly one year in each watershed. A compendium document is produced following the analysis of all collected data; this document titled the Comprehensive Characterization Report (CCR) is shared with watershed partners for comments and feedback. These CCR documents are available on the partnership website at www.phillyriverinfo.org. The CCR assessment serves to document the watershed baseline prior to implementation of any plan recommendations, allowing for the measure of progress as implementation takes place upon completion of the plan. The CCR status of each watershed is:

Darby-Cobbs	Completed 2004
Tookany/Tacony-Frankford	Completed 2005
Wissahickon	Completed 2007
Pennypack	In production
Poquessing	In production

B.3.1.3 Watershed Planning Process

B.3.1.3.1 Development of Plan Goals, Objective, Indicators and Options

PWD's watershed-wide goal setting process begins with the development of a "base set" of goals for the watershed – incorporating all available goal related statements captured within existing plans and reports. This base set of goals is then presented to the stakeholder group for evaluation. A facilitated discussion is held during which the partners are invited to add to this list of goals and finally to adopt this master list as the initial goal set for the watershed area.

Often times, this stakeholder insight may reveal "information gaps" not addressed by problem analysis that requires additional data collection. Ultimately, with stakeholder collaboration, a final list of goals is established that should reflect the multitude of stakeholder interests in the watershed.

The following example clarifies the difference between a goal and an objective for the purposes of the PWD Watershed Planning process:

Goal: These are to be general and not specifically measurable. Goals represent a series of "wishes" for the watershed. (e.g. Improve water quality)

Objective: Objectives translate the goal statements into measurable parameters. The objective should lead toward the establishment of a target value and could help to establish a trend over time. There can be multiple objectives for a single goal. (e.g. Meet state numeric criteria for bacteria in dry weather.)

Based on the preceding descriptions, each of the stakeholder goals is further evaluated and translated into objectives so that progress would be measurable as management options are implemented in the future.

Management Option: A management option is a technique, measure, or structural control that addresses one or more objectives (e.g., a stormwater best management practice (BMP) that is installed, an ordinance that gets passed, or an educational program that gets implemented).

Each objective is then evaluated for the identification of potential management options that could be implemented to achieve measurable progress toward the goal. This evaluative process results in a comprehensive list of potential options that will need to be individually evaluated for feasibility under the conditions of a given watershed area.

Indicator: Indicators can be used to characterize the current condition of a watershed area and can be used to measure progress toward achieving goals as management options are implemented. (e.g. Percentage of samples meeting state criteria for bacteria)

A list of indicator measures is developed to address each of the objectives so that as management options are implemented, progress can be measured toward attainment of the watershed goal.

B.3.1.3.2 Screening of Management Options

Clear, measurable objectives provide guidance for developing options designed to meet the watershed goals. Lists of management options are developed to meet each of the goals and objectives established for the watershed and once evaluated, only those options deemed feasible and practical are considered in the final list of management options. Options were developed and evaluated in three steps:

1. Development of a Comprehensive Options List. Virtually all options applicable in the urban environment are collected. These options are identified from a variety of sources, including other watershed plans, demonstration programs, regulatory programs, literature, and professional experience.

2. Initial Screening. Some options can be eliminated as impractical for reasons of cost, space required, or other considerations. Options that already planned and/or committed to, are mandated by another program, or are agreed upon as vital are chosen for inclusion in the final list as not needing further evaluation. The remaining options are screened for applicability to the watershed as well as for their relative cost and the degree to which they meet the project objectives. Only the most cost-effective options are considered further.

3. Detailed Evaluation of Structural Options. Structural best management practices for stormwater management are subjected to a modeling analysis as necessary to assess effects on runoff volume, peak stream velocity, and pollutant loads at various levels of coverage.

B.3.1.3.3 Water Quality Goal Setting Update

Planning goals were established for the Darby-Cobbs and Tookany/Tacony-Frankford Watershed Partnerships as a part of the IWMP development process. These goals are now a formal part of the IWMPs adopted by the stakeholders as representative of their long-range wishes for the watersheds. To view these goal sets, please go to **www.phillyriverinfo.org** and look at the Goals section of each of these completed IWMPs.

B.3.1.3.4 Wissahickon Creek Watershed

As documented in the FY07 Stormwater Annual Report, a watershed-wide list of stakeholder goals has been established by the Wissahickon Watershed Partnership. This list consisted of 23 stakeholder goals for the Wissahickon Creek Watershed.

After the completion of the watershed-wide goal setting process PWD evaluated how to move forward with their planning process while the upstream portion of the watershed continued to gather data and complete a number of ongoing initiatives. PWD determined that in order to meet their own obligations and commitments that they must continue the planning process for the City of Philadelphia portion of the watershed and select from the "master list" of watershed-wide goals those which were specifically relevant to the City.

The 23 goals established through the watershed-wide goal setting process were individually evaluated by PWD against the problems identified by the WCWCCR and examined for applicability to the City of Philadelphia portion of the watershed. PWD determined that 12 of these goals were clearly applicable to the City. PWD developed a number of measurable objectives for each of them.

PWD will be developing an IWMP document for the City of Philadelphia portion of the Wissahickon Creek Watershed over the fall/winter 2008 and will share this plan with the Wissahickon Watershed Partnership as a model for developing a complimentary initiative in the upstream portion of the watershed.

Table III.B-4 Proposed Goals and Objectives for the City of Philadelphia portion of the WCWCCR

Protect drinking water quality (both surface and groundwater) 1. Continue to meet the requirements of the LT2ESWTR regulations
Protect drinking water taste and odor 1. Limit Geosmin concentrations to <10ng/L throughout April and May
Improve and maintain baseflow through increased infiltration to support water quality and aquatic community health. 1. Maintain average annual dry weather flow, excluding treated wastewater effluent, at a minimum average annual flow of 59 cfs at the mouth. 2. Reduce amount of Directly Connected Impervious Cover (DCIA) by 1%.
Increase preparedness for natural hazards, spills, discharges and terrorism 1. Obtain agreements from the 5 WWTPs and industrial users sign up as users or the Early Warning System emergency reporting phone number 2. Increase the amount of continuous water quality data collected from the Wissahickon Creek (Reactivation of Ft. Washington USGS gauge station) 3. Utilize fish biomonitoring station to assess water quality
Increase communications within the watershed 1. Create a Wissahickon Creek "event notification system" for the public
Improve aquatic habitat 1. Restore 7 miles of stream channel and habitat such that habitat scores are X% comparable to reference conditions.
Restore aquatic ecosystem health 1. Increase benthic quality index to 80% of reference reaches. 2. Increase IBI to 40 averaged at all sampling sites.
Improve awareness of watershed issues at a local level (municipalities and stakeholders) 1. Convene a watershed partnership stakeholder forum 2. Establish a partnership website to serve as an information resource
Make stormwater/watershed related educational opportunities available to every stakeholder in the watershed 1. Educate residents about benefits of rain barrel installation; have 10% of watershed resident install rain barrels on their homes. 2. Develop and implement at least 3 stormwater management/watershed issues related workshops within each 5 year implementation planning timeline
Improve and protect surface water quality 1. Meet state numeric criteria for bacteria in dry weather. 2. Meet State Water Quality Standards for dissolved oxygen 3. Meet state criteria for pH at all sites and times. 4. Remove Wissahickon Creek from the state list of impaired waters.
Eliminate untreated sewage discharges to Wissahickon Creek 1. Eliminate cross-connections of sanitary to storm sewers. 2. Eliminate sanitary sewer discharges to the stream in dry weather.
Reduce channel erosion and sediment loads caused by runoff 1. Reduce the annual sediment load from overland flow by 10%. 2. Reduce the annual sediment load from channel erosion by 75%

B.3.1.3.5 Pennypack Creek Watershed

In the spring of 2008, PWD initiated a watershed-wide stakeholder goal setting process for the Pennypack Creek Watershed as a part of the IWMP development process. For the purposes of this exercise, the term "goal" was used to define a broad set of "wishes" and "aspirations" for the watershed. The purpose was to derive a comprehensive watershed-wide "wish list" of goals for the watershed. These goals are not intended to be specifically measurable at this time. Upon completion of the watershed-wide goal setting process, the planning team will evaluate and translate each of them into measurable "objectives" so that progress would be assessable as management options are implemented in the future. Utilizing the input from the Pennypack Watershed Partnership, this goal setting process was designed to be inclusive of a multitude of stakeholder perspectives.

PWD staff prepared for the goal setting process by reviewing existing watershed plans and reports. Since the Pennypack Creek River Conservation Plan was recently completed (2005) and that planning initiative included a stakeholder goal setting process, the RCP goals were deemed an appropriate starting point from which stakeholders could begin evaluating for completeness. These goals along with others culled from additional existing sources such as the Pennypack Greenway Partnership's Strategic Planning process and the Pennypack stakeholder "Key Person Interviews" were synthesized into a list of broad goals and measurable objectives and shared with the watershed stakeholders for evaluation.

A diversely representative group consisting of roughly 27 stakeholders actively participated in the goal setting process. Of these, 7 participants represented municipalities within the drainage area, 2 represented nonprofit organizations, 2 represented the PADEP, 5 represented Bucks and Montgomery County agencies, 1 attended on behalf of a Pennsylvania State legislator's office, 1 represented a golf course, 2 represented local parks and 5 represented City of Philadelphia agencies. This stakeholder assemblage is currently evaluating a final "wish list" consisting of 8 broad goals for the Pennypack Creek Watershed.

Table III.B-5 Draft Pennypack Watershed Stakeholders Goals and Objectives

Habitat and Ecological Protection/Restoration • Improve Stream Habitat and Restore Aquatic Communities • Restore Ecological Integrity • Protection and enhancement of high quality sites
Stormwater Management • Improve In-stream Flow Conditions • Stormwater management planning
Improvement of Water Quality • Improve Water Quality and Reduce Pollutant Loads
Erosion Reduction • Improve and Protect Stream Corridors
Flooding • Mitigate Flooding
Open Space Preservation, Recreation and Cultural Opportunities • Enhance and Improve Recreational Opportunities • Permanently preserve land to ensure a protected greenway • Preserve cultural and historic resources • Build a Trial • Enhancement of tributary streams and mainstem of Pennypack Creek
Quality of Life • Enhance Quality of life for Watershed Residents
Stakeholders Involvement • Improve Stewardship, Communication and Coordination among Watershed Stakeholders and Residents • Increase understanding of, affinity for and commitment to natural systems

In the fall of 2008 the Pennypack Watershed Partnership will be reconvened to finalize and approve this list of proposed goals and adopt them as representative of stakeholder goals for the watershed. These goals will be reevaluated in the winter of 2008/2009 upon review of the PCWCCR by the watershed stakeholders. At that time goals will be prioritized and measurable objectives can be defined for each approved goal.

B.3.1.3.6 Poquessing Creek Watershed

A Poquessing Creek Watershed Partnership will be convened on the winter of 2008/2009; at that time a preliminary set of stakeholder goals will be developed.

B.3.1.4 Implementation Planning - Development of Target Approach for Meeting Goals and Objectives

Through PWD's experience in working with stakeholder groups in goal prioritization and option evaluation, they have learned that stakeholder priorities can at times differ from those identified by the data driven problem identification process. PWD has developed an approach that is able to address 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 could be addressed simultaneously with those identified through scientific data. Two of the targets were defined so that they could be fully met through implementation of a limited set of options, while the third target would best be addressed though 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 overall goal of fishable and swimmable waters through improved water quality, more natural flow patterns, and restored aquatic and riparian habitat. 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 will result in realizing some of the objectives within a relatively short time frame, providing positive incentive to the communities and agencies involved in the restoration, and more immediate benefits to the people living in the watershed.

PWD's IWMP planning targets are defined below:

Program Support (Planning, Outreach & Reporting)

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), be accessible to the public, and be an amenity to the community. Target A was defined with a focus on trash removal and litter prevention, and the elimination of sources of sewage discharge during dry weather. 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.

Target B: Healthy Living Resources

Improvements to the number, health, and diversity of the benthic macroinvertebrate and fish species needs 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 silt 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. 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 will require 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.

PWD has committed to developing and executing four sequential 5-year Implementation Plans for the City of Philadelphia portion of the drainage area within each planning shed. Thus far Implementation Plans have been developed for the Cobbs and Tookany/Tacony-Frankford Watersheds (available at www.phillyriverinfo.org); the plans have matching implementation timelines, running from 2006 through 2011, and an implementation plan for the Wissahickon Creek Watershed is in development. Adaptive management will be utilized as necessary at each 5-year planning interval to ensure that progress is being achieved.

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Table III.B-6 - 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		Initiated in 2008	Implementation plan to be developed following completion of RCP	To be developed in 2009
Cobbs-Darby Creeks	2003	2003	Darby RCP completed in 2005 by Darby Creek Valley Association	Completed 2004	1st 5-year Implementation Plan developed and committed to; 2006-2011
Tacony-Frankford Creeks	2000/2001	2004	Completed in 2004	Completed 2005	1st 5-year Implementation Plan developed and committed to; 2006-2011
Pennypack Creek	2002	2007-2008	Completed in 2005	Initiated in winter 2008, to be completed by 2010	To be developed 2010/2011
Schuylkill River (tidal, non-tidal)	Monitoring Only		Completed in 2001 by the Academy of Natural Sciences, Natural Lands Trust, and the Conservation Fund	Implementation Plan to be developed for the City of Philadelphia portion of the drainage area in 2009	To be developed 2009
Poquessing Creek	2001	2008-2009	Completed in 2007	To be initiated in winter 2009, scheduled for completion in 2011	To be developed 2010/2011
Wissahickon Creek	2001	2005-2006	Completed in 2000 by FPC	Initiated in 2005, anticipated completion of planning process for City of Philadelphia portion of the watershed 2008.	1st 5-year Implementation Plan developed currently in development; it will cover time period from 2009-2014

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B.3.2 LAND: Wet-Weather Source Control

B.3.2.1 Ordinance and Regulations Modifications - Continue to review and revise stormwater management regulations for development and redevelopment

PWD's Stormwater Management Regulations, effective January 1, 2006, provided the 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, infill projects which involve earth disturbance between 5,000 and 15,000 square feet, or projects which involve earth disturbance over 1 acre and require a PA DEP NPDES permit.

Tightening of the stormwater management regulations will be considered during the LTCPU process.

Please refer to the Stormwater Management Report section "Post-Construction Stormwater Management in New Development and Redevelopment" for more information on the Stormwater Management Regulations.

B.3.2.2 Implementation of Stormwater BMPs and LID - Continue to implement best management and LID demonstration

Parcel-based Stormwater Billing

Please refer to "Parcel-based Stormwater Billing" under "Impervious Cover Disconnection" for more information on evaluating the stormwater component of its rates to develop an economic plan that allocates charges based upon use of the storm sewer system and credit appropriate levels of on-site control.

BMP and LID projects

Please refer to section "Target C - Wet Weather Water Quality and Quantity" of the Stormwater Report section for a listing of completed and potential BMP projects.

PWD's Land-based Program

The PWD's Land-based Program is part of a major city initiative to transform Philadelphia into one of the most sustainable cities in the country. The Land-based Program can be thought of as a series of individual programs, each targeting a different generator of stormwater. There are 10 key programs and associated subprograms that will be utilized to help PWD and the City of Philadelphia to manage the existing impervious area.

With the development of the LTCPU, PWD will be detailing the Land-based Program and the tools that are needed to implement each program. The 10 major programs of the land-based Program are: Green Streets, Green Alleys and Driveways, Green Schools, Public Facilities, Green Parking, Public/Open Spaces, Green Homes, Green Industry, Green Businesses and Commerce, and Green Institutions.

B.3.2.3 Catch Basin Control Program - Continue to maintain the trapped inlets

Please refer to NMC6 - "Control the Discharge of Solids and Floatables by Cleaning Inlets and Catch Basins" for more information on PWD's maintenance of the inlets.

B.3.2.4 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 separating the stormwater runoff from large impervious land using many different techniques such as a new parcel-based stormwater billing system, plan review for development and re-development, and working with PennDOT on the I95 improvements.

Parcel-based Stormwater Billing

For many years, the Water Department has recovered the costs for the operation and maintenance of its stormwater system components (pipes, storm drains, pump stations, treatment facilities, and billing) through a service charge related to our customers' water meter size. This method is considered a reasonable means to approximate the contribution of a property to stormwater runoff. Properties with larger water meters are usually larger parcels of impervious land (land covered by asphalt, pavement and structures which generate runoff). In 1994, the Water Department convened a diverse group of stakeholders, the Stormwater Charge Citizens Advisory Council (CAC), to make recommendations for improving our stormwater charge methodology. In the end, the CAC recommended that the City should implement a formula based on the gross size of the customer's property and the imperviousness of the property, as these two factors are most important in determining the stormwater runoff contribution of individual properties. Because the impervious factor is the most dominant factor in calculating stormwater runoff, the CAC recommended that 80 percent of the stormwater costs should be recovered based on a property's impervious area and 20 percent of the stormwater costs should be based on the property's gross area. The CAC also recognized that providing a detailed analysis of each of the City's 450,000 residential properties would be expensive and not provide a significant improvement in the fairness of property based charge. They recommended that the City's residential properties be treated as a single parcel with total gross area and imperviousness area factors. The total costs would be divided among all residences. This recommendation was implemented in the FY 2002 tariff and resulted in a decrease in stormwater costs to residences and other smaller meter customers.

However, at the time when the FY 2002 rates were being developed, the City did not have accurate or adequate parcel information to transition from a meter based charge to a property based stormwater charge among its larger customers. Accordingly, the meter based charge was maintained to distribute the stormwater-related costs among larger customers. In early 2006, the Water Department began the process of validating the

City's parcel data information with the Bureau of Revisions and Taxes (BRT) database and orthographic (impervious) information. This information was available from the 2004 contracted flyover of the City. Water Department staff can now analyze the approximately 40,000 non-residential accounts to determine, on an individual customer basis, the stormwater runoff contribution of each large customer parcel, in order to apply the 80/20 impervious/gross area formula. This work has been completed and is available for the next rate new tariff (planned for a multi-year period beginning in FY 2010).

The Water Department proposes to transition stormwater charges among its large meter, non-residential customer base over a three year period beginning in FY 2010. This transition will result in more equitable stormwater charges that closely match the cost of managing stormwater runoff from each property. Current calculations show that the majority of large meter customers will see a reduction or otherwise minor impact on the stormwater component of their water and sewer bills. For those customers that will see noticeable increases in their stormwater fees, the department will identify opportunities on their property to decrease the amount of their impervious area and thus decrease their stormwater fees.

The Water Department is also evaluating properties that do not presently have a water/sewer account. These parcels also generate stormwater runoff that is managed by the City and therefore should be reasonably charged for such service. These current non-customers include parking lots, utility right-of-ways and vacant land. Current large meter customers have recognized this discrepancy, and in prior rate hearings have demanded that we charge parcels, such as parking lots, to share the cost burden of stormwater management. The Water Department is applying the same 80/20 impervious/gross area formula to these properties to identify appropriate charges. Once the identification and corresponding stormwater calculations for these parcels are complete, stormwater costs can be spread out and shared over a larger customer base, resulting in a decrease for all current customers.

The CAC also encouraged the City to provide a means for customers to ease the burden of property based stormwater charges. Customers who have the ability to decrease the amount of directly connected impervious area (hard surfaces that direct runoff to the City's sewer system) on their property may do so using any number of stormwater management practices (rain gardens, infiltration islands, porous asphalt and sidewalks, vegetated swales, green roofs). Once a property has been retrofitted with any of these features, the Water Department would re-evaluate its stormwater fees based on the 80/20 impervious/gross area formula.

In addition to the data processing necessary to ensure the successful implementation of this project, PWD has made outreach to potentially affected customers a priority. During the implementation of this project, PWD will be reaching out to individual customers who will see a significant increase in the stormwater portion of their bills to offer site inspections and conceptual designs that if implemented, will reduce their stormwater charge and the impact to the City's sewer system.

PWD feels that a property based stormwater management charge will result in a fair "cost of service" that provides incentives for non-residential and stormwater only customers to incorporate green building practices, where practicable, into their sites. In addition, all customers will be more aware of the impact they have and the importance of urban stormwater management practices.

I95 Redevelopment

PennDOT is in the midst of a long-term, multi-phase initiative to improve and rebuild I-95 in Philadelphia which includes reconstructing and widening miles of pavement, and reconfiguring most of the interchanges from I-676/Vine Street through Academy Road. The I-95 reconstruction offers an opportunity to reconfigure stormwater facilities along the Delaware River Waterfront and can play a major role in reducing stormwater and CSO discharges to the rivers. Separating the stormwater runoff from the highway from the existing combined sewers and discharging it to the Delaware in compliance with the stormwater regulations can effectively remove this category of impervious cover from the combined sewers. PWD is currently working with PennDOT on how they will manage the stormwater on the 5 upcoming proposed construction projects - Section CPR - Cottman Avenue - Princeton Avenue Interchange, Section BSR - Cottman Avenue through Bridge Street, Section BRI - Bridge Street Interchange through the Betsy Ross Bridge Interchange, Section AFC - Betsy Ross Bridge Interchange to Allegheny Avenue, and Section GIR - Allegheny Avenue through Girard Avenue Interchange.

Plan Review

Under Philadelphia's new stormwater management regulations, development and redevelopment is helping to significantly reduce the amount of directly-connected impervious cover. Please refer to the Stormwater Management Annual Report section "Post-Construction Stormwater Management in New Development and Redevelopment" for more information on PWD's Plan Review work.

B.3.2.5 Reforestation - Work to implement reforestation demonstration projects to provide additional tree canopy

BMP Projects

The OOW is actively involved in numerous projects throughout the city that are increasing the urban tree canopy. These projects include planting street trees, installing stormwater management tree trenches, constructing vegetated bioswales, and other plantings. Current projects that are completed or in progress include Baltimore Avenue, Union Hill, Rittenhouse Square, Waterview Recreation Center, West Mill Creek, 47th and Gray's Ferry, and Columbus Square. Many similar projects are currently in the planning stage including Blue Bell Triangle, Liberty Lands, Passyunk and 28th, 61st, and 63rd, Queen Lane, and Belmont treatment plant.

Tree Planting

OOW has facilitated the planting of trees in the City of Philadelphia through various projects during this timeframe, including 10 trees through Belmont Goose Project , 13 trees through Mill Creek Watershed Redevelopment Phase II, 377 trees for the Marshall Road Stream Restoration Project, 53 trees for the 7th and Cheltenham Restoration, 36 trees at Turner Middle School, and 15 trees at Mitchell Elementary School.

We have also contributed to tree planting occurring outside the City of Philadelphia but within our watershed boundaries. In the Schuylkill watershed, 320 Native trees and shrubs were planted at Springford High School, 270 Native trees and shrubs at Brookside Country Club, and 300 native trees and shrubs at Upper Perkiomen High School under the Targeted Watershed Grant Program.

Our office also provides support for tree plantings, such as supplying University City Green and others with 100 shovels for volunteer plantings.

One upcoming project is the development of a Tree Nursery. We will be transforming a site that covers approximately 11 city lots into an urban tree nursery. The tree nursery will use innovative stormwater management techniques to create an aesthetic and environmentally sound model that has prospects for long term care and maintenance. Our vision is that matured trees are sold and planted throughout the neighborhood and along the proposed greenway, or sold to city agencies/non-profits for the purposes of tree restoration in city parks.

The current city administration has adopted a goal of increasing urban tree canopy to 30% which is equal to planting an additional 1.5 million trees city wide. This is a goal the OOW supports and will facilitate as possible.

Tree Vitalize

OOW is an active partner and supporter of the Tree Vitalize program. 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 work toward planting trees in neighborhoods lacking sufficient tree canopy.

B.3.3 WATER: Ecosystem Restoration and Aesthetics

B.3.3.1 Waterways Restoration Team - Continue the assignment of a dedicated clean-up team to remove cars, shopping carts, and other debris, from CSO receiving waters

Please refer to NMC6 - "Continue to Fund and Operate the Waterways Restoration Team (WRT)" for more information on the assignment of the Waterways Restoration Team.

B.3.3.2 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

In addition to PWD's Waterways Restoration Team's main task of removing large debris from the city's streams, this crew is now also working to restore eroded stream banks and streambeds around outfall pipes and in tributaries that protects the department's sewer infrastructure in the banks and beds of our streams. Types of projects that the team works on are plunge pool removals, fish passage projects, emergency stream bank restorations and interim stabilization projects. Table III.B-7 shows a listing of projects that WRT has completed to date.

Please refer to NMC6 - "Continue to Fund and Operate the Waterways Restoration Team (WRT)" for more information on the Waterways Restoration Team.

Table III.B-7 WRT restoration projects completed or planned as of September 2008

Project	Watershed	Constructed by WRU	Status	Description
Current Projects				
PP Rock Ramp	PP	Yes	Complete	Fish passage project;
Indian Creek	CC	Yes	Complete	Interim stabilization completed by WRU; future restoration project to be completed by a contractor
Wises Mill Run	WS	Yes	Complete	Lower segment; interim stabilization
Gorgas Run	WS	Yes	Complete	Interim stabilization; infrastructure protection with boulders
Byberry Creek	PQ	No	Complete	Monitoring of Byberry at Waldermere Dr
Crescentville Outfall	TTF	Yes	Complete	Plunge pool removal and culvert restoration with boulders
Maxwell Place Outfall	PP	Yes	Complete	Plunge pool removal
Adams Ave Fish Ramp	TTF	Yes	Complete	Fish passage project
Awbury Stream Daylighting	TTF	Yes	Complete	Phase I included development of a bioswale and daylighting of a spring/stream
Bingham Street Sewer Crossing	TTF	Yes	Complete	Plunge pool removal
CC Creek 61st Street Repair	CC	Yes	Complete	Emergency streambank restoration after a sewer line rupture
Marshall Road Restoration Work	CC		Complete	Stream restoration where erosion had exposed a sanitary sewer lateral
Future Projects				
Carpenters Woods	WS	Yes (future)	In Design	Stormwater outfall restoration; 3 outfalls discharge to one location creating severe erosion
Winchester Outfall	PP	Yes (future)	In Design	Plunge pool removal and tributary restoration. The design is now complete and the WRU will begin work in fall 2008
Awbury Wetland	TTF	Yes (future)	In Design	Phase II will include a wetland/pond restoration

FPC Tree House	WS	Yes (future)	In Design	A number of SW BMPs will be implemented at the Andorra Education Center where a good deal of erosion is taking place on the property
Hower Creek (Formerly called Martin's Creek)	PP	Yes (future)	In Design	Outfall Restoration and additional restoration of ~300 feet of stream where there has been chronic erosion.
Kelly Drive at Strawberry Mansion "Canoe House"	SCH	Yes (future)	In Design	East Park Canoe House – installation of a deflector for the dock that will also provide fish habitat
NEC Ditman & Eden	PQ	No	In Design	Outfall Restoration and stabilization
Rex Ave	WS	No	In Design	WRU has built a rock wall along the stream to stabilize and protect it; future restoration project to be completed by a contractor
St Martin's Lane Bridge	WS	No	In Design	A bridge is in disrepair, needs stabilization.
Tustin Street Outfall Restoration	PP	No	In Design	Outfall restoration project. WRU performed interim stabilization work on exposed interceptor but further creak stabilization is to come.
George's Lane	WS	No	In Design	Culvert restoration

B.3.3.3 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

Cobbs Creek Stream Restoration

In 2008, PWD contracted with the joint venture team of Biohabitats and O'Brien & Gere to guide the long-term vision of aquatic ecological restoration work planned in the Cobbs Creek Watershed. Over the next 20 years, PWD intends to implement natural stream channel and wetland design work along the main stem of the Cobbs Creek within the City of Philadelphia. The anticipated benefits of this riparian corridor work will include reduced stream bank erosion, channel deposition and scour and restoring the natural functions of aquatic habitat and ecosystems to the greatest degree possible.

The Joint Venture Team has been contracted to implement the assessment and project feasibility phase of the plan. This phase shall include a review of existing data, targeted field work, and conceptual design of approximately 1 mile of stream. Upon completion of this work in 2009, PWD expects to move forward with the full design process on this reach of stream and associated riparian corridor.

Tacony Creek Stream Restoration
In 2008, PWD contracted with the Stantec to guide the long-term vision of aquatic ecological restoration work planned in the Tacony Creek Watershed. Over the next 20 years, PWD intends to implement natural stream channel and wetland design work along the main stem of the Tacony Creek within the City of Philadelphia. The anticipated benefits of this riparian corridor work will include reduced stream bank erosion, channel deposition and scour and restoring the natural functions of aquatic habitat and ecosystems to the greatest degree possible.

Stantec has been contracted to implement the assessment and project feasibility phase of the plan. This phase shall include a review of existing data, targeted field work, and conceptual design work. PWD expects have design concepts for approximately 20 projects including wetland creation, stream restoration, fish passages, and other associated water quality BMPs. Upon completion of this work in 2009, PWD expects to move forward with the full design process on those projects that are deemed to be most advantageous by the Design Team.

Other Stream Restorations
Please refer to the Stormwater Management Annual Report section "Natural Stream Channel Design (NSCD)" for more information on stream restorations such as Marshall Rd, Wises Mill, Whitaker Ave, Redd Rambler, and Cathedral Run.

B.3.3.4 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

Saylor Grove Wetland in Wissahickon Watershed
A one-acre stormwater wetland 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 urban stormwater generated in the storm sewershed per year before it is discharged into the Monoshone Creek. The Monoshone Creek is a tributary of the Wissahickon Creek- a source of drinking water for the City of Philadelphia. 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 BMP Retrofit in the historic Wissahickon Watershed.

Wises Mill Wetland in Wissahickon Watershed
Wises Mill Run 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 hindered by urbanization and large storm events. As a result, severe entrenchment occurred in both branches and excessive amounts of sediment has been added to the Wissahickon Creek. This project proposes to reduce flows prior to entering the southern branch by the creation of a stormwater treatment wetland. Secondly, the

restoration and stablization of the two branches will be possible by the improvement of the channel and banks to enhance water quality. Overall, sediment and erosion will be reduced, and aquatic and macroinvertebrate life will be improved.

Watershed Mitigation Registry

Since 1997, the City of Philadelphia has invested millions of dollars in creating watershed management plans to advance the restoration of riparian environmental resources. This planning work also identifies numerous stream and wetland enhancement opportunities, which are being compiled into a Watershed Mitigation Registry.

Philadelphia's Watershed Mitigation Registry takes a watershed approach to aquatic resource protection by considering the entire riparian system and its compartments as interdependent. This approach is consistent with federal guidelines for wetlands mitigation. Implementation of projects organized within a comprehensive watershed management framework would help achieve greater environmental benefit at reduced cost by addressing environmental, regulatory, and local community concerns in an integrated fashion.

The project registry is designed to function in a similar manner to wetland mitigation banks, with two important differences. Unlike mitigation banks that consist of completed wetland projects ready for purchase, the mitigation registry presents conceptual plans for projects ready to be designed and constructed. These plans encompass a range of riparian corridor improvements, including new and restored aquatic habitats, streambanks, wetlands, and flood and stormwater management. Although much research has been conducted to characterize the relative effectiveness of different wetlands in performing a range of environmental functions, no single method provides a technique for assessing the effectiveness of integrated riparian corridor improvements in mitigating impacts to wetlands from development and redevelopment projects.

Presently, the Registry includes over 200 targeted stream and wetland improvement locations in the Philadelphia area. These targeted areas include potential stream restoration, stream daylighting, wetland enhancement/creation, and fish passage projects.

Tidal Schuylkill Wetland Restoration

Historically, freshwater tidal wetlands extended from Trenton, New Jersey to Chester, Pennsylvania, but urbanization has reduced the area by 95%, with only small remnants of freshwater tidal wetlands on the Pennsylvania side of the Delaware River. Approximately 76% of the land area surrounding the tidal portion of the Schuylkill River is urban or residential. The banks along the lower reach, from the Delaware River confluence to stream mile 5, are dominated by industrial uses such as oil refineries. Continuing upstream, the River runs though Center City Philadelphia, a heavily developed area. The tidal Schuylkill is impacted by urban runoff, industrial sources, and combined sewer overflows.

Wetlands are essential habitat highly utilized by fish for foraging, nesting, spawning, and refuge from predators or environmental extremes (i.e. temperature). Particularly for migratory fish, wetlands play an important role in establishing a safe and productive migratory corridor to and from spawning grounds. Tidal freshwater wetlands are also important habitat for migratory birds and waterfowl. The Philadelphia area is within the Atlantic Flyway and important during both northbound and southbound migrations.

PWD assessed the tidal Schuylkill River for existing wetland areas and potential wetland restoration areas in October 2006. One existing wetland area (0.5 acre) and 13 wetland restoration areas (29.2 acres) were identified and mapped. The area between the Mingo Creek surge basin and the main channel of the Schuylkill River ranked first priority for wetland restoration.

The project area was surveyed in May and October 2007 in order to identify and delineate suitable planting areas. A staff gage was installed at that time and monitored during a tidal period to estimate maximum and minimum water depths. A planting plan was created based on maximum water levels and land ownership. Only the portion of the site owned by the City of Philadelphia was considered for planting. Grazing by Canadian geese was considered a barrier to a successful planting and goose exclusion fence was installed in 16ft grids in an attempt to overcome this issue.

PWD was awarded a grant from National Fish and Wildlife Foundation through the Delaware Estuary Watershed Grants Program for a sum of $21,000. The grant funded the purchase of vegetation native to the Philadelphia area as well as goose exclusion fence and other necessary supplies.

The project area was planted by PWD staff in May and June 2008. Vegetation chosen for the site includes: spatterdock (Nuphar advena/lutea), pickerelweed (Pontederia cordata), duck potato (Sagittaria latifolia), and arrow arum (Peltandra virginica). Monitoring of the area will be carried out twice a month through August 2008 and then will be reduced to once a month, during the growing season, through 2011.

B.3.3.5 Fish Passage Projects - Evaluate the benefits of projects that improve migratory fish passage in a manner consistent with the watershed management plans

Fish Passage on Cobbs Creek

The PWD is investigating the option of a project to create fish passage on the Cobbs Creek. The purpose of the Cobbs Creek Fish Passage Restoration Project would be to investigate, select, design and construct the best alternative to reestablish fish passage on Cobbs Creek. Two small dams represent opportunities to improve fish passage on Cobbs Creek. The lower dam, Woodland Dam, located close to the Cobbs Creek Parkway and Woodland Avenue, is the first impediment to fish passage on Cobbs Creek. It is a low concrete structure below which the creek is tidal. The upper dam, Millbourne Dam, situated on Cobbs Creek near 65th and Race Streets is a rock structure. Both dams are owned by the City of Philadelphia's Fairmont Park. This currently is only a potential project and it becoming an actual project is dependent on many things, the first of which is funding through the Army Corp.

PWD Sanitary Line Natural Rock Ramp Fishway

After Frankford and Rhawn St. Dam remnants were removed in 2006, the downstream-most obstruction to anadromous fish passage in Pennypack Creek Watershed was a PWD sanitary sewer line approximately 450m upstream of the former Frankford Ave. dam. Because this was an active sewer line that would be very expensive to relocate, a rock ramp fishway was constructed in 2007 to raise the water surface elevation and provide fish passage at this site (**Figure III.B-1**).

PWD has completed phase one of the physical monitoring activities planned for the rock ramp, by installing a stream gage and recording stream stage to correlate to the nearby Rhawn St. USGS gage station. A detailed post-construction survey of the rock ramp is underway in order to support a hydraulic model of the rock ramp (River2D). Preliminary work has shown that a much greater spatial resolution of survey points is required to accurately model the effects of the individual boulders in the rock arches, so a second survey is planned for fall 2008. PWD hopes to eventually estimate velocity vectors within the rock ramp at varying river flow conditions and compare physical conditions to fish swimming behavior.

Figure III.B-1 Photo of the Pennypack Rock Ramp

Fairmount Fish Ladder

The Fairmount Dam fishway is situated within the Philadelphia City limits on Fairmount Park property. Begun in 1977 and completed in 1979 the fish ladder was constructed on the western side of the Fairmount Dam. The fish ladder has been maintained largely by the voluntary efforts of the Friends of the Fairmount Fish Ladder. The effects of time and natural forces have damaged the existing fish ladder and the degradations severely limit the ladder's efficiency at passing migratory fish species.

In 2002, the Philadelphia Water Department (PWD) partnered with the Philadelphia District, Corps of Engineers, to improve and revitalize the Fairmount Dam Fish Ladder, pursuant to Section 1135 of the Water Resources Development Act of 1986. During 2003, PWD entered into an agreement with Alden Research Laboratories to model the current hydrologic conditions within the fish ladder and provide model alternatives based on expertise from the United States Fish and Wildlife Service. Between 2003-2005, scientists and engineers from USACE completed final designs for the fish ladder restoration project, including the creation of an outdoor educational area adjacent to the fishway.

In March 2008, ABC Construction began staging for the preliminary construction phase of the project. Since then, construction has been focused primarily on the structural components of the fish ladder (i.e., chambers, exit and entrance structures, attraction flow, etc.). In August 2008, ABC Construction, Inc. indicated that construction of the outdoor classroom would commence in October with an anticipated date of completion near the end of the month (i.e., October 28th).

B.3.3.6 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

Environment, Stewardship & Education Division

The Philadelphia Water Department continues to support the Environment, Stewardship & Education Division of the Fairmount Park Commission, which undertakes a broad range of environmental restoration activities throughout the park system. These activities occur primarily on the 5,600 acres of natural lands in the system's seven largest watershed and estuary parks. These are Poquessing Creek, Pennypack, Tacony Creek, Wissahickon Valley, Fairmount (East/West), Cobbs Creek and Franklin Delano Roosevelt parks.

The restoration activities include:

Controlling and removing exotic invasive plants and replacing them with species native to Philadelphia County.

Increasing the density and diversity of native plants in riparian zones, forests and other areas.

Converting mown lawn to meadows where the lawn is not currently used for active recreation.

Managing meadows, including periodic mowing to control tree growth.

Constructing new and restoring/expanding existing wetlands.

Removing or modifying existing dams.

Restoring eroded/degraded stream channels and stabilizing streambanks using bioengineering techniques.

Repairing and stabilizing erosion gullies on forested slopes.

Constructing berms, diversions, grassed waterways, infiltration trenches and filter strips to control stormflow from impervious services and mown areas.

Controlling access to reduce trash dumping and damage by vehicles.

Riparian Buffer component of Stream Restorations

Riparian buffer enhancement would be included in many of the stream restorations that are completed. Please for to "Stream Habitat Restoration" for more information on stream restoration projects.

Please refer to "Wetland Enhancement and Construction" for more information on how riparian buffer projects will be included in the Watershed Mitigation Registry.

WRT projects

Please refer to section "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" for more information on any riparian buffer component of projects the WRT is completing.

B.3.4 Other Watershed Projects

B.3.4.1 River Conservation Plan - Continue to work in partnership with local partners to complete and implement River Conservation Plans (RCPs)

Darby RCP

A River Conservation Plan was completed by the Darby Creek Valley Association (DCVA) for the entire watershed drainage area in 2005.

Tacony-Frankford RCP

The Tacony-Frankford River Conservation Plan (RCP) is a holistic plan to improve the Tacony-Frankford watershed. It is developed through a collaborative process of local organizations and residents, and addresses various types of projects that will make the watershed a better place to live. It addresses history, water quality, culture, art, parks, trails, youth education, municipal education, etc.

The goal is to create a grassroots driven watershed conservation plan. The plan reflects the character of the watershed and the issues and concerns of the residents of the watershed. The planning process also creates or enhances partnership possibilities among plan participants.

The RCP was completed in July of 2004.

Pennypack RCP

The Pennypack Partnership developed a Request for Proposals for a consultant to lead the data collection and public outreach components of the plan, under the guidance of the RCP team. The consultant, F.X. Browne, Inc. was selected to oversee both the data collection and public outreach components of the RCP and began this work in the Fall 2003. In January 2004, the first RCP Steering Committee took place and a public outreach schedule and suggested public workshops were discussed and planned for the spring. In 2005, a number of public outreach and education events took place, including:

April 2005 Stream Restoration Workshop

April 2005 Watershed Friendly Homeowners Workshop

September 2005 Fish Shocking Demo on Pennypack and presentation of draft plan

September 2005 Presentation of draft plan at Pennypack Trust Ecological Restoration Plant Sale

October 2005 – Presentation of draft plan at Montco Trout Unlimited

October 2005 – Presentation of draft plant at annual Applefest Celebration at Fox Chase Farms

The RCP Plan was completed in December 2005. Work to implement some of its recommendations will continue into the future and will act as a platform for the development of a watershed management plan in 2008.

Poquessing RCP

Please refer to the Stormwater Management Annual Report section "Target B- Healthy Living Resources" for information on the Poquessing RCP.

Delaware Direct RCP

Please refer to the Stormwater Management Annual Report section "Target B- Healthy Living Resources" for information on the Delaware Direct RCP.

B.3.4.2 Watershed Information Center - Create a website to serve as a Watershed Information and Technology Center

Please refer to "Continue to Maintain Watershed Management and Source Water Protection Partnership Websites" for more information on PWD's Watershed Information Center.

B.3.4.3 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. One system, Rivercast, supports the identification and analysis of water quality events to support water use status decisions (swimming, triathlons, rowing, etc.) and makes this information available in real time to the public. The other system, Early Warning System, is used to monitor water quality and notify water systems about such events as hazardous substance spills or sudden changes in water quality.

Please refer to "Continue to Maintain Watershed Management and Source Water Protection Partnership Websites" for information on Rivercast and the Early Warning System.

B.3.4.4 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, the PWD has developed another internet-based notification system called CSOcast, which reports on the overflow status of outfalls in every CSOshed. The purpose of this notification system is to alert the public of possible CSOs from Philadelphia's combined sewer system outfalls.

Please refer to "Expand the Internet-based Notification System (Rivercast) to the Tidal Section of the Lower Schuylkill River" for information on CSOcast and for additional information on Rivercast.

B.3.4.5 Interpretive Signage - Continue to implement interpretive signage

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 that it would be hazardous to their health to contact the water during such events. It also requests that the Water Department is informed of any overflows during dry weather and provides an emergency number to call.

The CSO Signage Project was a pilot project aimed at determining if outfall signage was a feasible way to accomplish public notification of combined sewer overflows. The Philadelphia Water Department (PWD), in conjunction with the Fairmount Park Commission, installed 13 signs at CSO outfalls in the city. Locations for placement of these signs were selected based on factors such as high visibility, known recreational areas, and volume of the combined sewer overflow. Installation of the CSO signage was done in summer 2007 and then a survey of the signage sites was completed in October 2007. During this survey, each of the CSO signage sites was visited and photos were taken to confirm the status of the signs that were installed. Survey of the sites determined that several of the signs were removed or vandalized. Of the thirteen signs that were installed, five of them were vandalized or removed during the short amount of time between installation and the survey.

Although signage is seen as a simple, low-cost, visual way to raise awareness of combined sewer outfalls, this pilot project has highlighted the difficulties in using a signage as a public notification system in Philadelphia due to the poor sustainability of the signs in the field.

In 2008, a billstuffer was included in all PWD bills on the CSO Signage Public Notification project as well as answering additional questions such as What is a Combined Sewer Overflow (CSO)? , What is the goal of the Signage Program?, Can I swim in the water near a CSO?, Is it safe for my dog to drink the water near a CSO?, and Can I eat the fish?

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 are very useful when the public is reporting a problem at an outfall, they are able to accurately identify the outfall. This helps to alleviate communication problems between the public and the PWD responders.

Tookany/Tacoy-Frankford Watershed Signage

The PWD and the Tookany/Tacony-Frankford Watershed Partnership have installed signs at bridge crossings throughout the Tookany/Tacony-Frankford Watershed to help residents and visitors learn the names of local streams and rivers in their travels, raise awareness of local watersheds, connect residents and visitors with local waterways, and encourage them to protect water resources. A total of 10 signs have been placed on state-owned roads, in both directions, at five locations in the watershed: Roosevelt Boulevard between F and Bingham Streets, Adams Avenue between Newtown Avenue and Crescentville Road, Whitaker Avenue between Torresdale and Hunting Park Avenues, and Torresdale Avenue between Hunting Park and Frankford Avenues. The Tookany/Tacony-Frankford Watershed drains 29 square miles in Philadelphia and Montgomery counties. The watershed has a diverse population that includes portions of the inner city as well as suburban communities. Water flowing from various tributaries in the watershed discharge to the Delaware River through the Frankford Creek.

Restoration Locations Signage

Although no interpretive signage was installed at restoration locations during this reporting period, it is a goal to have signs at each of the major BMP installations. Conceptual planning was done for signs at each of the BMP sites in the Mill Creek watershed. Signs have been installed at some of our previous restorations sites, such as interpretive signage at the Saylor Grove Wetland.

B.3.4.6 Interpretive Centers - Continue to support existing educational interpretive centers to educate citizens about their community and the water environment

Please refer to the Stormwater Management Annual Report section "PWD Public Education and Outreach" for information on PWD's continued support of the Fairmount Water Works Interpretive Center.

Please refer to NMC7 – "Continue to Provide Annual Information to City Residents about Programs via Traditional PWD Publications" for information on PWD's support of existing educational centers including the Clean Water Theatre and other public outreach tools.

B.3.4.7 Basin-Specific Stormwater Management Plans (ACT 167) - Continue to support the State Act 167 Storm water Management Planning process and integrate the results of these efforts into the watershed management plans and implementation plans

Recognizing the adverse effects of excessive stormwater runoff resulting from development, the Pennsylvania General Assembly approved the Stormwater Management Act, P.L. 864, No. 167 on October 4, 1978. 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 Department of Environmental Protection (DEP), municipalities and counties, and provides for enforcement and appropriations. All counties must, in consultation with its municipalities, prepare and adopt a stormwater management plan for each of its designated watersheds. Within six months following adoption and approval of a watershed stormwater plan, each municipality is required to adopt or amend stormwater ordinances as laid out in the plan

The City of Philadelphia is committed to supporting the development of Act 167 Stormwater Management Plans for each of the watersheds that drain to the City, including:

Cobbs Creek,

Darby Creek,

Delaware River,

Pennypack Creek,

Poquessing Creek,

Schuylkill River,

Tacony/Frankford Creek, and

Wissahickon Creek.

The City of Philadelphia will sign a Phase 1 Agreement with the DEP 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.

B.3.4.7.1 Darby-Cobbs Creek

An Act 167 Stormwater Management Plan was completed for the Darby-Cobbs Watershed in January 2005, led by Delaware County Planning Department with Borton Lawson as technical consultant. This plan can be viewed at the Delaware County Planning Department's website at: www.co.delaware.pa.us/planning/watersheditems

In order to properly address stormwater management in the Darby Creek Watershed below the confluence of Cobbs and Darby Creeks, it was determined that both watersheds needed to be hydrologically evaluated. One Act 167 plan was, therefore, developed encompassing the two watersheds, thus satisfying the Act 167 planning requirements for both watersheds.

The Darby-Cobbs watershed lies within twenty-six (26) municipalities in Delaware County, two (2) municipalities in Chester County, two (2) municipalities in Montgomery County, and (1) municipality in Philadelphia County as follows:

Delaware County	Chester County
Aldan Borough	Easttown Township
Morton Borough	Tredyffrin Township
Clifton Heights Borough	Montgomery County
Newtown Township	Lower Merion Township
Collingdale Borough	Narberth Borough
Norwood Borough	Philadelphia County
Colwyn Borough	City of Philadelphia
Prospect Park Borough	
Darby Borough	
Radnor Township	
Darby Township	
Ridley Township	
East Lansdowne Borough	
Ridley Park Borough	
Folcroft Borough	
Rutledge Borough	
Glenolden Borough	
Sharon Hill Borough	
Haverford Township	
Springfield Township	
Lansdowne Borough	
Tinicum Township	
Marple Township	
Upper Darby Township	
Millbourne Borough	
Yeadon Borough	

B.3.4.7.2 Tookany/Tacony-Frankford Creek

The development of the Act 167 Plan for this watershed was led by PWD in partnership with Montgomery County Planning Commission; Borton Lawson Engineering was hired as technical consultant. The main objective of this stormwater management plan is to control stormwater runoff on a watershed-wide basis rather than on a site-by-site basis, taking into account how development and land cover in one part of the watershed will affect stormwater runoff in all other parts of the watershed. This plan was completed March 2008 and is currently under evaluation of municipal partners. To view the entire TTF Act 167 Stormwater Management Plan, please visit: www.phillyriverinfo.org

The Tookany/Tacony-Frankford Watershed encompasses a total area of approximately 32.96 square miles and includes the following major tributaries: Jenkintown Creek, Rock Creek, Mill Run, and Baeder Creek.

Abington Township	Rockledge Borough
Cheltenham Township	Springfield Township
Jenkintown Borough	City of Philadelphia

Information below is excerpted from the TTF Act 167 final plan:

This plan was developed utilizing data including the physical features of the watershed, (soils, wetlands, topography, floodplains, dams and reservoirs, stream dimensions, and obstructions) as well as information on existing conditions/problems solicited from the stakeholder advisors – in a committee called the WPAC, Watershed Planning Advisory Committee. The WPAC consisted of representatives from the 6 municipalities as well as other interested parties including County Conservation Districts and others. Information on existing land use and zoning was also collected. All of this data was compiled into a geographic information system (GIS) database.

The computer model used for the project was the Environmental Protection Agency's Stormwater Management Model (EPA SWMM 5.0). This model was chosen for the project because it can be easily adapted to an urban area, it has the ability to analyze reservoir or detention basin-routing effects, and it is accepted by the Department of Environmental Protection. To gain a realistic picture of what occurs in the Tookany/Tacony-Frankford Watershed, the model was calibrated against actual stream flow data, regression models, as well as data from the Federal Emergency Management Administration (FEMA) and the Army Corps of Engineers.

Another aspect of the analysis involves modeling design storms. (This term refers to assigning a frequency to a storm based on the amount of rain that falls over a 24-hour period.) As the amount of rain falling over a 24-hour period increases, the frequency or chance of that storm occurring decreases. To make implementation of the Plan viable by the municipalities, a simple, but accurate method was developed for municipal officials, engineers and developers to abide by the Plan. The watershed was divided into three (3) stormwater management districts and assigned the following proposed condition/existing condition runoff rates for each.

Table III.B.3-1 TTF Stormwater Management Districts

District	Proposed Condition Design Storm (reduce to)	Existing Condition Design Storm
A	2-year 5-year 10-year 25-year 50-year 100-year	1-year 5-year 10-year 25-year 50-year 100-year
B	2-year 5-year 10-year 25-year 50-year 100-year	1-year 2-year 5-year 10-year 25-year 100-year
C*	Conditional Direct Discharge District	

In District C, development sites which can discharge directly to the Tookany/Tacony-Frankford main channel or major tributaries or indirectly to the main channel through an existing stormwater drainage system (i.e., storm sewer or tributary) may do so without control of proposed conditions peak rate of runoff greater than the 5-year storm. Sites in District C will still have to comply with the groundwater recharge criteria, the water quality criteria, and streambank erosion criteria. If the proposed conditions runoff is intended to be conveyed by an existing stormwater drainage system to the main channel, assurance must be provided that such system has adequate capacity to convey the flows greater than the 2-year existing conditions peak flow or will be provided with improvements to furnish the required capacity. When adequate capacity in the downstream system does not exist and will not be provided through improvements, proposed conditions peak rate of runoff must be controlled to the existing conditions peak rate as required in District A provisions (i.e., 10-year proposed conditions flows to 10-year existing conditions flows) for the specified design storms.

All regulated activities are required to implement water quality controls as defined by the ordinance.

Generally, they are as follows:

Montgomery County Portion of the Watershed:

a. Provide infiltration capacity that is equal to 1.0 inch of rainfall over all proposed impervious surfaces.

Philadelphia County Portion of the Watershed:

a. Provide infiltration capacity that is 1.0 inch over the Directly Connected Impervious area (DCIA) and that is within Earth Disturbance (ED) limits. The DCIA is an impervious or impermeable surface, which is directly connected to the drainage system as defined in the manual. The ED is any human activity which moves or changes the surface of land, including, but not limited to, clearing and grubbing, grading, excavation, embankments, land development, agricultural plowing or tilling, timber harvesting activities, road maintenance activities, mineral extraction, and the moving, depositing, stockpiling, or storing of soil, rock or earth materials.

The infiltration volume for both counties does not have to be provided in one location.

However, if site conditions preclude capture of runoff from portions of the impervious area, the infiltration volume for the remaining area should be increased an equivalent amount to offset the loss.

If site conditions preclude use of infiltration facilities for such reasons as high groundwater tables or extensive rock conditions, a waiver from Section 405, Groundwater Recharge, would be required from the Municipality.

Provide buffer areas on perennial or intermittent stream passing through the site. The buffer areas are recommended to be at least fifty (50) feet wide, but never less than ten (10) feet wide. The buffer area shall be maintained with and encouraged to use appropriate native vegetation.

If none of the above options are feasible due to site constraints, the applicant must provide stormwater detention that meets the management district criteria for the site location or else obtain approval from the municipal Engineer to implement other BMPs that will provide water quality benefits of an equivalent level.

Activities that are exempt from certain requirements of the ordinance as defined by the ordinance are still encouraged to implement voluntary stormwater management practices for these requirements as indicated in Appendix B of the model ordinance.

B.3.4.7.3 Pennypack Creek

PWD has committed to developing an Act 167 Stormwater Management Plan for the Pennypack Creek Watershed. PWD will act as municipal lead for plan development, and will partner with the Montgomery County Planning Commission and Bucks County Planning Commission in order to complete the plan. A Request for Proposals will be released in July 2008 and contract will be awarded in September 2008. Upon selection of a contractor to develop the Act 167 Plan, the stakeholder Watershed Planning Advisory Committee (WPAC) will be convened in order to help guide the process.

B.3.4.7.4 Poquessing Creek

PWD is committed to developing an Act 167 Stormwater Management Plan for the Poquessing Creek Watershed. PWD will act as municipal lead for plan development and will partner with the Montgomery County Planning Commission and Bucks County Planning Commission in order to complete the plan. This plan is not scheduled to be initiated until fall 2009.

B.3.4.7.5 Wissahickon Creek

An Act 167 Stormwater Management Plan is not currently scheduled for the Wissahickon Creek Watershed, but the PWD hopes that funding will be allocated for development of a plan following the completion of the Poquessing Creek Act 167.

B.3.4.7.6 Schuylkill River

The portion of the Schuylkill River Watershed within the City of Philadelphia will be covered by the City of Philadelphia county-wide Act 167 and is currently covered by the City of Philadelphia Stormwater Regulations.

B.3.4.7.7 Delaware River

The portion of the Schuylkill River Watershed within the City of Philadelphia will be covered by the City of Philadelphia county-wide Act 167 and is currently covered by the City of Philadelphia Stormwater Regulations.

B.3.4.8 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

PWD employs a full-time state certified Sewage Enforcement Officer (Eric Ponert - Cert. No. 03590) who continues to require/review sewage facilities planning modules for new land developments within Philadelphia County and, in conjuction with PWD's Office of Watersheds and Planning and Research Department, reviews downstream sewage conveyance and treatment facilities to ensure that adequate capacity exists within these systems to accomodate flow from new land developments within Philadelphia County and tributary municipalities. PWD maintains a database and hard-copy files which include all submitted/reviewed modules for land developments within Philadelphia County and requests for capacity certification from tributary municipalities.

B.3.5 Monitoring and Assessment

B.3.5.1 NPDES – Quarterly Special Discharge Monitoring Report

The PWD is committed to submitting the Quarterly Special Discharge Monitoring Report; this report is due 45 days after the end of the quarter so we will submit a report 4 times a year by February 15, May 15, August 15, and November 15.

B.3.5.2 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 the following section represent the average annual CSO overflow statistics for period January 1 2007 – August 31 2008 as required in the NPDES Permit. The table has 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.

The estimated average annual frequency and volume statistics for period January 1 2007 – August 31 2008 are presented in the Table III.B-8

Table III.B-8 CSO Statistics for Period January 1 2007 – August 31 2008 by Outfall

Outfall Name	Frequency	Duration		SWO Volume (ft^3)	
		Min	Max	Min	Max
C_FRTR	148	0.5	40.75	56.93	4,043,000
C_FRA	52	0.25	11.25	1.49	493,700
C01	37	0.5	9.25	53.97	91,700
C02	12	0.25	3	33.48	11,930
C04A	47	0.5	34.5	101.50	3,593,000
C05	43	0.25	11.75	2.87	284,700
C06	93	0.25	38.5	2.81	2,225,000
C07	62	0.25	34.25	93.52	910,800
C09	54	0.25	15	48.03	580,600
C10	58	0.25	24.25	2.86	148,100
C11	85	0.25	36	1.02	5,321,000
C12	80	0.25	31.5	0.92	779,200
C13	60	0.25	27.5	13.59	611,000
C14	68	0.25	18	8.74	516,000
C15	52	0.25	15.5	3.61	109,500
C16	15	0.25	1.75	5.55	39,520
C17	70	0.75	33	346.40	12,660,000
C18	71	0.25	17.5	2.02	626,900
C19	26	0.25	2	231.70	285,200
C20	28	0.25	2.5	12.86	136,200
C21	10	0.25	2	205.90	139,700
C22	57	0.25	5.75	18.66	399,200
C23	13	0.25	2.75	1.30	47,470
C25	41	0.25	7.25	7.95	745,200
C28A	38	0.25	3	0.96	101,700
C29	77	0.25	19.25	1.23	220,800
C30	45	0.25	13	224.00	107,000
C31	77	0.25	26	7.49	517,900
C32	60	0.25	16	55.49	486,000
C33	45	0.25	10.25	2.41	126,900
C34	27	0.25	8.75	165.10	68,890
C35	12	0.25	5.5	55.52	26,170
C36	12	0.25	2.5	288.90	26,650
C37	26	0.25	8.5	2.20	28,280
D_FRW	72	0.25	25	69.90	5,898,000
D02	68	0.25	37.5	1,090.00	7,180,000
D03	65	0.25	33.25	217.60	1,889,000
D04	41	0.25	32	5.77	260,200
D05	78	0.5	35	264.30	16,400,000
D06	30	0.25	28.75	38.61	735,100
D07	40	0.5	28	180.20	9,050,000

D08	66	0.25	32.25	24.11	572,500
D09	11	0.25	1	196.00	32,840
D11	33	0.25	25	1,380.00	2,272,000
D12	69	0.25	10	2.33	19,100
D13	20	0.5	1.5	626.90	35,980
D15	24	0.25	2.75	31.54	113,300
D17	74	0.25	16.25	127.50	742,400
D18	74	0.5	20.5	357.60	578,200
D19	72	0.5	22	171.70	458,500
D20	52	0.25	7	53.06	284,900
D21	63	0.5	17.5	1,183.00	703,800
D22	129	0.25	31.5	6.25	4,736,000
D23	68	0.25	19.25	1.30	33,200
D25	107	0.75	31	693.40	21,910,000
D37	80	0.5	30.25	768.40	6,056,000
D38	67	0.75	28.25	7,564.00	7,100,000
D39	87	0.5	29	4.10	7,059,000
D40	107	0.25	30	0.01	390,600
D41	75	0.25	26.25	4.03	491,900
D42	36	0.25	6.25	0.65	31,230
D43	28	0.5	8	28.49	23,910
D44	72	0.25	27.5	15.91	1,827,000
D45	65	0.5	26.5	3,844.00	12,390,000
D46	39	0.25	16.75	412.90	151,000
D47	128	0.5	32.75	10.46	1,644,000
D48	68	0.5	24.5	3,228.00	4,081,000
D49	14	0.25	1	83.28	13,040
D50	37	0.25	9.75	68.36	55,220
D51	126	0.5	32.25	3.90	532,700
D51A	95	0.25	27.5	0.00	302,600
D52	56	0.25	12.5	3.21	81,370
D53	16	0.5	4.5	3,838.00	304,700
D54	37	0.25	15.5	1,047.00	1,528,000
D58	49	0.25	15.75	1,046.00	348,600
D61	89	0.5	22.5	0.01	251,300
D62	60	0.25	11	0.41	118,500
D63	58	0.25	17.75	538.90	2,716,000
D64	60	0.25	9.5	0.01	86,340
D65	50	0.25	17.75	873.30	1,789,000
D66	64	0.5	21.75	946.30	1,571,000
D67	59	0.25	19.25	95.62	743,900
D68	77	0.25	28.25	39.10	4,783,000
D69	42	0.5	18.75	42.95	1,315,000
D70	30	0.5	17.75	1,790.00	2,227,000

D71	80	0.25	27.75	148.80	1,597,000
D72	45	0.5	26.25	1,244.00	1,371,000
D73	71	0.5	27.25	2,264.00	3,182,000
F_FRFG	111	1	37.5	5,957.00	25,480,000
F03	51	0.25	24.5	6.48	1,347,000
F04	105	0.25	29.25	2.05	3,126,000
F05	105	0.5	27.5	5.44	317,300
F06	36	0.25	14.25	2.13	222,100
F07	64	0.25	21.25	12.63	876,900
F08	60	0.25	19.75	0.91	453,900
F09	94	0.25	26.5	4.09	272,800
F10	102	0.5	28.5	7.75	837,200
F11	110	0.5	30	9.77	4,462,000
F12	50	0.25	16	2.53	236,800
F13	87	0.25	22.75	1.18	415,500
F21	106	0.5	30.5	1,276.00	23,930,000
F23	68	0.25	9.75	228.40	170,200
F24	72	0.25	8.5	29.48	74,410
F25	11	0.5	7.25	8,298.00	509,300
P01	37	0.25	7.5	2.93	84,180
P02	79	0.25	27.5	7.31	2,051,000
P03	44	0.25	30	5.81	675,800
P04	21	0.75	29	2,179.00	3,950,000
P05	36	0.25	32.75	4.66	8,267,000
S_FRM	1	1	1	390,600.00	390,600
S01	70	0.25	27	4.96	2,897,000
S01T	110	0.25	26	2.86	4,454,000
S02	87	0.25	26.75	1.47	242,300
S03	12	0.5	1	650.50	10,990
S04	132	0.25	36.75	3.09	457,700
S05	109	0.25	31	5.35	6,491,000
S06	108	0.25	29.25	5.14	2,356,000
S07	25	0.25	8.75	284.80	344,600
S08	67	0.25	19.75	9.42	30,030
S09	59	0.25	20	183.10	1,500,000
S10	89	0.25	27	29.91	496,500
S11	50	0.5	7.75	64.57	43,330
S12A	75	0.25	22.75	1.29	144,200
S13	41	0.5	4.75	55.56	38,020
S14	106	0.25	29.75	1.69	404,400
S15	50	0.25	11.75	2.11	44,280
S16	129	0.25	31.25	1.60	267,800
S17	9	0.25	1	78.97	15,780
S18	81	0.25	28	126.60	1,258,000

S19	56	0.25	11.75	19.71	42,910
S20	109	0.25	32	4.76	2,831,000
S21	41	0.25	4.5	5.71	16,060
S22	68	0.25	22.75	2.28	375,800
S23	91	0.25	26	43.01	266,800
S24	66	0.25	23	1.02	144,400
S25	68	0.25	23.25	3.29	293,200
S26	114	0.5	33	41.30	2,901,000
S30	15	0.25	1.5	11.30	71,060
S31	91	0.25	26.5	68.48	860,700
S32	26	0.25	2	1.56	99,860
S33	107	0.25	19.75	1.36	3,971,000
S36A	100	0.5	29.75	24.20	1,186,000
S37	105	0.25	29	7.29	578,800
S38	58	0.25	17.25	8.91	1,548,000
S42	70	0.75	24.25	320.20	2,887,000
S42A	109	1	33.75	222.70	3,502,000
S44	67	0.5	23.25	135.60	1,547,000
S45	112	0.25	49.75	20.17	9,147,000
S46	50	0.5	17.75	11.20	340,800
S50	98	0.25	37.25	101.20	85,040,000
T_01	103	0.25	29	3.11	1,567,000
T_03	82	0.25	28.25	42.43	1,051,000
T_04	78	0.25	28	22.56	733,800
T_05	62	0.25	17	2.21	378,400
T_06	61	0.25	24.5	2.49	3,671,000
T_07	16	0.25	2.75	25.36	34,980
T_08	110	0.5	32.25	151.90	23,940,000
T_09	61	0.25	18.25	13.37	284,700
T_10	90	0.25	29.5	71.19	828,400
T_11	80	0.5	26.75	46.49	510,400
T_12	15	0.5	4.5	2.19	26,560
T_13	89	0.25	29.25	39.97	1,671,000
T_14	94	0.25	31	5.31	47,290,000
T_15	79	0.25	28.75	19.55	2,346,000
T_FRRR	49	0.5	14.5	82.94	1,964,000

Table III.B-9 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
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
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
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
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

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
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
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
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
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

B.3.5.3 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.

Comprehensive Watershed Monitoring Program: Proposed Strategy 2008-2015

Assessing the integrity of our waterways is integral to the long-term sustainability of our aquatic ecosystems. Thorough measurements of our aquatic communities and infrastructure allow to us determine whether or not a particular waterbody and the lands around it are headed toward improvement or degradation. The Philadelphia Water Department (PWD) considers such assessments a top priority and is committed to monitoring sites within and beyond Philadelphia County lines.

The City of Philadelphia recognizes the potential impacts of discharges from stormwater, combined sewer overflows (CSO) and other discharges and conditions that affect drinking water and other designated uses of our waterways. To date, the City maintains a monitoring program developed in coordination with the Pennsylvania Department of Environmental Protection (Southeast Regional Office), integrating biomonitoring techniques with rigorous chemical and physical assessments.

From 1999 through 2008, the Philadelphia Water Department has implemented a comprehensive assessment strategy that provides both quantitative and qualitative information regarding the aquatic integrity of the watersheds that characterize Philadelphia. To date, baseline assessments of five watersheds have been completed, with information being disseminated to state officials and to local partnerships through technical and public meetings and website development. In addition, comprehensive characterization reports (CCR) have been completed for the Darby-Cobbs, Tookany/Tacony-Frankford, and Wissahickon Creek Watersheds, with additional plans to finalize reports on the Pennypack and Poquessing-Byberry watersheds in 2009 and 2010, respectively.

The draft "Comprehensive Watershed Monitoring Program: Proposed Strategy 2008-2015" that is currently being drafted will detail the proposed watershed monitoring strategy developed by the Philadelphia Water Department to comply with both the City's stormwater and CSO permit requirements and to assist with the Sourcewater Protection Program's objectives. Moreover, this report will outline a five-year plan (i.e., 2010-2015) that will address time-lines, goals and objectives for the monitoring program, changes and/or additions to the current strategy and budgetary considerations. The Philadelphia Water Deapartment will continue to work with the Southeast Regional Office of the Department of Environmental Protection to finalize this monitoring strategy.

2007 USGS gage network annual summary

PWD and the United States Geologic Survey (USGS) have constructed and/or refurbished gaging stations in nine locations throughout Philadelphia's watersheds. USGS staff are 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 are 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. The 2007 data is still being reviewed and this report will be available upon request in several weeks.

Stormwater Management Program Annual Report

National Pollution Discharge Elimination System (NPDES) Permit
No. PA 0054712
Covering the Period from July 1st, 2007 to June 30th, 2008

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Section A 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, many of them in place prior to the EPA Stormwater Regulation. The ordinances and regulations may be found at www.Phila.gov.

This Annual Report is submitted to the Pennsylvania Department of Environmental Protection (PADEP), 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, 2007 to June 30, 2008.

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Section B Sediment Total Maximum Daily Load (TMDL) for Wissahickon Creek – Feasibility Study & Monitoring Plan

The City has developed and implemented a program designed to achieve the first goal of the sediment TMDL effort which requires the City "to establish baseline data on the City's contribution of sediment loading and flow variations". The City conducted a feasibility study to determine 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 which was initiated in October 2005 and scheduled to continue through August 2008, includes an evaluation of the outfalls and tributaries that have the greatest potential for improvement through implementation of BMPs and/or other methods. The final study will list all MS4 outfalls and tributaries to the Wissahickon Creek that have been evaluated and/or chosen for further study, provide a rationale for selection, and present modeling results.

As a result of the study, the City has designed and implemented a monitoring plan that includes modeling results and monitoring for Total Suspended Solids (TSS) and flow at selected MS4 outfalls and at the confluence of selected tributaries to the Wissahickon Creek during various flow events (low flow, normal flow, and storm flow). The following provides a brief summary of the major elements, actions, and findings of the sediment and stream restoration feasibility study. The feasibility study document and supporting data are located in FY 2006 Stormwater Annual Report Appendix A. Updates based on data acquired between July 1 2007 and June 30 2008 are presented in the following summary of the sediment and stream restoration feasibility study. A final data set will be collected in August, 2008. Upon completion of analysis of this final data set, a summary report will be produced documenting conclusions of the two-year monitoring program.

B.1 Summary of Sediment and Stream Restoration Feasibility Study

B.1.1 Study Objectives

- To identify stream reaches with the most degradation and the greatest potential for restoration

- To estimate sediment loads originating from streambank erosion.

- To establish stage-discharge and discharge-TSS rating curves for tributaries

- To provide an objective means of ranking the stream reaches for restoration

B.1.2 Study Approach

The TMDL is based on models used to estimate Total Suspended Solids (TSS) originating from stream bank erosion and stormwater runoff. PWD developed an approach based on field data and modeling, with conclusions tested using each of the following approaches:

- SWMM modeling to estimate runoff loads and flows from outfalls and tributaries.

- Stream assessment techniques (BEHI scores) and Rosgen derived stream bank erosion rates to estimate in-stream TSS load (can be applied to entire watershed).

- Bank pin measurements to verify or improve BEHI score approach (reality check on BEHI based estimates).

- Measured TSS and flow to estimate total annual load and compare to SWMM and BEHI score TSS load estimates (reality check on sum of SWMM and BEHI estimates).

- Estimate of total volume of soil eroded from pre-development conditions to current stream profile. This was used to estimate time to reach current stream profile using estimated erosion rates from BEHI (an independent reality check on the estimated erosion rate using an entirely different approach).

B.1.2.1 Estimated Outfall Loadings and Runoff

Methods used to develop stormwater outfall flows and loads are described in detail in the Wissahickon Creek Watershed Comprehensive Characterization Report (WCWCCR). Drainage area and estimated mean annual runoff volume for each outfall, estimated mean annual pollutant loads for each outfall and a summary of the total number of outfalls per tributary are reported in tabular form. Each of these tables is included in FY 2006 Stormwater Annual Report Appendix A.

B.1.2.2 In-Stream Loading Assessment Techniques

There are two elements to the monitoring program designed to assess in-stream loading of TSS. The first estimates the sediment load originating from stream banks. The second estimates the total sediment load being carried by the stream. Data collection is ongoing for both parts.

PWD employed the Bank Erosion Hazard Index (BEHI) and Near Bank Stress (NBS) as defined by Rosgen (1996) to predict erosion rates and classify the erosion potential of the tributaries. Three hundred and sixty eight reaches in 12 tributaries have been assessed using BEHI and NBS criteria. Reaches were assessed based on visual inspection of obvious signs of erosion. BEHI and NBS scores were grouped as very low, low, moderate, high or very high. Reaches not assessed with BEHI and NBS criteria were assessed with modified BEHI criteria. Modified assessments were meant to be rapid assessments and relied on a combination of bank angle, weighted root density, surface protection, and best professional judgment of the field crew to categorize a bank as very low, low, moderate, high, very high, or extreme erosion potential. A combination of the aforementioned assessment types was used to predict the sediment load originating from streambank erosion (Table B.1.2-2). Predictions were based on measured streambank erosion rates in a reference stream in Colorado (Rosgen, 1996). The total sediment load predicted for 12 Wissahickon tributaries within Philadelphia County was 4.2 millions pounds per year.

Table B.1.2-1 Wissahickon Tributary Characteristics and Erosion Assessment Bank Lengths

Tributary	Drainage Area, Acres	Stream Length, Feet	BEHI Erosion Bank Length, Feet	Modified BEHI Assessment Bank Length, Feet	Zero Erosion / Channelized Bank Length, Feet
Bells Mill	323	6,722	1,712	8653	3,079
Cathedral	160	2,770	425	5025	91
Creshiem	1,218	14,143	1,180	17366	9,740
Gorgas Lane	499	2,170	280	3644	415
Hillcrest	217	3,530	318	6167	576
Hartwell	144	5,272	25	5817	4,702
Kitchens Lane	234	7,753	1,175	12741	1,589
Monoshone	1,056	6,926	32	7119	6,700
Thomas Mill	104	4,009	600	7418	0
Valley Green	128	2,874	158	4346	1,245
Wises Mill	446	7,056	782	11856	1,474
Rex Ave	137	1,947	255	3559	81

Table B.1.2-2 Wissahickon Tributary Streambank Erosion Estimate – Colorado Stream Based

Tributary	BEHI Erosion lb/yr	Modified BEHI Assessment Erosion lb/yr	Total Erosion lb/yr	Erosion Per Foot of Eroding Stream Length lb/ft/yr
Bells Mill	286,483	305,664	592,146	114
Cathedral	60,535	298,843	359,378	132
Creshiem	128,046	739,411	867,458	94
Gorgas Lane	67,263	312,646	379,909	194
Hillcrest	28,263	161,645	189,908	59
Hartwell	819	62,167	62,985	22
Kitchens Lane	108,235	261,886	370,121	53
Monoshone	11,113	142,378	153,491	43
Thomas Mill	56,159	298,303	354,462	88
Valley Green	8,101	214,058	222,159	99
Wises Mill	101,877	310,925	412,802	65
Rex Ave	30,656	205,596	236,252	124
Total	**887,550**	**3,313,522**	**4,201,071**	**1,087**

B.1.2.3 Bank Profile Measurements

Bank pins were installed in Monoshone, Kitchens Lane, Gorgas Lane, Cresheim, Valley Green, Hartwell, Wises Mill, Cathedral Run, Rex Ave, Thomas Mill, Bells Mill, and Hillcrest in an effort to measure streambank erosion at these sites. A total of 82 bank pin sites were chosen to reflect varying BEHI and NBS scores in order to validate and calibrate the prediction model. Twenty-two bank pin sites were installed during the fall of 2005, and 60 bank pin sites were installed during the summer of 2006. A detailed explanation of how to install and analyze bank pin data is found in FY 2006 Stormwater Annual Report Appendix A. The current bank pin installation locations can be seen in Figure B.1.2-1 on the following page.

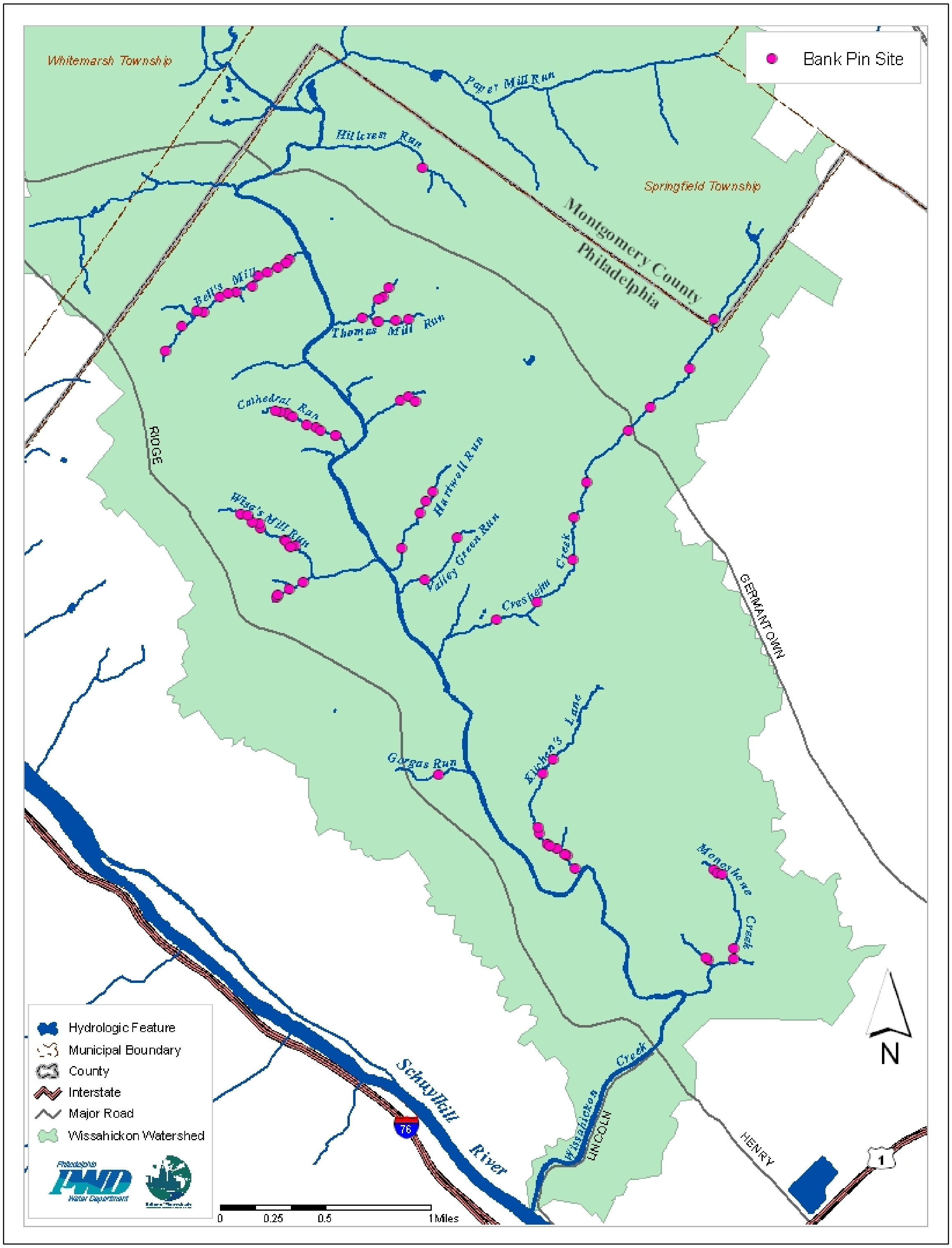

Figure B.1.2-1 Bank Pin Locations

Bank profiles at bank pin sites are measured semi-annually (in March/April and again in August) to determine erosion rates. This report discusses the results of the bank profiles measured through August 2007 (August data is utilized for load estimates, spring readings are used for quality assurance of the data and to assess for any potential dramatic changes that may have taken place during that 6 month period). Erosion rates and sediment loads are calculated from the bank profile measurements following the steps listed below:

1. Each set of bank pin measurements taken on a particular day is plotted. The vertical axis represents height from the toe pin, and the horizontal axis represents distance from that same toe pin. All measurements at a given site are taken relative to this plane.

2. The individual measurements are connected using straight lines to form a profile of the bank shape at the time the measurements were taken.

3. The area between the bank profile and vertical plane is calculated. This area has units of $length^2$ perpendicular to the bank.

4. To estimate erosion rate between two bank profiles taken on different days, a difference in area perpendicular to the bank is taken.

5. This area is divided by difference in height between the top and bottom bank pins. The result is an average erosion rate with units of length perpendicular to the bank.

6. An estimate of bank area is calculated by multiplying estimated bank height and reach length.

7. The erosion rate (length perpendicular to the bank) is multiplied by bank area to yield an estimated erosion rate with units of $length^3$ (volume of soil) over the time period between two sets of measurements.

8. The volume of soil is related to a mass of soil using a reasonable assumption of soil dry bulk density.

As of August 2007, the bank pin measuring program had been active for over a year. The 82 bank pin sites cover the majority of BEHI-NBS combinations assessed in the Wissahickon Creek tributaries. There are 65 sites that have a complete year of data, and an additional 12 sites with at least 6 months of useful data. These 12 sites have been active for over a year; however the toe pin could not be located during a minimum of one round of measurements. Of these sites, 27 have a high BEHI rating (including two sites with at least 6 months of useful data) and 26 have moderate BEHI ratings. The remaining 24 sites have a low BEHI rating. The present analysis relies on these 77 sites;

the remaining sites were not included due to the lack of reliability in bank pin measurements of less than 6 months.

Average erosion rates for the 27 sites rated high and 26 sites rated moderate were used in combination with visual assessments to estimate a sediment load originating from the Wissahickon tributaries within Philadelphia County (Table B.1.2-3). The average erosion rate for either a high or moderate rating was applied to the stream length associated with that ratings. The remaining areas (sites with low, very high or extreme BEHI ratings) utilized erosion rates based on the Colorado stream reference. Using this method, a total sediment load of 3.2 million pounds of sediment per year is estimated to originate from streambank erosion. The bank profiles are scheduled to be measured again in August 2008. By August 2008, all of the bank pin sites will have been installed for a minimum of two years. Upon completion of the August 2008 bank profile measurements, the sites with at least six months of useful data will be used to estimate a sediment load. Conclusions will be drawn from these calculations and a separate report documenting the results will be submitted. At this time, no additional bank profile measurements are scheduled after August 2008.

Table B.1.2-3 Wissahickon Tributary Streambank Erosion Estimate – Bank Pin Based

Tributary	BEHI Erosion lb/yr	Modified BEHI Assessment Erosion lb/yr	Total Erosion lb/yr	Erosion Per Foot of Eroding Stream Length lb/ft/yr
Bells Mill	163,842	146,160	310,002	60
Cathedral	146,298	242,930	389,228	143
Creshiem	107,994	594,061	702,056	76
Gorgas Lane	75,685	276,444	352,128	176
Hillcrest	31,008	77,122	108,130	33
Hartwell	3,167	28,984	32,151	11
Kitchens Lane	91,394	242,683	334,078	48
Monoshone	7,895	65,151	73,045	20
Thomas Mill	50,499	200,188	250,687	63
Valley Green	11,209	183,903	195,112	87
Wises Mill	95,224	242,670	337,894	53
Tributary I	25,405	147,763	173,167	91
Total	**809,620**	**2,448,059**	**3,257,678**	**861**

B.1.2.4 Stage Discharge and Sediment Discharge Rating Curves

In order to estimate the total suspended sediment load in the stream, a stage-discharge and a sediment-discharge rating curve will be generated. Stage data will be used in conjunction with the rating curves to calculate an estimated sediment load per year.

Stage data from Bells Mill, Cathedral Run, Wises Mill, Monoshone, Gorgas Lane, Kitchens Lane, and Cresheim tributaries were recorded near the Wissahickon confluence downstream of all stormwater outfalls. Stage was measured every six minutes by either an ultrasonic down-looking water level sensor or a pressure transducer and recorded on a Sigma620. PWD staff periodically downloaded stage data and performed quality assurance. Any data determined to be incorrect was removed and saved in another location.

Stage recording devices were installed in Bells Mill, Cathedral Run, Wises Mill, and Monoshone from summer 2005 to summer 2007. A staff gage and pressure transducer were installed in Gorgas Lane Run, Kitchen's Lane Run and Cresheim Creek in July 2007, August 2007 and September 2007 respectively and will be removed after a year of data collection. Stage-discharge rating curves were established in the Monoshone, Wises Mill and Bells Mill tributaries following a modified version of the USGS protocol (Buchanan and Somers 1969). Stage-discharge rating curves in all other tributaries will be modeled based on cross section data.

In order to estimate suspended sediment loading, automated water collection devices (ISCO model no. 6712) were used to collect water samples during wet weather events in the Wissahickon Creek tributaries. In the attempt to characterize an entire storm event, automated samplers were triggered by a 0.2 ft elevation change in stream height and collected samples every 20 minutes for the first hour. Following this step, samples were then collected every 2-4 hours until discharge returned to base flow conditions. Suspended sediment loads will be related to the discharge at which they were collected to create a suspended sediment-discharge rating curve. The location of installed samplers can be seen in Figure B.1.2-2.

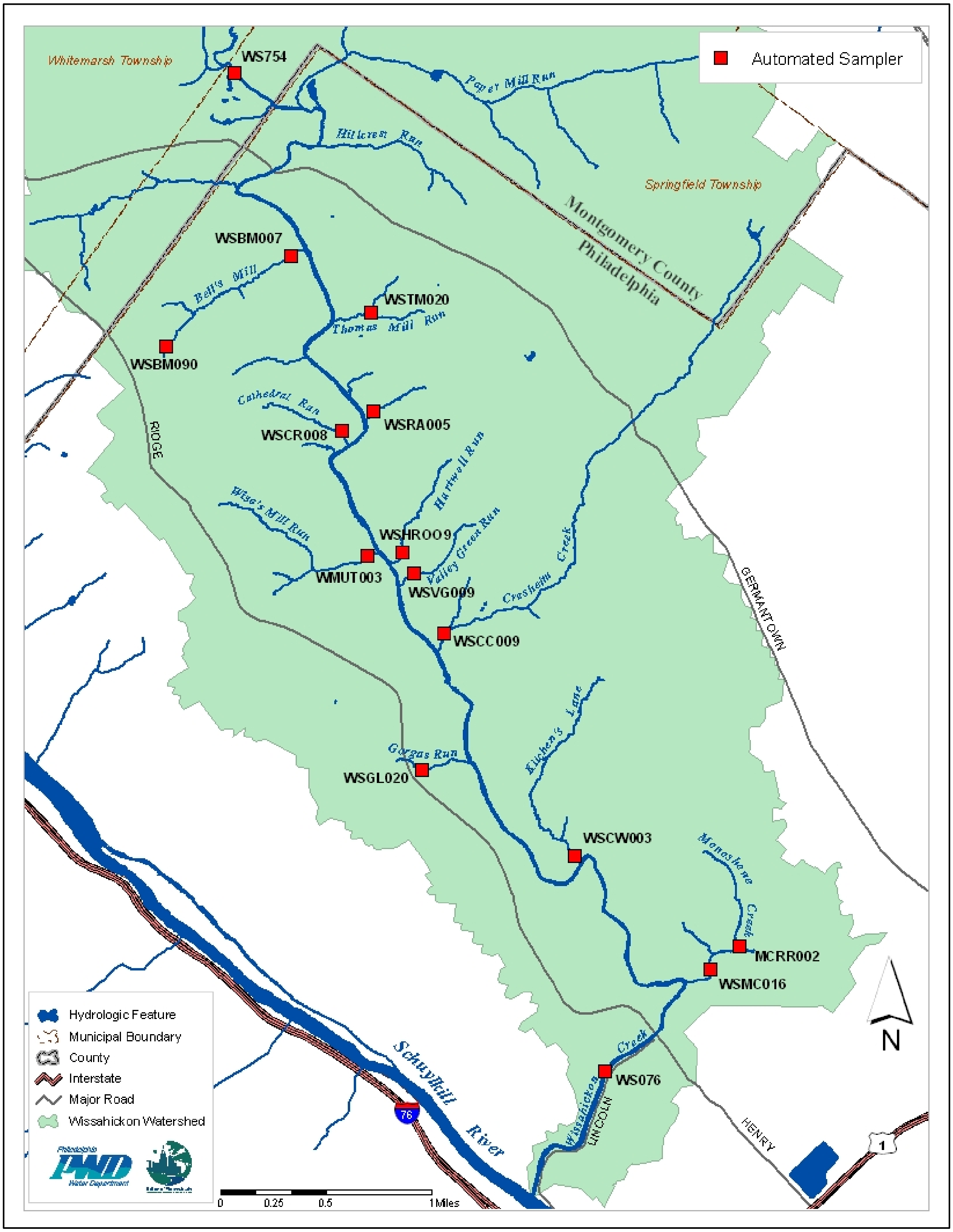

Figure B.1.2-2 Automatic Sampler Locations

B.2 Tributary Restoration Potential Ranking

Any stream channel and corridor restoration plan for the Wissahickon requires a ranking of tributaries. EVAMIX has been chosen to rank the restoration potential of tributaries and stream reaches. EVAMIX is a matrix-based, multi-criteria evaluation program that makes use of both quantitative and qualitative criteria within the same evaluation; regardless of the units of measure. The algorithm behind EVAMIX is unique in that it maintains the essential characteristics of quantitative and qualitative criteria, yet is designed to eventually combine the results into a single appraisal score. This critical feature gives the program much greater flexibility than most other matrix-based evaluation programs, and allows the evaluation team to make use of all data available to them in its original form.

Methods used to develop tributary restoration potential ranking are described in detail in the FY 2006 Stormwater Annual Report Section B. Upon completion of the August 2008 bank pin readings the final reach ranking will be produced. This information will be utilized in the development of the Wissahickon Creek Integrated Watershed Management Plan's (WCIWMP) implementation commitment.

Criteria chosen to evaluate restoration potential are summarized in Table **Error! Not a valid bookmark self-reference.**B.2-1 and discussed in more detail below.

Table B.2-1 Ranking Criteria

Criterion	Unit	Need for Restoration				Restoration Potential	
		Sediment Reduction	Habitat	Riparian	Infrastructure	Channel	Riparian
Estimated stream bank erosion load	lb/ft/yr	XX	X	N/A	N/A	N/A	N/A
Habitat index	% ref. cond.	N/A	XX	N/A	N/A	N/A	N/A
Benthic macroinvertebrate index	# species	N/A	XX	N/A	N/A	N/A	N/A
Construction difficulty and disturbance	TBD	N/A	N/A	X	N/A	XX	XX
Fairmount Park projects	Number	N/A	N/A	N/A	N/A	XX	XX
Identified sanitary sewer problems	Number	N/A	N/A	N/A	XX	N/A	N/A

XX - need or potential for restoration is highly related to the criterion
X - need or potential for restoration is somewhat related to the criterion

Ranking analyses were performed with several sets of criteria weights. One set of weights for the restoration project is shown in Table B.2-2. The results obtained with that weight set are presented in **Error! Reference source not found.**B.2-3. Also shown in **Error! Reference source not found.**B.2-3 is the sum of all the reach lengths for each category identified as low, medium, and high priority within each tributary. The tributary restoration ranking is graphically represented in **Error! Reference source not found.**B.2-1, and reach restoration ranking is graphically represented in Figure B.2-2.

Table B.2-2 Criteria Weights

Criteria	Weight 0<wt<1
Estimated stream bank erosion load	0.300
Habitat index	0.100
Benthic macroinvertebrate index	0.100
Fairmount Park projects	0.100
Identified sanitary sewer problems	0.100
Construction difficulty/disturbance index	0.300

B.2.1 Sediment Loading and Erosion Results

Upon completion of the August 2008 bank pin readings the final sediment load and erosion estimates will be produced. This information will be shared in the form of a final report.

B.2.2 Future Sampling

In efforts to comply with the Wissahickon Creek Sediment TMDL and the continuing goal of reducing sediment load from tributaries within City boundaries, PWD is in the process of developing a long-term implementation and monitoring strategy, which will be closely associated with the Wissahickon Creek Integrated Watershed Management Plan (WCIWMP) and its associated Implementation Plan(s) that PWD is developing. PWD's IWMPs are produced with an anticipated 20 year implementation timeline addressed through four subsequent 5-year Implementation Plans. The tributary restoration approach will be driven by the WCIWMP's Implementation Plans.

Outlined within this report is an implementation strategy that will carry forth through the end of this Stormwater Permit cycle. Subsequent Stormwater Permits will reference the WCIWMP and Implementation Plans for up-to-date implementation and monitoring strategies.

Table B.2.2-1 Timeline Strategy for Monitoring Components of the Wissahickon TMDL.

Monitoring Program	2005				2006				2007				2008				2009				2010				2011			
	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
Tributary Prioritization																												
BEHI/NBS Studies																												
Bank Profile Measurements																												
Stream Modeling																												
Flow Monitoring																												
Discharge Rating Curve																												
Continuous Stage Recording																												
Sediment Transport Rates																												
TSS Rating Curve																												
BMP Monitoring																												
Post Construction TSS Monitoring																												
Post Construction Bank Profile Measurements																												
Post Construction Stream Modeling																												

B.2.2.1 Continued Bank Pin Program

PWD established 82 bank pin sites throughout 11 Wissahickon Creek tributaries within Philadelphia County. The main objective of the bank pin program is to quantify the load of sediment originating from streambank erosion within the Wissahickon tributary system. Another objective of the bank pin program is to define a local relationship between measured stream bank erosion and qualitative stream bank erosion (using Rosgen's BEHI/NBS method). PWD established bank pin sites in areas that were assessed to have a range of BEHI/NBS scores in order to better estimate the true standard deviations and arrive at a relationship between the empirical bank pin data and the visual assessment.

Bank profiles at bank pin sites will be measured semi-annually in order to calculate yearly erosion rates and sediment loads. Erosion rates and sediment loads are calculated from the bank profile measurements following the protocol outlined in FY 2006 Stormwater Annual Report, Appendix A. By August 2008, all of the bank pin sites will have been installed for a minimum of two years. Upon completion of the August 2008 bank profile measurements, the sites with at least six months of useful data will be used to estimate a sediment load. Conclusions will be drawn from these calculations and a separate report documenting the results will be submitted. At this time, no additional bank profile measurements are scheduled beyond August 2008.

Continuous Stage Data

Stage-discharge characterization on the eleven tributaries within Philadelphia County limits will be continue until data has been collected from all tributaries. Stage data will be recorded at designated monitoring sites using a fixed Sigma ultrasonic sensor and/or pressure transducer. Stage data will be downloaded monthly and QA/QC will be performed by PWD staff. Over a years worth of stage data has been collected from Bells Mill, Cathedral Run, Wises Mill, and Monoshone. By September 2008, stage data will have been collected for at least one year from Gorgas Lane, Kitchens Lane, and Cresheim Creek.

Stage Discharge Rating Curve

Stage-discharge rating curves for Bells Mill, Monoshone, and Wises Mill were completed following a modified version of the USGS protocol (Buchanan and Somers 1969). Future stage-discharge rating curves will be modeled using cross section and slope data collected at designated monitoring sites.

Sediment Discharge Rating Curve

Automated water collection devices (ISCO model no. 6712) have been used to collect water samples during wet weather events in eleven of the Wissahickon Creek tributaries within Philadelphia County. In the attempt to characterize an entire storm event, automated samplers were triggered by a 0.2 ft elevation change in stream height and collected samples every 20 minutes for the first hour. Following this step, samples were collected every 2-4 hours until discharge returned to base flow conditions. Suspended sediment loads will be related to the discharge at which they were collected to create a suspended sediment rating curve.

Post Construction Monitoring

The final objective of the TMDL monitoring program is to measure (i.e., quantify) the efficacy of Best Management Practices (BMPs) and their benefit in terms of sediment reduction in the Wissahickon Creek Watershed. To meet this objective PWD will use the natural stream channel design (NSCD) monitoring methodology described in Section E.3.2.3. Section E.3.2.3 outlines the physical and biological/habitat monitoring methods that will be used to examine the functionality of BMPs in the Wissahickon Creek Watershed.

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

The City has polychlorinated biphenyl (PCB) Pollutant Minimization Plans in effect under each of the three Water Pollution Control Plants individual NPDES permits which set forth a more stringent plan than is requested within the City's MS4 NPDES Permit. For additional information on the City's PCB PMP, see the City's NPDES permits for each of its three wastewater treatment plants:

NEWPCP	PA0026689
SEWPCP	PA0026662
SWWPCP	PA0026671

C.1 City PMP Contact Information

Keith Houck, Manager
(215) 685 - 4910
Industrial Waste Unit
Aramark Tower, 3rd Floor
1101 Market Street
Philadelphia, PA 19107

C.2 City of Philadelphia MS4 Service Area

A table and maps for the MS4 service area referencing known locations where PCB material, equipment, processes, soil area, or facilities are or have been located can be found in FY 2006 Stormwater Annual Report Appendix B.

C.3 PCB Locations

Within the City's MS4 service area, there are no known materials, equipment, processes, soil areas or facilities that are known to be releasing, directly or indirectly. To that effect, there are also no known PCB sources within its MS4 system that the City believes may require some degree of control to reduce its discharge. However the City has compiled a list of known locations where PCB material, equipment, processes, soil area, or facilities are or have been located. This list has been compiled from 2 lists discussed below:

Description of "Devices" List

This list is a compilation of information obtained from USEPA, PADEP, DRBC, Partnership for the Delaware Estuary, the Philadelphia Fire Department, the Philadelphia Department of Public Health and PECO, along with PWD's inventory of PCB-containing equipment. The sites listed are those within PWD's MS4 service area and at which PCB-containing devices may exist. In accordance with PWD's PCB Pollutant Minimization Plan (PCB PMP) which was submitted to DRBC on September 30, 2005, PWD's Industrial Waste Unit (IWU) will visit the listed sites over a five-year period to determine the status of each site's PCB-containing devices. IWU will characterize that status using a list of forty (40) descriptors to determine the site's potential as a possible source of PCBs. Appropriate corrective steps will be taken for any site found to be releasing or having the potential to release PCBs.

Description of "Health Dept." List

This list contains sites at which the Philadelphia Department of Public Health has some record of a past PCB release. In accordance with PWD's PCB PMP mentioned above, IWU will visit the listed sites over a two-year period to determine the status of each and will recommend additional risk reduction measures where appropriate.

During FY 2008, PWD IWU performed 80 site inspections. A discussion of the results of each of these inspections is provided in the PWD PCB PMP, located in **Appendix J**.

C.4 In-Stream PCB Sampling

In accordance with Section E of the City's Stormwater National Pollution Discharge Elimination System (NPDES) permit, the City will collect and analyze twelve (n=12) in-stream samples for PCBs during the permit term.

C.4.1 PCB Sampling Locations

PWD staff scientists have identified six strategic PCB monitoring locations where they will also be able to record continuous water quality and quantity data in each of the watersheds located within the City of Philadelphia. Each sampling site will be stationed at the furthest downstream USGS gage station in each of the City's six watersheds (Figure C.4-1).

C.4.2 PCB Sampling Period

Surface water PCB sampling will commence in the Spring of 2009. Samples at each station will be collected once during dry weather (n=6) and once during wet weather conditions (n=6), for a total of 12 samples. A wet weather event is defined by precipitation greater than 0.5 inches in a continuous 24 hour period. Additionally, wet weather conditions extend from the commencement of rain through 72 hours following the wet weather event.

C.4.3 PCB Sampling Technique 1668A

To determine surface water concentrations of PCBs, PWD will be using the standard operating procedures and analysis techniques outlined by the United States Environmental Protection Agency's (USEPA) Method 1668A. This congener-specific method is used to determine the twelve PCBs designated as toxic by the World Health Organization plus the remaining 197 chlorinated biphenyl congeners. Method 1668A allows estimation of homolog totals by level of chlorination and estimation of total PCBs (Table C.4-1).

C.5 Delaware River Basin Commission (DRBC) Cooperation

As the City moves forward in implementing the PCB PMP, it looks forward to continuing to enlist the cooperation of stakeholders throughout the Delaware Estuary in developing a template for other MS4 systems. PWD's PCB PMP was also submitted to the DRBC on September 30, 2005.

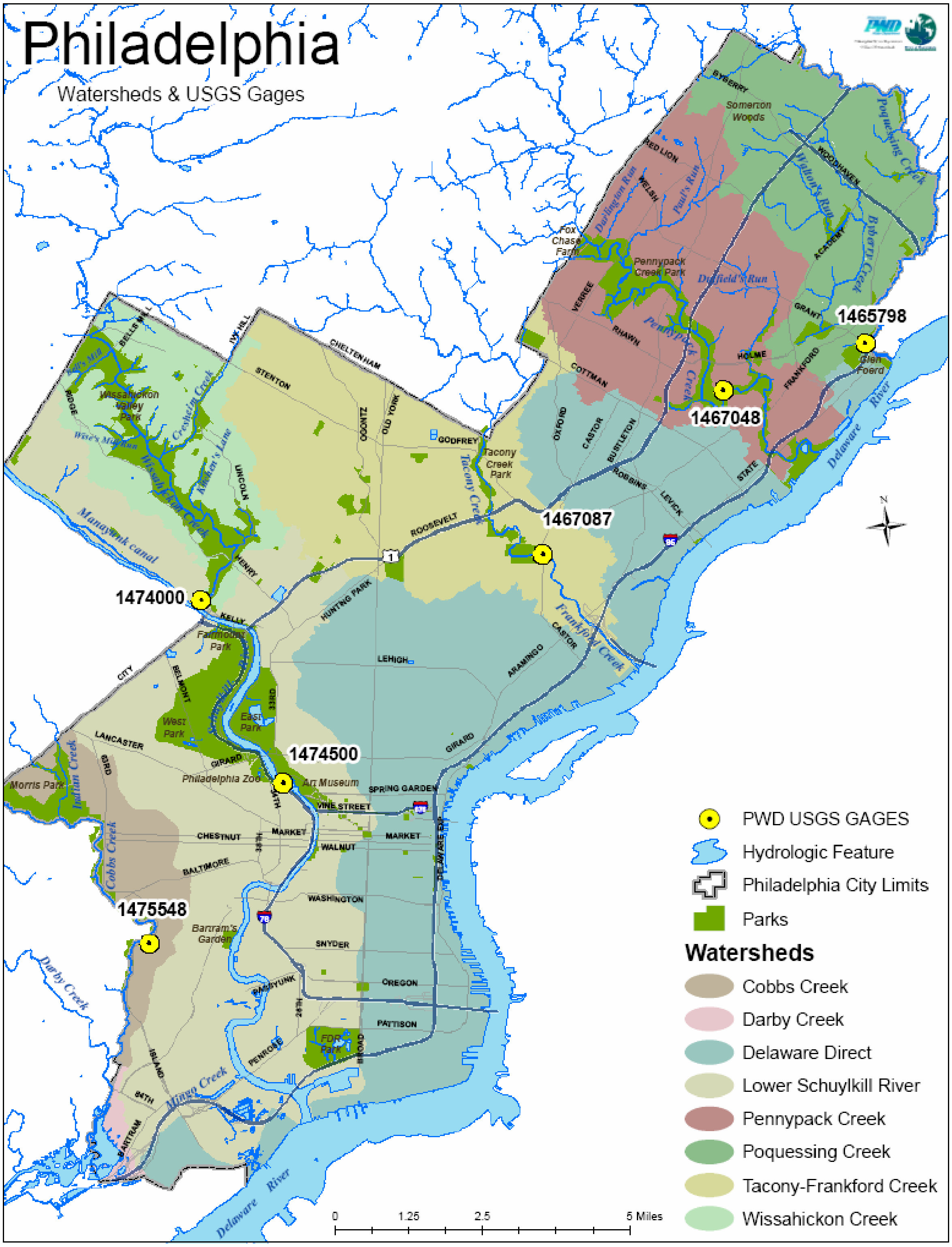
Philadelphia
Watersheds & USGS Gages
1465798
1467048
1467087
1474000
1474500
1475548
PWD USGS GAGES
Hydrologic Feature
Philadelphia City Limits
Parks
Watersheds
Cobbs Creek
Darby Creek
Delaware Direct
Lower Schuylkill River
Pennypack Creek
Poquessing Creek
Tacony-Frankford Creek
Wissahickon Creek
0
1.25
2.5
5 Miles

Table C.4-1 PCB Congeners Sampled in Method 1668A

Congener Number	PCB Congeners	Congener Number	PCB Congeners	Congener Number	PCB Congeners	Congener Number	PCB Congeners
1	2-MoCB	26	2,3',5-TrCB	51	2,2',4,6'-TeCB	76	2',3,4',5-TeCB
2	3-MoCB	27	2,3',6-TrCB	52	2,2',5,5'-TeCB1	77	3,3',4,4'-TeCB1,2
3	4-MoCB	28	2,4,4'-TrCB1	53	2,2',5,6'-TeCB	78	3,3',4,5-TeCB
4	2,2'-DiCB	29	2,4,5-TrCB	54	2,2',6,6'-TeCB	79	3,3',4,5'-TeCB
5	2,3-DiCB	30	2,4,6-TrCB	55	2,3,3',4'-TeCB	80	3,3',5,5'-TeCB
6	2,3'-DiCB	31	2,4',5-TrCB	56	2,3,3',4'-TeCB	81	3,4,4',5-TeCB2
7	2,4-DiCB	32	2,4',6-TrCB	57	2,3,3',5-TeCB	82	2,2',3,3',4-PeCB
8	2,4'-DiCB1	33	2',3,4-TrCB	58	2,3,3',5'-TeCB	83	2,2',3,3',5-PeCB
9	2,5-DiCB	34	2',3,5-TrCB	59	2,3,3',6-TeCB	84	2,2',3,3',6-PeCB
10	2,6-DiCB	35	3,3',4-TrCB	60	2,3,4,4'-TeCB	85	2,2',3,4,4'-PeCB
11	3,3'-DiCB	36	3,3',5-TrCB	61	2,3,4,5-TeCB	86	2,2',3,4,5-PeCB
12	3,4-DiCB	37	3,4,4'-TrCB	62	2,3,4,6-TeCB	87	2,2',3,4,5'-PeCB
13	3,4'-DiCB	38	3,4,5-TrCB	63	2,3,4',5-TeCB	88	2,2',3,4,6-PeCB
14	3,5-DiCB	39	3,4',5-TrCB	64	2,3,4',6-TeCB	89	2,2',3,4,6'-PeCB
15	4,4'-DiCB	40	2,2',3,3'-TeCB	65	2,3,5,6-TeCB	90	2,2',3,4',5-PeCB
16	2,2',3-TrCB	41	2,2',3,4-TeCB	66	2,3',4,4'-TeCB1	91	2,2',3,4',6-PeCB
17	2,2',4-TrCB	42	2,2',3,4'-TeCB	67	2,3',4,5-TeCB	92	2,2',3,5,5'-PeCB
18	2,2',5-TrCB1	43	2,2',3,5-TeCB	68	2,3',4,5'-TeCB	93	2,2',3,5,6-PeCB
19	2,2',6-TrCB	44	2,2',3,5'-TeCB1	69	2,3',4,6-TeCB	94	2,2',3,5,6'-PeCB
20	2,3,3'-TrCB	45	2,2',3,6-TeCB	70	2,3',4',5-TeCB	95	2,2',3,5',6-PeCB
21	2,3,4-TrCB	46	2,2',3,6'-TeCB	71	2,3',4',6-TeCB	96	2,2',3,6,6'-PeCB
22	2,3,4'-TrCB	47	2,2',3,4'-TeCB	72	2,3',5,5'-TeCB	97	2,2',3',4,5-PeCB
23	2,3,5-TrCB	48	2,2',4,5-TeCB	73	2,3',5',6-TeCB	98	2,2',3',4,6-PeCB
24	2,3,6-TrCB	49	2,2',4,5'-TeCB	74	2,4,4',5-TeCB	99	2,2',4,4',5-PeCB
25	2,3',4-TrCB	50	2,2',4,6-TeCB	75	2,4,4',6-TeCB	100	2,2',4,4',6-PeCB

101	2,2',4,5,5'-PeCB1	129	2,2',3,3',4,5-HxCB	157	2,3,3',4,4',5'-HxCB2	185	2,2',3,4,5,5',6-HpCB
102	2,2',4,5,6'-PeCB	130	2,2',3,3',4,5'-HxCB	158	2,3,3',4,4',6-HxCB	186	2,2',3,4,5,6,6'-HpCB
103	2,2',4,5,6'-PeCB	131	2,2',3,3',4,6-HxCB	159	2,3,3',4,5,5'-HxCB	187	2,2',3,4,5,5',6-HpCB1
104	2,2',4,6,6'-PeCB	132	2,2',3,3',4,6'-HxCB	160	2,3,3',4,5,6-HxCB	188	2,2',3,4',5,6,6'-HpCB
105	2,3,3'4,4'-PeCB1,2	133	2,2',3,3',5,5'-HxCB	161	2,3,3',4,5',6-HxCB	189	2,3,3',4,4',5,5'-HpCB2
106	2,3,3',4,5-PeCB	134	2,2',3,3',5,6-HxCB	162	2,3,3',4',5,5'-HxCB	190	2,3,3',4,4',5,6-HpCB
107	2,3,3',4',5-PeCB	135	2,2',3,3',5,6'-HxCB	163	2,3,3',4',5,6-HxCB	191	2,3,3',4,4',5',6-HpCB
108	2,3,3',4,5'-PeCB	136	2,2',3,3',6,6'-HxCB	164	2,3,3',4',5',6-HxCB	192	2,3,3',4,5,5',6-HpCB
109	2,3,3',4,6-PeCB	137	2,2',3,4,4',5-HxCB	165	2,3,3',5,5',6-HxCB	193	2,3,3',4',5,5',6-HpCB
110	2,3,3',4',6-PeCB	138	2,2',3,4,4',5'-HxCB1	166	2,3,4,4',5,6-HxCB	194	2,2',3,3',4,4',5,5'-OcCB
111	2,3,3',5,5'-PeCB	139	2,2',3,4,4',6-HxCB	167	2,3,4,4',5,5'-HxCB2	195	2,2',3,3',4,4',5,6-OcCB1
112	2,3,3',5,6-PeCB	140	2,2',3,4,4',6'-HxCB	168	2,3',4,4',5',6-HxCB	196	2,2',3,3',4,4',5,6'-OcCB
113	2,3,3',5',6-PeCB	141	2,2',3,4,5,5'-HxCB	169	3,3',4,4',5,5'-HxCB1,2	197	2,2',3,3',4,4',6,6'-OcCB
114	2,3,4,4',5-PeCB1,2	142	2,2',3,4,5,6-HxCB	170	2,2',3,3',4,4',5-HpCB1	198	2,2',3,3',4,5,5',6-OcCB
115	2,3,4,4',6-PeCB	143	2,2',3,4,5,6'-HxCB	171	2,2',3,3',4,4',6-HpCB	199	2,2',3,3',4,5,5',6'-OcCB
116	2,3,4,5,6-PeCB	144	2,2',3,4,5',6-HxCB	172	2,2',3,3',4,5,5'-HpCB	200	2,2',3,3',4,5,6,6'-OcCB
117	2,3,4',5,6-PeCB	145	2,2',3,4,6,6'-HxCB	173	2,2',3,3',4,5,6-HpCB	201	2,2',3,3',4,5',6,6'-OcCB
118	2,3',4,4',5-PeCB1,2	146	2,2',3,4',5,5'-HxCB	174	2,2',3,3',4,5,6'-HpCB	202	2,2',3,3',5,5',6,6'-OcCB
119	2,3',4,4',6-PeCB	147	2,2',3,4',5,6-HxCB	175	2,2',3,3',4,5',6-HpCB	203	2,2',3,4,4',5,5',6-OcCB
120	2,3',4,5,5'-PeCB	148	2,2',3,4',5,6'-HxCB	176	2,2',3,3',4,6,6'-HpCB	204	2,2',3,4,4',5,6,6'-OcCB
121	2,3',4,5,6-PeCB	149	2,2',3,4',5',6-HxCB	177	2,2',3,3',4',5,6-HpCB	205	2,3,3',4,4',5,5',6-OcCB
122	2',3,3',4,5-PeCB	150	2,2',3,4',6,6'-HxCB	178	2,2',3,3',5,5',6-HpCB	206	2,2',3,3',4,4',5,5',6-NoCB1
123	2',3,4,4',5-PeCB2	151	2,2',3,5,5',6-HxCB	179	2,2',3,3',5,6,6'-HpCB	207	2,2',3,3',4,4',5,6,6'-NoCB
124	2',3,4,5,5'-PeCB	152	2,2',3,5,6,6'-HxCB	180	2,2',3,4,4',5,5'-HpCB1	208	2,2',3,3',4,5,5',6,6'-NoCB
125	2',3,4,5,6'-PeCB	153	2,2',4,4',5,5'-HxCB1	181	2,2',3,4,4',5,6-HpCB	209	DeCB1
126	3,3',4,4',5-PeCB1,2	154	2,2',4,4',5',6-HxCB	182	2,2',3,4,4',5,6'-HpCB		
127	3,3',4,5,5'-PeCB	155	2,2',4,4',6,6'-HxCB	183	2,2',3,4,4',5',6-HpCB		
128	2,2',3,3',4,4'-HxCB1	156	2,3,3',4,4',5-HxCB2	184	2,2',3,4,4',6,6'-HpCB		

Section D Source Identification

Presented is a description of the City of Philadelphia municipal separate storm sewer system (MS4) including the sewershed, combined sewer system sewershed, non-contributing areas, and watershed boundaries. The following tables presents a summary of the Philadelphia infrastructure and MS4 system, including; stormwater outfalls (434 total), lengths of sanitary sewer, and lengths of stormwater sewer within Philadelphia and contributing neighboring townships. These areas are depicted in Figure D-1 on the following page.

Table D-1 Infrastructure Area of Philadelphia and Neighboring Contributors

Watershed	Square Miles of Philadelphia and Contributing Area Infrastructure				
	MS4 Area	Combined Area	Un-Sewered Area	Stormwater Area	Non-Contributing Area
Darby-Cobbs	86.0	4.4	0	0	1.4
Delaware Direct	39.9	22.0	0	0.4	0.1
Pennypack	21.7	0.6	0	0.2	4.9
Poquessing	28.5	0	0	0	4.0
Schuylkill	15.3	17.3	0	1.5	11.1
Tacony	1.6	19.7	0	0	1.4
Wissahickon	14.0	0.0	1.1	0	2.9
Total	**207.0**	**64.0**	**1.1**	**2.1**	**25.8**

Table D-2 Description of MS4 Infrastructure

Watershed	Miles of Pipe			MS4 Outfalls	
	Stormwater	Sanitary	Total MS4	PWD Owned	Other
Darby-Cobbs	0	9.0	9.0	3	0
Delaware Direct	28.6	56.5	85.1	17	0
Pennypack	1.5	234.2	235.7	129	3
Poquessing	0.0	143.9	143.9	145	1
Schuylkill	23.7	130.6	154.3	42	0
Tacony	0.4	58.8	59.2	32	1
Wissahickon	0	91.2	91.2	64	0
Total	**54.1**	**724.1**	**778.2**	**429**	**5**

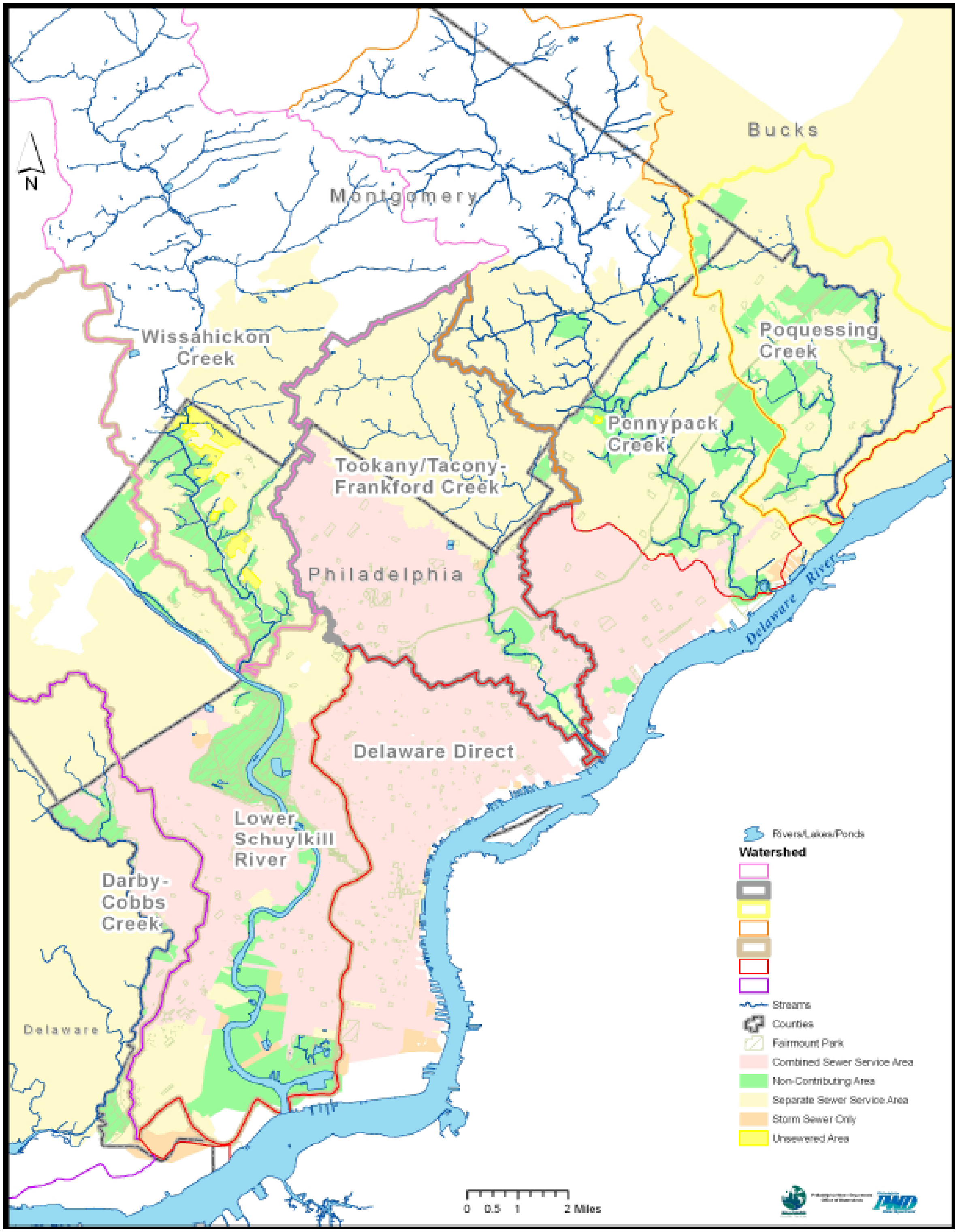

Figure D-1 Philadelphia Infrastructure System Areas

Table D-3 GIS Data Layers and Filenames Submitted on Data CD

GIS Data Layers and Filename	
FY 2007 E&S Inspection Locations	Philadelphia Area Land Use
FY 2007 PADEP Coordinated Reviews	Philadelphia Major Watersheds
FY 2007 Permitted Industries	Philadelphia Population 2000 Census
FY 2007 Plan Review Locations	Philadelphia Sewersheds
FY 2007 Stormwater Permit Tracking	Poquessing Watershed
Known Historical PCB Locations	PWD Monitoring Locations
Pennypack Watershed	Wissahickon Hydrology Polygon
Philadelphia Area Hydrology Polygon	Wissahickon Hydrology Polyline
Philadelphia Area Hydrology Polyline	Wissahickon Watershed
Philadelphia Detention Basins	

PWD has included the GIS layers referenced above on the accompanying CD to this report in response to the requirements of the Permit.

FY 2007E&S Inspection Locations
This layer presents the locations of erosion and sedimentation inspections carried out at construction sites within Philadelphia in FY 2007. The contents of this layer are discussed in Section H.

FY 2007 PADEP Coordinated Reviews
This layer presents the locations of new plan reviews coordinated with PADEP and PWD. The contents of this layer are discussed in Section H.

FY 2007 Permitted Industries
This layer presents the location of significant industrial users that possess a permit allowing discharge into the stormwater sewer system.

FY 2007 Plan Review Locations
This layer presents the locations of new plan reviews conducted by PWD during FY 2007. The contents of this layer are discussed in Section H.

FY 2007 Stormwater Permit Tracking
This layer presents the locations of all new applicants for stormwater permits within Philadelphia County.

Known Historical PCB Locations
This layer presents the location of all known and historical polychlorinated biphenyl (PCB) locations within Philadelphia.

Pennypack Watershed
This layer presents the delineation of the Pennypack Creek watershed that drains parts of Montgomery, Bucks, and Philadelphia Counties.

Philadelphia Area Hydrology Polygon
This layer presents the boundaries of Philadelphia County hydrology in a polygon based shapefile.

Philadelphia Area Hydrology Polyline
This layer presents the boundaries of Philadelphia County hydrology in a polyline based shapefile.

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

Philadelphia Area Land Use
This layer presents land use within Philadelphia, Bucks, Chester, Delaware, and Montgomery Counties. The source of this data is the Delaware Valley Regional Planning Commission. Metadata contained within this file further explains the source and processing of this data.

Philadelphia Major Watersheds
This layer presents the delineation of the Philadelphia County portion of the Darby-Cobbs, Delaware-Direct, Pennypack, Poquessing, Schuylkill, Tacony-Frankford, and Wissahickon watersheds.

Philadelphia Population 2000 Census
This layer presents the results of the 2000 Census in Philadelphia County.

Philadelphia Sewersheds
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.

Poquessing Watershed
This layer presents the delineation of the Poquessing watershed that drains parts of Bucks, Montgomery, and Philadelphia Counties.

PWD Monitoring Locations
This layer presents the locations of the PWD's chemical, fish, macroinvertebrate, and algae sampling sites.

Wissahickon Hydrology Polygon
This layer presents the boundaries of Wissahickon watershed hydrology in a polygon based shapefile.

Wissahickon Hydrology Polyline

This layer presents the boundaries of Wissahickon watershed hydrology in a polyline based shapefile.

Wissahickon Watershed
This layer presents the delineation of the Wissahickon Creek watershed that drains parts of Montgomery and Philadelphia Counties.

Also included in the Data CD is a Geodatabase titled StormwaterDataConversion.mdb. This database is the PWD inventory of all assets and each layer has extensive metadata to explain the origin and contents of all data. The features most pertinent to this report include the outfalls, manholes, inlets, and various pipe layers.

Table D-4 GIS Stormwater Data Conversion Geodatabase Layers on Data CD

GIS Stormwater Data Conversion Geodatabase Layers	
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_stVirtualNode

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Section E Discharge Management, Characterization, and Watershed-Based Assessment and Management Program

E.1 Step 1 Preliminary Reconnaissance: Permit Issuance through end of Year 3

E.1.1 Comprehensive Watershed Monitoring Program

The City of Philadelphia recognizes the potential impacts of discharges from stormwater, CSO and other discharges and conditions that affect drinking water and other designated uses of our waterways.

Comprehensive assessment of our waterways is integral to planning for the long-term health and sustainability of our water systems. The Philadelphia Water Department (PWD) considers such assessments as essential to raising awareness in Southeastern Pennsylvania as to the impact that land development activities are having on waterbody health. 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.

Specifically, biological monitoring is a useful means of detecting impacts to the aquatic ecosystems necessary for sustainable fisheries and other designated uses. Biological communities respond to wide variety of chemical, physical and biological factors in the environment and can reveal natural and anthropogenic stressors. In this respect, resident biota in a water body act as natural monitors of environmental quality and can reveal the effects of episodic and cumulative pollution and habitat alteration.

Bio-assessments, however, must be integrated with appropriate chemical and physical measures, land use characterizations, and pollutant source information necessary to establish linkages between stressors and environmental quality. These linkages can then be used to create decision-making frameworks for selecting restoration techniques that are appropriately balanced between in-stream restoration, land-based management practices, and new water and sewer infrastructure.

From 1999 to 2008, 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 being used to plan improvements to the watersheds in the Southeast Region of Pennsylvania.

E.1.2 Background

The Philadelphia Water Department has carried out extensive sampling and monitoring programs to characterize conditions in seven local watersheds (Figure 1), both within the county boundaries and outside counties/municipalities. The program is designed to document the condition of aquatic resources and to provide information for the planning process needed to meet regulatory requirements of EPA and PADEP. The program includes hydrologic, water quality, biological, habitat, and fluvial geomorphological aspects. The Office of Watersheds is well suited to manage the program because it merges the goals of the city's stormwater, combined sewer overflow, and source water protection programs into a single unit dedicated to watershed-wide characterization and planning.

Under the provisions of the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) requires permits for point sources that discharge to waters of the United States. In the six watersheds entering Philadelphia, stormwater outfalls and wet weather sewer overflow points discharging to surface waters are classified as point sources and are regulated by NPDES.

EPA's Combined Sewer Overflow Control Policy, published in 1993, provides the national framework for regulation of CSOs under NPDES. The Policy guides municipalities, state and federal permitting agencies in meeting the pollution control goals of the CWA in as flexible and cost-effective a manner as possible. As part of the program, communities serviced by combined sewer systems are required to develop long-term CSO control plans (LTCPs) that will result in full compliance with the CWA in the long term, including attainment of water quality standards. PWD completed its LTCP in 1997 and is currently implementing its provisions. The strong focus of the National CSO Policy on meeting water quality standards is a main driver behind PWD's water quality sampling and monitoring program.

Regulation of stormwater outfalls under the NPDES program requires operators of medium and large municipal stormwater systems or MS4s to obtain a permit for discharges and to develop a stormwater management plan to minimize pollution loads in runoff over the long term. Partially in administration of this program, PA DEP assigns designated uses to water bodies in the state and performs ongoing assessments of the condition of the water bodies to determine whether the uses are met and to document any improvement or degradation. These assessments are performed primarily with biological indicators based on the EPA's Rapid Bio-assessment Protocols (RBPs) and physical habitat assessments.

PWD's Office of Watersheds (OOW) and Bureau of laboratory Services (BLS) are responsible for characterization and analysis of existing conditions in local watersheds to provide a basis for long-term watershed planning and management. The extensive sampling and monitoring program described in this section is designed to provide the data needed for the long-term planning process.

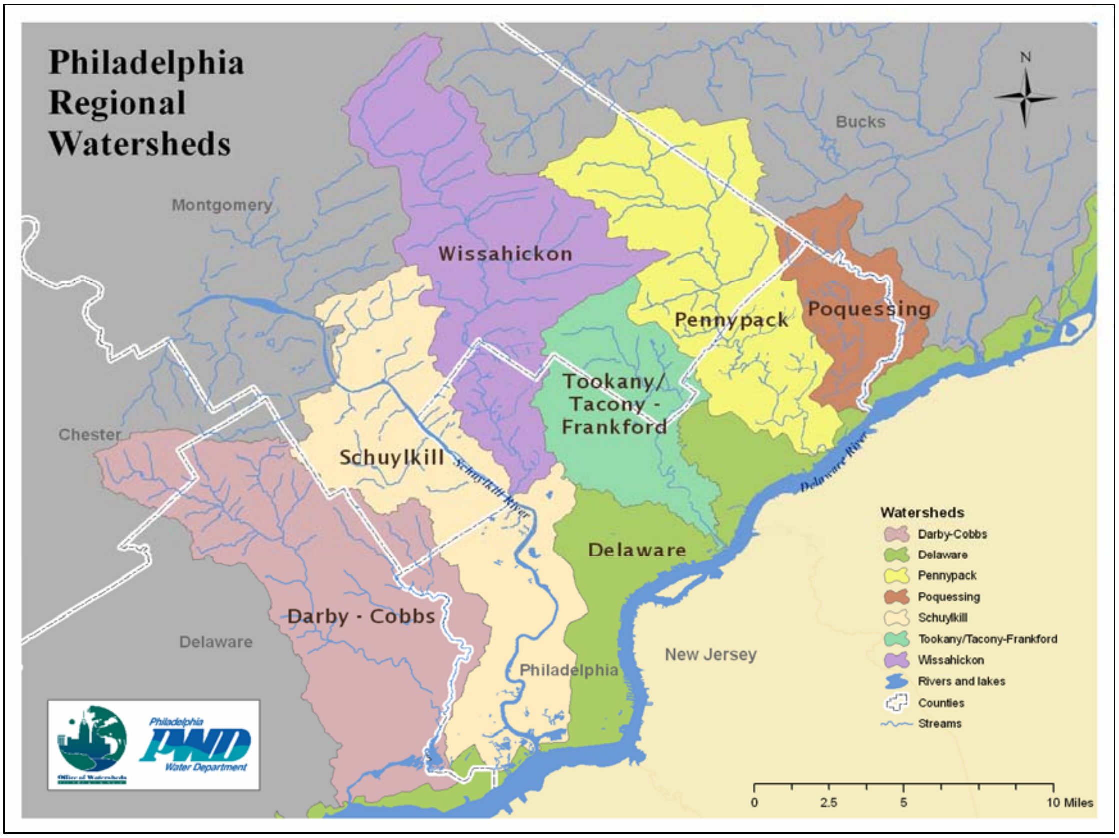

Figure E.1.2-1 Philadelphia Regional Watersheds

E.1.3 Water Quality Monitoring

E.1.3.1 Guiding Principles of Urban Water Chemistry Assessment

PWD water chemistry assessment activities are guided by recognition of the fact that water quality changes dramatically during wet weather. Water quality assessment procedures must advance our understanding of wet weather effects on stream water quality as well as our stormwater and sewer infrastructure. 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.

E.1.3.2 Discrete Water Chemistry Assessment

During the 2002-2007 assessment cycles, a series of four weekly surface water grab samples were manually collected during winter, spring and summer at several locations in each watershed (n=12 sampling events at each location). These samples were termed “discrete interval” samples as the sampling was conducted on a weekly basis regardless of weather conditions. This sampling program represented the finest watershed-wide spatial resolution of all of PWD’s water quality monitoring activities. Parameters (Table E.3.1-1) were chosen because state water quality criteria apply to them or because they are known or suspected to be important in urban watersheds. These discrete interval water chemistry assessment data represent the most complete modern water chemistry dataset for the majority of Philadelphia’s watersheds.

In 2006, PADEP published a review of statistical techniques and provided guidelines for water chemistry statistical analysis when the goal is determining whether a site is meeting its designated use or not (PADEP 2006). This document described attainment and non-attainment of water quality criteria as mutually exclusive cases, and presented a statistical framework for evaluation of the hypothesis that a stream is or is not attaining its designated use. PWD made slight modifications to the 2008 sampling regime in order to better comply with these guidelines by ensuring that a minimum of 8 samples be collected in dry weather, baseflow conditions at each monitoring station. Pennypack and Poquessing-Byberry Creek watershed data have been collected according to these guidelines.

Once Pennypack and Poquessing-Byberry Creek Watershed CCRs are completed, there will be a reduced demand for intensive watershed-wide chemistry assessment until it is necessary to revisit and collect more data from these monitoring locations for updating indicator status for Watershed Management Plans (Section E.3.2.1). However, PWD will continue to maintain baseflow water chemistry assessment at sites in the PWD USGS gage network at in winter, spring, and summer. This data will be useful as a long-term record of water quality changes in the region.

Integrated Watershed Management Plans (IWMP) for the Cobbs and Tookany/Tacony-Frankford Creek Watersheds were completed in 2004 and 2005. 5-Year Watershed Implementation Plans were completed for both watersheds in 2006. IWMPs initially recommended a five year interval for re-assessments and Indicator Status Updates, but that interval was determined to be too aggressive, at least for the initial Indicator Status Updates. The initial re-assessment monitoring interval recommendation was changed to ten years, in recognition of the fact that watershed-wide assessments are best suited to characterize macro-scale water quality and biological community health.

Allowing ten years before re-assessment will potentially allow for a greater number of IWMP and CSO LTCP projects to be completed, and allow PWD to focus monitoring efforts on evaluating the performance of stormwater BMPs and restoration projects. Re-assessment and subsequent Indicator Status Reports should complement the “adaptive management approach”, and allow for the locations and methods of assessment to be changed, depending upon the number of projects implemented and their spatial distribution.

E.1.3.3 Continuous Water Quality Assessment

In addition to discrete chemical sampling, PWD incorporated automated equipment at strategic locations within each watershed as part of the 1999-2008 comprehensive monitoring strategy. Using submerged instruments (YSI Sonde 6600, 6600 EDS and 600 XLM), dissolved oxygen, temperature, pH, conductivity, depth (stage) and turbidity were logged at 15-minute intervals. The instruments were deployed for approximately two weeks, retrieved and replaced with fresh calibrated instruments in order to produce nearly seamless temporal data. Continuous water quality monitoring has occurred in the Darby-Cobbs, Tookany/Tacony-Frankford, Wissahickon, and Pennypack watersheds. Deployments will occur in the Poquessing-Byberry Watershed in 2009.

Long-term continuous monitoring for TMDL compliance and building a long-term water quality data record for the aforementioned watersheds will be accomplished over 2008-2015 through a partnership with the USGS. Continuous water quality instruments will also be utilized in evaluating the performance of certain BMPs and assessing conditions in tidal portions of the Schuylkill and Delaware Rivers as well as Frankford Creek.

E.1.3.4 Wet Weather Chemical Monitoring

The third water quality component of PWD's comprehensive monitoring strategy 1999-2008 was collecting water samples during wet weather flows. Automated samplers (Isco, Inc. models 6712, 6700) were strategically placed in locations throughout the watershed and used to collect samples during runoff producing rain events. This automated system obviated the need for staff to manually collect samples, thereby greatly increasing sampling efficiency. Automated samplers were programmed to commence sampling with a small (0.1ft.) increase in stage. Once sampling was initiated, a computer-controlled peristaltic pump and distribution system collected grab samples at 30 min. to 1 hr. intervals, the actual interval being adjusted on a site by site basis according to "flashiness". Adjustment of rising-limb hydrograph sampling interval allows optimum characterization of water quality responses to stormwater runoff and wet weather sewer overflows. Due to sample volume restrictions, fewer chemical analyses are performed on samples collected in wet weather (Table E.3.1-1).

The primary use of automated samplers in the 2008-2015 period will be for assessment of stormwater BMP performance. Automated samplers have been successfully deployed at the Saylor Grove Stormwater Treatment Wetland, and it is expected that as additional stormwater BMPs are constructed, automated samplers will be the primary means of evaluating water quality performance. As an added advantage, data which are logged from the pressure transducer that is used to initiate sampling provide the input for the water quantity/hydrologic performance evaluation.

Currently, plans are in place to construct large stormwater treatment wetlands in the Wissahickon Creek Watershed at Wise's Mill Run and Cathedral Run. Automated samplers will be used to collect samples from the influent and effluent until a sufficient number of storm events have been captured to evaluate stormwater treatment wetland performance. If this research shows a reasonable level of consistency, there may be a reduced need to monitor additional stormwater BMPs with such a complicated and expensive monitoring system.

Automated samplers were also used extensively in tributaries to Wissahickon Creek to develop relationships between turbidity and TSS. TSS and turbidity were more closely correlated in mainstem samples than in the tributaries, however, the latter correlation was still significant (Log transformed) ($r(58)=0.80$, $p<0.001$). It is likely that additional samples would strengthen this relationship, as tributaries have not been sampled during larger storm events. These strong correlations between TSS and Turbidity support the future use of turbidity as an indicator of TSS concentration. TSS monitoring is one component of The City of Philadelphia's plan for evaluation of projects which are implemented to achieve sediment TMDL goals.

Table E.1.3-1 Chemical Analytes Collected During Chemical Monitoring Programs

Parameter	Units	Discrete	Wet Weather	Continuous
Alkalinity	mg/L	X		
Aluminum	mg/L	X	X	
Dissolved Aluminum	mg/L	X		
Ammonia	mg/L as N	X	X	
Arsenic	mg/L	X	X	
Dissolved Arsenic	mg/L	X		
BOD5	mg/L	X	X	
Cadmium	mg/L	X	X	
Dissolved Cadmium	mg/L	X		
Calcium	mg/L	X	X	
Chromium	mg/L	X	X	
Dissolved Chromium	mg/L	X		
Specific Conductance	µS/cm	X		X
Copper	mg/L	X	X	
Dissolved Copper	mg/L	X		
E. coli	CFU/100mL	X	X	
Fecal Coliform	CFU/100mL	X	X	
Hardness	mg/L CaCO3	X	X	
Iron	mg/L	X	X	
Dissolved Iron	mg/L	X		
Lead	mg/L	X	X	
Dissolved Lead	mg/L	X		
Magnesium	mg/L	X		
Manganese	mg/L	X	X	
Dissolved Manganese	mg/L	X		
Nitrate	mg/L	X	X	
Nitrite	mg/L	X	X	
Orthophosphate	mg/L	X	X	
Dissolved Oxygen	mg/L	X		X
pH	pH units	X		X
Total Phosphorus	mg/L	X	X	
Sodium	mg/L	X		
Suspended Solids	mg/L	X	X	
Total Solids	mg/L	X	X	
Temperature	°C	X		X
TKN	mg/L	X	X	
Turbidity	NTU	X	X	X
Zinc	mg/L	X	X	
Dissolved Zinc	mg/L	X		

E.1.3.5 Biological Monitoring

PWD continues to integrate biological assessments into the monitoring program as a means of identifying potential physical impairments or chemical stressors. In addition, biological indices produced from the various monitoring strategies serve as a baseline for future restoration projects. The biological monitoring protocols employed by PWD are in accordance with methods developed by the United States Environmental Protection Agency (EPA) and the PADEP. These procedures are as follows:

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

E.1.3.5.1 Macroinvertebrate Assessments

In 2007, PADEP shared a new set of protocols for Benthic Macroinvertebrate Assessments, with significant changes to field sampling, laboratory, and data analysis techniques. PWD has adopted these new sampling techniques for 2007 and 2008 monitoring activities in Pennypack Creek and Poquessing-Byberry Creek Watersheds. Sample results are compared to a series of reference metrics that are intended to be used statewide, without regard for regionalization or climate influences. Preliminary work with these metrics shows that even streams used as reference sites (*e.g.*, French Creek) are classified as "impaired" under the new assessment method. Furthermore, because the revised method requires a sample size of 200±20% individuals, compared to the 1999-2006 data collected with minimum 100 individual sample size, randomized sub-sampling or other normalization procedures may need to be used with the data collected according to the new DEP Assessment protocol to maintain compatibility with pre-established IWMP indicators for Indicator Status Update reports.

Integrated Watershed Management Plans (IWMP) for the Cobbs and Tookany/Tacony-Frankford Creek Watersheds were completed in 2004 and 2005. 5-Year Watershed Implementation Plans were completed for both watersheds in 2006. IWMPs initially recommended a five year interval for re-assessments and Indicator Status Updates, but that interval was determined to be too aggressive, at least for the initial Indicator Status Updates. The initial re-assessment monitoring interval recommendation was changed to ten years, in recognition of the fact that watershed-wide assessments are best suited to characterize macro-scale water quality and biological community health.

Allowing ten years before re-assessment will potentially allow for a greater number of IWMPs and CSO LTCP projects to be completed. Re-assessment and subsequent Indicator Status Reports should complement the "adaptive management approach", and allow for the locations and methods of assessment to be changed, depending upon the number of projects implemented and their spatial distribution.

Other projects where macroinvertebrate surveys may be helpful in assessing BMP performance include stormwater wetland creation at Saylor Grove, Wise's Mill Run, Cathedral Run, the headwaters of Pennypack Creek and other headwaters streams targeted for intensive restoration.

E.1.3.5.2 Fish Assessments

From 1999 through 2008 PWD has sampled fish communities throughout each of Philadelphia's watersheds using USEPA Rapid Bio-assessment V Methods (RBP V). Results of these samples have been summarized in numerous reports, with the Pennypack Creek Watershed CCR in preparation and Poquessing-Byberry Creek Watershed CCR due in 2009.

Integrated Watershed Management Plans (IWMP) for the Cobbs and Tookany/Tacony-Frankford Creek Watersheds were completed in 2004 and 2005. 5-Year Watershed Implementation Plans were completed for both watersheds in 2006. IWMPs initially recommended a five year interval for re-assessments and Indicator Status Updates, but that interval was determined to be too aggressive, at least for the initial Indicator Status Updates. The initial re-assessment monitoring interval recommendation was changed to ten years, in recognition of the fact that watershed-wide assessments are best suited to characterize macro-scale water quality and biological community health.

Allowing ten years before re-assessment will potentially allow for a greater number of IWMPs and CSO LTCP projects to be completed. Re-assessment and subsequent Indicator Status Reports should complement the "adaptive management approach", and allow for the locations and methods of assessment to be changed, depending upon the number of projects implemented and their spatial distribution. Other projects where RBP fish surveys may be helpful in assessing BMP performance include streambank restoration projects along Tacony and Cobbs Creeks as well as fish habitat and passage improvements in Pennypack Creek.

E.1.3.5.3 Algae Assessments

From 2002 through 2008, PWD has collected algal periphyton samples from a small number of sites in selected watersheds using components of USEPA Rapid Bio-assessment Protocol 6.1 (laboratory-based approach). Algal periphyton are collected from natural substrates and biomass is estimated based on a quantitative chlorophyll-a and total chlorophyll analysis. Periphyton sampling is performed primarily to address the question of whether anthropogenic nutrient sources are causing eutrophication, which may result in violations of water quality criteria for dissolved oxygen, pH, and have adverse effects on aquatic food webs. Large concentrations of chlorophyll indicate excessively dense algal growth, which may help explain observed aquatic life impairments.

E.1.3.6 Physical Monitoring

E.1.3.6.1 Habitat Assessments

Habitat assessments are conducted at each monitoring site based on the Environmental Protection Agency's *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* (Barbour *et al*., 1999). Reference conditions are used to normalize the assessment to the "best attainable" situation. Habitat parameters are separated into three principal categories: (1) primary, (2) secondary, and (3) tertiary parameters:

- Primary parameters are those that characterize the stream "microscale" habitat and have greatest direct influence on the structure of indigenous communities.

- Secondary parameters measure "macroscale" habitat such as channel morphology characteristics.

- Tertiary parameters evaluate riparian and bank structure and comprise three categories: (1) bank vegetative protection, (2) grazing or other disruptive pressure, and (3) riparian vegetative zone width.

In 2007, PADEP shared a new set of protocols for Physical Habitat Assessments that differ slightly from those in the RBPs. Some individual habitat metrics were split into separate categories, while others had slight changes to the condition description text. PWD adopted these new sampling techniques for 2008 monitoring activities in Poquessing-Byberry Creek Watershed. Normalization procedures may be used with the data collected according to the new DEP Assessment protocol to maintain compatibility with pre-established IWMP indicators for Indicator Status Update reports.

E.1.3.6.2 Habitat Suitability Index (HSI) Modeling

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, habitat suitability indices have applied to Darby-Cobbs, Tookany/Tacony-Frankford, and Wissahickon Creek Watersheds.

E.1.3.6.3 Physical Habitat Survey and Integrated Flow Modeling

Beginning in 2007, PWD began performing detailed surveys of fish sampling sites with a total station, replacing the previous cross sectional transect technique employed previously. These detailed surveys include positions along streambanks and are linked to detailed cross sectional and longitudinal profiles developed for the PWD FGM program (section). The increased level of spatial data quality has enabled development of 2 dimensional finite element flow models for these locations (River 2D). These models allow us to examine habitat suitability across a range of flows and better determine the spatial and temporal extents of suitable combinations of water depth, velocity, and substrate. It is expected that these models will be particularly useful in evaluating the effectiveness of instream fish habitat enhancement structures and instream structural BMPs.

E.1.3.6.4 Fluvial Geomorphologic (FGM) Analysis

To date, FGM analysis has been conducted on the Darby-Cobbs, Tookany/Tacony-Frankford Wissahickon, Pennypack and Poquessing-Byberry 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. For a detailed description of the FGM standard operating procedures, refer to http://www.phillyriverinfo.org/.

E.1.3.7 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 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).

A river mile-based naming convention has been created for sampling and monitoring sites in the regional watersheds. The naming convention includes a two letter prefix denoting major watershed, one or more optional letters denoting a tributary stream, and a series of digits to represent the distance from the mouth of the stream in hundredths of a mile. For example, site DCC110:

"DC" stands for the Darby-Cobbs watershed.

"C" stands for Cobbs Creek.

"110" places the site 1.10 miles upstream of the mouth of Cobbs Creek, where it flows into Darby Creek.

Table E.1.3-2 explains the current number of assessment sites in each watershed relative to the various monitoring programs. In addition, Figures 2-11 display the location and type of monitoring procedure that has been conducted at each assessment site.

Table E.1.3-2 Number of Monitoring Locations Relative to the Monitoring Program

Watershed	Monitoring Program								
	Biological			**Chemical**			**Physical**		
	RBP III	*RBP V*	*Algae*	*Discrete*	*Continuous*	*Wet Weather*	*Habitat*	*HSI Index*	*FGM*
Darby-Cobbs	17	9	0	9	5	5	17	9	95
Tacony-Frankford	12	7	4	9	8	6	12	7	102
Wissahickon	32	10	5	10	6	8	32	10	230
Pennypack	20	11	4	13	4	4	20	11	130
Poquessing	13	7	4	7	3	3	13	6	160
Tidal Schuylkill	N/A	4	N/A	4	2	2	N/A	N/A	N/A

N/A Not Applicable

E.1.3.6 Monitoring Time Line Strategy

Prior to the creation of a comprehensive monitoring strategy, baseline assessments were conducted in all of the Philadelphia regional watersheds to assess the degree, location and type of impairments occurring within each system. Typically, 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), comprehensive characterization reports (CCRs) are now accomplished on a two-year timeline (Table 1.3-3)

Table E.1.3-3 Proposed Watershed Monitoring Timeline 2008-2010

COMPREHENSIVE MONITORING	Watershed-wide assessment of chemical, biological, and physical conditions; wet weather, continuous, and discrete chemistry; and full RBPs at several monitoring stations throughout the entire watershed.

Watershed	Program Components	2008				2009				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	1	2	3	4	1	2	3	4
Darby Cobbs	Monitoring	Completed 2003-2004																																			
	Data Analysis																																				
	Comprehensive Report																																				
	Monitoring																																				
	Data Analysis																																				
	Indicator Status Update																																				
Tacony - Frankford	Monitoring	Completed 2004-2005																																			
	Data Analysis																																				
	Comprehensive Report																																				
	Monitoring																																				
	Data Analysis																																				
	Indicator Status Update																																				
Wissahickon	Monitoring	Completed 2005-2006																																			
	Data Analysis																																				
	Comprehensive Report																																				
	Monitoring																																				
	Data Analysis																																				
	Indicator Status Update																																				
Pennypack	Monitoring																																				
	Data Analysis																																				
	Comprehensive Report																																				
	Monitoring																																				
	Data Analysis																																				
	Indicator Status Update																																				
Poquessing - Byberry	Monitoring																																				
	Data Analysis																																				
	Comprehensive Report																																				
	Monitoring																																				
	Data Analysis																																				
	Indicator Status Update																																				

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E.1.3.7 Goals and Measures of Success

The proposed watershed monitoring strategy is an integrated approach which will improve the evaluations of non-point source pollution controls and the combined effectiveness of current point and non-point source controls. Similarly, biological attributes can be used to measure site-specific ecosystem responses to remediation or mitigations directed at reducing non-point source pollution impacts. Through the monitoring programs described in this permit cycle, PWD will be able to measure the relative success of remediation and restoration programs occurring within the Philadelphia regional watersheds. As a major stakeholder in the watersheds, PWD will also be able to provide insight and direction for smaller communities within the watersheds and parties involved in the watershed approach.

E.1.3.8 Reporting

Based on the monitoring time line strategy (Section E.1.3.6), PWD is in the process of completing all required preliminary and comprehensive assessments in the Poquessing Creek Watershed during this permit year. In addition, The Pennypack Creek Watershed Comprehensive Characterization Report (WCWCCR) detailing the biological, chemical and physical attributes of the Pennypack Creek Watershed will be completed in October 2008.

E.1.4 Land Use and Resource Mapping

The City has conducted extensive mapping of information relevant to stormwater management planning. Previously discussed in Section D of this document, 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 accompanying CD. These figures are also presented in FY 2006 Stormwater Annual Report Appendix C – Land Use and Resource Mapping, separated by watershed.

E.1.5 Preliminary Problem Assessment

E.1.5.1 Wissahickon Creek Watershed

A Comprehensive Characterization Report was completed for the Wissahickon Creek Watershed in February 2007 which included analysis of data collected over the 2005-2006 monitoring period and presented a characterization of problems within this watershed area. The comprehensive characterization report is currently available to the public through the internet at the following address: www.PhillyRiverInfo.org.

E.1.5.2 Pennypack Creek Watershed

As discussed throughout Section E.2, PWD will complete a comprehensive characterization report of the Pennypack Creek Watershed in October 2008. This report will serve as the technical framework for the Pennypack Creek Integrated Watershed Management Plan (PCIWMP) to be completed in 2009. The technical report will also provide state and federal agencies and local officials with a succinct problem statement, outlining the biological, physical and chemical integrity of the system and the potential sources of impairment. The comprehensive characterization report will be disseminated to the public through the internet at the following address: www.PhillyRiverInfo.org.

E.1.5.3 Poquessing Creek Watershed

PWD is in the process of completing all required preliminary and comprehensive assessments in the Poquessing Creek Watershed during this permit year. A comprehensive characterization report for the Poquessing-Byberry Creek Watershed, including problem statements, will be completed in 2010.

E.1.6 Inventory of Point and Non-Point Sources

There are no new point and non-point sources to be included in the FY 2008 Stormwater Annual Report that were not presented in the FY 2007 Stormwater Annual Report. For a complete listing of all NPDES permitted dischargers in Philadelphia please refer to pages 29-35 of the FY 2006 Stormwater Annual Report.

The City is also actively involved in developing annual and seasonal estimates of non-point source pollutants. As the results of this analysis become available, they will be included in subsequent annual reports.

E.2 Step 2 Watershed Plan Development: Permit Issuance through End of Year 5

PWD's Integrated Watershed Management Planning (IWMP) process is based on a carefully developed approach to meeting the challenges of watershed management in an "urban" setting. An IWMP is a long-term road map designed to achieve the twin goals of a healthy community and healthy natural resources. An integrated plan embraces the laws designed to save our streams, preserve the streams' ecology, and enhance the parkland and riparian buffers that shelter these streams. The planning process also involves incorporation of the best of municipal and conservation planning efforts, which strive to ensure that growth within the targeted watershed occurs with particular attention to the impacts on the environment.

IWMPs focus on attaining priority environmental goals in a phased approach, making use of the consolidated goals of the numerous existing programs that directly or indirectly require watershed planning. They are built upon the solid, scientific foundation composed of water quality monitoring (wet and dry weather), macroinvertebrate and fish bio-assessments, physical stream surveys (FGM) and computer simulated modeling programs for stormwater flows and pollutant loading described herein.

E.2.1 Monitoring and Sampling

Current activities of the PWD center on analyzing and summarizing data collected from the Pennypack Creek watershed in preparation for a comprehensive baseline characterization. To meet the regulatory requirements and long-term goals of its stormwater, and drinking water source protection programs, PWD has embraced a comprehensive watershed characterization, planning, and management program for the Pennypack Creek Watershed. 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 has helped form watershed partnerships with surrounding urban and suburban communities to explore regional cooperation based on an understanding of the impact of land use and human activities on water quality.

Coordination of these different programs has been greatly facilitated by PWD's creation of the Office of Watersheds (OOW), which is composed of staff from the PWD's planning and research, CSO, collector systems, laboratory services, and other key functional groups. One of OOW's responsibilities is to characterize existing conditions in local watersheds to provide a basis for long-term watershed planning and management. The focus of OOW during FY 2007 and FY 2008 is the Pennypack Creek Watershed.

OOW is developing a series of watershed management programs for each of the City's watersheds. Cobbs Creek was the first watershed for which an IWMP was completed; the Tookany/Tacony-Frankford Watershed Partnership was second to complete a plan. The WCWCCR, completed in February 2007, was third in this series of technical documents. PWD has designed these reports to complement IWMPs by characterizing a watershed's land use, geology, soils, topography, demographics, meteorology, hydrology, water quality, ecology, fluvial geomorphology, and pollutant loads. These reports are intended as a single compilation of background and technical documents that can be periodically updated as additional field work or data analyses are completed. PWD is presently in the second year (data analysis and report preparation phase) of The Pennypack Creek Watershed CCR.

E.2.1.1 Water Quality Sampling and Monitoring

In order to comply with the State-regulated stormwater permit obligations, water quality sampling was conducted throughout 2007 and 2008 in Pennypack Creek Watershed. A watershed-wide comprehensive water quality characterization program was implemented in Pennypack Creek Watershed, while wet weather water quality sampling for sediment TMDL and BMP monitoring continued in Wissahickon Creek Watershed. The sampling and monitoring sites are presented in **Appendix I** Monitoring Locations. A list of the parameters sampled during the discrete, continuous, and wet weather sampling can be found in Table E.1.3-1. Three 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.

E.2.1.1.1 Discrete Interval Sampling

PWD staff collected surface water grab samples at thirteen (n=13) locations within Pennypack Creek Watershed for chemical and microbial analysis (**Appendix I**). Each site along the stream was sampled once during the course of a few hours, to allow for travel time and sample processing/preservation. The purpose of discrete sampling is initial characterization of water quality under both dry and wet conditions and identification of parameters of possible concern.

Sampling events were planned to occur at each site at weekly intervals for one month during three separate seasons. Actual sampling dates were as follows: "winter" samples collected 1/17/07, 1/24/07, 1/31/07, 2/7/07; “spring” samples collected 4/25/07, 5/2/07, 5/9/07, 5/16/07; “summer” samples collected 8/1/07, 8/8/07, 8/15/07, 8/22/07. A total of 156 discrete samples, comprising 6240 chemical and microbial analytes, were collected during the 2007 assessment of Pennypack Creek Watershed. To add statistical power, additional discrete water quality samples were collected 5/7/2008 in order to ensure that a minimum of 8 samples had been collected in dry weather conditions. Samples from PWD's wet-weather chemical sampling program were also included in analyses when appropriate.

E.2.1.1.2 Continuous Monitoring

Physicochemical properties of surface waters are known to change over a variety of temporal scales, with broad implications for aquatic life. Several important, state-regulated parameters (e.g., dissolved oxygen, temperature, and pH) may change considerably over a short time interval, and therefore cannot be measured reliably or efficiently with grab samples. Self-contained data logging continuous water quality monitoring Sondes (YSI Inc. Models 6600, 6600 EDS, 600XLM) were deployed beginning 5/22/07 at four (n=4) sites within Pennypack Creek Watershed in order to collect DO, pH, temperature, conductivity and depth data. Sondes were redeployed in Pennypack Creek Watershed in March 2008 to ensure that an entire growing season’s worth of data were collected, including any early spring DO stress events.

E.2.1.1.3 Wet Weather Event Sampling

Automated samplers (Isco, Inc.) were used to collect samples from 4 mainstem sites in Pennypack Creek Watershed during runoff-producing rain events in 2007 and 2008. Samples were collected from 4 mainstem locations during wet weather events that took place 5/9/07, 8/9/07, 10/9/2007, 11/6/2007, and 5/16/2008. Additional samples were collected from several tributary streams within the Wissahickon Creek Watershed and the Stormwater treatment wetland at Saylor Grove in the Monoshone Creek Watershed (tributary to Wissahickon Creek). Wet weather data collection in tributary sites is on-going, along with the streambank erosion component of PWD’s sediment source assessment (Section B). These data will allow characterization of water quality responses to stormwater runoff.

Automated samplers are equipped with vented in-stream pressure transducers that allowed sampling to commence beginning with an increase in stage. Once sampling was initiated, a computer-controlled peristaltic pump and distribution system collected the first 4 grab samples at 40 minute intervals and the remaining samples at 1 hr. intervals.

E.2.1.2 Biological Assessments

E.2.1.2.1 Benthic Macroinvertebrate Assessments

During March 2007, PWD conducted Rapid Bioassessment Protocols (RBP III) at fifteen (n=15) locations within Poquessing-Byberry Creek Watershed (**Appendix I**). Surveys were conducted at 10 mainstem locations and 5 tributary locations. Two of the 5 tributary sites are located within Philadelphia County.

E.2.1.2.2 Fish Assessments

Between 6/1/08 and 6/23/08, PWD biologists conducted fish assessments at six (n=6) locations within Poquessing-Byberry Creek Watershed (**Appendix I**). All surveys were conducted at mainstem stations using electrofishing gear as described in EPA RBP V (Barbour, et al.).

E.2.1.2.3 Algae Assessments

Periphyton communities were sampled from Poquessing sites PQ865, PQ115, and PQB025, as well as Pennypack sites PP340, PP970, PP1680, and PP2020, chiefly to assess the role of periphyton regulating stream metabolism. Surveys were conducted at mainstem locations only, with the exception of site PQB025 on mainstem Byberry Creek. Sites were chosen based on proximity to continuous water quality monitoring stations, but some adjustments were made in order to situate the periphyton sampling locations in areas with sufficient depth and substrates and to attempt to control for differences in canopy cover.

PWD's 2007-8 periphyton monitoring in Poquessing and Pennypack Creek Watersheds has been enhanced with partnerships from the Philadelphia Academy of Natural Sciences (ANS) and Widener University. PWD collected estimates of periphyton chlorophyll-a at four sites in spring and summer (24 periphyton samples total), while the ANS laboratory analyzed periphyton intercellular nutrient ratios (C:N:P). Effects of scouring and sloughing of periphyton biomass on DO dynamics were investigated in partnership with the engineering department of Widener University.

E.2.1.2.4 Physical Assessments

E.2.1.2.4.1 EPA Habitat Assessment

Immediately following benthic macroinvertebrate sampling procedures, habitat assessments were completed at twenty four (n=15) sites in Poquessing Creek Watershed (**Appendix I**) based on the Environmental Protection Agency's Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers (Barbour et al. 1999). Physical habitat assessments were performed at each benthic macroinvertebrate sampling location. Reference conditions were used to normalize the assessment to the "best attainable" situation.

Habitat parameters were separated into three principal categories: (1) primary, (2) secondary, and (3) tertiary parameters. Primary parameters are those that characterize the stream "microscale" habitat and have greatest direct influence on the structure of indigenous communities. Secondary parameters measure "macroscale" habitat such as channel morphology characteristics. Tertiary parameters evaluate riparian and bank structure and comprise three categories: (1) bank vegetative protection, (2) grazing or other disruptive pressure, and (3) riparian vegetative zone width.

E.2.1.2.4.2 Habitat Suitability Index (HSI) Evaluation

HSI models for nine species were selected for Pennypack Creek Watershed. Models were chosen to reflect the range of habitat types and attributes needed to support healthy, naturally-reproducing native fish communities and provide recreational angling opportunities in the watershed. Two centrarchid fish, redbreast sunfish (Lepomis auritus), and smallmouth bass (Micropterus dolomieu), were included in the analysis. These species are tolerant of warmer water temperatures and require extensive slow, relatively deep water (i.e., pool) habitats with appropriate cover or structure to achieve maximum biomass.

While black basses (M. dolomieu and its congener M. salmoides) are not native to Southeast Pennsylvania, they occupy the top carnivore niche and are among the most sought-after freshwater game fish in water bodies where they occur. Moreover, the only other large bodied piscivores known to occur naturally in Poquessing and Pennypack Creek Watersheds are American eels, native catadromous fish for which no HSI have been developed. Salmonid HSI models were used for brown trout (Salmo trutta) and rainbow trout (Oncorhynchus mykiss). While these coldwater fish generally cannot establish and maintain reproducing populations in warm water streams, the Pennsylvania Fish and Boat Commission (PFBC) actively stocks both rainbow and brown trout in Pennypack Creek Watershed. Poquessing Creek Watershed is not actively stocked.

Four native minnow species were selected for HSI analysis: blacknose dace (Rhinichthys atratulus), common shiner (Luxilis cornutus), creek chub (Semotilus atromaculatus), and longnose dace (Rhinichthys cataractae). These minnow species have different habitat requirements and tend to occur in different portions of a watershed overall.

Furthermore, these species are known to occur in Poquessing and Pennypack Creek Watersheds, and are generally common throughout southeast Pennsylvania streams with appropriate habitat.

HSI model output for each site was compared to EPA habitat data results. With the exception of fallfish, brown trout and rainbow trout HSI data, HSI model output was compared to observed fish abundance and biomass with correlation analyses. As fish known to associate primarily with pool habitats generally grow to larger sizes, a successful model should perhaps correlate with the biomass per unit volume. Conversely, models that aim to predict habitat suitability for small minnows that inhabit riffles might be expected to have a stronger relationship with fish abundance per unit surface area. Several habitat models likely require modification in order to be useful in guiding or evaluating stream habitat improvement activities. While time constraints precluded the modification of models to better suit Poquessing and Pennypack Creek Watersheds, it is hoped that such modifications will increase the usefulness of these models in the future. Simple correlations between habitat and fish abundance/biomass data are included in individual model results when appropriate, and PWD is currently exploring other statistical tools to study fish and macroinvertebrate habitat relationships.

E.2.1.2.4.3 Infrastructure Assessment

During FY 2008, infrastructure assessments were completed in the entire Pennypack and Poquessing Creek watershed, modeled after the effort completed in FY 2006-2007 in the Wissahickon Creek watershed. In order to document infrastructure throughout the basin, PWD staff walked along stream segments with GPS, digital photography, and portable computer equipment, compiling an inventory of every infrastructure feature encountered. These features included bridges, culverts, dams, stormwater outfalls and drain pipes greater than 8" in diameter, sewers, pipe crossings, confluences, manholes, and areas where one or more of the stream banks were artificially channelized. The end product of this effort is a complete GIS coverage with associated digital photographs of each feature.

E.2.1.2.4.4 Fluvial Geomorphologic (FGM) Analysis

Wissahickon Creek Watershed

During FY 2008, FGM assessment work on the Wissahickon was furthered through the QA/QC of field data moving towards the compilation of the final report. Unfortunately, the final report's compilation was delayed by errors in bankfull identification by PWD's field team. This necessitated the re-surveying of bankfull at each of the 213 cross-sections established within the Wissahickon Creek Watershed. This process took place from November, 2007 through April, 2008. Presently PWD is continuing to compile the rough draft of this report and hopes to complete the final document by January, 2009.

Pennypack Creek Watershed

During FY 2008, FGM assessment work on the Pennypack was furthered through the QA/QC of field data moving towards the compilation of the final report. Unfortunately, the final report's compilation was delayed by errors in bankfull identification by PWD's field team. This necessitated the re-surveying of bankfull at each of the 128 cross-sections established within the Pennypack Creek Watershed. This process took place from April, 2008 through June, 2008. Presently PWD is continuing to compile the rough draft of this report and hopes to complete the final document by June, 2009.

Poquessing Creek Watershed

In FY 2007, a geomorphologic stream survey, consisting of the assessment of approximately 50 miles of stream channel within the watershed, was completed on the Poquessing Creek. The stream survey was completed during the period February – April 2007. The Main Stem of Poquessing Creek is approximately 12 miles in length, with approximately 38 miles of tributaries that stem from it. A majority of the watershed is located in Philadelphia County, with small portions in both Bucks and Montgomery Counties. Field crews consisting of personnel from the Philadelphia Water Department conducted the geomorphologic survey.

The geomorphologic survey involved walking the entire length of the main stems of the Poquessing Creek, its large tributaries, and some unnamed smaller tributaries to record specific information about the channel and surrounding habitat. One representative stream channel cross section was measured per reach, with 160 reaches and most reaches being smaller than 2000 feet in length. Measured field data was collected to determine stream channel types for each reach and to help evaluate channel stability. Qualitative habitat data was also collected.

The data collected from this study is currently being processed and analyzed. This survey and assessment will aid in the determination of the flow patterns in the Poquessing Watershed which will allow for the conceptual planning of projects that will mitigate the effects of storm flow on the stream by decreasing the erosive effects of the stormwater, decreasing the quantity of water that reaches the streams, and stabilizing and restoring the banks using natural techniques to withstand storm flows. It will also provide data that will help in the development of an approach for the restoration of Poquessing Creek with an emphasis on hydraulic sustainability, enhancement to riparian habitat, improved aesthetics, and biological improvement.

PWD hopes to complete the QA/QC process for this effort during FY 2008, with the publication of a final report some time in FY 2009.

E.2.1.2.5 Reporting

The final version of the Pennypack Creek Watershed Comprehensive Characterization Report (PCWCCR) shall be available for public review and comment in October 2008. Upon completion, three copies will be delivered to the PADEP (Southeast Regional Office) and will be disseminated to the public at the following web address: www.PhillyRiverInfo.org. The Poquessing-Byberry Creek Watershed Comprehensive Characterization Report will be completed in 2010.

E.2.1.2.6 2008 Sampling and Monitoring Program

As discussed in Section 2: Step 1 (part b) of the City's Stormwater Permit, the PWD is presently conducting a comprehensive assessment in the Poquessing Creek Watershed during 2008-2009. Discrete chemical sampling has been completed, with the exception of additional dry weather baseline samples required to comply with PADEP statistical guidelines for water chemistry analysis (i.e., minimum 8 samples). Continuous and wet weather monitoring shall continue through 2009. Biological and physical assessments were completed in 2007-2008 and data analysis is presently underway. Completion of the PCWCCR is expected in October 2008.

E.2.2 QA/QC and Data Evaluation

OOW and the Bureau of Laboratory Services (BLS) have planned and carried out an extensive sampling and monitoring program to characterize conditions in Pennypack and Poquessing-Byberry Creek Watershed. The program includes hydrologic, water quality, biological, habitat, and fluvial geomorphological components. Again, because the OOW has merged the goals of the city's stormwater, combined sewer overflow, and source water protection programs into a single unit dedicated to watershed-wide characterization and planning, it is uniquely suited to administer this program.

Sampling and monitoring follow the Quality Assurance Project Plan (QAPP) and Standard Operating Protocols (SOPs) as prepared by 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. SOPs for chemical and biological assessments can be found at the following address: www.PhillyRiverInfo.org .

E.2.2.1 Water Quality Criteria for Pennypack Creek Watershed

An analysis will be conducted on the water quality data currently being collected in the Pennypack and Poquessing Creek watersheds. Using the data collected from discrete wet and dry weather sampling, comparisons are to be made to PADEP water quality standards. National water quality standards and reference values will be used where state water quality standards are not available. The water quality standards or reference values and their sources are listed in Table E.2.2-1.

Table E.2.2-1 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

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
NH_3-N	Maximum	pH and temperature dependent	PA DEP
$NO_{2\text{-}3}$-N	Nitrates – Human Health Consumption for water + organisms	2.9 mg/L ***	EPA 822-B-00-019
$NO_2 + NO_3$	Maximum (Public Water Supply Intake)	10 mg/L	PA DEP
Periphyton Chl-a		Ecoregion IX – 20.35 mg/m2	USEPA 1986 (Gold book)
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-00-021
TN	Maximum	4.91 mg/L ***	EPA 822-B-00-020
TP	Maximum	140 ug/L ***	EPA 822-B-00-022
TSS	Maximum	25 mg/L	Other US states
Turbidity	Maximum	8.05 NTU ***	EPA 822-B-00-023

* - Water quality standard requires hardness correction; value listed is water quality standard calculated at 100 mg/L $CaCO_3$ 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

E.2.3 Watershed & Water Body Modeling – Estimates of Loadings from the City's MS4 System

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. Designed to meet the goals and objectives of numerous, water resources related regulations and programs, the method recommends the use of adaptive management approaches to implement recommendations on a watershed-wide basis. Its focus is on attaining priority environmental goals in a phased approach, making use of the consolidated goals of the numerous existing programs that directly or indirectly require watershed planning. Central to the approach is development of IWMPs for each of the watersheds that drains to the City of Philadelphia. The Wissahickon Creek IWMP (WCIWMP) is the third to be completed, following the Cobbs Creek IWMP (CCIWMP) in 2004 and Tookany/Tacony-Frankford IWMP (TTFIWMP) in 2005. Watershed management plans for the Pennypack and Poquessing watersheds are planned for completion during the term of the current NPDES stormwater permit.

The approach followed has four major elements, each with multiple tasks specific to the planning efforts within the watershed.

- Data collection, organization and analysis
- Systems description
- Problem identification and development of plan objectives
- Strategies, policies and approaches

Data Collection, Organization and Analysis

The collection and organization of existing data on surface water hydrology and quality, pollutant loads, wastewater collection and treatment, stormwater control, land use, stream habitat and biological conditions, and historic and cultural resources is a critical step in the watershed characterization process. In addition, existing rules, regulations, and guidelines pertaining to watershed management at federal, state, basin commission, county, and municipal levels are examined for coherence and completeness in facilitating the achievement of watershed planning goals.

Data are collected by many agencies and organizations in various forms, ranging from reports to databases and Geographic Information System (GIS) files. Field data collection efforts were undertaken throughout the study, and expanded as data gaps were identified.

Systems Description

The planning approach for an urban stream must focus on the relationship between the natural watershed systems (both groundwater and surface water) and the constructed systems related to land use that influence the hydrologic cycle, such as water supply, wastewater collection and treatment, and stormwater collection. A critical step in the planning process is to examine this relationship in all its complexity.

PWD's extensive physical, chemical and biological monitoring program is initiated for roughly one year in each watershed. A compendium document is produced following the analysis of all collected data; this document titled the Comprehensive Characterization Report (CCR) is shared with watershed partners for comments and feedback. These CCR documents are made available on PWD's Watershed Information Center website at www.PhillyRiverInfo.org. The CCR assessment serves to document the watershed baseline prior to implementation of any plan recommendations, allowing for the measure of progress as implementation takes place upon completion of the plan.

Problem Identification and Development of Plan Objectives

Existing problems and issues of water quality, stream habitat, and streamflow related to the urbanization of the watershed can be identified through analyses of:

- Prior studies and assessments
- Existing data
- New field data
- Stakeholder input

Problems and issues identified through data analysis must be compared with those brought forward by stakeholders. An initial list of problems and issues then are transformed into a preliminary set of goals and objectives. These goals and objectives may reveal data gaps and may require additional data collection and analysis. Ultimately, with stakeholder collaboration, a final list of goals and objectives is established that reflects the conditions of the watershed. These goals and objectives are prioritized by the stakeholders based on the results of the data analysis.

Strategies, Policies and Approaches

Once a list of planning objectives is selected based on the sound scientific analysis and consensus among stakeholders, effective sets of management alternatives are developed to meet the agreed upon objectives. These alternatives are made up of a combination of implementation options that may include suggested municipal actions, recommendations on water supply and wastewater collection system improvements, potential measures to protect water quality from point sources, best management practices for stormwater control, measures to control sanitary sewer overflows, changes to land use and zoning, stream channel and stream bank restoration measures, etc.

An Integrated Watershed Management Plan will provide a list of implementation options that have been deemed appropriate for the given watershed area. Recommended implementation options these will be presented as a watershed-wide set of "guidelines" for implementation over the 20-year horizon. The City of Philadelphia will commit to implementing packages of these recommended options in the way of 4 sequential 5-year Implementation Plans for each watershed.

E.2.3.1 Wissahickon Watershed

A detailed hydrologic model has been developed for the Wissahickon watershed using EPA's Stormwater Management Model (SWMM). The outputs of this model can be found in the Wissahickon Creek Watershed Comprehensive Characterization Report (WCWCCR) online at www.PhillyRiverInfo.org .

E.2.3.2 Pennypack Watershed

The modeling of stormwater volumes within the Pennypack Creek watershed is currently at the data analysis stage. Cross-section data from the Pennypack Creek was collected in the summer and fall of 2007. Modeling was initiated in spring 2008 and results will be presented in the Pennypack Creek Watershed Comprehensive Characterization Report (PCWCCR), scheduled to be available on www.PhillyRiverInfo.org in the winter of 2008/2009.

E.2.3.3 Poquessing Watershed

An updated loading analysis of the Poquessing Creek watershed will be performed in FY 2009 as a part of the data collection and analysis process central to the development of the Poquessing Creek Comprehensive Characterization Report.

E.2.4 Problem Definition and Water Quality Goal Setting

E.2.4.1 Problem Definition

E.2.4.1.1 Wissahickon Creek Watershed

The extensive monitoring program initiated by PWD in the Wissahickon Creek Watershed between 2005 and 2006 culminated with the production of the WCWCCR. The WCWCCR highlighted a multitude of water quality related issues within the watershed drainage. As stated in the WCWCCR, "problems faced by the Wissahickon Creek Watershed stem from many sources; primarily, the creek suffers from physical disturbance due to urbanization and excess nutrient input from municipal wastewater treatment plants." These effects are evident in the comprehensive assessment of the aquatic habitat, biological communities and water chemistry documented in this report. Please review the entire report at the following address: www.PhillyRiverInfo.org.

At the completion of the data gathering and analysis process conducted for development of the WCWCCR, PWD began to assess additional data needs to better understand problems that exist in the Montgomery County portion of the watershed. Significant data gaps emerged necessary for understanding the needs specific to the upstream portion of the watershed, including flooding, inconsistencies in ordinances and water quality impairments. Additionally complicating the watershed-wide collaborative planning process is the inactive status of the Wissahickon TMDL for nutrients. As of June, 2008 the TMDL was under evaluation by the US EPA. This made it difficult to bring the permitted dischargers on board with supporting the planning process as they still did not know what would be required of them in the future.

It was beyond PWD's scope and available staff resources to develop comprehensive assessments of the Montgomery County specific issues, and without commitment from the upstream municipalities to assist in data collection and analysis and ultimately to implementation of recommendations, PWD was unable to commit to this undertaking.

PWD has elected to move forward with developing an IWMP that will deal specifically with the City of Philadelphia portion of the WCW. Over the coming years, many ongoing initiatives in the upstream portion of the watershed be completed, each of which producing data that could help to fill some of these data gaps in order to identify problems and their sources for this portion of the watershed. PWD will continue to convene the WWP over the coming years in hopes that as data gaps are filled, the WWP will take the lead in developing a complementary implementation approach for the upstream portion of the watershed.

E.2.4.1.2 Pennypack Creek Watershed

An extensive monitoring program has been initiated by PWD in the Pennypack Creek Watershed between 2007 and 2008 will culminate with the production of the PCWCCR. The PCWCCR will highlight the water quality related issues within the watershed drainage.

E.2.4.1.3 Poquessing Creek Watershed

Sampling was initiated in the Poquessing Creek Watershed in May/June 2008 and the sampling program will continue through April 2009. Upon completion of the data collection and analysis a Poquessing Creek Watershed Comprehensive Characterization Report will be completed – targeted for the winter 2009/2010.

E.2.4.2 Water Quality Goal Setting

E.2.4.2.1 Wissahickon Creek Watershed

As documented in the FY07 Stormwater Annual Report, a watershed-wide list of stakeholder goals has been established by the Wissahickon Watershed Partnership. This list consisted of 23 stakeholder goals for the Wissahickon Creek Watershed.

After the completion of the watershed-wide goal setting process PWD evaluated how to move forward with their planning process while the upstream portion of the watershed continued to gather data and complete a number of ongoing initiatives. PWD determined that in order to meet their own obligations and commitments that they must continue the planning process for the City of Philadelphia portion of the watershed and select from the "master list" of watershed-wide goals those which were specifically relevant to the City.

The 23 goals established through the watershed-wide goal setting process were individually evaluated by PWD against the problems identified by the WCWCCR and examined for applicability to the City of Philadelphia portion of the watershed. PWD determined that 12 of these goals were clearly applicable to the City. PWD developed a number of measurable objectives for each of them.

PWD will be developing an IWMP document for the City of Philadelphia portion of the Wissahickon Creek Watershed over the fall/winter 2008 and will share this plan with the Wissahickon Watershed Partnership as a model for developing a complimentary initiative in the upstream portion of the watershed.

Table E.2.4-1 Proposed Goals and Objectives for the Philadelphia Portion of the WCWCCR

Goals	Objectives
Protect drinking water quality (surface and groundwater)	1. Continue to meet requirements of the LT2ESWTR
Protect drinking water taste and odor	1. Limit geosmin concentrations to <10ng/L between April and May
Improve and maintain baseflow through increased infiltration to support water quality and aquatic community health.	1. Maintain average annual dry weather flow, excluding treated wastewater effluent, at a minimum average annual flow of 59 cfs at the mouth. 2. Reduce amount of Directly Connected Impervious Cover (DCIA) by 1%.
Increase preparedness for natural hazards, spills, discharges and terrorism	1. Obtain agreements from the 5 WWTPs and industrial users sign up as users or the Early Warning System emergency reporting phone number 2. Increase the amount of continuous water quality data collected from the Wissahickon Creek (Reactivation of Ft. Washington USGS gauge station) 3. Utilize fish biomonitoring station to assess water quality
Increase communications within the watershed	1. Create a Wissahickon Creek "event notification system" for the public
Improve aquatic habitat	1. Restore 7 miles of stream channel and habitat such that habitat scores are X% comparable to reference conditions.
Restore aquatic ecosystem health	1. Increase benthic quality index to 80% of reference reaches. 2. Increase IBI to 40 averaged at all sampling sites.
Improve awareness of watershed issues at a local level (municipalities and stakeholders)	1. Convene a watershed partnership stakeholder forum 2. Establish a partnership website to serve as an information resource
Make stormwater/watershed related educational opportunities available to every stakeholder in the watershed	1. Educate residents about benefits of rain barrel installation; have 10% of watershed resident install rain barrels on their homes. 2. Develop and implement at least 3 stormwater management/watershed issues related workshops within each 5 year implementation planning timeline
Improve and protect surface water quality	1. Meet state numeric criteria for bacteria in dry weather. 2. Meet State Water Quality Standards for dissolved oxygen 3. Meet state criteria for pH at all sites and times. 4. Remove Wissahickon Creek from the state list of impaired waters.
Eliminate untreated sewage discharges to Wissahickon Creek	1. Eliminate cross-connections of sanitary to storm sewers. 2. Eliminate sanitary sewer discharges to the stream in dry weather.
Reduce channel erosion and sediment loads caused by runoff	1. Reduce annual sediment load from overland flow by 10%. 2. Reduce annual sediment load from channel erosion by 75%

E.2.4.2.2 Pennypack Creek Watershed

In the spring of 2008, PWD initiated a watershed-wide stakeholder goal setting process for the Pennypack Creek Watershed as a part of the IWMP development process. For the purposes of this exercise, the term "goal" was used to define a broad set of "wishes" and "aspirations" for the watershed. The purpose was to derive a comprehensive watershed-wide "wish list" of goals for the watershed. These goals are not intended to be specifically measurable at this time. Upon completion of the watershed-wide goal setting process, the planning team will evaluate and translate each of them into measurable "objectives" so that progress would be assessable as management options are implemented in the future. Utilizing the input from the Pennypack Watershed Partnership, this goal setting process was designed to be inclusive of a multitude of stakeholder perspectives.

PWD staff prepared for the goal setting process by reviewing existing watershed plans and reports. Since the Pennypack Creek River Conservation Plan was recently completed (2005) and that planning initiative included a stakeholder goal setting process, the RCP goals were deemed an appropriate starting point from which stakeholders could begin evaluating for completeness. These goals along with others culled from additional existing sources such as the Pennypack Greenway Partnership's Strategic Planning process and the Pennypack stakeholder "Key Person Interviews" were synthesized into a list of broad goals and measurable objectives and shared with the watershed stakeholders for evaluation.

A diversely representative group consisting of roughly 27 stakeholders actively participated in the goal setting process. Of these, 7 participants represented municipalities within the drainage area, 2 represented nonprofit organizations, 2 represented the PADEP, 5 represented Bucks and Montgomery County agencies, 1 attended on behalf of a Pennsylvania State legislator's office, 1 represented a golf course, 2 represented local parks and 5 represented City of Philadelphia agencies. This stakeholder assemblage is currently evaluating a final "wish list" consisting of 8 broad goals for the Pennypack Creek Watershed.

Table E.2.4-2 Draft Pennypack Watershed Stakeholders Goals and Objectives

Goals	Objectives
Habitat and Ecological Protection and Restoration	1. Improve Stream Habitat and Restore Aquatic Communities 2. Restore Ecological Integrity 3. Protection and enhancement of high quality sites
Stormwater Management	1. Improve In-stream Flow Conditions 2. Stormwater management planning
Improvement of Water Quality	1. Improve Water Quality and Reduce Pollutant Loads
Erosion Reduction	1. Improve and Protect Stream Corridors
Flooding	1. Mitigate Flooding
Open Space Preservation, Recreation and Cultural Opportunities	1. Enhance and Improve Recreational Opportunities 2. Permanently preserve land to ensure a protected greenway 3. Preserve cultural and historic resources 4. Build a Trial 5. Enhancement of tributary streams and mainstem of Pennypack Creek
Quality of Life	1. Enhance Quality of life for Watershed Residents
Stakeholders Involvement	1. Improve Stewardship, Communication and Coordination among Watershed Stakeholders and Residents 2. Increase understanding of, affinity for and commitment to natural systems

In the fall of 2008 the Pennypack Watershed Partnership will be reconvened to finalize and approve this list of proposed goals and adopt them as representative of stakeholder goals for the watershed. These goals will be reevaluated in the winter of 2008/2009 upon review of the PCWCCR by the watershed stakeholders. At that time goals will be prioritized and measurable objectives can be defined for each approved goal.

E.2.4.2.3 Poquessing Creek Watershed

A Poquessing Creek Watershed Partnership will be convened on the winter of 2008/2009; at that time a preliminary set of stakeholder goals will be developed.

E.2.5 Technology Evaluation

An integral component of developing the Watershed Management Plans is implementing appropriate stormwater management options in response to the key stormwater issues identified under Step 1 of the NPDES permit. The overall goal for mitigating stormwater is to improve the quality of runoff and decrease the quantity and rate of runoff as it reaches the receiving water bodies through the MS4. There are numerous approaches to achieving these stormwater runoff improvements. The City is responsible for ensuring that any technology that is implemented to address stormwater issues is also evaluated for its effectiveness. What has become increasingly evident over the past year is the contribution of private development in addressing stormwater runoff problems. A discussion of the programs, technology and approaches implemented to date are included specifically within this section and also as part of the Best Management Practices narrative located in Section K.

E.2.5.1 Household Hazardous Waste Collections

During FY 2008, the City of Philadelphia held 6 Household Hazardous Waste Collection events, during which a total of more than 127 tons of hazardous waste and 68 tons of computer material were collected and disposed of properly. These materials include oil, paint, and other toxic household substances. In FY 2008 50,367 tons of recycled materials were collected from residents of the City of Philadelphia as well as 5,073 tons of composting leaves. A summary of the collections over the last 5 fiscal years is provided below in Table E.2.5-12. In addition, more information is available to the public at http://www.phila.gov/streets/hazardous_waste.html.

Table E.2.5-11 Household Hazardous Waste Collection Statistics (FY 2004 - 2007)

Collection Event		# of Attendees	Quantity Accepted (lbs)		
Location	**Date**		**HHW**	**Computers**	**Total**
FY 2004 Total		**3,365**	**284,696**	**47,593**	**284,696**
FY 2005 Total		**3,740**	**280,722**	**30,793**	**315,255**
FY 2006 Total		**3,866**	**306,707**	**67,319**	**374,026**
FY 2007					
State Road and Ashburner (Thurs)	20-Jul-06	620	39,297	6,834	46,131
22nd and York	19-Aug-06	223	16,495	3,389	19,894
63rd Street	7-Oct-06	327	22,989	1,868	24,857
Delaware and Wheatsheaf	4-Nov-06	732	51,258	19,826	71,084
State Road and Ashburner (HHW)	5-May-07	691	57,372	18,212	75,584
Domino and Umbria	9-Jun-07	765	52,787	9,531	62,318
	12-Jul-06	Testing	NA		NA
Propane Pick-up at Sanitation Yards	Scheduled	Special Pick-up			
FY 2007 Total		**3,358**	**240,198**	**59,660**	**299,858**
FY 2008					
State Road and Ashburner	19-Jul-07	758	39,934	18,250	58,184
22nd and York	25-Aug-07	219	15,800	2,650	18,450
63rd Street	7-Oct-07	295	21,263	7,857	29,120
Delaware and Wheatsheaf	3-Nov-07	424	30,494	8,215	38,709
State Road and Ashburner	4-Apr-08	1,176	84,636	24,650	109,286
Domino and Umbria	6-June-08	860	61,928	15,932	77,695
Special Pick-Up (Computers and TVs) Area 4 and 6 Drop off sites				58,695	58,695
FY 2008 Total		**3,372**	**254,055**	**136,249**	**390,304**

NA Not Applicable

E.2.5.2 Infrared Analysis in the Wissahickon Watershed

Aerial infrared (IR) imaging of all the hydrology in the Wissahickon Creek Watershed (105 miles), Cobbs Creek Watershed (24 miles) and Tacony-Frankford Creek Watershed (32 miles) was conducted for the purpose of finding thermal anomalies indicative of liquid contamination of the surface water. Possible causes of the thermal anomalies are leaking sewer lines, ground water seeps, unidentified surface or subsurface outfalls in the form of pipes or drains, storm sewers and any other detectable source of liquid that may be of interest. A detailed explanation of the imagine process and contractor hired to perform the inspections can be found in FY 2006 Stormwater Annual Report pages 57-58.

A shapefile was created showing spatial location of each thermal anomaly identified and all associated data such as suspected cause of the anomaly. Maps were created showing each of the anomalies in Philadelphia and the surrounding area and infrastructure to help better identify problems and to help in locating the point in the field. The field investigation of the thermal anomalies is ongoing. Philadelphia contained 38 locations where thermal anomalies were observed and each one of those sites has been investigated, and corrective action taken when necessary. PWD is also contacting and working with outside communities to identify and manage the sources of thermal anomalies documented in their communities.

E.2.5.3 Floatables Control

R.E. Roy Skimming Vessel

PWD's desire to improve public awareness of an individual's contribution to coastal aesthetics— notably in the Delaware and Schuylkill Rivers—and to improve water quality and aesthetics of surrounding parks and recreational areas recommended the use of a skimming vessel to remove debris from targeted reaches of the tidal portions of these two rivers.

In 2003, the PWD evaluated skimmer vessel technology types, models, and vendors, based on critical decision points such as material handling, vessel speed, mobile off-loading, seaworthiness, and O&M, and capital and life-cycle costs. The PWD determined that the Rover 12 - a 40ft, container type, debris vessel, was the vessel capable of safely and efficiently servicing these rivers.

On June 18th, 2004, the initial payment for the construction of the vessel was authorized by the PWD and the fabrication of the skimming vessel officially began. On December 17th, 2004 the PWD sent a team to Rhode Island for a vessel inspection at Hewitt Environmental's contractors manufacturing facility - Blount Boats, Inc. Fabrication continued throughout the first half of 2005 and the boat was delivered on June 28th, 2005. The vessel completed sea trials and after a few minor modifications and was accepted by the PWD. The total cost of the vessel was $526,690.

The vessel, now known as the R. E. Roy, was operated in-house, by PWD personnel from delivery until April 2006. These personnel were trained by the vessel construction company on proper operations of the vessel. The vessel was in operation on the Schuylkill and Delaware Rivers performing general debris collection and removal. The vessel was also used to clean up for and service as a public relations highlight at events such as the Schuylkill Regatta.

The PWD went through the process of securing a contractor for the permanent operation of the skimming vessel from October 2005 through March 2006. The vendor selected through this process has become the full-time operator of the skimming vessel for a contract period of at least one year, with the option for contract renewal. The vessel is now operated five days per week, 8 months of the year.

The contract was awarded to River Associates, Inc of Philadelphia, PA in the spring of 2006. River Associates began operation in April 2006. Since that time, they have been operating the vessel and performing general debris cleanup on both the Delaware and Schuylkill Rivers. They have also participated in numerous public events including the PECO Energy Earth Day Cleanup, the Jam on the River at Penn's Landing, the Schuylkill River Sojourn, and the Godspeed Sail & Landing Party at Penn's Landing.

During the 2007-2008 period of record, the skimmer vessel was in operation in 2007 from July through December before shutting down for winter maintenance, and then began operation again in March 2008. The total amount of debris collected in FY 2008 from July 1st, 2007 to June 30th, 2008 was 30.48 tons. The weights of debris collected during each month during Fiscal Years 2008 and 2007 are displayed in the chart below:

Table E.2.5-2 Debris Collected by R.E. Roy Skimming Vessel

Month	Tons of Debris Collected
July 2007	4.51
August 2007	2.63
September 2007	1.49
October 2007	3.24
November 2007	7.2
December 2007	2.43
March 2008	1.76
April 2008	2.46
May 2008	2.54
June 2008	2.22
FY 2008 Total	30.48

Pontoon Boat

Throughout the 2007-2008 swimming season, PWD managed a skimming operation for floatable debris on the non-tidal Schuylkill through use of the pontoon vessel. This program was an extension of the large debris removal already occurring on the tidal portions of the Delaware and Schuylkill rivers. Due to the high visibility of the project, it received excellent public feedback throughout the season.

Once a week, a crew of three operated the office's pontoon vessel, collecting an average of 2.5 yd^3 per day. During Fiscal Year 2008 the pontoon vessel was operated 10 times removing a total of 29.5 cubic yards of trash from the Non-Tidal Schuylkill River. The chart below details the composition of the debris collected. The majority of this debris was collected along Kelly Drive each week, covering only 25% of the anticipated project area.

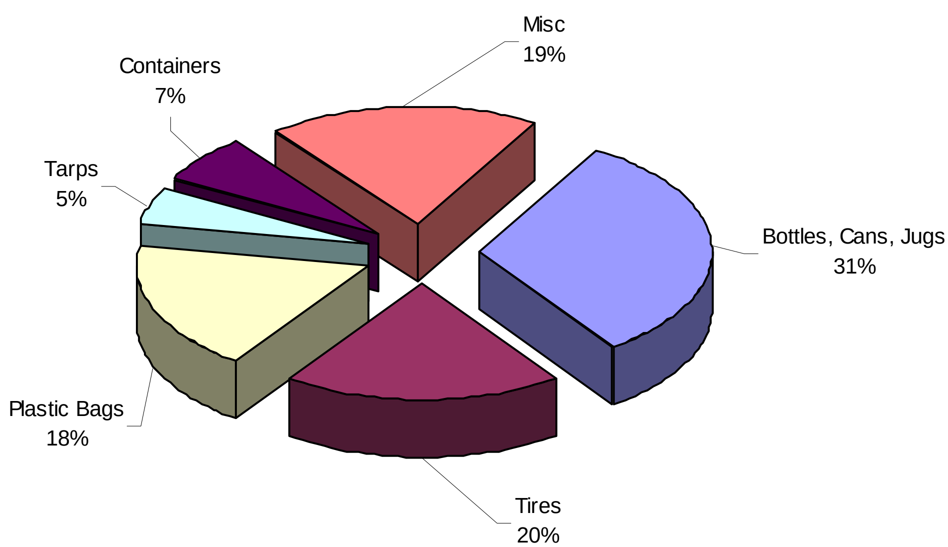

Figure E.2.5-2 Percent Composition of Recovered Debris

Adequately covering the proposed area will require a three person crew operating the pontoon boat at least twice a week throughout the swimming season. The sustainability of this project will depend on increased staffing within the Waterways Restoration Team (Section E.3.1.2) as well as future public participation.

E.2.5.4 Economic Assessment and Funding Requirements

As watershed management plans are completed for the Wissahickon, Pennypack and Poquessing watersheds each report will include an economic assessment. The assessment will detail funding requirements including identifying known and potential funding sources necessary for successful plan implementation. Subsequent annual reports will provide appropriate assessments as the Watershed Management Plans are completed.

E.2.5.4 Public Involvement

Public involvement, including education and outreach, is detailed in Section E.3.2.1 Integrated Stormwater Management Plans and Section I Miscellaneous Programs and Activities.

E.3 Step 3 – Watershed Plan Implementation and Performance Monitoring: Permit Issuance through Expiration

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 benefits watershed-wide. Through PWD's experience in working with stakeholder groups in goal prioritization and option evaluation, they have learned that stakeholder priorities can at times differ from those identified by the data driven problem identification process. This could present a challenge in development and approval of a management alternative for watershed implementation. PWD has developed an approach that is able to address 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 could be addressed simultaneously with those identified through scientific data. Two of the targets were defined so that they could be fully met through implementation of a limited set of options, while the third target would best be addressed though 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 overall 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 will result in realizing some of the objectives within a relatively short time frame, providing positive incentive to the communities and agencies involved in the restoration, and more immediate benefits to the people living in the watershed.

PWD's IWMP planning targets are defined below:

Program Support (Planning, Outreach & Reporting)
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), be accessible to the public, and be an amenity to the community. Target A was defined with a focus on trash removal and litter prevention, and the elimination of sources of sewage discharge during dry weather. 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. The water quality of the stream in dry weather, particularly with respect to bacteria, should be similar to background concentrations in groundwater.

Target B: Healthy Living Resources
Improvements to the number, health, and diversity of the benthic macroinvertebrate and fish species needs 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 silt 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 BMP 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 also will help protect the investment in stream restoration made as part of the 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 will require 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.

PWD has created and committed to a detailed five-year Implementation Plan for the portion of the Tookany/Tacony-Frankford Watershed within the City of Philadelphia. This plan has been designed to begin in 2006 and run through 2011.

By winter 2008/2009, PWD will develop an Implementation Plan for the City of Philadelphia portion of the drainage area of the Wissahickon Creek Watershed. This plan will be designed to begin in 2009 and run through 2014.

E.3.1 Program Support (Planning, Outreach & Reporting)

E.3.1.1 Integrated Stormwater Management Plans

The City shall continue to work with adjacent counties and municipalities to develop integrated stormwater management plans as part of the watershed planning process.

Philadelphia watersheds have a diverse range of planning needs that range from those of the Delaware that has a long-standing river basin commission, and has been the focus of major monitoring and modeling studies, to its tributaries for which very little data and analysis are available. The actual scope of each task is developed and described in a work plan or similar document by each stakeholder group at the commencement of watershed planning activities. PWD has completed the watershed management plans for the Cobbs Creek sub-basin and the Tookany/Tacony-Frankford Creek Watershed, which was developed in hand with the River Conservation Plan (RCP) that PWD spearheaded for the watershed. These plans will serve as templates for urban watersheds. In November 2005, the PWD launched the Wissahickon Watershed Partnership with the goal of developing an IWMP for this basin. In 2007 re-initiated the Pennypack Partnership, which completed a RCP in 2005 to initiate the development of an IWMP for this basin. In winter 2008, 2009 PWD will reconvene the Poquessing Creek Partnership.

E.3.1.2 Continue to Support Watershed Partnerships

E.3.1.2.1 *Tookany/Tacony-Frankford Watershed*

This Partnership has elected a Board of Directors and has received its tax-exempt status as the first multi-municipal Watershed Partnership in the region and this year hired its first Executive Director of the organization. The Executive Director began working for the organization in the spring of 2007. The mission of the Partnership is the implementation of the watershed management plan.

Current members of Tookany-Tacony/Frankford Partnership:

Abington Township	Ogontz Avenue Revitalization Corporation
Awbury Arboretum	PA Department of Environmental Protection
Cheltenham Township	PA Environmental Council
Fairmount Park Commission Environmental Stewardship and Education Division	PA Horticultural Society
Frankford Group Ministry	Philadelphia Water Department
Friends of Tacony Creek Park	Rockledge Borough
Jenkintown Borough	Senior Environmental Corps.
Melrose Park Neighbors Association	US Environmental Protection Agency
Montgomery County Commissioners	US National Park Service
Montgomery County Conservation District	

Tookany-Tacony/Frankford Organization/Committees

This nonprofit organization has begun to organize itself into various working committees under the direction of the Board of Directors. Thus far, the committees consist of the Executive Committee and Planning and Performance. This organization has applied for several grants and funding programs over the past year, including the National Park Service's Community Planning Grant – which funds the development of a "Communications Plan" for the group. The Partnership also applied to the USEPA's Targeted Watershed Initiative Grant for project implementation funding.

The Education and Outreach Committee of the Tookany/Tacony Frankford Watershed Partnership developed the below programs and/or participated in the below events.

1. 2007 Treasures of the TTF Watershed Bus Tour

2. 2008 Treasures of the TTF Watershed Bus Tour; June 27, 2008

3. TTF Model Neighborhood Project

4. Communications Plan for TTF Model Neighborhood Project

5. Brochure on TTF Model Neighborhood Project

6. Stream Clean-Up at Wall Park

September 15, 2007

7. Stream Clean-Up at Wall Park;

April 19, 2008

8. TTF Watershed Lessons

Taylor Elementary School

January 22, 2008

9. TTF Watershed Lessons

Emlen Elementary School

March 12, 2008

10. Rain Barrel Workshops (a total of 235 rain barrels were distributed)

1. Awbury Arboretum, One Awbury Rd., Philadelphia, PA 19138

November 15, 2007

2. Frankford Group Ministry, 4620 Griscom St., Philadelphia, PA 19124

December 13, 2007

3. Glenside-Weldon Elementary School, 423 N. Easton Road, Glenside, PA 19038

April 16, 2008

4. Cedarbrook Middle School, 300 Longfellow Rd., Wyncote, PA, 19095

April 26, 2008

E.3.1.2.2 Pennypack Creek Watershed

The Pennypack Watershed covers 56 square miles and covers portions of 11 municipalities and the City of Philadelphia. The watershed is located within the lower Delaware River Basin and discharges into the Delaware River in the City of Philadelphia. PWD led an effort to develop a RCP for this watershed, which was completed in 2005.

PWD reconvened the Pennypack Watershed Partnership in December 2007 to begin the development of an IWMP for this watershed. The Pennypack Partnership has been convened twice in FY08, December 11th and May 21st. PWD will continue to convene the partnership over the coming years as an Integrated Watershed Management Plan for this watershed is developed.

The Pennypack Watersheds Partnership Education and Outreach Committee was convened in February, 2008. Below is a list of the meetings and events that have occurred, since it began.

Meetings/Events include:

1. Rain Barrel Workshop

January 26, 2008

Pennypack Environmental Center

2. Kick-Off Education & Outreach Committee Meeting,

February 6, 2008

Pennypack Ecological Restoration Trust

3. Education & Outreach Committee Meeting,

March 27, 2008

Pennypack Ecological Restoration Trust

4. Backyard Buffer Presentation

May 2008

E.3.1.2.3 Poquessing Creek Watershed

The final Poquessing Creek Watershed River Conservation Plan (RCP) was completed in July, 2007. The final RCP report was submitted to the Department of Conservation and Natural Resources in the winter of 2007 to be considered for the Pennsylvania Rivers Registry.

Prior to the completion of the report, a photo contest was held in the summer of 2006 to build awareness of the beauty of the Poquessing Watershed. The winning photographs from the contest were subsequently placed in the 2008 Poquessing RCP Calendar, which was developed by the RCP Team in the fall of 2007 as an additional outreach tool. The calendar includes the recommendations that resulted from the RCP, along with the

Executive Summary of the Plan. It was distributed widely, to every RCP participant and partner in the watershed.

The following steering committee meetings took place in the last phase of the RCP:

Steering Committee Meeting #8

July 10, 2007

Glen Ford Mansion, Philadelphia

A Backyard Buffer presentation was also presented to the Friends of Poquessing on June 5, 2008 at the Community College of Philadelphia.

E.3.1.2.4 Delaware River Direct Watershed

In the spring of 2007, the consultants (Cahill Associates and Pennsylvania Horticultural Society) were hired by Philadelphia Water Department to lead the Delaware Direct RCP. By the end of June, 2007, the RCP Team (PWD and consultants) determined that a unique RCP strategy would be desirable for this watershed due to the number of planning efforts currently in place and the complexity of issues in and along Philadelphia's waterfront. As a result, the RCP Team modified the scope of the RCP in order for it to include an emphasis on the implementation of the Philadelphia GreenPlan recommendations. The first phase of this project (data collection and public participation) commenced in the fall of 2007.

The following meetings and events have taken place in the first phase of the Delaware Direct Watershed River Conservation Plan:

1. Steering Committee Meeting #1

November 15, 2007

Pennsylvania Horticultural Society

2. Steering Committee Meeting #2

February 20, 2008

Pennsylvania Horticultural Society

3. Focus Group/Workshop #1: Ecology and Riverfront Design – Case Study Pulaski Park

April 30, 2008

Pennsylvania Horticultural Society

4. Focus Group/Workshop #2: The Built Environment – Advanced Parking Lot Design

June 4, 2008

Independent Seaport Museum

5. Focus Group/Workshop #3: Mobility and Connections

July 31, 2008

Penn Treaty Park

6. Rain Barrel Workshop

May 13, 2008

St. Michael's Church, Northern Liberties

49 rain barrels were distributed

E.3.1.2.5 Wissahickon Creek Watershed

An IWMP was initiated for the Wissahickon Creek Watershed in fall, 2005 and the Wissahickon Watershed Partnership continues to be convened today.

Wissahickon Watershed Partnership Meeting Attendees:

Abington Township	PA Department of Environmental Protection
Ambler Wastewater Treatment Plant	PA Environmental Council
Clean Water Action	Philadelphia University
Fairmount Park Commission	Philadelphia Water Department
Friends of the Wissahickon	Schuylkill Center for Environmental Education
F X Browne, Inc.	Schuylkill Riverkeeper
Lansdale Borough	Senior Environmental Corps, Center in the Park
Lower Gwynedd Township	Temple University, Center for Sustainable Communities
McNeil CSP	Upper Dublin Township
Merck, Inc.	Upper Gwynedd Township
Montgomery County Conservation District	US Environmental Protection Agency
Montgomery County Planning Commission	Whitemarsh Township
Morris Arboretum	Whitpain Township
North Wales Borough	Wissahickon Restoration Volunteers
North Wales Water Authority	Wissahickon Valley Watershed Association

The Wissahickon Partnership was convened a number of times over the past year as this group continues to drive the development of the IWMP for this watershed area.

The Education and Outreach Committee of the Wissahickon Watershed Partnership continues to meet and develop materials and programs.

Since July, 2008, the Education & Outreach Committee has met on the below dates:

-August 22, 2007, Morris Arboretum

-March 19, 2008, Morris Arboretum

-April 24, 2008, Morris Arboretum

The Committee also developed the below products and organized the following events:

-Wissahickon Watershed Stormwater Best Management Practices (BMP) Bus Tour

-Wonders of the Wissahickon Watershed Brochure

-Wonders of the Wissahickon Watershed Brochure Celebration

-Municipal Yard Make-Over Contest (Rain Garden Program), leading to the design and implementation of three rain gardens in the Wissahickon Watershed

-Municipal Rain Garden Workshop (with accompanying PowerPoint)

-Homeowners' Rain Garden Workshop

-Pennsylvania Rain Garden Brochure

-Stormwater Basin-Retrofit Program

-Stormwater Bain Retrofit Workshop

-Rain Barrel Workshops

Wissahickon Creek Detention Basin Inventory and Retrofit Program

PWD developed a replicable approach for generating an inventory of existing stormwater management facilities within a watershed and then prioritizing the facilities for retrofit with structural and nonstructural stormwater best management practices aimed at enhancing groundwater recharge and water quality treatment of stormwater runoff and implemented it in the Wissahickon Creek Watershed. The study area for this initiative was limited to the sub-watershed drainage areas of the tributary streams flowing to the Wissahickon Creek, specifically excluding basins draining to the mainstem. The study focused on first and second order stream locations where implementation benefits could be maximized. (Funding for this study was provided by a US EPA 104b3 grant administered by PA DEP.)

The initiative involved development of a process in which a desktop analysis of Geographic Information Systems (GIS) data layers was utilized to identify a preliminary set of basins and a field assessment protocol was developed to visit each basin to collect information relevant to retrofit priority. Data collected about each basin was fed into an evaluative matrix program where fifteen weighted criteria were applied to each basin to prioritize the 153 basins in the inventory for retrofit. A ranked output was produced at both the watershed-wide as well as the individual municipal level; basins were ranked with high, medium and lower priority for retrofit. Information about three types of basin retrofits and benefits associated with each type for a given basin size. It will be up to the implementers of each basin retrofit to evaluate the appropriate measures for implementation in a basin given the existing conditions of the basin.

For more information on this initiative, a copy of the final report and all appendices as well as downloadable GIS data, please visit: www.watershedscience.info/basininventory

Wissahickon Detention Basin Retrofit and Technical Assistance Program

PWD funded a Technical Assistance Program to follow up on the recently completed *Inventory of Existing Stormwater Management Facilities with Retrofit Potential within the Wissahickon Creek* designed to assist watershed stakeholders (specifically municipalities) in making use of the information in moving toward implementation of basin retrofits. The Basin Inventory initiative concluded by stating that all basins considered for retrofit would require a detailed, site-specific feasibility study and engineering design in order to proceed and that existing conditions such as flooding, groundwater contamination, karst geology, proximity to drinking water intakes, groundwater wells, and many other factors must be considered in order to deem the basin appropriate for retrofit implementation. This program was intended to provide stakeholders with the tools necessary to perform such site specific feasibility studies.

Technical assistance is provided to partners in the form of site visits, conceptual and final project designs, workshops, and a brochure. Three or four municipally-owned facilities will be guided through the site assessment and design process to prepare for retrofit implementation. This Technical Assistance Program was initiated in the spring of 2008 and came to a close on June 30th, 2008. At the close of this initiative, the Pennsylvania Environmental Council secured additional funds to continue this program in the coming year and actually construct 2-3 retrofits within the Wissahickon Creek Watershed.

Upper Wissahickon Critical Area Resource Plan/Special Area Management Plan Pilot Project

A Critical Areas Resource Plan (CARP) Pilot is being developed for the Upper Wissahickon Watershed in Montgomery County to demonstrate the critical area planning process established under Act 220 of 2002—The Pennsylvania Water Resources Planning Act—and the special area management plan process recommended through the Pennsylvania Coastal Zone Management Program. The plan's focus was on water supply but also pulled together many of the different water resource activities currently being pursued in the watershed. Though the study area for this initiative only included the Upper Wissahickon (which covered the headwaters through just below the confluence with the Sandy Run Creek tributary)

PWD supported the development of this plan. PWD provided technical data to the planning team and provided staff resources to attend multiple planning meetings and for draft plan review.

E.3.2 Target A - Dry Weather Water Quality and Aesthetics

E.3.2.1 Defective Lateral Program

Over the last permit year, the City has continued to successfully operate its Defective Lateral Program. A detailed discussion of this program is provided within this report in Section F - Detection, Investigation, and Abatement of Illicit Connections and Improper Disposal.

E.3.2.2 Waterways Restoration Team

In July 2003, PWD and the Fairmount Park Commission (FPC) initiated an exciting partnership that will improve the environmental quality of the beloved city parks and streams.

The FPC has assumed responsibility for over 200 acres of land dedicated to the City for stormwater management purposes land that was, up until now, a mowing and landscaping maintenance burden for PWD. The FPC will use this land to further its vision of developing "watershed parks," creating natural connections between neighborhoods and existing park areas.

In exchange, PWD is fielding a Waterways Restoration Team (WRT) – a crew dedicated to removing large trash – cars, shopping carts, and other short dumped debris - from the 100 miles of stream systems that define our City neighborhoods. This crew will also restore eroded stream banks and stream beds around outfall pipes and remove sanitary debris at these outfalls. WRT will work in partnership with the FPC staff and the various Friends of the Parks groups to maximize resources and the positive impacts to our communities. This partnership focuses on the core strengths of our two agencies. The FPC will continue to improve landscape management of the City's parks and dedicated lands, while PWD will focus its efforts on water quality improvements, a mandate it has under its state and federal water quality related permits.

Table E.3.2-1 Waterways Restoration Team – FY 2008 Performance Measurements

Waste Removed	FY 2006	FY 2007	FY 2008
Debris Removed (tons)	425	441	326
Cars Removed	21	41	80
Tires Removed	396	1,201	861
Shopping Carts Removed	161	84	72
Number of Clean-up Sites	**124**	**142**	**178**

In FY 2008, WRT removed a smaller amount of trash than what was removed in FYs 2006 and 2007. This is not an indicator that WRT has been less effective this year than last, but is more representative of there being less debris in the streams. One of the greatest achievements is the higher number of clean-up sites visited by WRT. In FY 2008, WRT cleaned thirty-six more sites than what was cleaned in FY 2007. The increased assignment and progress of the WRT exemplifies PWD's commitment to cleaning and beautifying regional water resources.

In addition to the unbelievable amounts of trash that have been eliminated from our park and stream systems, the WRT completed four plunge pool restoration projects. WRT has finished plunge pool work at Adams Avenue and Bingham Avenue in the

Tacony-Frankford Creek, Gorgas Lane in the Wissahickon Creek, and at the Maxwell Place outfall in the Pennypack Creek.

E.3.2.3 Stormwater Outfall Inspections

Please reference Section F - Detection, Investigation, and Abatement of Illicit Connections and Improper Disposal for a more detailed discussion of this subject.

E.3.2.4 Dry Weather Flow Outfall Sampling

Please reference Section F - Detection, Investigation, and Abatement of Illicit Connections and Improper Disposal for a more detailed discussion of this subject.

E.3.2.5 Priority Outfall Closure Testing

Please reference Section F - Detection, Investigation, and Abatement of Illicit Connections and Improper Disposal for a more detailed discussion of this subject.

E.3.3 Target B - Healthy Living Resources

E.3.3.1 Natural Stream Channel Design (NSCD)

PWD is currently employing 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. NSCD aims to restore receiving waters in several ways, including the reconstruction of stream geometry for present day flows, reestablishing the stream bank to allow for improved access to the flood plain, installing in-stream energy dissipating devices, and creating low velocity nulls by using vernal pools to achieve flood attenuation and treatment. The exploration of the NSCD technique is required in Section 2, Step 3b of the City of Philadelphia MS4 NPDES permit. The permit requires the City to employ and evaluate NSCD as a viable rehabilitation option for channelized, eroded, scoured, silted, and inhospitable streams within Philadelphia County. These techniques are to be deployed by PWD to work toward improving the healthy living resources of Philadelphia, including the number, health, and diversity of benthic invertebrates and fish species in watersheds impacted by stormwater. In addition to meeting permit requirements, the Marshall Road, Wise's Mill, Whitaker Avenue, Redd Rambler, and Cathedral Run projects carried out by PWD will hopefully demonstrate to neighboring communities the environmental benefits of NSCD.

Additionally, during FY 2008, PWD started the design process on restoring approximately 6,000 feet of impaired stream of Bell's Mill Run, a tributary in the Wissahickon Creek Watershed that flows directly into Wissahickon Creek.

Marshall Road

During FY 2008, at the stream restoration site known as Marshall Road, PWD continued visual inspections of the restoration reach throughout the year. Visual assessments are used by PWD to monitor any significant changes to the stream channel, as well as any possible impacts on PWD infrastructure. Fortunately, no significant changes were observed in the restoration reach and no maintenance was required on this NSCD demonstration project executed by PWD. For a full description of the Marshall Road project, please refer to **Appendix K** of this document and FY 2006 Stormwater Annual Report page 69.

Wises Mills

Picking up on 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 will infiltrate, detain, and treat a portion of stormwater from a 90-acre watershed prior to discharging to the headwaters of Wises Mill's lower branch. In addition, this effort aims to restore and stabilize areas of Wises Mill Run that have been significantly undermined by stormwater infrastructure and dams on this stream. These efforts will target several hundred feet of stream along the 6,800 foot long tributary to Wissahickon Creek. PWD expects 30% Design to be complete by November, 2008, and we will continue to move this project forward with hopes of completing the final design by the end of FY 2009.

Whitaker Avenue

The Tacony Creek – Whitaker Avenue stream restoration project is situated in the Tacony Creek Park located of Roosevelt Boulevard (US 1) downstream of the Whitaker Avenue Bridge and upstream of the Wyoming Avenue Bridge in northeastern Philadelphia. This project will implement a sustainable approach to stream habitat restoration that will mitigate the impacts of urban development and related hydrologic and hydraulic modifications over approximately 2,000 feet of stream length. PWD has assembled a project team to develop an approach for the restoration of Tacony Creek that encompasses the replication of natural hydrologic and ecological cycles, sustainability, enhancement to riparian and in-stream aquatic habitat, improved aesthetics, and significant cost savings over structural solutions. The results of this approach include not just stable stream bank geometry, but also long term ecological stability.

The project site involves 2 stakeholders, Fairmount Park Commission and the Scattergood Foundation, both of whom are partners in working to see this project to fruition.

At this time last year, PWD expected to be able to finalize design and commence construction in Fall, 2008. However, several issues have delayed this effort. First and foremost, PWD has not, as of August, 2008, received a permit from PADEP required to implement this stream restoration project. In addition, during the fall of 2007, PWD and the Fairmount Park Commission decided to invest in additional invasive species removal effort during 2008 and 2009, such that the vegetative stabilization of this site is maximized. The final design and specifications for the Whitaker Avenue project will be complete by October, 2008, with the anticipated construction to occur during the fall of 2009.

Redd Rambler

Over the last three and a half years, PWD has worked diligently with the 89 property owners that border this stream. While this has caused significant delays in the design process, PWD also has felt that these efforts have been worthwhile in ensuring the resident's confidence in the stewardship of the City and its environment. At this time last year, PWD was anticipating bidding this design during Spring, 2008, with construction occurring during Fall, 2008.

Unfortunately, due to the significant land ownership issues associated with this project, there have significant delays that may actually affect the feasibility of this project. PWD has continued to work with the residents adjacent to Redd Rambler to obtain Temporary Construction Access agreements along the entire project area. While we have received more than 60% of the necessary agreements, the remaining residents have been hesitant to provide PWD with permission to perform work in all areas. In addition, PWD will still require legislation to be passed in City Council to extend Right-of-Way in some areas to assure that PWD can continue to operate and maintain this project in the future. Each of the issues has indefinite time frames associated with them. During FY 2009, PWD will continue to work with the residents of Redd Rambler with the hopes of constructing this project.

Cathedral Run

During FY 2007, PWD received the final Watershed Management Plan for the Cathedral Run watershed. Upon receipt, PWD began working with Fairmount Park Commission (FPC) to establish a prioritization of the projects and outreach efforts contained within the Plan. The first project to be tackled by PWD and FPC was the design and construction of Infiltration Area #1. This Area had been targeted to manage and infiltrate stormwater from up to 25 acres. However, during FY 2008, PWD and AKRF, our design consultant realized that multiple physical constraints would prevent this area from being a feasible stormwater management area. Instead, PWD is targeting Infiltration Area #2, as presented in the Watershed Management Plan. This area will manage a portion of the rainfall from the 91 acres watershed upstream of outfall W-076-01. Presently, the 30% Design of this facility is being completely by AKRF, with the final design to be completed during the FY 2009 reporting period.

For a full description of the Cathedral Run project, please refer to Appendix C of the FY 2006 Stormwater Annual Report page 73.

E.3.3.2 Monitoring Effectiveness of NSCD

As each of PWD's NSCD projects are constructed, PWD realizes the importance of extensive monitoring and O&M that accompanies such projects. It is very rare that such projects do not require additional "tweaking" or maintenance. In addition, 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 will conduct post implementation monitoring at each site that will include the measurement of relevant biological, habitat, and physical parameters to be used in comparison to pre-construction conditions.

E.3.3.2.1 NSCD Physical Monitoring

The physical monitoring component of PWD's NSCD monitoring program will be modeled after those methods specifically described in *River Assessment and Monitoring* or RAM (Rosgen, 2008). The RAM manual provides the framework for a comprehensive monitoring protocol that allows for a replicable dataset to be created allowing for independent valuation of a project's performance over time.

Specifically, the method will include the following data collection efforts:

- Establishment & Survey of permanent cross-sections at riffles, runs, pools, and glides
- Survey of Longitudinal profile along the entire project reach
- Individual pebble counts at riffles, runs, pools, glides
- Bar Sample/Pavement-Sub Pavement sampling
- BEHI/NBS Assessment
- Establishment of and occupation of permanent photo points

This dataset will allow for further data analysis and the completion of an annual monitoring report that will include:

- Narrative Report
- Sketch Map
- Stream Classification
- River reach summary and dimensionless ratios
- Velocity computation form
- Cross-section data & graphs

- Longitudinal profile data and graph
- Pebble Count data and graph
- Stream Stability Indices
- BEHI & NBS worksheets and Stream Erosion Predictions
- Bar Sample data and graph
- Stream Sediment Competency Assessment
- Photos from established photo points

E.3.3.2.2 NSCD Biological/Habitat Monitoring

The Biological and Habitat monitoring component of PWD's NSCD monitoring program will be modeled after components of the PADEP Instream Comprehensive Evaluation (ICE) found in Appendix A of the 2006 PADEP Bureau of Water Standards and Facility Regulation Instream Comprehensive Evaluation Surveys. Specifically, PWD will perform qualitative habitat assessments and collect benthic macroinvertebrates according to the "wadeable freestone" and "riffle run" protocols (Appendices A, B, H, of the aforementioned document). Monitoring will be conducted in early spring at five year intervals following project construction. At sites that support native fish communities or propagation and passage of migratory fish, PWD will periodically sample fish populations and fish habitat at the discretion of the PA Fish and Boat Commission.

In addition to the benthic macroinvertebrate metrics described in PADEP 2006 Appendix H, PWD will collect benthic macroinvertebrates from regional reference sites representative of the best attainable biological condition in order to continue with the assessment methods and address indicators established in Integrated Watershed Management Plans.

E.3.4 Target C - Wet Weather Water Quality and Quantity

In addition to the implementation of the NSCD projects discussed above, the City also understands the need to address wet weather water quality and quantity issues prior to the flow entering its rivers and streams. In such, the City has implemented various BMP projects in which PWD has partnered with groups in each watershed.

A comprehensive list of BMP projects are presented in Tables E.3.4-1 and E.3.4-2 below. The tables include projects in both MS4 as well as combined sewersheds since the projects, regardless of location within the City, present an opportunity to assess implemented technologies. The assessments can then be used to select appropriate practices for improving water quality and quantity. Additional information regarding each project can be found in **Appendix K**. Completed projects are presented in Table

E.3.4-1 and potential projects are listed by name, watershed, and project stage in Table E.3.4-2. The five project stages presented in Table E.3.4-2 are: construction complete, design complete, in construction, in design, and ongoing.

Construction Complete: The project has been fully constructed

Design Complete: The project has been fully designed and is ready for contractor bids

In Construction: The project is currently under construction in FY 2008

In Design: The project is currently being designed by PWD staff and partners in FY 2008

Ongoing: The project is still undergoing multiple stages of design or construction

Since the FY 2007 Stormwater Annual Report, great progress has been made in the construction, design, and initiation of new wet weather BMPs. Since FY 2007, nine new projects are 'in design' and one new project is 'design complete'. In addition to new projects, of those presented in FY 2007 two have moved from 'design complete' to 'construction complete' stages, one 'ongoing' project is now 'construction complete', and three projects have moved from 'in design' to 'construction complete' stages.

Table E.3.4-1 PWD Completed Stormwater BMP Projects

Project Name	Watershed	Shed Type
47th & Grays Ferry Rain Garden	Schuylkill	Combined
Allens Lane Art Center Porous Basketball Court	Wissahickon	Separate
BLS Meadow	Tacony-Frankford	Combined
Clark Park Infiltration Project	Schuylkill	Combined
Cliveden Park Stormwater Project	Tacony-Frankford	Combined
Courtesy Stables Runoff Treatment Project	Wissahickon	Separate
East Falls Parking Lot Bio-retention	Schuylkill	Separate
Fox Chase Farms Riparian Buffer Project	Wissahickon	Separate
Marshall Road Stream Restoration	Cobbs	Combined
Mill Creek Playground Porous Basketball Court	Schuylkill	Combined
Mill Creek Farm	Schuylkill	Combined
Monastery Stables Stormwater Diversion & Detention Project	Wissahickon	Separate
N. 50th St. Retrofit (Tree Planting, Garden, & Rain Barrels)	Schuylkill	Combined
Overbrook Environmental Education Center	Schuylkill	Combined
Pennypack Park Wetland & Pervious Parking Lot	Pennypack	Separate
Saylor Grove Stormwater Treatment Wetland	Wissahickon	Separate
School of the Future (Green Roof & Cistern)	Schuylkill	Combined
Springside School Stormwater Improvements	Wissahickon	Separate
Waterview Recreation Center Streetscape	Tacony-Frankford	Combined
W.B. Saul High School	Wissahickon	Separate
West Mill Creek Infiltration Tree Trench	Schuylkill	Combined
Wissahickon Charter School Rain Garden	Schuylkill	Separate

Table E.3.4-2 PWD Potential Stormwater BMP Projects

Project Name	Project Stage	Watershed	Shed Type
Baxter Visitor's Parking Lot	Design complete	Delaware	Separate
Liberty Lands Stormwater Project	Design complete	Delaware	Combined
BLS Streetscape – stormwater planters & tree trenches	In design	TTF	Combined
Barry Playground Stormwater Improvements	In design	Schuylkill	Combined
Belmont WTP Streetscapes	In design	Schuylkill	Separate
Blue Bell Tavern Park Stormwater Improvements	In design	Cobbs	Combined
Cathedral Run Watershed Restoration	In design	Wissahickon	Separate
Columbus Square Streetscape & Rain Garden	In design	Delaware	Combined
Lancaster Ave. Streetscape (59th -63rd)	In design	Schuylkill	Combined
Market St. Streetscape (34th-41st)	In design	Schuylkill	Combined
Passyunk Ave. Stormwater Improvements	In design	Schuylkill	Combined
Redd Rambler Run Stream Restoration	In design	Pennypack	Separate
Queen Lane Streetscape	In design	Schuylkill	Separate
South Street Headhouse Streetscape	In design	Delaware	Combined
Tacony Creek Whitaker Ave. Stream Restoration	In design	TTF	Combined
Wise's Mill Watershed Restoration	Ongoing	Wissahickon	Separate

Please refer to **Appendix K** for fact sheets describing all of the above projects.

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Section F Detection, Investigation, and Abatement of Illicit Connections and Improper Disposal

F.1 Compliance with Permit Requirements

The City of Philadelphia's Defective Lateral Detection and Abatement Program was developed under the City's initial Municipal Separate Storm Sewer System (MS4) permit signed in 1995 and further refined under a Consent Order & Agreement (COA), reached with the Pennsylvania Department of Environmental Protection (PADEP) on June 30, 1998. On March 18, 2004, the COA was officially terminated. However, the City has remained faithful to the terms of that agreement and many of the COA requirements have now been incorporated into the City's new MS4 permit. As in previous years, during FY 08, the results of dry weather outfall and subsystem sampling were used to evaluate priorities for the Defective Lateral Detection and Abatement Program.

F.1.1 Staffing

As in prior years, the City maintains up to 4 crews dedicated to the identification and abatement of defective connections. Additional resources such as CCTV truck and crews are regularly assigned as needed to assist the program.

F.1.2 Funding

In addition to the staff resources dedicated to the identification and abatement of defective connections, the City funds abatement of owner-occupied, residential cross connections through the Cross Connection Repair Program. Funding for cross connection abatement and other customer assistance programs is budgeted at $2.5 million annually. During the reporting period, 53 abatements were completed under the program, at an average cost of $3,538.47, for a total cost of $187,539.

F.2 Prevention of Illicit Discharges

F.2.1 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.

F.2.2 Abatement of Residential Cross Connections

The City maintains a Defective Lateral and Abatement Program in compliance with the MS4 permit issued by the Pennsylvania Department of Environmental Protection. The City requires abatement of all residential defective connections upon discovery. An annual funding allotment of $2.5 Million is available through customer assistance programs in the form of City-funded cross connection abatements and HELP loans.

Information on the assistance programs accompanies the homeowner's notification of defect. The City also publicizes the assistance programs through bill stuffers to ratepayers, and through public education events. The City also maintains the legal authority to take administrative action to cease the pollution condition. During the FY 08 reporting period, the City funded abatement of 45 residential cross connections at an average cost of $4,060.88, for a total cost of $182,740.

F.2.3 Abatement of Commercial and Industrial Cross Connections

The City maintains a Defective Lateral and Abatement Program in compliance with the MS4 permit issued by the Pennsylvania Department of Environmental Protection. The City 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 08 reporting period, the City funded abatement of 8 commercial cross connections at an average cost of $599.88, for a total cost of $4,799.

F.3 Investigation of Illicit Discharge Sources

The City maintains a stormwater outfall monitoring system in compliance with the MS4 permit issued by the Pennsylvania Department of Environmental Protection. All 434 of 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. In addition, outfalls identified as priority outfalls under the MS4 permit are sampled quarterly.

The City also investigates all potential reports of an illicit discharge from the stormwater system through either the Industrial Waste Unit or the Sewer Maintenance Unit. The City investigates and reports all discovered illicit discharges to receiving waters. During FY 08, the City investigated 39 reported sewage discharges.

In addition to programs above, the City also has initiated a monitoring and modeling effort within the separate sanitary sewer areas to target specific areas where infiltration and/or ex-filtration may be likely. In the summer of 1999, the City initiated a portable flow-monitoring program to augment monitoring data that was collected by an existing network of permanent monitoring sites at fixed locations. Under this program, fifteen (15) American Sigma 920 portable flow monitors were purchased. These monitors have multiple sensors that use a combination of pressure transducer and ultrasonic technologies for measuring depths and Acoustic-Doppler technology for velocity measurement. Additionally, a consultant, Camp Dresser & McKee, was chosen to assist the City in the startup of this program. Data from this program is routinely analyzed and compared to data provided from the City's extensive Stormwater Management Model (SWMM) hydraulic model.

One of the goals of the monitoring program was for the City's in-house instrument technicians to receive training and experience in the proper setup, use, maintenance, and trouble-shooting of flow monitoring equipment. Beginning with the third round of deployments in October 2000, the City's personnel began running this program completely in-house.

Another initiative started by the City is a very large undertaking to evaluate and enhance our existing sewer assessment program. The City awarded a contract for $5.7 Million over two years to the engineering firm of Hazen & Sawyer Environmental Engineers & Scientists to inspect approximately 200 miles of sewers in 9 pilot areas using CCTV equipment. Four of these areas (Manayunk, Rhawnhurst, Oak Lane, and Bustleton) are in separate storm and sewer system areas. Additionally, the consultant provided training to the City's in-house sewer inspection personnel on the standard NASSCO rating system. This consultants work was completed FY 06 and the City is now running the entire program in-house.

F.4 Dye Tests and Abatements

During FY 08 the Defective Connections Abatement staff conducted 2,706 complete tests. Of the complete tests, 40 (1.5 %) were found defective. The total cost for the 53 abatements performed in FY 08, both residential and commercial, was $187,539.

F.5 Outfall Investigations

During FY 08, 56 outfalls were inspected and 30 were sampled due to observed dry-weather flow under the Permit Inspection Program. In addition, 30 outfalls were inspected and 30 sampled due to observed dry-weather flow under the Priority Outfall quarterly sampling program during FY 08. These samples are used to evaluate priorities for the Defective Lateral Detection and Abatement Program. A summary table of the progress of the Defective Lateral Detection and Abatement Program from FY 05-FY 08 as well as a synopsis of the work in the priority areas is provided below.

Table F.5-1 Summary of Defective Lateral Detection and Abatement Program FY 2005-FY 2007

	# Cross Connections Abated		Total Cost of Abatements
	Residential	**Commercial**	
FY 2005	48	5	$169,955
FY 2006	66	3	$333,094
FY 2007	78	0	$388,844
FY 2008	45	8	$ 187,539
Total	**237**	**16**	**$ 1,079,432**

In the past three reporting periods, PWD has abated 237 cross connections at a cost of $1,079,432.

F.5.1 T-088-01 (7th & Cheltenham Avenue)

In this priority outfall area, as of June 30, 2008, 2,828 properties have had complete tests as defined by the MS4 permit. Of these properties, 130 (4.6%) have been found to have defective laterals and been abated.

Additionally, at the end of Fiscal Year 2002, six dry weather diversion devices were installed to intercept contaminated flow within the storm system from five identified areas and redirect the flow into the sanitary system. These devises are inspected regularly by the City's Collector System Flow Control Unit. The locations of these devices, the number of inspections, blockages, and discharges found in FY 08 are listed below:

Table F.5.1-1 Dry Weather Diversion Device Installation Locations

Location	ID#	Inspections	Blockages	Discharges
Plymouth Street, West of Pittville Ave.	CFD-01	50	5	0
Pittville Avenue, South of Plymouth St.	CFD-02	55	13	0
Elston Street, West of Bouvier Street	CFD-03	53	2	0
Ashley Street, West of Bouvier Street	CFD-04	49	1	0
Cheltenham Ave, East of N. 19 Street	CFD-05	56	3	0
Verbena Street, South of Cheltenham Ave.	CFD-06	44	0	0

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

Table F.5.1-2 T-088-01 Quarterly Fecal Coliform Sampling

Date	Outfall (Fecal Colonies per 100 ml)
9/25/07	21,000
10/3/07	4,400
1/24/08	9,000
4/10/08	10,000

As part of the City's efforts to improve conditions at this outfall, stream embankment repairs and elimination of the pooling area on the outfall apron were proposed. Design work for these improvements was completed and the project was bid in Fiscal Year 2003. Construction was completed in Fiscal Year 2005.

F.5.2 W-060-01 (Monastery Avenue)

In this priority outfall area, as of June 30, 2008, 611 properties have had complete tests as defined by the MS4 permit. Of these properties, 16 (2.6%) have been found to have defective laterals. All 16 have been abated.

Additionally, two dry weather diversion devices were installed to intercept contaminated flow within the storm system and redirect the flow into the sanitary system. These devises 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 08 are listed below:

Table F.5.2-1 W-06-01 Inspections

Location	ID#	Inspections	Blockages	Discharges
Jannette Street, West of Monastery Ave.	MFD-01	46	1	0
Green Lane, North of Lawnton Street	MFD-02	44	0	0

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

Table F.5.2-2 W-06-01 Quarterly Fecal Coliform Sampling

Date	Outfall (Fecal Colonies per 100 ml)
9/17/07	3,500
10/22/07	200
3/13/08	20,000
4/23/08	30

F.5.3 Monoshone Creek Outfalls

Of the seven stormwater outfalls that discharge to the Monoshone Creek, the focus of the City's efforts is primarily just one outfall, W-068-05. This outfall is the largest in the watershed and essentially constitutes the headwaters of the creek since the historic creek has been encapsulated into this storm system and daylights at this outfall. This outfall is also the source of the majority of the fecal contamination in the creek. For this priority outfall, as of June 30, 2008, 2,739 properties have had complete tests as defined by the MS4 permit. Of these properties, 92 (3.4%) have been found to have defective laterals and all but two were subsequently abated.

In the spring of 2003, the City conducted CCTV sewer exams of both the storm and sanitary systems under Lincoln Drive. Given the high vehicle volume on this major artery for the City, this was a very difficult and time-consuming effort as all exams had to be done during weekends. A leak from the sanitary interceptor under Lincoln Drive, in the vicinity of Johnson Street, into the storm system was detected. The CCTV examinations showed that the integrity of the sanitary sewer was generally in excellent condition except for one area where bricks appeared to be missing in the vicinity of where the infiltration into the storm system was noted.

The City decided to move forward with a lining contract to address this situation. The contract provided for the lining of 3,160 feet of 2'-6" brick interceptor sewer under Lincoln Drive from Washington Lane (Paper Street only) to Arbutus Street. This scope included the entire length of sanitary sewer that is not physically lower in depth than the storm sewer system. The contract was bid, awarded, and completed in Fiscal Year 2004.

The City was also concerned about the erosion that had been occurring to the channelized section of Monoshone Creek at the W-068-05 outfall. The erosion had created a large pool at the outfall that the City believed exasperated the nuisance odors experienced and created an unsafe condition for small children that might wade in the creek. After discussion with the local community group, the Friends of the Monoshone, the City decided to make repairs to the channelized section to remove the pool and shore up the retaining walls. This work was designed as part of the sewer-lining contract above and performed at the same time.

Since that time, periodic follow up examinations of the storm system during dry weather periods have been conducted by the Industrial Waste Unit in attempts to locate additional isolated areas where fecal contamination may be occurring.

Additionally, the City of Philadelphia completed construction of a 1-acre stormwater treatment wetland this past year at outfall W-060-10. This wetland treats the dry weather flow fed by springs in this outfall as well as the wet weather runoff from the outfall's 156-acre drainage area. During and following the construction of this wetland, the City has been continuing to investigate dry weather contaminations within this outfall area.

Fecal coliform sampling at these outfalls continues quarterly. A listing of the results for the W-068-05 outfall samples in FY 08 are listed below:

Table F.5.3-1 W-068-05 Quarterly Fecal Coliform Sampling

Date	Outfall (Fecal Colonies per 100 ml)
9/17/07	3,800
10/22/07	22,000
3/13/08	360
4/23/08	3,000

F.5.4 P-090-02 (Sandy Run)

The City 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 devise is inspected regularly by the City's Collector System Flow Control Unit and continues to function properly. The number of inspections in Fiscal Year 2008 was 26. There were 1 blockage and 0 discharges reported in conjunction with these inspections.

F.5.5 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. These outfalls and the results of fecal sampling are listed below:

Table F.5-4 Manayunk Canal Outfall Fecal Sampling Results

Outfall	Outfall Fecal Colonies per 100 mL			
	5/23/07	8/16/07	3/25/08	6/02/08
S-058-01	654	200	4,400	260
S-059-01	29,000	19,000	3,900	3,200
S-059-02	760	58,000	480	37,000
S-059-03	490	5,800	690	570 (6/23/08)
S-059-04	45	1,360	250	2,400
S-059-05	145	45,000	50	690
S-059-09	300	100	350	7,900

In these 7 outfalls, as of June 30, 2008, 2,444 properties have had complete tests as defined by the MS4 permit. Of these properties, 59 have been found to have defective laterals and subsequently abated.

F.6 2006 Monoshone Study

In FY 2006, PWD conducted and completed an analysis of the 82 defective lateral abatements and sewer relining work performed in the sewershed of outfall W-068-04/05 which discharges to the Monoshone Creek in the Wissahickon Creek watershed. The purpose of this analysis was to determine the water quality improvements achieved as a result of this work and to compare this improvement with the additional water quality benefits anticipated from the Saylor Grove Stormwater Wetland BMP, also located in the Monoshone. 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 can be found in FY 2006 Stormwater Annual Report, Appendix F.

F.7 End of Pipe Anti-microbial Pilot Study

In FY 2006, PWD purchased anti-microbial filtration fabric for installation in Monoshone Creek outfall W-068-05 to evaluate the effectiveness of this technology in reducing fecal coliform contributions to the Monoshone Creek from outfalls with defective laterals. The filtration fabric is surface bonded with an anti-microbial agent which kills bacteria upon contact. PWD completed an initial installation of a limited quantity of this product at the end of outfall W-068-05 in FY 2006 and collected water quality samples of the dry weather outfall flow upstream and downstream of the filtration fabric to assess product performance. The initial deployment failed to demonstrate product effectiveness in reducing fecal coliform and E. coli concentrations as was anticipated. After consulting with the manufacturer, it was decided that due the high volume of water consistently present in this outfall, more of this product should be utilized than was initially deployed. In FY 2007, more filtration fabric was deployed using a new configuration recommended by the manufacturer and sampling resumed. Final sampling and evaluation of this product will be completed in FY 2008.

Following sampling conducted in FY 08, PWD has decided to discontinue the pilot study of anti-microbial fabric. Sampling conducted during FY 07 and FY 08 did not identify a reduction in fecal coliform and E. coli concentrations at W-068-05 due to the anti-microbial properties of the filtration fabric. Upon review of the data and consultation with the manufacturer, the technology was determined to be unsuitable for the intended use at W-068-05.

Section G Monitor and Control Pollutants from Industrial Sources

G.1 Inspections

As Title III sites are identified as part of industrial site inspections the City will expand the inspection to include a review of PPC Plan, on-site visual inspection, verify proper operations and maintenance of BMPs, and review any DMRs for compliance with conditions of the individual NPDES permit.

In subsequent annual reports, any identified sites will be listed as having been subjected to the inspection described above.

G.2 Industrial Waste Inspection Forms

The City has updated its Industrial Waste Inspection Forms used during inspections which take place during enforcement activities as part of its Pretreatment program. The updated form was faxed to Jennifer Fields, Regional Manager, PADEP on March 29th, 2006.

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Section H Monitor and Control Stormwater from Construction Activities

H.1 Introduction

As a result of extensive efforts throughout Pennsylvania to improve and protect overall watershed health the relative condition of streams and rivers has been investigated and classified. Each stream has been identified by the State as whether or not it is attaining its designated use as a swimmable, fishable waterbody. Furthermore, those streams listed as not attaining their designated use were assessed as to which primary pollutants were attributed to the impairments. The majority of stream miles throughout Philadelphia are listed as impaired due to urban runoff. Uncontrolled and untreated urban runoff presents an ongoing negative impact to the receiving streams as a result of increased impervious areas providing a greater rate and volume of runoff reaching the surface waters through the municipal separate storm sewer system.

PWD and watershed partners located within the Darby-Cobbs Creek watershed collaborated under the Act 167 Watershed Management Planning effort led by Delaware County Planning Commission and developed a comprehensive document inclusive of a stormwater Ordinance. The stormwater Ordinance expanded upon the State model Ordinance by addressing issues identified with respect to the Watershed. PWD committed to enacting the Darby-Cobbs Creek Watershed Management Plan by signing a resolution in August, 2005 followed by adoption of the Stormwater Regulations that became effective as of January 1st 2006. A copy of the resolution along with excerpts of Ordinance and Regulation language were delivered to the State in compliance with the NPDES permit on December 23rd, 2006.

Stormwater runoff is a concern both during construction and after construction. Active construction sites are the primary contributor of sediment to our waterways. 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 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 Fiscal Year 2008 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 fiscal year 2008 activities include the following:

- Enforced stormwater Regulations that are in compliance with the State Model Stormwater Ordinance

- Collaborated with multiple city departments to reduce barriers to low impact development

- Increased the erosion and sedimentation control inspection program

- Reviewed Stormwater Management Plans (E & S and post-construction stormwater management) for compliance with the Regulations

- Coordinated reviews with PADEP on NPDES permit applications

- Revised the Philadelphia Stormwater Management Guidance Manual

- Conducted stormwater workshops for the engineering and development community

- Updated Fact sheets and pamphlets on topics related to the changes in stormwater requirements and the development process

- Maintained and improved a website for receiving PWD project submittals online

The following discussion specifically documents progress made so far in terms of stormwater runoff from construction activities including the collaborative between City Departments as well as between the City and State agencies. A summary of all plan review activities in FY 2008 is presented in Table H.5-1 at the conclusion of this section.

H.2 Construction Site Runoff Control

PWD reviews Erosion and Sedimentation (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 been incorporated into the stormwater management program during FY 2008.

During each site visit the inspector communicates with the construction manager and requests to see a copy of the on-site E&S Plan. Photographs are taken documenting site conditions and included as part of the inspection report. The City inspection report form is adapted directly from the PADEP form. Copies of the inspection report detailing out-of-compliance items are distributed to the site manager and maintained as part of an electronic project file.

A total of 107 E&S Control Plans were reviewed during this reporting cycle. Inspectors conducted 846 site inspections. Many sites were visited multiple times to ensure compliance with appropriate E&S controls (Table H.2-1).

Table H.2-1 Erosion and Sedimentation Inspection Site Location Summary

Drainage Type	Number of Locations
Combined Sewer Area	114
Non-Contributing Area	15
Separate Sewer Area	69
Stormwater Only	1
Un-sewered	1
Water	3
Total Locations	**203**

This value includes 62 site complaints which were typically not projects subject to PWD review. Several were coordinated visits with the PADEP designated engineer. Based upon the FY 2008 inspections, the major compliance issues continue to include improper use of silt fences, inadequate or lack of inlet protection, contractor not following the on site 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 H.2-1.

As the E&S Control program moves forward, scheduled inspections and responses to complaints will be addressed separately. Plan reviews will continue for projects between 15,000 square feet and one acre of earth disturbance. Coordinated site visits between PWD and PADEP will continue throughout the permit cycle as needed and documented accordingly. The documentation of site visits will be refined through improved data collection which will allow for clear representation of projects located within separate or combined sewersheds. Subsequent annual reports will include compilations and assessments of site visits and improvement in E&S compliance both for the specific reporting year as well as over the course of the permit cycle.

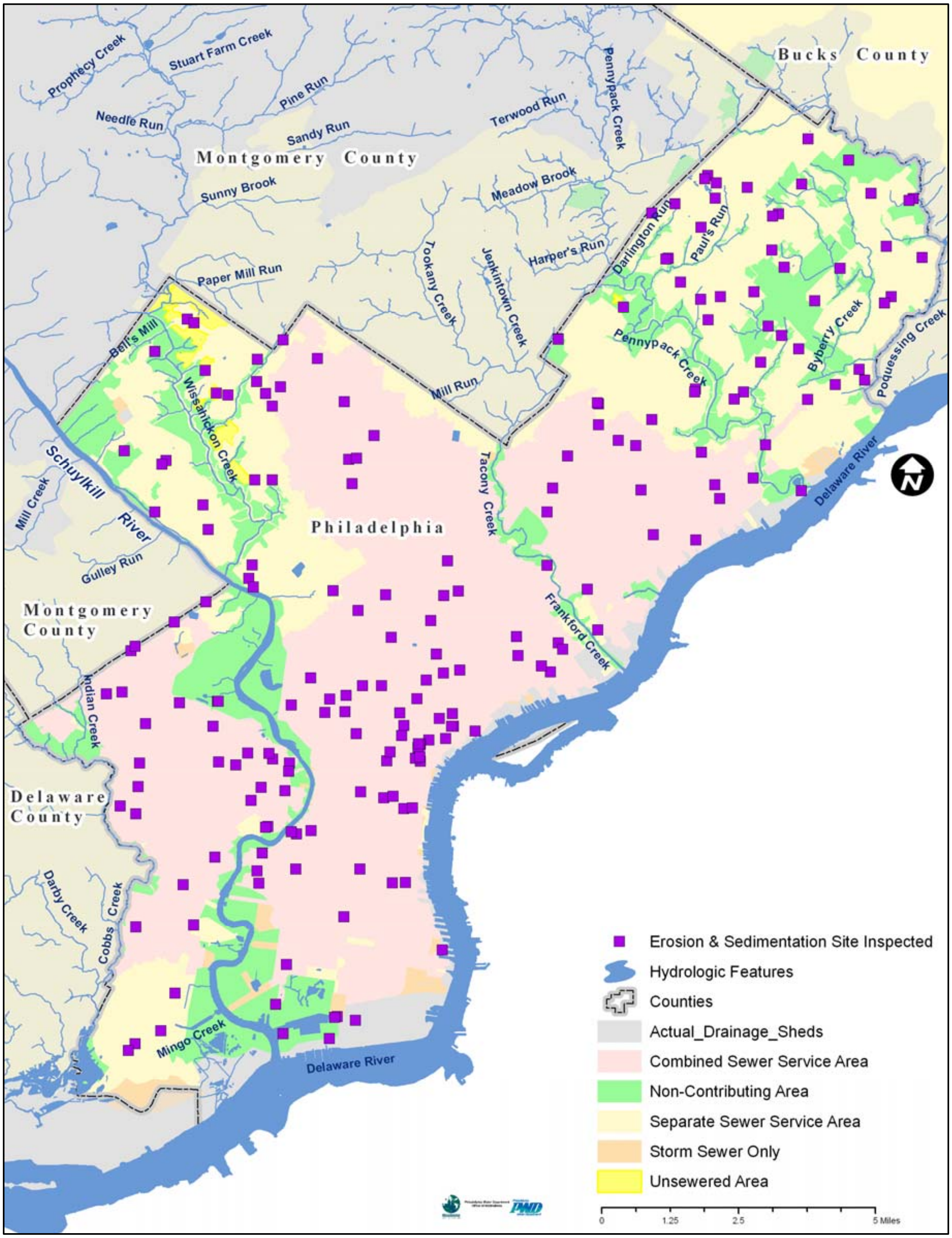

Figure H.2-1 Erosion and Sedimentation Site Inspections

H.3 Post-Construction Stormwater Management in New Development and Redevelopment

The adoption of City wide Stormwater Regulations as of January 1st 2006 enabled Philadelphia to review plans for both new and redevelopment sites ensuring that water quality and quantity are part of the management plan. The Regulations focus on the Post-Construction Stormwater Management Plan (PCSMP), which addresses more than the typical peak rate controls previously required. The role of stormwater management has been expanded to address smaller more frequent storms in terms of water quality volume and channel protection for all development projects throughout the City. The Philadelphia Stormwater Regulations are available online at www.PhillyRiverInfo.org but are also included within FY 2006 Stormwater Annual Report Appendix G.

The Stormwater Regulations have been enacted to address the following technical components:

Water quality: The 1st inch of precipitation over directly connected impervious cover must be recharged. Where recharge is not feasible or limited then any remaining volume is required to be subjected to an acceptable water quality practice.

Channel Protection: The 1-year, 24-hour storm must be detained and slowly released over a minimum of 24-hours and maximum of 72-hours.

Flood Control: Watersheds that have been part of an Act 167 planning effort are to follow the model results for flood management districts. In Philadelphia, Darby and Cobbs creeks watershed are subject to specified management districts. Projects outside of Darby-Cobbs watershed are currently treated as either a district controlling post-development peaks to pre-development peaks or are considered appropriate for direct discharge.

Non-structural Site Design: Projects are required to maximize the site potential for stormwater management through appropriate placement and integration of stormwater management practices.

In addition to the technical criteria, stormwater management requirements are clearly identified as applying to both new development and redevelopment projects. PWD in collaboration with other City departments recognized the need to appropriately insert PWD into the development process in order to inform the development community of the stormwater requirements before extensive investment into the design has been expended. Under this premise PWD divided the Stormwater Plan review into two components: the first being a conceptual review tied to the zoning permit; the second being the full technical plan review requiring approval prior to the building permit.

Conceptual plans are submitted online and must receive approval prior to obtaining a Zoning permit from Licenses and Inspections. The conceptual plan review phase enables PWD to clearly inform the applicant of stormwater management requirements applicable to their specific project. During FY 2008, the PWD online project submittal system received 653 conceptual plans for review.

Once conceptual approval has been received then the project can submit a full technical plan set addressing the stormwater regulations and other City plan requirements. PWD has approved 112 full technical plans during FY 2008. 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 H.3-1, Table H.3.1-1, and Table H.3.1-2 below.

Table H.3.1-1 Approved Stormwater Plan Location Summary by Contributing Area

Drainage Type	Number of Locations
Combined Sewer Area	56
Non-Contributing Area	8
Separate Sewer Area	44
Stormwater Only	1
Un-sewered	2
Water	1
Total	**112**

Table H.3.1-2 Approved Stormwater Plan Location Summary by Watershed

Drainage Watershed	Number of Locations
Cobbs Creek	4
Delaware River	25
Poquessing Creek	8
Pennypack Creek	17
Schuylkill River	35
Tacony/Frankford Creek	12
Wissahickon Creek	11
Total	**112**

Any project exceeding one acre of earth disturbance is required to obtain a PADEP NPDES General Permit for control of stormwater runoff during construction activities. The City may not release the building permit until the NPDES permit has been issued. As a result, a large collaborative effort has been initiated between PWD and PADEP in coordinating plan reviews between departments. Since the beginning of the year there have been 62 coordinated permit applications submitted to PADEP that are undergoing a joint stormwater management review.

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. Of particular interest are green approaches that encourage the return of rainfall back to the hydrologic cycle through evapotranspiration or distributed infiltration. As of Fiscal Year 2008 Annual Report, PWD's records indicate that projects are proposing use of pervious paving for a total of 9.1 acres and installation of green roofs at a total of 3.2 acres. As PWD works on improving the plan review process to provide greater incentives for incorporating green approaches for managing stormwater the number of green roofs and area of porous paving will see great increases throughout the permit cycle.

Quantifying the impact of the Regulations in terms of total acres developed, area removed from contributing to the combined sewer system, volume of water quality managed, volume of stormwater infiltrated, increase in management approaches (i.e. structural basins, green roofs, porous paving, rain gardens) will be incorporated into reports in upcoming years.

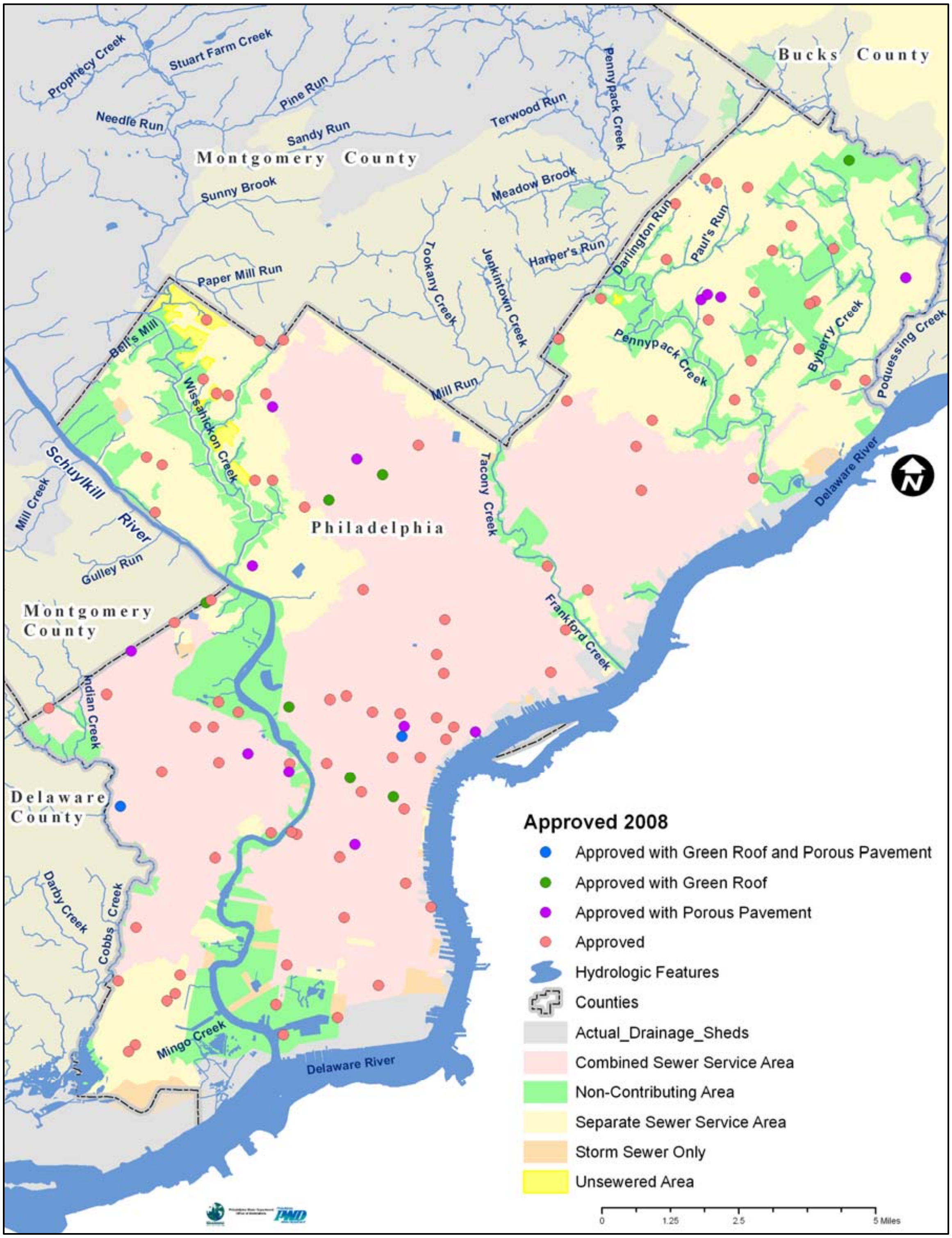

Figure H.3-1 Locations of Approved Post-Construction Stormwater Management Plans

H.4 Application/Permits

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. The City receives notifications through Act 14, Municipal Notification, by applicants applying for a permit to discharge stormwater from construction activities. The notifications are reviewed and recorded as part of the data collection process for a known development proposal.

Not only does PWD receive notifications but also coordinates review of NPDES application plan sets and calculations. Since a post-construction stormwater management plan must be submitted to both the state and the municipality for sites disturbing over one acre of earth, the City recognizes the importance of ensuring both municipal and state engineers are reviewing the same plans and are aware of each others technical requirements.

H.5 Stormwater BMP Handbook and Education Materials

PWD released the Stormwater Management Guidance Manual (Manual) in concert with the Stormwater Regulations going into effect as of the first of January 1st 2006. The Manual was created with a focus on urban stormwater management and includes Stormwater Management Practice details, development processes in the City, calculation worksheets and supporting reference material.

The Manual is intended to be a dynamic document allowing updates as needed with the most recent version available for electronic download at www.PhillyRiverInfo.org. During FY 2008, PWD released a new version of the Manual in January. The Manual provides guidance for the entire site design process, beginning with initial site design considerations, through the post-construction stormwater management plan submittal elements, and ultimately the acquisition of stormwater plan approval. Tools are provided to assist in completion and submittal of a stormwater management plan consistent with the intent of the City. They include flowcharts to guide the developer through the process, worksheets to assist with calculations, and checklists to ensure the plan is complete. The tools work together to address stormwater management on the development site from concept to completion.

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Table H.5-1 Summary of Plan Review Activities throughout FY 2007

	July '07	*Aug. '07*	*Sept. '07*	*Oct. '07*	*Nov. '07*	*Dec. '07*	*Jan. '08*	*Feb. '08*	*Mar. '08*	*Apr. '08*	*May '08*	*June '08*	*FY 08 Total*
Conceptual Review Stage													
Approvals	19	17	12	9	14	18	14	13	22	25	13	11	**187**
Rejections	32	36	16	25	33	45	40	56	55	42	35	51	**466**
Reviews	51	53	28	34	47	63	54	69	77	67	48	62	**653**
New Project Submittals	15	20	11	21	21	14	22	17	16	20	16	20	**213**
Average Review Time	12.9	10.6	17.2	18.6	15.7	8.4	6.6	6.8	6.2	4.6	2.5	2.6	**8.4**
Erosion and Sedimentation Plan Review													
Approvals	5	3	5	9	2	3	9	4	3	0	0	3	**46**
Rejections	2	10	4	4	4	11	9	4	2	2	4	5	**61**
Cancelled	0	2	0	0	0	0	1	0	0	1	0	0	**4**
Not Applicable	1	1	0	0	0	1	0	12	0	0	0	21	**36**
Review Deferred to DEP	1	9	5	3	2	4	3	3	5	2	1	0	**38**
Post Construction Stormwater Management Plan Review Stage													
Approvals	5	12	10	11	9	4	15	13	10	12	5	7	**113**
Rejections	23	38	30	37	33	38	34	37	36	31	37	34	**408**
Reviews	52	76	50	74	61	55	61	65	62	56	61	54	**727**
New Project Submittals	26	13	12	15	10	9	11	9	5	9	12	10	**141**
Acres of Earth Disturbance Approved	10.7	120.4	113.9	61.0	12.7	8.2	22.1	38.8	54.2	33.3	2.4	8.4	**486.0**
Acres of Green Roofs Approved	0.1	0	1.2	0.8	0	0	0	0.5	0	0.3	0	0.3	**3.2**
Acres of Porous Pavement Approved	0.3	0	0	0.7	0.7	0.0	0.7	5.6	0	0.4	0.3	0.5	**9.1**
DEP Reviews													
New Coordinated Reviews	8	7	5	10	6	4	3	4	3	4	4	4	**62**
Erosion and Sedimentation Inspections													
New Sites Inspected	21	8	15	11	10	5	13	8	23	8	6	3	**131**
Complaint Driven Inspections	1	0	1	2	1	0	2	2	0	0	1	0	**10**
Total Inspections	45	26	42	40	62	47	91	67	122	112	100	92	**846**
Inspections at Project Sites with MS4 Sewers	13	9	15	18	23	15	34	27	43	32	41	32	**302**
Inspections at Project Sites with Combined Sewer	25	9	20	18	30	23	45	28	59	65	49	54	**425**

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Section I Watershed, Combined Sewer Overflow, and Source Water Protection Programs

The Philadelphia Water Department (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 Office of Watersheds (OOW), 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. OOW appropriates the human and financial resources of PWD towards programs that aim to reduce the impact of point and non-point source pollution and contaminated runoff in a broad effort to enhance the health of the Philadelphia region's waterways. The main programs within OOW, in addition to the Stormwater Management Program (SMP), that work together to improve regional ecological health, water quality, and sustainability are: the Delaware Valley Early Warning System, Schuylkill Action Network, Combined Sewer Overflow (CSO) Management Program, Watershed Planning, Source Water Protection Program, and Wetlands Mitigation Registry. The SMP and OOW programs work in tandem when producing watershed plans, annual permit compliance reports, demonstration best management practices, and public education and outreach events. Following is a description of the Delaware Valley Early Warning System, Schuylkill Action Network, CSO Management Program, Source Water Protection Program, and the Watershed Mitigation Registry OOW programs, the achievement they have earned, and their future direction and goals. The Watershed Planning Program is presently explained in detail throughout Section E of this report.

I.1 Delaware Valley Early Warning System

I.1.1 Background

The Delaware Valley Early Warning System (EWS) is an integrated monitoring, notification, and communication system designed to provide advance warning of surface water contamination events in the Schuylkill and lower Delaware River watersheds. The EWS was developed in 2002 with funding provided by the Pennsylvania Department of Environmental Protection (PADEP) and the United States Environmental Protection Agency (USEPA) and was deployed as a fully functional system in 2004. PWD initiated the development of the EWS after identifying the need for such a system while collaborating with upstream treatment plant operators during the completion of the Source Water Assessments for the Schuylkill and Lower Delaware Rivers between 1998 and 2000. 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.

A key recommendation of the Source Water Assessments for the Delaware River was to develop a watershed-wide Early Warning Monitoring Network to provide early detection and notification of discharges to or changes in the quality of the surface water supply. PWD pursued this recommendation, and in 2002, and then developed the EWS in 2003.

The EWS is comprised of 4 principal components; the EWS Partnership, the notification system, the monitoring network, and the web-based database and portal. The EWS Partnership is comprised of stakeholders and includes representatives from both public and private drinking water treatment plants in the coverage area, industries who withdraw water from the Schuylkill and Delaware rivers for daily operations, and representatives of government agencies from both PA and NJ. The notification system includes both automated telephone notification and web-based notification capabilities. The monitoring network is comprised of on-line water quality and flow monitoring stations located at USGS sites and water treatment plant intakes throughout both watersheds. The web-site and database portal are the backbone of the EWS and are fully integrated with the notification system and monitoring network.

The telephone notification system is a powerful tool that allows a caller to initiate emergency notifications to multiple recipients through a single call. The system accepts calls from emergency responders, water utility personnel, and municipal and industrial dischargers. The system records event information provided via touch-tone responses to a standard question and answer process, and makes telephone and email notifications to affected EWS participants. The recent integration of the CodeRED emergency notification system allows outgoing calls to be completed in less than four minutes. This automated process reduces the burden on the emergency responders and other information providers by providing multiple and redundant calls to system participants, and also reduces the possibility that a notification could get lost or mis-routed.

The EWS website provides a dynamic and interactive user interface to the EWS database, allowing users to access and share event and water quality information via the internet. Various user interface formats are available, including forms for reporting and viewing the details of a water quality event, maps to identify the location of an event, graphs that present water quality, and a time of travel estimator. The time of travel estimator uses real-time flow data from USGS gauging stations to provide plug-flow travel time estimates for each downstream intake based on current river conditions. These tools allow PWD and the other water purveyors within the Schuylkill and Delaware River watersheds to be more informed about water quality throughout the watershed and thereby be better prepared to react to changing or emergency conditions.

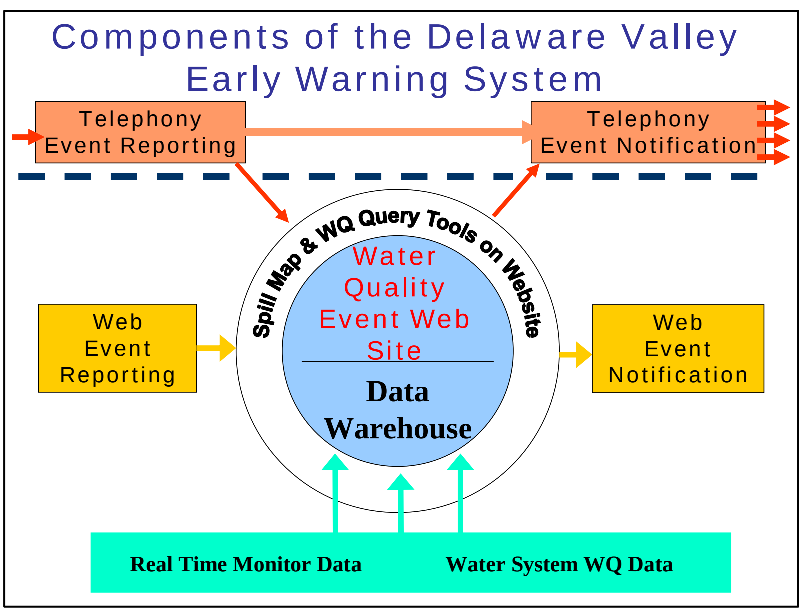
The water quality monitoring network compiles both near real-time and historic water quality data. The near real-time network utilizes continuous water quality monitors that are located at select water treatment plant intakes and USGS gauging stations and transmits data collected at those locations to the EWS server, thus making the data accessible via the website. The water quality monitoring network provides water suppliers with near real-time information about water quality upstream of their intakes so that they can anticipate changes in water quality and adjust their treatment accordingly. Real-time monitoring is currently limited to simple water quality parameters such as turbidity and pH, but the network will be expanded in future years as monitoring technologies advance and as other monitoring needs are identified. In addition to the near real-time data, utilities will submit the results of their routine operational monitoring, creating a historical database against which real-time data can be compared. The system has the potential to incorporate sophisticated monitoring equipment like gas chromatographs and bio-monitors that can detect changes in water quality that might result from major discharges or intentional contamination.

One of the unique features of the Delaware Valley EWS is that the system operates essentially unmanned. Once an event is reported via telephone or the Internet, the system will automatically perform the time-of-travel estimations, and notify downstream users. System users can then report updates and additional information on the website as the event develops.

I.1.2 Early Warning System Protocol

The EWS can be used to fulfill several different source water protection needs. First and foremost, it is a communication and notification system that emergency response personnel and water suppliers can use to share information about source water contamination events. Second, it provides access to water quality data throughout the watershed thus alerting water suppliers to a change in water quality long before it reaches their intake. In the future, dischargers will be encouraged (preferably required) to use the EWS to make downstream notifications of overflows, spills and accidental discharges. The technical features of the EWS are illustrated in Figure I.1.2-1 and described in detail below.

Figure I.1.2-1 Components of the Early Warning System



Emergency response personnel and water suppliers often observe a water quality event or are notified by the public. A water quality event can be anything from a transportation accident, to a fire, to a sewage overflow, to illegal dumping, which results in a discharge to the river or sewer system. Upon being made aware of and confirming an event the responding party can use the EWS to notify downstream users by calling the EWS telephone notification system or by reporting the event to the EWS website (www.DelawareValleyEWS.org). In reporting the event, the responding party will supply information about the time, location, risk level, cause, and result of the event. The EWS uses the location information to identify the appropriate parties to notify. The system currently determines whether the event occurred in the Schuylkill or Delaware watershed and notifies all participating water suppliers, emergency response personnel and agencies within that watershed. In the near-future, the system will use location information to identify and notify only those participants downstream of the event. Notifications are made by phone for high risk events or by email for lower risk events (additional flexibility for notifications is a future goal of the system). If a telephone notification is delivered, the notification consists of a standard message that informs the recipient that a water quality event has occurred followed by specific information about time and location of the event and, if available, a message from the reporting party. If an email notification is sent, the email message contains critical information including the time, location and description of the event, and advises the recipient to go to the web-site for additional information. The recipient of the notification will then either call the telephone system or log onto the website to receive more information. The web-site will have an event report with all of the information that the responding party provided. The web-site also has a time-of-travel estimator that uses real-time USGS flow data to estimate the time at which the contaminant will arrive at the downstream intakes. Downstream water suppliers can also access water quality data associated with the event. The water suppliers can use the time-of-travel and water quality information to plan their response strategies. As the event progresses, the information provided on the web-site can be updated by the initiator of the report or by other participants as they learn more about the event. In this way, the water supply community can communicate and be kept abreast of the event as it unfolds. All of this occurs in a secure environment.

The EWS water quality monitoring network collects continuous water quality data from select drinking water intakes along the main stem Delaware River and transmits that information to the EWS server, thus making it available to the EWS participants via the EWS web-site. Currently, there are three water quality monitoring stations in the Delaware River watershed EWS monitoring network. In the Delaware River watershed there are fourteen participating water suppliers. Water suppliers can log on to the EWS web-site on a daily basis to see water quality information from these locations, which span from Easton, Pennsylvania to Philadelphia. This type of analysis will allow water suppliers to identify changes in water quality associated with both natural and accidental contamination events. For example, storm events and algae events are two naturally occurring events that will impact the water treatment process. Fortunately, both are easily identifiable using simple on-line monitors like turbidity and pH. A downstream utility can track changes in these parameters and know when they need to initiate a treatment process change in order to effectively treat the water. Similarly, significant accidental spills to the river may be detected through changes in pH or conductivity. The EWS water quality monitoring network will allow water suppliers to be more proactive, rather than reactive when it comes to responding to changes in water quality.

PWD worked closely with PADEP's Emergency Response team in the development of the EWS. During this process both PWD and PADEP agreed that one of the mutual goals is to have dischargers add the EWS to their downstream notification list. In this way PWD could insure that downstream water suppliers receive information about overflows, spills and accidental discharges. PWD has been in the process of working with PADEP to make this happen, and may eventually necessitate PADEP incorporating the EWS into the dischargers' permit requirements. If such a requirement is implemented, the discharger would call the EWS telephone system or enter the event into the EWS web-site to initiate downstream notifications. Having dischargers contact the EWS directly will increase the number and geographic diversity of downstream notifications with just a single phone call.

The Delaware Valley EWS has tremendous potential to reduce the time in which water suppliers become aware of and react to water quality events of all kinds. The system is a tool designed to help water suppliers respond to the accidental, terrorist and natural water quality events that cannot be prevented by standard source water protection measures. In this way, the EWS is a perfect complement to a well developed source water protection program.

I.2 Schuylkill Action Network

Philadelphia is the furthest downstream city in the Schuylkill River watershed, which provides a source of drinking water for Philadelphia residents. The primary source of impairment of the Schuylkill watershed is stormwater, which accounts for 273 of its 1,000 total impaired stream miles. The majority of these impaired stream miles are within and just outside Philadelphia. A preliminary restoration analysis found that it would cost approximately $288 million to design and reconstruct all impaired stream miles through natural stream channel design. The Schuylkill Action Network (SAN) Stormwater Workgroup, is a partnership of representatives from the Philadelphia Water Department, Pennsylvania Department of Environmental Protection, conservation districts, watershed organizations, municipalities, and others groups throughout the watershed. The Stormwater Workgroup was formed to identify a cost-effective approach to stormwater management through project prioritization and planning. Several projects identified through the Stormwater Workgroup will be funded through the Environmental Protection Agency's Watershed Initiative Grant Program, which awarded approximately 1.15 million dollars to the SAN for its innovative and collaborative approach to watershed management. Of the total grant amount, approximately $300,000 will go toward stormwater-related projects over a three year period.

In FY 2008, the SAN Stormwater Workgroup implemented many of these projects tackling the issue of stormwater pollution in the watershed. Workgroup members reviewed several grant applications and provided letters of support to priority projects that target headwater streams, basin retrofits, impaired streams, public land, and priority townships. In FY 2008, the workgroup completed ranking all detention basins in the Wissahickon Creek watershed to identify those that can be enhanced or modified to enhance groundwater recharge and stormwater quality. At Norristown High School, the workgroup assisted school officials in enhancing the ability of two detention basins to retain and infiltrate stormwater. Stormwater Workgroup members also developed conceptual designs to improve the management of runoff on the campuses of Mount St. Joseph's Academy and Springside School. As a result, Springside School implemented a rain garden traffic circle on the campus that infiltrates stormwater and provides educational opportunities for the students.

While the majority of stormwater-related activities are conducted by the Stormwater Workgroup, activities of other SAN workgroups under the EPA grant are linked with stormwater. The Education and Outreach Team published "A Guide to Stormwater Management on Campus" and distributed it to schools throughout the watershed in FY 2008. The Guide encourages and details simple techniques through which students, teachers, and maintenance personnel may improve stormwater management on campuses. The Agriculture Workgroup spent much of FY 2008 implementing riparian buffers on agricultural lands in Berks County. To date, 32,000 feet of streambank fencing, 6,225 feet of riparian plantings, and 13 cattle crossings have been installed by the Agriculture Workgroup.

I.3 Combined Sewer Overflow Management Program

The Combined Sewer Overflow Management Program, CSOMP, within the Office of Watersheds at the Philadelphia Water Department works to implement technically viable, cost-effective improvements and operational changes that mitigate the impacts of combined sewer overflows. Please refer to the first section of this document for additional information regarding the CSOMP.

I.4 Source Water Protection Program

The mission of the Source Water Protection Program within PWD's OOW is to enhance, protect, and preserve the surface waters of the Schuylkill and Delaware Rivers to ensure a high quality and sustainable source of drinking water for future generations of Philadelphia residents. The accomplishment of this mission requires a holistic watershed approach, a sense of common commitment and responsibility shared by all who work and reside in the watershed boundaries, and a respect for the interconnectedness between source water protection concerns, upstream land and water use, and the importance of maintaining a healthy aquatic ecosystem which nurtures habitat and inspires low-impact recreation. While working to enhance the quality of our source waters and ensure adequate flows for future water needs, the Source Water

Protection Program seeks to transform our rivers into regional treasures capable of sustaining multiple uses and valued as precious community resources whose protection and preservation is the common goal of all who live and work within the watershed. The Source Water Protection Program seeks to accomplish this mission under three interrelated areas of responsibility:

Source Water Quality Enhancement & Protection through Watershed Based Partner Projects: Activities that address priority source water quality concerns through watershed partnership initiatives that ensure long-term, sustainable improvements to the water quality of the Schuylkill and Delaware River watersheds.

Early Warning Notification and Event Communication: Efforts to improve notification and communication surrounding water quality events which may threaten water supply and recreational safety.

Drinking Water Treatment Support and Quantitative Sustainability Analysis: drinking water compliance assistance, local water quality improvement projects, treatment technology research and testing, and quantitative analyses to ensure sustainability of surface water supply for future generations of Philadelphia residents.

The unique role of the Source Water Protection Program is to address water quality and quantity concerns as they relate to drinking water treatment and to conduct source tracking studies and develop partnership initiatives to create innovative solutions on a local and watershed wide scale. The Source Water Protection Program not only addresses existing water quality and quantity concerns but conducts research, monitoring, and analysis to evaluate potential future concerns in order to play a proactive role in protecting and preserving our water supply.

The Source Water Protection Program began in 1998 with the responsibility of completing Source Water Assessments for 52 drinking water intakes in the Schuylkill and Delaware Rivers. This effort resulted in the identification of the primary causes of contamination in the rivers that serve as PWD's drinking water sources. The findings of the Source Water Assessment led to the development of the SAN as a regional partnership initiative to address these identified source water quality challenges through a collaboration of federal, state, and local governments, watershed organizations, conservation organizations, and various other governmental and non-governmental organizations who are concerned about water quality issues in the Schuylkill River. In 2005, EPA awarded the $1.15 million Schuylkill Watershed Initiative Grant (SWIG) for the SAN to implement restoration projects in the areas of agriculture, abandoned mind drainage, and stormwater. Between 2003 and 2007, Source Water Protection Plans were completed for the Schuylkill and Delaware Rivers identifying strategies for addressing the water quality and quantity concerns addressed in the Source Water Assessments for both rivers. In the past 8 years since its inception, the Source Water Protection Program has implemented numerous local and watershed wide BMPs, developed partnerships to address regional water quality and quantity concerns, created an advanced water quality early warning system to support drinking water treatment operations along with an associated system for recreational water quality advisories, and conducted research, monitoring, and analysis for a broad range of issues related to drinking water treatment support and regulatory compliance. The Schuylkill and Delaware Source Water Assessments and Protection Plans can be found online at www.PhillyRiverInfo.org.

I.5 Watershed Mitigation Registry

The City of Philadelphia's Watershed Mitigation Registry (WMR) is an innovative OOW program initiated in 2007. The 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. The intent of the WMR is to facilitate the matching of projects that the City of Philadelphia has determined to be high priority elements of its Integrated Watershed Management Plans (IWMPs) with those mitigation needs that arise from waterfront development and projects, transportation improvement projects, or other development and redevelopment projects. The selection process requires close coordination among the developer, the City of Philadelphia, the Pennsylvania Department of Environmental Protection (PADEP), and the US Army Corps of Engineers (USACE). An important part of the process is the development of a procedure to compare the value of the losses at the proposed development or redevelopment site with the environmental value that would be achieved at proposed mitigation projects. This procedure has been completed and is awaiting comments.

As Philadelphia developed over the past 200 years, many of its streams, riparian corridors and aquatic resources have been lost or degraded. The remaining aquatic and riparian areas are critical resources to the region. Major impacts include the impairment of almost every mile of stream within Philadelphia, impediments to migratory fish passage, loss of habitat and wetlands, degraded water quality, etc. Even remaining areas of high value are threatened, such as the impacts of future degradation of the Cobbs Creek on Heinz Wildlife Refuge.

Though the past impacts have been considerable, significant opportunities to restore and improve the riparian corridors and aquatic resources within Philadelphia are available and are being strongly supported by a range of initiatives. Since 1997, the Philadelphia Water Department (PWD) and the Fairmount Park Commission (FPC) have invested millions of dollars in creating environmental resource inventories (including wetland inventories) for the City of Philadelphia, and integrated watershed management plans for environmental and aquatic resource impact recovery. These plans are based on park master plans, source water protection plans, river conservation plans, and recent field work. Efforts by PWD and FPC parallel other City planning initiatives such as GreenPlan Philadelphia, which is the City's comprehensive open space plan.

The combined result of the City's planning efforts is the identification of numerous areas targeted for restoration and enhancement, many of which are now listed in the WMR for the Philadelphia Region. Thus far the WMR compiles 272 targeted areas identified in the aforementioned inventories and management plans. Targeted areas are categorized as wetland creation (72), wetland enhancement (88), wetland enhancement - invasive management (24), tidal mudflat - wetland restoration (33), stream restoration (41), stream daylighting (2), pond buffer (2), and wetland preservation (4). The WMR functions as a straightforward way to search for a project by watershed, project type, project size, and a variety of other variables. Reports, which include pictures and a potential project description, are automatically generated based on queries allowing information to be disseminated to interested parties in a timely fashion.

A registry program utilizing these projects would help achieve greater environmental benefit at reduced cost by addressing environmental and/or regulatory requirements in an integrated fashion. Selected projects could achieve goals encompassed by FPC Master Plans, PWD's SMP, CSOMP, and water quality goals and pollutant reduction targets set by total maximum daily loads (TMDLs). These projects will also help mitigate damage to the environment caused by infrastructure improvements, create economic benefits, and improve recreational value. In addition, many of these projects are located in areas with low income and minority neighborhoods that would be enhanced by the proposed upgrades.

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Section J Miscellaneous Programs and Activities

J.1 Pollutant Migration/Infiltration to the MS4 System

The Industrial Waste Unit (IWU) within the Philadelphia Water Department (PWD) responds to all citizen complaints of liquid, solid, or gaseous pollutants within Philadelphia. The IWU coordinates with neighboring communities in the event that a pollutant may drain into the Philadelphia MS4 system. The IWU unit uses a variety of pollution sensing, testing, and removal techniques to mitigate the impacts of spills to the MS4 system, combined system, and receiving waters. Presented in Table J.1-1 below is a list of all pollutant migration events in FY 2008. The locations of all events are presented on the following page in Figure J.1-1.

Table J.1-1 Pollutant Migration/Infiltration to the MS4 System

Date	Location	Pollutant	Drainage Type
7/20/07	10049 Sandmeyer	Unknown	MS4
8/8/07	Upstream of Belmont	Heating Oil	Non-Contributing
8/13/07	17th and Titan	Gasoline/Oil	CSO
8/27/07	1040 Erie Avenue	Mineral Oil	CSO
8/31/07	Water Works	Chlorinated Water	Non-Contributing
9/28/07	2811 Cottmann Ave	Washwater , Cooking Grease	MS4
10/1/07	319 Market St.	Cooking Grease	CSO
10/12/07	1030 Arch St.	Acidic Lens Grinding Sol.	CSO
11/9/07	1500 Hunting Park Ave.	Heating Oil	CSO
12/14/07	17th and Latimer	Unknown	CSO
12/30/07	2200 Columbus Blvd.	Diesel Fuel	CSO
1/9/08	400 E. Tioga	Green Dye	CSO
1/9/08	41st and Ogden	Diesel Fuel	CSO
2/6/08	1120 Spring Garden	Poultry Blood	CSO
2/24/08	5000 Richmond Street	Styrene	CSO
3/5/08	3025 Castor Ave.	Cement	CSO
3/7/08	1100 N Bodine St.	Groundwater	CSO
3/19/08	7301 Coventry Rd.	Heating Oil	MS4
4/8/08	2160 E Street Rd	Cooking Grease	Non-Contributing
4/8/08	Aramingo Ave ramp, 95	Diesel Fuel	CSO
4/18/08	11200 Roosevelt Blvd	Gasoline	CSO
5/5/08	3144 W Passyunk Ave	Cumene	Stormwater Only
5/6/08	20th and Chestnut	Gasoline	CSO
5/12/08	Rittenhouse ST. and Wiss.	Non-PCB Transformer Fluid	MS4
6/16/08	4100 Frankford Ave.	Mixed Solvent	CSO
6/24/08	9626 Darlington	Chlorinated Water	MS4
6/27/08	2111 York Street	Oil	CSO
8/25/08	17th and Flora	Diesel Fuel	CSO

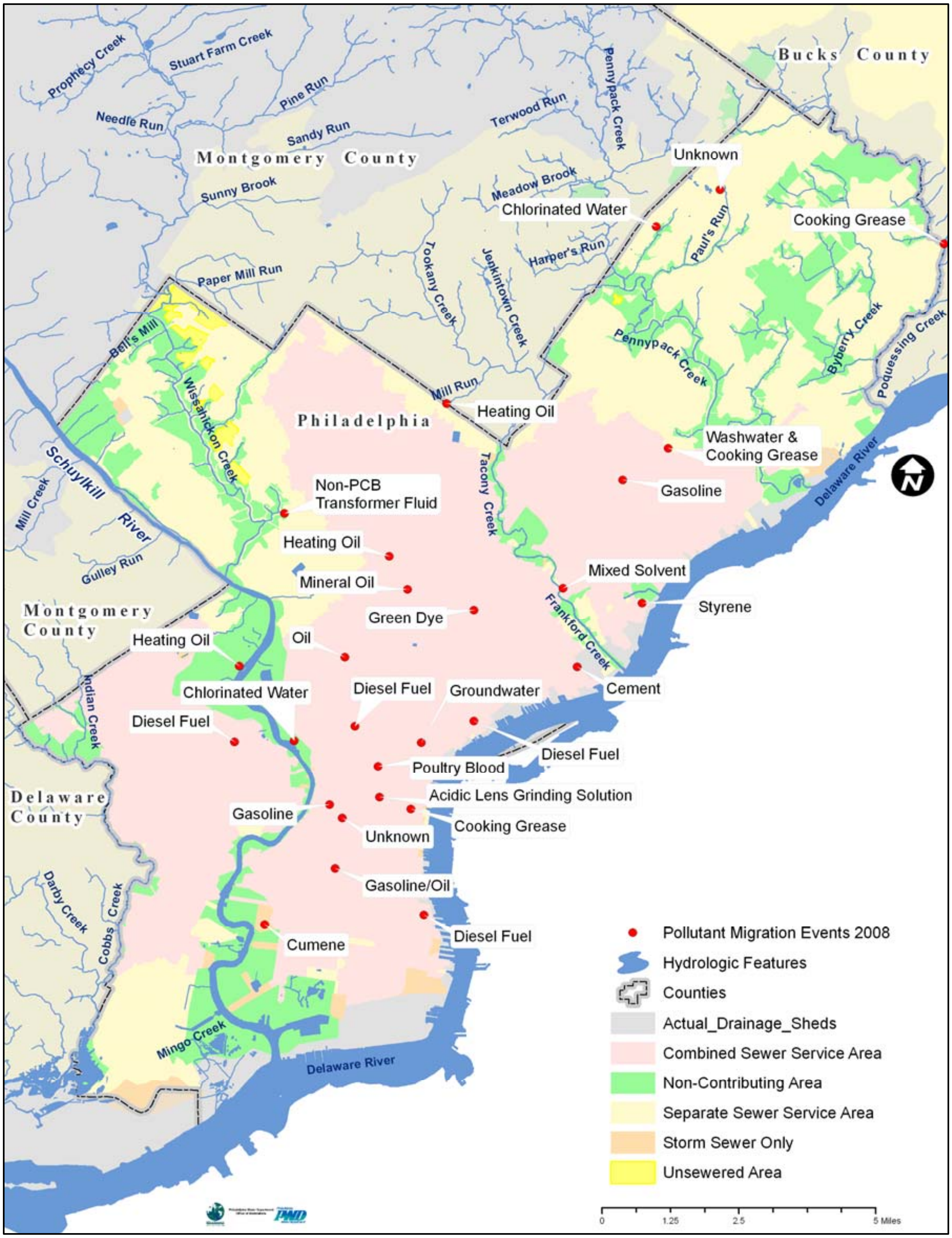

Figure J.1-1 FY 2008 Pollutant Migration/Infiltration Event Locations

J.2 Public Education and Awareness

Most of the city ordinances related to this minimum control are housekeeping practices that help to prohibit litter and debris from actually being deposited on the streets and within the watershed area. These include litter ordinances, hazardous waste collection, illegal dumping policies and enforcement, bulk refuse disposal practices, and recycling programs. If these pollutants eventually accumulate within the watershed, practices such as street sweeping and regular maintenance of catch basins can help to reduce the amount of pollutants entering the system and ultimately, the receiving waterbody. Examples of these programs are ongoing and presented in the Section II of the CSO portion of this document. PWD will continue to provide public information about the litter and stormwater inlets as part of its implementing this minimum control, as well as continue to develop the following new programs.

From the moment the City of Philadelphia began providing water to its citizens there has been a need to create partnerships to protect the water supply. In our earliest days it was through the creation of Fairmount Park. Today we comply with state and federal regulations that require citizen participation. More importantly however, PWD, through its Public Education Unit, has for more than 21 years voluntarily reached the public through an aggressive education and community outreach program that serves as a model for utilities across the country. Through these programs, PWD raises public awareness and understanding of stormwater problems and issues. Educational materials and programs are distributed and hosted at these events and at PWD's premier watershed education center – The Fairmount Water Works Interpretive Center. In addition, monthly billstuffers are included with customers' water and sewer bills, reaching over 460,000 households. And, the City continues to facilitate watershed stakeholder meetings to unify public participation in the surrounding counties and to address the issues pertaining to stormwater management on a watershed scale.

J.2.1 Billstuffers

Billstuffers are regularly produced by PWD as an educational tool for disseminating information pertaining to customer service and environmental issues. Specific billstuffers are designed on an annual basis for the CSO, Stormwater and Watershed Management programs to address the associated educational issues. These billstuffers reach over 470,000 water and wastewater customers. The environmental bill stuffers distributed in Fiscal Year 2008 include:

- Waterwheel (Jan.)
- Streets Department Curbside Recycling Program (May)
- Streets Recycling (August)
- Ins & Outs of Sewer Inlets (Nov.)
- Trash & Recycling Schedule (Dec.)

- Waterwheel (April)
- Streets Recycling (March)
- Streets Recycling (August)
- Ins and Outs of Sewer Inlets/Proper Disposal of Grease (Oct.)
- Coast Day Event Information (August 2007)
- Nonpoint Source Water Pollution Reduction Tips & Volunteer Solicitation for Storm Drain Marking (March 2008)

J.2.2 Waterwheel Watershed Newsletters

Water Department's watershed newsletters are usually published on bi-annual basis and target specific information to the residents living within a particular watershed. In this manner, citizens can be kept informed of departmental water pollution control initiatives specific to the watershed they live in. Please refer to Section 4.3.2 of the Combined Sewer Annual Report for details regarding the FY 2008 Waterwheel Watershed Newsletters.

J.2.4 PWD Public Education and Outreach

J.2.4.1 Fairmount Water Works Interpretive Center

Teachers and students are invited on an adventure to explore Water in Our World at the Fairmount Water Works Interpretive Center. Here, students travel through time as they learn about the role of water in Philadelphia's past, present and future.

Innovative exhibits and interactive educational programs meld the history, technology and science of providing water to a regional urban watershed. Below are short descriptions of the FWWIC programs.

The Art of Diatoms: So Small, So Significant

Diatoms are a key biological component to understanding our rivers. These microscopic algae have been used to help determine the environmental conditions of our rivers for many years. Students will focus on the study of diatoms through the use of a microscope, drawings and history. Students will gain an understanding that all life forms are made up of cells, and that there is a direct relationship that exists between organisms and within an environment.

History of Manayunk Canal: Industrial Revolution --Environmental Devolution

The industrial history of a neighborhood can often reveal what led to the devastating impact of industrialization on the drinking water source in the City of Philadelphia, namely a public health crisis. In this lesson students will experience through a walking tour outside and examination of historical documents the one hundred year rise and fall of a section of the city of Philadelphia and its relationship to the Schuylkill River - an area that once thrived as an industrial manufacturing center and at the same time led to an environmental catastrophe that affected the citizen's drinking water supply.

Clean it Up: Treating Dirty Water

There are 9 steps in the water treatment process to make source water into finished drinking water for over 1.5 million Philadelphians. This lab experiment will introduce students to filtration, one of the important steps in this process since the Water Department began treating water in the early 1900's. Using a pre-made mixture of dirty water, students will observe and record its various properties.

The Rain Drain: Stop Trash in its Tracks

One of the greatest threats to the quality of our region's rivers and creeks is stormwater runoff pollution. This occurs when rainwater washes over the land and collects pollutants, such as motor oil,dog wastes, pesticides and litter. Too often, these get carried into storm drains, or directly into streams and rivers. In this lesson, students will discover the connection between the storm drain on the at or near the corner, the nearby creek, pollution and drinking water.

Water in Our World

This general orientation to the FWWIC provides the perfect overview for the teacher focusing on a variety of water issues, past, present and future. Students will be introduced to a variety of concepts and vocabulary using activity booklets in exhibits on the natural water cycle, watersheds, the water use cycle, land use and pollution. They will also learn about their individual relationship to local, regional and global water quality issues on Planet Earth.

Land and Water: A Delicate Balance

Every day, people make choices about how they will use the land around them - often without considering how their use of land may affect the water they drink. Let your students come to understand the delicate relationship of land use to water quality through a matching card activity using the exhibits in the FWWIC. Students will also study a variety of maps to understand the development of land over time, and then plan fictional communities of their own in a way that would protect water quality.

From Street to Stream: Slow the Flow

Students will focus on stormwater runoff (one of the greatest sources of water pollution today), watersheds, and the different kinds of land pollution that affect our water quality - past and present. Students will explore, on foot, the Water Works site and surroundings as a way to better understand the concepts of point- and non-point-source pollution. The lesson will also give students a look into PWD's demonstrations of best management practices for existing and future land development.

Building as Machine: Water for the City

The Water Works is an engineering landmark. Students will learn about the design and function of this nineteenth century pumping station and why it was the most visited public place in America at that time. Learn how innovative technology for the public good and a concern for the natural environment, beauty and civic pride all came together at this unique site. Students will become apprentice engineers as they examine the pumps and gears that put the "works" in Water Works.

The Schuylkill River Watershed: A Tale of Two Settings

The Schuylkill River is a critical natural resource for the entire Philadelphia region. But can your students tell you why the river is so important? In collaboration with the Schuylkill Center for Environmental Education (SCEE), located upstream, just inside the City's northwestern boundary, the FWWIC offers a full-day program that travels to both sites to teach students about the critical connection between watershed protection and water quality. Students will explore the ecology of SCEE's unimpaired first-order stream, which is a tributary of the Schuylkill River, and will use the interactive exhibits at FWWIC to learn how communities within the Schuylkill River Watershed impact the river and have a stake in protecting them.

PWD's Public Education Unit makes presentations at area schools, organizations and community events, providing information on all topics regarding the urban and natural water cycles and watersheds. Teacher workshops and school-based programs and exhibits are also held daily at the FWWIC.

General Educational projects in 2006/2007 - A great variety of public information materials concerning the stormwater/watershed management in relation to the watershed framework were developed as a result of the watershed partnerships and RCPs, including: fact sheets, press releases, tabletop exhibits, brochures, watershed surveys, websites, watershed walks, and presentation materials.

Wetlands: Wildlife, Water and Weather

Wetlands clean stormwater, replenish ground water, reduce flooding risks, and provide a home for wildlife. In this lesson, campers and their chaperones learn how Philadelphia has created a model project to treat both water pollution and flooding issues by creating a wetland in an urban environment. Using household supplies, campers discovered how wetlands, capture, store and release water.

Urban Shad Watch

The first Urban Shad Watch was held in April 2005. This event encourages visitors to observe the upstream migration of the prehistoric shad. The second annual event was held April 2006. April 2007 was cancelled due to heavy rain; however the FWWIC is looking forward to holding the fourth annual event in April 2008.

Catch of the Day – Fish paintings for children

Fish don't talk, but what do they tell us?

Aquatic biologists' presentation on how many species of fish have returned to the Schuylkill River.

What's in the River Today?

A FWWIC new exhibit featuring the endangered river otter caught on tape.

Name the Shad; Name the Otter Activity

Fish Facts

An educational activity booklet, filled to the gills with activities about fish.

Drinking Water Week

PWD water treatment engineers and plant managers introduce students to water treatment processes.

J.2.4.2 PWD and Partner Programs and Projects

6th Annual Southeastern Pennsylvania Coast Day Event – September 17, 2007

PWD and the Partnership for the Delaware Estuary sponsored a free fun family festival at Penn's Landing along the Delaware River. As a new means of advertising the event this year, residents of Philadelphia received a copy of the brochure inside of their monthly water bill, courtesy of the Philadelphia Water Department. The same brochure was also placed at nearby hotels, museums and various other public places to promote the day, along with newspaper print advertising. In addition to the increased event advertisement, there was increased foot-traffic in the area which brought many new visitors to the event. In all, over 20 local and regional organizations took part, providing marine-themed educational and interactive displays for Coast Day visitors. The event also featured music, food, face painting, and crafts, as well as free samples of grilled Delaware Bay oysters. As an added feature this year, the AJ Meerwald was on site to provide an afternoon and evening sail, free of charge to Coast Day visitors.

2007 Philly FUN Fishing Fest

As a result of the revitalization of our region's rivers, PWD has witnessed the return of a variety of sporting fish to the Schuylkill River and believes that this good news is worth spreading. In celebration of the improving water quality, the Philadelphia Water Department and its partners, the Fish and Boat Commission, East Falls Development Corporation and the Schuylkill River Development Corporation – hosted the 3rd annual Philly FUN Fishing Fest on the banks of the Schuylkill River on Saturday, September 16th, 2007. Over 100 anglers participated and over fifty fish were caught during the tournament.

The fishing festival is open to the public - all skill levels and ages. 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. For more information on the Philly Fun Fishing Fest, please visit: http://www.phillyriverinfo.org/fishingfest/.

Schuylkill Banks in Philadelphia. This event is currently in the planning phase.

2008 "Clean Water Begins and Ends with You"

The Partnership for the Delaware Estuary and PWD sponsored its ninth drawing contest for Philadelphia public, private and home-schooled students grades K-12 in January 2008. Students were required to draw an illustration that shows how Philadelphians can help prevent stormwater runoff pollution. First prize drawings were used to promote stormwater pollution prevention messages on SEPTA buses and in the creation of a "Clean Water Begins and Ends with You" calendar. In 2008, there were over 1700 drawings entered into the contest, with over 57 classrooms participating. This year's award ceremony was held in April 2007 at the Fairmount Water Works Interpretive Center.

2008 Philly FUN Fishing Fest

PWD will host its annual Philly FUN Fishing Fest on September 20th, 2008, along the

2008 Urban Watersheds Revitalization Conference

The 2008 Urban Watersheds Revitalization Conference is currently in the planning phase, as this event will not take place until October 31st and November 1st (2008). The focus of this year's conference will be "Greening Our Streets." PWD wants to further explore how to improve stormwater management on public right-of-ways, while also beautifying, providing economic incentives, and creating other environmental benefits to these right-of-ways - in Philadelphia and in the neighboring suburban communities (i.e., in Bucks, Delaware, and Montgomery counties). We want to delve into the meaning of a green street, the vision behind it, and learn how we can move forward by turning this vision into a reality. The 2008 conference will be held at the Community College of Philadelphia (CCP) on Spring Garden Street, Philadelphia.

Activity Books & Watershed Maps

One of PWD's most successful community publications is the student activity book (grades 3 – 8) "Let's Learn About Water." This publication develops the concepts of definition of a watershed, impact of non-point source pollution, and personal responsibility for protecting our water supply. It is in great demand by schools, communities and government officials. This book was developed with the Partnership for the Delaware Estuary and was funded in part through DEP Coastal Zone Management funds. The curriculum has already been used in a number of middle schools to meet state required science-based credits. In 2005, the Activity Booklet was updated and made full color. The FWWIC was also highlighted in some of the activities to encourage students to visit with their families. In FY 2007, a fold out map of the Schuylkill River Watersheds was created, printed, and inserted into the activity book whenever it is being used by students who live with in that watershed.

Annual Earth Day Service Project

Community and watershed volunteers participated in PWD and Water Quality Council sponsored annual Earth Day service project by installing storm drain curb markers throughout the City. A volunteer solicitation including every day tips for reducing the amount of nonpoint source water pollution was sent to every resident in the City of Philadelphia in the water bill. To keep a consistent message, participating volunteers used the same medallion as previous years, developed by PWD, Partnership for the Delaware Estuary, and PA Coastal Zone Management to mark the message "Yo!!! No Dumping! Drains to River!" in front of storm drains. Due to the success of the bill stuffer in spring and summer 2008, over 300 volunteers registered to participate in the storm drain marking activity. Throughout these months, approximately 10,000 storm drains were decaled in the City of Philadelphia. In addition to the 10,000 storm drains marked an estimated 30,000 educational tip-cards were distributed to households near where the drains were marked.

Aquatic Invasive Species Watch Card and Posters

Aquatic Invasive Species (AIS) pose a major threat to maintaining biodiversity, particularly in Philadelphia's wetlands, streams, rivers and lakes. Pennsylvania's aquatic taxa are some of the most imperiled, with many native freshwater mussels, crayfish, and fish listed as Pennsylvania's Species of Greatest Need of Conservation. In recognition of the risk AIS pose to biodiversity, the Pennsylvania Fish and Boat Commission (PFBC) identified management of AIS as a priority topic.

The Philadelphia Water Department Aquatic Invasive Species (AIS) program has four major tasks: 1) prevent the spread of AIS by city employees through adopted HAACP protocols, 2) train city employees to identify AIS and report observations to department heads, 3) Public education and outreach regarding AIS, and 4) establish a chain of communication for the public to report observations of AIS to the appropriate agencies.

Part of the public outreach portion of this program includes an exhibit on the topic of AIS at the FWWIC, which is free to the public. The posters and complimentary educational literature was created in 2007, however the exhibit will be displayed in the summer of 2008. The complimentary literature - watch cards - will be distributed to boaters and other frequent water-way users, as well as to those visiting the Water Works Interpretive Center. The watch cards are wallet-size and water-proof. The invasive species watch cards and posters that were originally designed by Sea Grant have been updated by PWD with new text and additional logos.

Bilge Socks

In 2005, PWD staff worked with CNPP Specialists in the region to develop a bilge sock program, developing a logo to place on the bilge sock, creating an instructional tag to attach to the sock and distributing the socks to marinas and boaters in the region. In 2006, the bilge socks were distributed to all marinas and yacht clubs in Philadelphia. In 2007, PWD partnered with the U.S. Coast Guard in order for the Coast Guard to distribute the socks. The bilge socks were also distributed at Frankford Arsenal during Safe Boating Day in June, 2007. In 2008, PWD partnered with the Penn's Landing Corporation to also help distribute socks. The 2008 Safe Boating Day took place at Penn's Landing in June, 2008, where more bilge socks were distributed.

Clean Water Theatre

Working in partnership with the Academy of Natural Sciences, the Partnership for the Delaware Estuary, the PWD CAC offered the Clean Water Theatre's "All Washed Up" program which uses local artists and musicians to engage public, private and parochial schools throughout the City of Philadelphia in becoming active and informed stewards of our environment. The setting of the 20 minute play is in an urban park that has a river running through it. The story is built around three characters (an old man who is the caretaker of the park and who had been a vaudeville song and dance man in his youth, and two teenagers – a boy and a girl) that explore the importance of environmental stewardship and clean water. While there were not any live performances of Clean Water Theatre in 2007 & 2008, many video and DVD copies of the performance were distributed to teachers and local educators.

Delaware Estuary Watershed Workshop for Teachers

The 12th Annual Teachers Workshop was held July 21-25 this summer in conjunction with the Partnership for the Delaware Estuary, Bucks County Conservation District and

Pennsylvania's DCNR. 18 teachers participated in the week-long workshop. Workshop activities included canoeing the Neshaminy, visiting water quality BMP projects, performing chemical, physical and biological analysis on a stream, learning about wetlands, staying overnight at the College of Marine Studies, planting native plants, and much more. The Philadelphia Water Department hosted the teachers for a day by providing a tour of the Fairmount Water Works Interpretive Center, and Southwest Water Pollution Control Plant. This segment of the teachers' workshop provided the participants with crucial information on the local waterways as a source of their drinking water and the process undergone to return the water in an acceptable condition.

Dog Waste Control Program

Through a pilot project in Delaware, the Partnership for the Delaware Estuary found that most dog-owners are completely unaware of the connection of dog waste to water pollution. Many articulated that they clean-up in public areas as a common courtesy, but were unaware that the dog waste in their yards could be a potential source of stormwater runoff pollution. A similar project has been initiated with PWD. Five thousand "Bags on Board" and educational tip cards where 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. The refills are available at most local pet shops. The educational tip card that is being distributed with the units not only explains the affects of dog waste on local waterways, but also provides a list of other daily actions that can be modified slightly to reduce stormwater runoff pollution. This program was also beneficial in educating dog-owners on other sources of stormwater runoff pollution and how these non-point source pollutants affect the local waterways and the Delaware Estuary.

Homeowner's Guide to Stormwater Management

In 2004, PWD staff developed Philadelphia's first Homeowner's Guide to Stormwater Management. The document targets homeowners and residents that want to take an active role in helping to transform their properties and communities into healthier components of the watershed through environmentally-friendly stormwater management. The guide lays out specific steps and actions homeowners or community residents can take to improve stormwater management on their properties and in their communities.

In 2007, PWD developed a PowerPoint presentation, titled "A Homeowners' Guide to Stormwater Management" to accompany the guide. This presentation was given on September 27, 2007 at the North Wales Borough Hall (Wissahickon Watershed).

Monofilament Line Recovery & Recycling Program

In 2007, PWD worked with Coastal Non-point Pollution Program (CNPP) Specialists in the region to develop a Monofilament Line Recovery and Recycling Program for the southeast region of Pennsylvania. This program is still in the planning phase, although an order for five Monofilament Line Recycling Bins has been placed. These bins will be placed in popular fishing zones within the vicinity of the Delaware River.

Philadelphia Flower Show – PWD Exhibit: March 2-9, 2008

In 2008 PWD and the Partnership for the Delaware Estuary sponsored an exhibit at the Philadelphia Flower Show, where the theme was "Jazz It Up!" paying tribute to New Orleans. The display entitled "Mardi Gras Celebration of the Green Roof", featured how green roofs can be used to reduce stormwater runoff, regulate household temperatures, and compliment wild areas by providing "rest stops for insects and birds. The exhibit, visited by over 200,000 people included a rain barrel, sample green roof, and rain chain. A brochure with additional information was also available at the exhibit.

Safe Boating Program

PWD initiated an outreach, education, and notification program for marinas, personal watercraft users and boaters, titled the Smart Boating, Clean Waters Program. This program is led by the CNPP Specialists in the region and it is funded by the CNPP grant awarded by PA DEP. Most of the marinas, yacht clubs, boat launch ramps and fishing locations targeted for the program in Philadelphia are located near CSO outfalls on the Delaware River.

Various educational projects have resulted from the Smart Boating, Clean Waters Program. Projects, such as a water-proof brochure, titled "A Boater's Guide to Clean Waters," and user surveys and interviews with marina and yacht club operators to advise them on how to best adopt more environmentally friendly operation and maintenance practices.

Schuylkill Awareness Bands

Two thousand light blue awareness bands (made popular by the Lance Armstrong Foundation) were purchased for distribution at the FWWIC. The bands read "Schuylkill River" on one side and "Keep it clean!" on the other side. The bands are used as a take home reminder to visitors of the FWWIC of how they can personally make a difference in the quality of their local waterways.

Schuylkill Watershed Initiative "Stories"

Schuylkill Action Network and Schuylkill Watershed Initiative Grant (SWIG) Stories Project were completed in June 2008. This project consists of a 2-pocket folder that tells both the Schuylkill Action Network (SAN) and SWIG stories on the interior flaps. The folder can be used alone or in combination with the 20 story sheets about local Schuylkill Watershed Initiative projects. Most of these projects address water quality issues by directly reducing abandoned mine drainage, agricultural runoff and stormwater management challenges. Others focus on public education and outreach, helping to make the land-water connection for thousands of watershed residents.

Stormwater Management for Small Businesses

In the spring of 2008, PWD created a PowerPoint presentation, titled "Stormwater Management for Small Businesses." The presentation provides guidance to small business owners on actions they can take on their property to better manage stormwater. PWD staff presented this presentation to Rotary Club members, who comprise of business leaders. These meetings took place in two sections of the Tookany/Tacony Frankford Watershed, where main streets and small businesses are prevalent and where the presentation is applicable.

"Stormy Weather" Video

The video focuses on individual responsibility as a critical success factor in improving stormwater quality. The deleterious effects of stormwater pollution on the physical and biological community in aquatic systems are addressed through various anti-litter messages, such as: litter control, responsible household and pet waste management, and the proper use of inlets. The video is distributed to schools, watershed organizations and interested civics. The video has been distributed to over 300 environmental groups on an annual basis, various citizen groups, and schools, and has become a part of the environmental education curriculum for Delaware schools. The City's cable channel is showing the video twice a day.

Water Quality Council (formerly Citizens Advisory Council, CAC)

In 2001, the Water Quality CAC was formed from a merger of the Stormwater and the Drinking Water Quality CACs. Over the past few years, source water protection had become more of a concern for drinking water quality. The Drinking Water CACs focus has been drawn naturally toward non-point source pollution, a focus traditionally undertaken by the Stormwater CAC. Finally, this merging of the two CACs complemented the PWD's, PADEP's and EPA's new approach to looking at and addressing water quality issues on a holistic basis. The Partnership for the Delaware Estuary facilitates what is now referred to as the Water Quality Council meetings. The committee consists of representatives from the following groups:

Action AIDS
Bridesburg Civic Association
Bucks Count Water & Sewer Authority
Center in the Park - Senior Environment Corps
Community Legal Services of Philadelphia
Delaware River Basin Commission

Drexel University - School of Public Health
Drexel University Environmental Studies Institute
Delaware Valley Regional Planning Commission
Eastwick PAC
Friends of High School Park
Friends of Historic Rittenhouse Town
Friends of Poquessing Creek Watershed
Friends of Tacony Creek Park
MANNA
New Kensington CDC
PA DEP
Partnership for the Delaware Estuary
Penn PIRG
Pennsylvania Immigration and Citizenship Coalition
Pennsylvania Horticultural Society
Pennypack Ecological Restoration Trust
Pennypack Environmental Center
Philadelphia City Council
Philadelphia Department of Public Health
Philadelphia Corp for Aging
School District of Philadelphia
Schuylkill Center for Environmental Education
Schuylkill Navy
Schuylkill River Development Corporation
Southhampton Watershed Association
Stroud Water Research Center
Tookany/Tacony-Franford Watershed
U.S. EPA, Reg. 3 - Water Protection Division
Water Resource Association of the Delaware River Basin
Wissahickon Charter School

J.3 Pesticides, Herbicides, and Fertilizer Controls

Golf courses comprise a major land use within the Schuylkill River watershed. Golf course management techniques, particularly with regard to pesticide application, turf management, and water use significantly impact the quality and quantity of runoff leaving a golf course and entering nearby streams and rivers. To address this concern, the PWD holds an annual Golf Course Certification workshop through the Audubon Cooperative Sanctuary Program (ACSP). The ACSP is a voluntary education and certification program whose purpose it is to educate, provide conservation assistance to and positively recognize golf course managers for improving environmental management practices and conservation efforts as they pertain to outreach and education, wildlife and habitat management, chemical use reduction and safety, water conservation, and water quality management. The annual workshop introduces golf course managers to the certification program and provides detailed information on key components of the certification process and important principles of environmentally responsible management. To date, PWD has held five annual workshops in different parts of the Schuylkill River watershed. The 5th annual workshop was held at Bala Golf Course in Philadelphia in the April 2008. Twenty golf courses from around the region sent representatives to participate in workshop.

J.4 Snow Management Plan

The City of Philadelphia, like many other northeastern cities in the US, often 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. A copy of this Plan has been included on the accompanying CD to this report.

J.5 Municipal/Hazardous Waste, Storage, Treatment, and Processing Facilities

Over the remaining reporting years the City will collect and assess information regarding municipal facilities (waste treatment, storage and processing) in terms of stormwater runoff. Once preliminary information has been collated priorities and procedures will be developed for inspecting and monitoring such facilities.

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Section K Best Management Practices (BMPs)

The City is charged with implementing a wide range of BMPs for improving the quality, quantity and rate of stormwater runoff entering the MS4. Within Section K, each of the Permit specified BMPs is documented with regard to their scope, level of implementation and project updates for this Annual Report year. The City will continue to evaluate the effectiveness of each BMP as it is implemented. In addition to the required list of BMPs, the City is also including discussions of BMPs implemented outside of the MS4 areas. It is in the best interest of the City to evaluate all BMPs and use that information to improve and enhance all City Program goals regardless of whether they are required by regulation. When applicable, the BMP will provide previous year data collected along with a discussion of the overall effectiveness.

K.1 Enforcement of Storm Sewer Discharge Ordinance

Water Department continues to enforce its stormwater ordinance under the authority delegated 14-1603.1 of the Philadelphia Code and Charter. Please refer to Section H for additional information.

K.2 Commercial and Residential Source Controls

K.2.1 Mingo Creek Surge Basin

The City maintains all city-owned structural controls, which presently consists of the Mingo Creek Surge Basin. Maintenance consists primarily of scheduled preventative maintenance of the pumping station to support its intended purpose of flood control.

In FY 2000, a needs-analysis was completed for the dredging of the Mingo Creek basins. Survey drawings showing the plan and elevation views of the Surge Basin, indicate minimal material deposited in the bed of the basin. In fact there was an indication of basin bed erosion. Based on these findings, dredging of the basin was not recommended. However, additional field investigations reveal pockets of deposition in the basin, suggesting the need for additional study. In June 2001 the basins were dewatered so that visual observations could be made and photos taken of existing conditions.

PWD is considering a study to assess the feasibility of retrofitting the basin to improve water quality. The study identified that better methods are needed to determine actual sediment depths within the basins, and research of suitable vegetation survivability in the basin's typical flow regime. PWD investigated a methodology to collect a bathymetric profile of the basin topology in FY 2003.

PWD's generation of a comprehensive model of the contributing MS4 to the Mingo Creek Surge Basin has been temporarily interrupted due to the loss of critical personnel. Generation of this model is planned to resume upon replenishment of staffing, since further understanding of this system's flow regime, potential restrictive characteristics, and conveyance infrastructure longevity, are critical components in identifying possible maintenance and system enhancement locations.

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. As part of this committee, PWD is involved in early stage planning of stormwater quality management and stormwater conveyance system capacity enhancements associated within the airport restructuring projects.

K.3 Drainage Plan Review of Development

PWD and the City Planning Commission provide review of drainage plans for new development. The drainage plans addresses both flood control and potential stormwater pollutants under the authority delegated 14-1603.1 of the Philadelphia Code and Charter. Please refer to Section H for additional information.

K.4 Public Roadways BMPs

K.4.1 Deicing Practices and Salt Storage

The City monitors deicing practices in a manner consistent with its comprehensive snow emergency management procedures. A copy of the procedures was included in the FY 1996 Stormwater Annual Report. On average, the City deices approximately 2,400 street miles per storm.

There are six municipal salt storage areas in the city, all of which have been covered to prevent precipitation from coming in contact with the salt. A listing and map of Philadelphia salt storage locations can be found in FY 2006 Stormwater Annual Report pages 113-114.

K.4.2 Street and Inlet Practices

The City promotes, develops, and implements litter reduction programs, in an effort to increase public awareness of litter as a source of stormwater pollution. During FY 2008, the Streets Department continued its street cleaning programs that target street debris and litter. With its fleet of mechanical sweepers, the department provides daily street cleaning in Center City, and on major arteries and commercial corridors throughout the city. Many residential streets are also mechanically cleaned on a weekly basis. In FY 2008, a total 82,715 miles were cleaned. There are over 1,800 litter baskets in Center City and other commercial districts. The Philadelphia More Beautiful Committee organizes neighborhood cleaning events citywide. In the 2008 Clean Block season, over 9,700 blocks were cleaned by nearly 90,000 volunteers. Over 1,000 tons of trash were collected and removed.

K.4.3 Maintenance of City-Owned Inlets

The Inlet Cleaning Unit of the PWD, under the direct jurisdiction of the Chief of the Collector Systems is primarily responsible for the inspection and cleaning of over 78,000 stormwater inlets within the City. This section is also charged with the responsibility for the following areas: retrieving and installing inlet covers, installing original replacement covers that are missing, installing locking covers, unclogging choked inlet traps and outlet pipes so that inlets can take water; alleviating flooded streets and intersections when hydrants are opened, broken water mains, rain storms and other weather related problems. Inlet Cleaning is also charged with answering flood complaints at the Philadelphia Business Center. Finally, Inlet Cleaning has five (5) highway crews, whose duties are to clean high volume traffic areas during the night hours, 11 PM - 7 AM.

To insure the efficient and effective operation of the City's inlets and connecting stormwater sewers, it has been found necessary to use specialized inlet cleaning equipment to work along with the various units of the PWD as well as other government agencies and the private sector. The unit also cleans inlets on PWD properties.

The following table represents a summary of work performed by PWD/Inlet Cleaning Section from July 1, 2007 to June 30, 2008.

Table K.4.3-1 Inlet Cleaning Statistical Summary

Total Work Orders Received	92,539
Inlets Cleaned Mechanically	71,882
Inlets Cleaned Manually	1,473
Total Inlets Cleaned	73,355
No Cleaning Required (NCR)	1,122
Bad Locations (BL)	512
Parked Vehicles (PV)	10,613
Inlets Bled	12,839
Traffic	978
Referrals	8,709 **
Missing Cover Replacement	3,092
Locking Cover Installed	2,012
None Needed (NN)	614
No Inlet (NI)	735
Total Job Output	100,800
Ton of Debris Disposed	12,891***
Total Cubic Feet of Debris	890,212.3

*** These figures have not been included in the total job output*

**** Do not include days when scale was broken*

K.5 Animal Waste and Code Enforcement

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 the said penalties are displayed city-wide in any 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/.

K.6 PWD Flood Relief Project

Since the release of PWD's "Update to Interim Report on Wet Weather Basement Flooding in Philadelphia" dated March 1, 2006, there have been 2 severe rain events that have caused additional basement flooding in certain blocks within flood prone areas. The severe rain events occurred on June 3, 2006 & August 28, 2006.

The Philadelphia region has experienced an unusual number of severe rainfall events since 2004 that have caused basement flooding in several neighborhoods. PWD received many complaints of basement flooding following rain events on:

August 1, 2004

September 28, 2004 (Hurricane Ivan)

June 6, 2005

October 8, 2005

June 3, 2006

August 28, 2006

The above events rank in the top 15 out of over 1,800 rain events in the last 18 years from 1990 to 2007, based on a one-hour rain intensity. See Figure K.6-1 below for data of all rain events between 1990 and 2007, with some of the most recent severe rain events labeled.

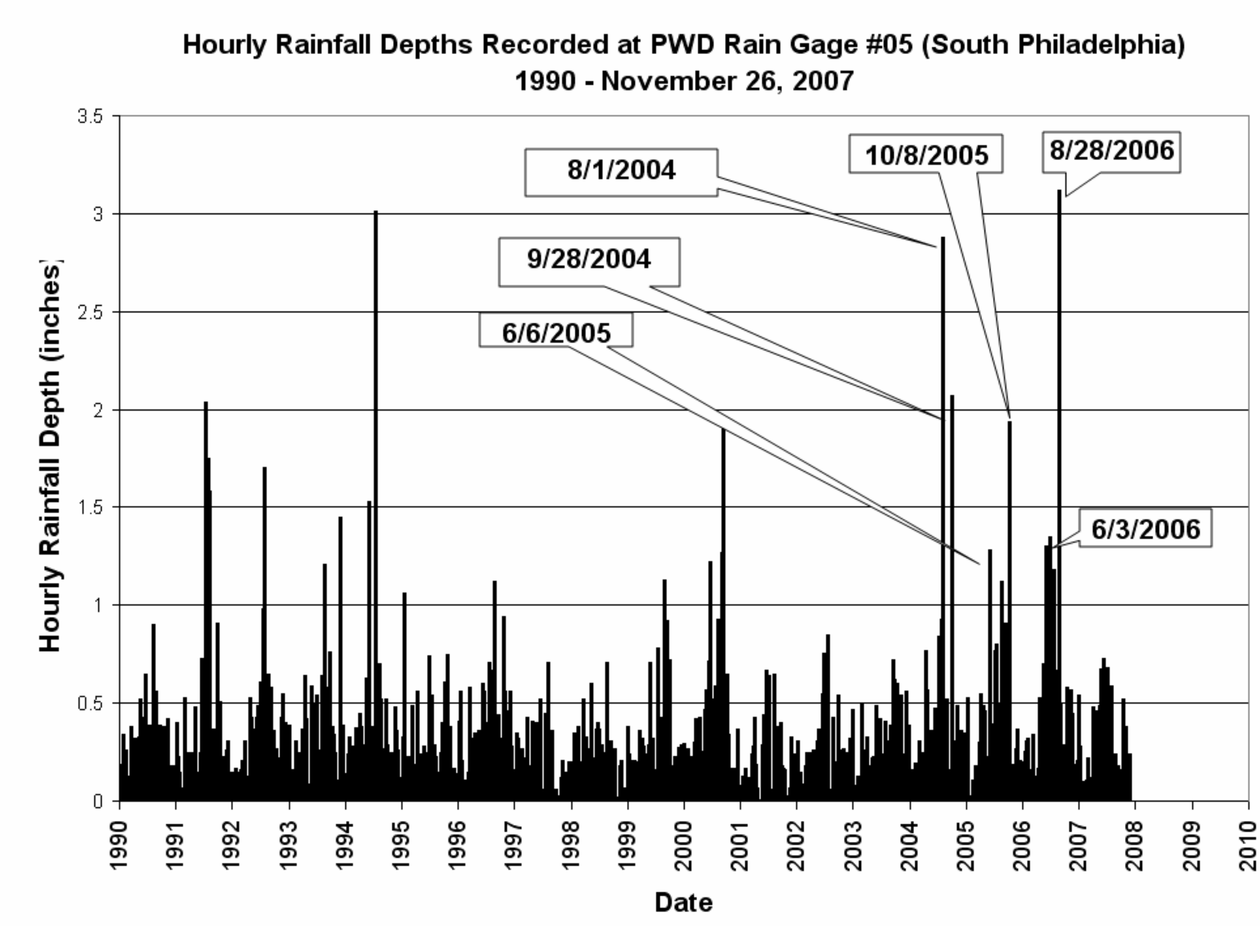

Figure K.6-1 Hourly Rainfall Data 1990-November 26, 2007

After evaluating over 1,800 rain events over the last 18 years, the following observations were made:

- The August 28, 2006 storm had the highest 1-hour rain intensity of any storm in the last 18 years, with over 3" of rain falling in a 1 hour period.
- Three of the top 4 storms based on one-hour rain intensity occurred in the last 4 years.
- 7 of the 15 most severe rain events in the last 18 years have occurred in the last 4 years.

This is dramatic evidence that the frequency of intense rain events has increased substantially over the last 2 years as compared to the preceding decade, and the intensities are among some of the highest in the last 18 years.

According to the National Oceanic and Atmospheric Administration's Precipitation Frequency Atlas, a rainfall event with the hourly intensity of August 1, 2004 and August 28, 2006 has the probability of occurring once every hundred years in the Greater Philadelphia Region. In this case it has recurred in just a little over 2 years. Storms of this intensity are unmanageable forces of nature that can overwhelm both home plumbing systems as well as the municipal sewer system.

K.6.1 Update of Comprehensive Flooding & Sewer Overflow Mitigation Program

PWD has initiated a large-scale project to analyze and reduce property damage from flooding and basement backups. Since the interim report on basement flooding (9/1/05) and the 1st update (3/1/2006), PWD has been working hard on multiple fronts to both understand the causes of flooding as well as to start implementation of items that would be helpful to flood prone properties.

PWD has embarked upon a huge effort to investigate, evaluate, analyze, and look for solutions to these problems. As part of this effort, PWD has begun and will continue to:

1. Inspect sewers in flood prone areas to determine if there are any obstructions and schedule appropriate maintenance where problems are found or schedule capital projects if structural problems are observed.

2. Collect and update data from property owners impacted by flooding.

3. Analyze the sewer system by hydraulically modeling the system to determine how the sewer system responds to storm events.

4. Coordinate with other government entities and enhance the legal framework for managing stormwater.

5. Provide possible remedies/solutions based upon the modeling information, which in turn is based on all of the data collected.

6. Initiate a Basement Back-up Protection Program

K.6.2 Sewer System Inspection and Maintenance

PWD routinely send maintenance crews to inspect sewers in blocks that have experienced and reported flooding, in order to look for blockages, obstructions, or other defects that may have contributed to flooding.

To date, PWD has inspected multiple sewers and identified no obstructions or accumulation of debris that would result in basement flooding. The small amounts of debris that were observed in a few isolated blocks have been cleaned. As part of this investigation, PWD identified two blocks that have structurally failing sewers. These locations have been added to the PWD sewer reconstruction capital program and given a high priority.

K.6.3 Property Data Collection

Input from neighborhoods and individual customers are essential in defining the extent and cause of the problem. In order to better understand the extent and severity of backups, PWD has modified its customer complaint system to allow for basement backup data to be collected in a more useful way. As it is impossible for PWD to observe conditions in every home, it is critically important that residents work with their civic leaders to accurately record, and communicate information about the date, time, depth, and duration of basement backups. It is also important to characterize the type and elevation (height from basement floor) of each basement plumbing fixture from which the backup has been observed. This information is needed to hydraulically model the storm event, evaluate the sewer system response to the rainfall, and identify measure to resolve backups.

PWD met with several community groups to discuss the flooding issue and has attempted to obtain more information from affected property owners. To facilitate information gathering, PWD generated a flooding questionnaire to help standardize data collection. The information gathered has been vital in helping PWD understand the limits of the affected areas as well as calibrating and verifying the hydraulic modeling of the sewer system. The questionnaire has been distributed at all community meetings on the subject as well as given to community group leaders for distribution to individuals who may have been unable to attend the public meetings.

K.6.4 Sewer System Analysis

PWD has made a significant investment in the latest technology in order to understand and analyze this city's infrastructure. PWD also has made a large investment in the ability to hydraulically model and analyze the sewer system and how it reacts and functions during wet weather events. In order for the hydraulic modeling results to be valid the model must be calibrated to ensure that the results reflect how the system is truly functioning. Building the computerized model of the sewer system and calibrating it is time consuming. Calibration quite often requires flow monitors to be installed in the sewers at key locations. The monitors will provide actual data of sewer flows and depths during wet weather events. This data will in turn be utilized in the hydraulic model to ensure that the model reflects the actual response of the sewer system to rainfall and that flood relief alternatives can indeed be effective.

PWD has installed temporary flow monitors in the sewer system at many key locations in order to obtain flow data during rain events. The monitors were installed in specific locations that would provide the most beneficial information to the modelers. In order for the information to be relevant, the monitors must be in place for several rain events, typically for several months. The information gathered is then used in conjunction with the hydraulic model to calibrate and/or verify that the model reflects what is actually taking place in the sewer system.

The modeling has been completed for the following trunk sewer systems:

Snyder/McKean St. sewershed east of Broad St. (South Philadelphia)

Lombard St. sewershed east of Broad St. (Washington Square West)

Laurel St. sewershed (Northern Liberties/Old Kensington)

Tasker and Reed St. sewersheds (South Philadelphia)

Shunk St., Porter St., Wolf St. sewersheds east of Broad St. (South Philadelphia)

Passyunk Ave. and Shunk St. sewersheds west of Broad St. (South Philadelphia)

Many individual projects have subsequently been identified that are required to increase the capacity of these trunk sewer systems in order to handle intense rain events. A detailed list of sewer construction projects in each of the above sewersheds is presented in Table K.6.4-1. The information in Table K.6.4-1 represents approximately $200 million in sewer construction costs. These projects are being incorporated into the PWD Capital Program. As PWD designs and ultimately constructs the sewer improvement projects, modifications to the size and location of new sewers may arise from the design process. PWD engineering staff continues to re-evaluate these projects to determine if there are better, less disruptive, or more efficient ways of achieving the required results. This list will be periodically modified to reflect any changes.

The projects are large and complicated and will take several years to design and construct. Based upon conservative assumptions, the hydraulic model indicates that the sewer systems improvements will eliminate or greatly reduce the potential for flooding based upon historical storm events. The hydraulic model indicates that these sewer system improvements greatly reduce the number of events that caused flooding and the severity, but may not be able to handle all possible rain events. PWD is sensitive to the fact that the improvement projects are disruptive to the community, and will do everything it can to minimize residential discomfort.

Table K.6.4-1 Flood Relief Program Sewer Improvement Projects

Laurel St Sewershed (Northern Liberties)			
Street	**From**	**To**	**Size**
Laurel St.	Del. River	Columbus Blvd.	(3) 11' X 11' Box
Laurel St.	Chamber	Chamber	
Laurel St.	Columbus Blvd.	Columbus Blvd.	(1) 11' X 11' Box
Laurel St.	Columbus Blvd.	Germantown Ave.	(1) 10' X 15' Box
Germantown Ave.	Laurel St.	Wildey St.	(1) 10' X 15' Box
Germantown Ave.	Wildey St.	2nd St.	(1) 10' X 8' Box
Germantown Ave.	2nd St.	Girard	(1) 10' X 8' Box
Germantown Ave.	Thompson St.	Master St.	(1) 9' X 10' Box
Master St.	Germantown Ave.	Randolph St.	(1) 9' X 10' Box
Lombard St. Sewershed East of Broad St. (Washington Square West)			
Street	**From**	**To**	**Size**
Pine St.	Front St.	2nd St.	8' X 7' Box
Pine St.	2nd St.	6th St.	78" RCP
Pine St.	6th ST.	12th St.	72" RCP
Pine St.	12th St.	13th St.	60" RCP
Pine St.	13th St.	Juniper St.	54" RCP
Pine St.	Juniper St	Broad St.	48" RCP
3rd St	Delancy ST.	Cypress St.	24" RCP
Moore St. Sewershed			
Street	**From**	**To**	**Size**
Moore St.	Chamber	Chamber	
Moore St.	Del. River	1000' Upstream	8' X 7' Box
Tasker St. & Reed St. Sewersheds (Reed St. Option)			
Street	**From**	**To**	**Size**
Reed St Outfall	River	New Chamber	(1) 7' X 14' Box
Reed St.	Chamber	Chamber	Chamber
Reed St	Chamber	Water St.	(1) 7' X 14' Box
Water St.	Reed St	Dickinson St.	(1) 7' X 14' Box
Dickinson St.	Water St.	8th St.	(1) 7' X 14' Box
Dickinson St.	8th ST.	13th St.	(1) 7' X 14' Box
Dickinson St.	13th St.	Broad St.	(1) 5' X 7' Box
9th St	Reed St	40' N. of Reed St.	48" RCP
13th St	Dickinson St.	Reed St.	4' X 8' Box
13th St	Reed St.	Wharton	4' X 6' Box
13th St	Wharton St.	Federal St.	60 " RCP
Wharton St.	13th St.	15th St.	60 " RCP
15th St.	Wharton St.	Federal St.	48 " RCP
Front St.	112' N. of Reed St	Federal St.	42 " RCP
Tasker St Gunite	Chamber	Water St.	6" Gunite

Clarion St.	Wharton St.	Federal St.	48" RCP
12th St.	Tasker St.	Morris St.	36" RCP
4th St.	Federal St	130' N. of Fed. St.	18" RCP
Federal St.	9th St.	10th St.	36" RCP
13th St	Morris St.	Moore St.	36" RCP
13th St	Dickinson St.	Morris St.	4' X 6' Box
Morris St	13th St.	Broad St.	42" RCP
Tasker St.	Broad St.	15th St.	36" RCP
Snyder/McKean/ Sewersheds			
Street	**From**	**To**	**Size**
Weccacoe St.	Snyder Ave.	Wolf St.	6'-0" X 8'-0" Box
Snyder Ave.	Front St.	4th St.	5'-0" X 11'-0" Box
Snyder Ave.	4th St.	6th St.	5'-0" X 11'-0" Box
Snyder Ave.	8th St.	10th St,	5'-0" X 10'-0" Box
3rd St. (Reverse flow)	Snyder Ave.	Jackson St.	36" RCP
3rd St. (Reverse flow)	Wolf St.	Jackson St.	36" RCP
4th St.(Reverse Flow)	Wolf St.	Snyder Ave.	36" RCP
Front St	McKean St.	Mifflin St.	36" RCP
			Chamber
Wolf St. Sewershed			
Street	**From**	**To**	**Size**
Oregon Ave	River	Weccacoe St.	6'-6" X 15'-0" Box
Weccacoe St.	Oregon Ave.	Wolf St.	6'-6" X 15'-0" Box
Wolf St.	Weccacoe St.	Vandalia St.	6'-6" X 13'-6" Box
Wolf St.	8th St.	12th St.	6'-0" X 8'-0" Box
Wolf St.	13th St.	Broad St	36" RCP
			Chamber
Oregon Ave./Shunk St./Porter St. Sewershed East of Broad St.			
Street	**From**	**To**	**Size**
Oregon Ave.	River	Front St	6' X 20' Box
Oregon Ave.	Front St.	8th St.	6' X 20' Box
8th St	Oregon Ave.	Shunk St.	6' X 20' Box
8th St	Shunk St.	Porter St.	6' X 16' Box
8th St	Porter St.	Wolf St.	6' X 14' Box
8th St	Wolf St.	Snyder Ave.	6' X 6' Box
8th St	Snyder Ave.	McKean St.	5' X 10' Box
Porter St	10th St.	Moyamensing Ave	5' X 6' Box
Porter St	Moyamensing	13th St.	42" RCP
Porter St	13th ST.	Broad St.	36" RCP
Moyamensing Ave.	Porter St.	Shunk St.	4' X 5' Box
Shunk St.	Moyamensing Ave.	Broad St.	48" RCP
Broad St.	Oregon Ave.	Oregon Ave.	36" RCP

3rd St.	30' S. of Shunk ST.	290 ' S. of Shunk St.	36" RCP
Oregon Ave.	5th St.	100' E. of 5th St.	36" RCP
5th St.	Shunk St.	Oregon Ave.	36" RCP
Passyunk Ave./Shunk St Sewersheds West of Broad St. (South of Shunk)			
Street	**From**	**To**	**Size**
Moyamensing	Junction Chamber	20th St	5'-0" X 12'-0" Box
Penrose Ave.	Pattison Ave.	20th St	5'-0" X 10'-0" Box
20th St.	Moyamensing	Oregon Ave.	5'-0" X 6'-0" Box
Oregon Ave	20th St.	18th St	5'-0" X 6'-0" Box
18th St	Oregon Ave.	Shunk St.	48" RCP
Moyamensing	20th St.	18th St	5'-0" X 7'-0" Box
Shunk St.	18th St.	15th St.	48" RCP
Pollock St.	Moyamensing	17th	66" RCP
17th St.	Pollock St.	Bigler St.	48" RCP
Bigler St.	17th St.	15th St.	48" RCP
Pollock St.	17th St.	Carlisle St.	48" RCP
15th St.	Bigler St.	Moyamensing	36" RCP
18th St	Moyamensing	Stocker St.	36" RCP
Stocker St.	18th St.	17th St.	24" RCP
Barbara St.	18th St.	Moyamensing	24" RCP
16th St.	Moyamensing	Oregon Ave.	30" RCP
*The size and/or location of the proposed sewers may change during the design process as more information becomes available or more efficient, less disruptive solutions are identified.			

K.6.5 Government and Regulatory Initiatives

PWD is sensitive to the impact stormwater, particularly urban runoff, has on the combined sewer system. Regulations requiring modern stormwater management practices in Philadelphia became effective January 1, 2006, and are described in detail in Section H. The stormwater regulations aim to prevent worsening of basement flooding, and ultimately reduce stormwater runoff even as Philadelphia re-develops.

K.6.6 Active Sewer Projects

PWD is designing sewer projects in the following sewersheds:

Snyder/McKean St. sewershed east of Broad St. (South Philadelphia)

Lombard St. sewershed east of Broad St. (Washington Square West)

Laurel St. sewershed (Northern Liberties/Old Kensington)

PWD recently completed construction of a capital project on Snyder Ave. from Swanson St. to Dilworth St.. The project involved reconstruction of approximately 800 feet of the existing trunk sewer with an enlarged box sewer. The project should have had a positive impact on the wet weather flow capacity and therefore improve the flooding situation in the Snyder Ave. and McKean St. drainages upstream of the improvement project. Additionally, the project involved approximately 2000 feet of water main replacement. The total cost of this project was $4.895 million.

K.6.7 Individual Property Solutions

Beginning November '06, PWD conducted a pilot Basement Protection Program, working with volunteer residents in the affected neighborhoods to install backwater valves on individual plumbing fixtures and main drains if warranted, and also to identify opportunities to disconnect the property's downspouts. The pilot program allows for the development of an anticipated and proposed scope of work for the department's contracted plumbers, and to determine related costs for this work, which involves restoring the portions of the basement or sidewalk affected by the installation of backwater valves. To date, PWD has retrofitted 12 properties while also developing a program protocol that will allows for a larger pool of customers to participate in the program which is free to eligible property owners.

PWD has budgeted $3 million in FY 2008 for the implementation of this program. On July 1 2007 PWD initiated its soft launch, working through City Council offices and neighborhood organizations. The goal of soft launch is to allow the program staff and plumbers to begin protecting additional qualifying properties with backwater valve protection while not working under the duress of a rain storm which results in basement backups.

Application forms may be obtained by calling the PWD hotline (215-685-6300). To qualify for the program, the applicant must be the property owner of record; the property should be located within the identified flooding neighborhoods; and the property's water/sewer bill should be paid to date. The property owner will be required to sign a Basement Backflow Prevention Agreement. Once a scope of work has been defined for the property work may proceed. Backwater valves require regular maintenance in order to keep them clean and functioning properly. In properties experiencing basement backups, basement fixtures can be elevated, plugged, individually retrofitted with a backwater valve, or eliminated. Homeowners can also have a licensed engineer or registered plumber evaluate the feasibility of installing a backwater valve and or ejector pump.

K.6.8 Flood Relief Project Summary

PWD understands the hardships caused by basement flooding, and therefore the solution to this issue is one of the highest priorities for PWD. This complex problem will require time and resources to implement targeted solution. PWD has budgeted $3 million in FY 2008for the installation of back water valves on individual property laterals and other solutions that prevent back ups. PWD has worked diligently to analyze and identify sewer system improvements, and is now beginning to implement solutions. PWD identified approximately $200 million in sewer system projects to improve the conveyance of stormwater from intense rain events more efficiently, and ultimately reduce the potential for basement flooding. PWD's capital budget has also been increased to fund the sewer improvement projects. PWD will continue to modify the size and location of projects based upon knowledge gained through the design process in order to optimize the results of each project while minimizing disruption to the community during construction.

K.7 Sanitary Infiltration Controls

The Industrial Waste Unit (IWU) within the Philadelphia Water Department (PWD) responds to all complaints of liquid, solid, or odorous sanitary pollution within Philadelphia. The IWU coordinates with neighboring communities in the event that a sanitary leak may drain into the Philadelphia MS4 system. The IWU unit uses a variety of investigative and removal techniques to mitigate the impacts of sanitary infiltration to the MS4 system, combined system, and receiving waters. Presented in Table K.7-1 below is a list of all pollutant migration events that reached either the MS4 or combined sewer systems in FY 2008.

Table K.7-1 FY 2008 Sanitary Infiltration Events

Date	Location	Drainage Type
10/19/2007	Winter St. and 21st	CSO
4/18/2008	2708 Welsh Rd.	MS4
4/23/2008	10742 Albemarle Lane	MS4
5/21/2008	Pauls Run and Verree Rd.	MS4

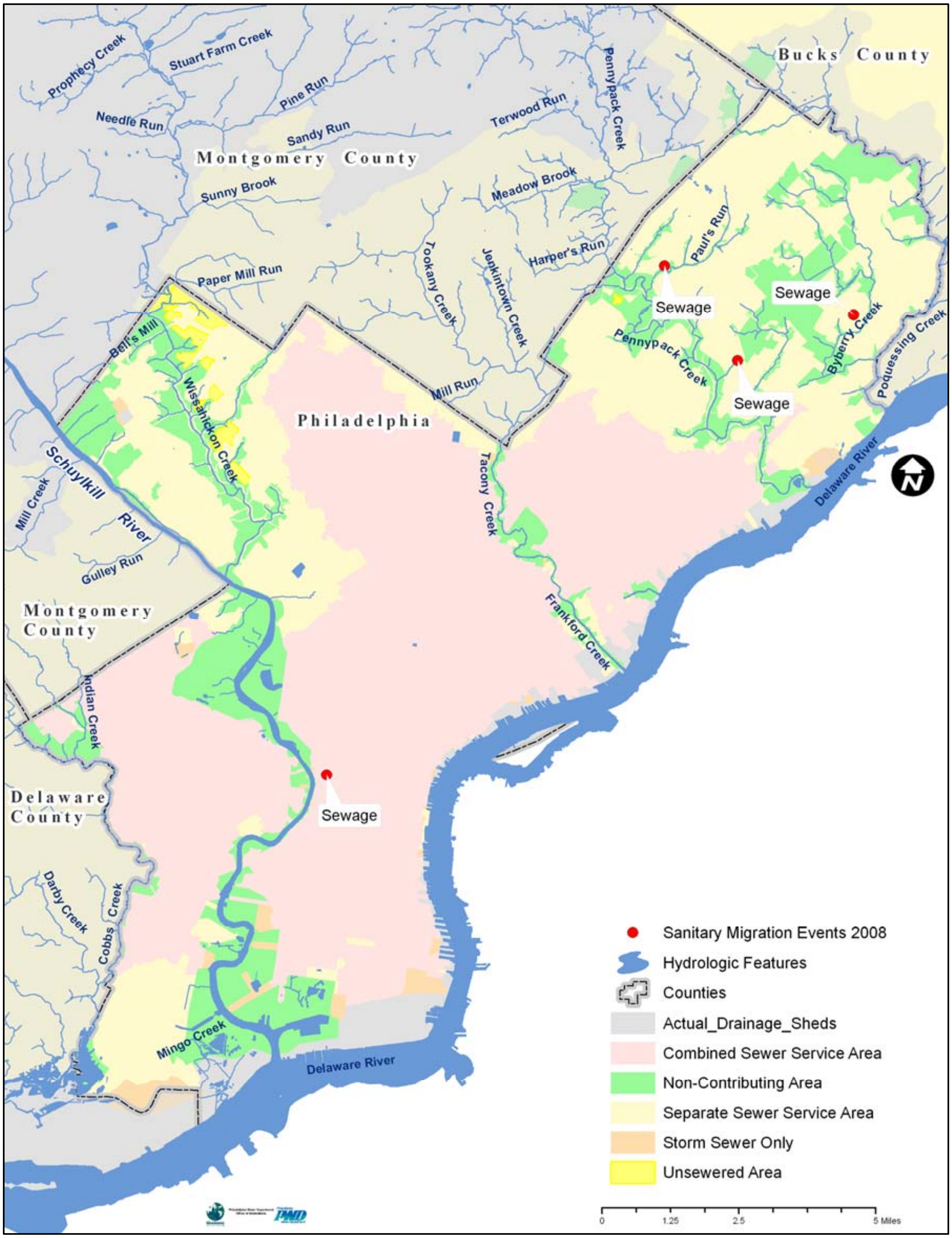

Figure K.7-1 FY 2007 Sanitary Infiltration Locations

K.8 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 by the Industrial Waste Unit, whose personnel are charged with response to such events.

In order to protect the Philadelphia Water Department's structures and treatment processes, IWU personnel 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. They supervise cleanup activities and assess environmental impact. The inspectors also investigate various other types of complaints. Please refer to Sections K.7 and J.1 for information regarding the nature of IWU responses during FY 2008.

K.9 Public Reporting of Illicit Discharges, Improper Disposal

The City vigorously 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 24 Hour/Day, 7 Day/Week Municipal Dispatcher to handle reports from the public. The direct numbers for the Dispatcher are (215) 686-4514 or (215) 686-4515. In addition, a customer service hotline 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.

K.10 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. Please reference Section E.2.5.1 for a more detailed discussion of this topic.

K.11 Pennypack Creek Rock Ramp

Please refer to Section K.11 of the FY 2007 Stormwater Annual Report and Section III.B.3.3.5 of the FY 2008 Combined Sewer Annual Report for a detailed explanation of the design and current status of the Pennypack Creek Rock Ramp.

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Section L Assessment of Controls

The City of Philadelphia has implemented multiple best management practices (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.

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Section M Fiscal Resources

The Stormwater Management Program is funded from the City's Water Fund, supported by revenue from water and sewer rates. The Water and Wastewater Funds are required under the General Ordinance to be held separate and apart from all other funds and accounts of the City. The Fiscal Agent and the funds and accounts therein shall not be commingled with, loaned or transferred among themselves or to any other City funds or accounts except as expressly permitted by the General Ordinance. During the reporting period, the City provided fiscal resources needed to support operation and maintenance of the Stormwater Management Program as outlined in Table M-1 below. The table presents fiscal year budgets for both the reporting year as well as the upcoming fiscal year.

Table M-1 Fiscal Resources

Program	FY 2008 Budget	FY 2009 Budget
Office of Watersheds	$9.96 Million	$10.11 Million
Collector Systems Support	$1.43 Million	$1.59 Million
Sewer Maintenance and Flow Control	$18.75 Million	$21.02 Million
Inlet Cleaning	$4.38 Million	$4.78 Million
Abatement of Nuisances	$9.4 Million	$9.4 Million
Sewer Reconstruction	$22.5 Million	$22.5 Million
Public Affairs and Education	$4.27 Million	$4.73 Million
Total	**$70.69 million**	**$74.13 Million**

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.

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Appendix A
PWD Flow Control CSO Maintenance

PWD FLOW CONTROL UNIT

COMBINED SEWER OVERFLOW MAINTENANCE

FISCAL YEAR 2008

PART 1	PHILADELPHIA WATER DEPARTMENT	Section 1
DRY WEATHER STATUS	WASTE AND STORM WATER COLLECTION	
REPORT	FLOW CONTROL UNIT	July 2006 - June 2007

COLLECTOR	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Jan-07	Feb-07	Mar-07	Apr-07	May-07	Jun-07	Totals
UPPER PENNYPACK - 5 UNITS													
INSPECTIONS	10	10	11	6	15	16	16	22	19	11	15	21	172
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	3	5	1	2	4	0	0	0	0	0	0	0	15
UPPER DELAWARE LOW LEVEL - 12 UNITS													
INSPECTIONS	33	16	26	31	35	33	38	34	31	27	40	32	376
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	8	3	6	15	10	14	8	1	0	0	0	0	65
LOWER FRANKFORD CREEK - 6 UNITS													
INSPECTIONS	13	12	9	11	13	14	22	21	19	19	12	12	177
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	4	0	2	1	6	3	3	1	0	1	0	0	21
LOWER FRANKFORD LOW LEVEL - 10 UNITS													
INSPECTIONS	20	14	13	15	22	24	38	27	34	22	27	24	280
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	4	3	3	3	5	1	3	3	3	2	0	1	31
FRANKFORD HIGH LEVEL - 14 UNITS													
INSPECTIONS	19	19	48	43	54	32	60	46	47	34	24	34	460
DISCHARGES	0	0	0	1	1	0	0	0	0	0	0	1	3
BLOCKS CLEARED	1	3	7	6	10	2	8	0	1	0	0	0	38
SOMERSET - 9 UNITS													
INSPECTIONS	19	28	18	27	19	33	23	34	23	22	38	21	305
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	3	0	0	2	0	1	0	0	0	1	0	1	8
LOWER DELAWARE LOW LEVEL - 33 UNITS													
INSPECTIONS	104	141	108	79	95	84	92	77	121	104	71	84	1160
DISCHARGES	0	0	1	0	0	0	0	0	0	0	0	0	1
BLOCKS CLEARED	2	0	4	2	3	1	2	0	0	2	0	3	19
CENTRAL SCHUYLKILL EAST - 18 UNITS													
INSPECTIONS	84	102	75	97	72	87	80	63	99	54	81	62	956
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	0	4	2	2	0	1	5	0	1	0	1	1	17
LOWER SCHUYLKILL EAST - 9 UNITS													
INSPECTIONS	25	36	29	33	25	32	42	37	42	29	26	20	376
DISCHARGES	1	0	0	0	0	0	0	0	0	0	0	0	1
BLOCKS CLEARED	6	5	6	9	4	3	3	2	2	1	4	0	45
CENTRAL SCHUYLKILL WEST - 9 UNITS													
INSPECTIONS	23	29	37	36	28	38	29	32	34	27	36	44	393
DISCHARGES	0	0	0	0	0	0	0	0	0	1	1	3	5
BLOCKS CLEARED	1	1	2	1	1	1	0	0	0	0	1	2	10
SOUTHWEST MAIN GRAVITY - 10 UNITS													
INSPECTIONS	48	57	56	56	50	53	30	49	45	43	41	42	570
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	0	6	3	7	11	5	0	1	1	5	6	1	46
LOWER SCHUYLKILL WEST - 4 UNITS													
INSPECTIONS	32	32	29	29	26	22	24	26	23	26	26	21	316
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	9	11	11	5	5	2	2	4	1	2	5	1	58
COBBS CREEK HIGH LEVEL - 23 UNITS													
INSPECTIONS	48	85	69	69	81	81	67	74	75	77	72	78	876
DISCHARGES	0	0	0	0	1	0	0	0	0	0	1	0	2
BLOCKS CLEARED	0	0	0	0	1	0	2	0	1	1	2	1	8
COBBS CREEK LOW LEVEL - 13 UNITS													
INSPECTIONS	25	42	42	32	31	28	23	28	39	29	29	23	371
DISCHARGES	0	0	0	0	1	0	0	0	0	0	0	0	1
BLOCKS CLEARED	0	0	0	0	0	0	0	0	0	0	0	0	0
RELIEF SEWERS - 26 UNITS													
INSPECTIONS	37	76	65	80	66	112	92	64	76	69	49	40	826
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	3	9	0	0	0	1	1	1	0	0	0	1	16
TOTALS / MONTH for 201 REGULATOR UNITS													Totals
TOTAL INSPECTIONS	540	699	635	644	632	689	676	634	727	593	587	558	7614
TOTAL DISCHARGES	1	0	1	1	3	0	0	0	0	1	2	4	13
TOTAL BLOCKS CLEARED	44	50	47	55	60	35	37	13	10	15	19	12	397
AVER. # of INSP. / BC	12	14	14	12	11	20	18	49	73	40	31	47	28
DISC / 100 INSPECTIONS	0.2	0.0	0.2	0.2	0.5	0.0	0.0	0.0	0.0	0.2	0.3	0.7	0.2

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	AVER	DTR
UPPER PENNYPACK 5 NEWPC UNITS															
P01	2	2	2	1	3	3	3	5	3	2	3	4	33	2.8	11.1
P02	2	2	2	1	3	3	3	5	3	2	3	4	33	2.8	11.1
P03	2	2	2	1	2	3	3	5	5	2	3	4	34	2.8	10.7
P04	2	2	3	2	3	4	4	5	5	3	4	5	42	3.5	8.7
P05	2	2	2	1	4	3	3	2	3	2	2	4	30	2.5	12.2
UPPER DELAWARE LOW LEVEL 12 NEWPC UNITS															
D02	4	2	3	2	2	3	4	4	4	3	3	5	39	3.3	9.4
D03	3	1	2	1	2	4	3	5	3	3	3	4	34	2.8	10.7
D04	4	2	3	3	4	3	4	5	5	4	4	4	45	3.8	8.1
D05	2	1	2	7	9	5	3	4	3	3	8	4	51	4.3	7.2
D06	2	2	2	2	2	2	3	2	2	2	4	3	28	2.3	13.0
D07	2	1	2	4	3	3	3	2	2	2	3	2	29	2.4	12.6
D08	2	1	2	2	3	2	3	2	2	2	3	2	26	2.2	14.0
D09	3	1	2	2	2	2	3	2	2	2	3	4	28	2.3	13.0
D11	4	2	2	2	2	2	3	2	2	2	3	1	27	2.3	13.5
D12	2	1	2	2	2	3	3	2	2	2	2	1	24	2.0	15.2
D13	2	1	2	2	2	2	3	2	2	1	2	1	22	1.8	16.6
D15	3	1	2	2	2	2	3	2	2	1	2	1	23	1.9	15.9
LOWER FRANKFORD CREEK 6 NEWPC UNITS															
F13	3	1	4	2	3	3	4	6	4	6	2	2	40	3.3	9.1
F14	2	1	1	2	3	3	4	3	3	2	2	2	28	2.3	13.0
F21	2	1	1	2	2	2	3	3	3	2	2	2	25	2.1	14.6
F23	2	5	1	2	2	2	4	3	3	4	2	2	32	2.7	11.4
F24	3	3	1	2	2	2	4	3	3	2	2	2	29	2.4	12.6
F25	1	1	1	1	1	2	3	3	3	3	2	2	23	1.9	15.9
LOWER FRANKFORD LOW LEVEL 10 NEWPC UNITS															
F03	1	1	1	1	2	2	5	4	3	2	2	2	26	2.2	14.0
F04	1	1	1	1	2	2	4	3	3	2	2	2	24	2.0	15.2
F05	1	1	2	1	2	2	5	4	5	2	3	2	30	2.5	12.2
F06	2	1	1	2	2	2	4	4	5	2	4	2	31	2.6	11.8
F07	1	1	1	1	2	2	3	3	3	2	3	2	24	2.0	15.2
F08	2	1	1	1	2	2	3	3	3	2	3	4	27	2.3	13.5
F09	7	4	2	3	3	5	4	2	5	3	4	3	45	3.8	8.1
F10	3	1	1	3	2	2	3	1	2	2	2	2	24	2.0	15.2
F11	1	1	1	1	2	2	3	1	2	2	2	2	20	1.7	18.2
F12	1	2	2	1	3	3	4	2	3	3	2	3	29	2.4	12.6
FRANKFORD HIGH LEVEL 14 NEWPC UNITS															
T01	1	1	3	4	3	2	4	4	4	3	2	2	33	2.8	11.1
T03	2	2	4	5	4	3	5	4	3	3	2	3	40	3.3	9.1
T04	2	2	4	4	6	3	5	4	4	2	4	2	42	3.5	8.7
T05	1	1	3	3	6	3	4	4	3	2	2	2	34	2.8	10.7
T06	1	1	3	3	3	2	4	4	3	2	2	2	30	2.5	12.2
T07	1	1	3	3	3	2	4	4	3	2	2	2	30	2.5	12.2
T08	1	1	4	3	3	2	4	3	3	2	2	2	30	2.5	12.2
T09	1	1	3	2	3	2	4	3	3	2	2	2	28	2.3	13.0
T10	2	2	4	4	5	2	5	2	4	3	1	3	37	3.1	9.9
T11	2	2	4	3	4	2	5	2	4	3	1	3	35	2.9	10.4
T12	1	1	3	2	3	2	4	3	3	2	1	4	29	2.4	12.6
T13	2	2	4	3	4	3	4	3	4	3	1	3	36	3.0	10.1
T14	1	1	3	2	4	2	4	3	3	3	1	2	29	2.4	12.6
T15	1	1	3	2	3	2	4	3	3	2	1	2	27	2.3	13.5

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	AVER	DTR
SOMERSET LOW LEVEL 9 NEWPC UNITS															
D17	3	3	2	5	2	4	3	4	4	2	7	3	42	3.5	8.7
D18	1	4	2	2	2	4	2	4	3	2	4	3	33	2.8	11.1
D19	1	2	2	2	2	4	3	4	3	3	6	3	35	2.9	10.4
D20	1	3	2	3	2	4	3	4	3	2	3	3	33	2.8	11.1
D21	1	3	2	2	2	3	2	4	1	4	3	3	30	2.5	12.2
D22	1	3	2	2	2	4	2	4	3	2	3	2	30	2.5	12.2
D23	1	3	1	5	3	3	3	3	2	2	3	2	31	2.6	11.8
D24	2	4	2	3	2	4	2	3	2	2	3	1	30	2.5	12.2
D25	8	3	3	3	2	3	3	4	2	3	6	1	41	3.4	8.9
LOWER DELAWARE LOW LEVEL 33 SEWPC UNITS															
D37	4	4	3	3	3	5	4	4	3	5	3	3	44	3.7	8.3
D38	3	4	3	4	2	5	3	3	4	3	4	1	39	3.3	9.4
D39	3	3	8	2	2	5	4	3	4	3	3	3	43	3.6	8.5
D40	1	3	2	1	2	2	1	3	3	2	3	1	24	2.0	15.2
D41	1	4	2	5	3	2	2	3	4	3	2	1	32	2.7	11.4
D42	1	3	3	2	2	2	1	4	5	2	2	1	28	2.3	13.0
D43	1	4	2	2	2	2	1	4	4	2	2	1	27	2.3	13.5
D44	2	4	2	2	3	2	3	2	3	4	1	1	29	2.4	12.6
D45	14	10	11	5	9	5	7	2	8	11	4	15	101	8.4	3.6
D46	1	8	7	4	6	3	3	2	3	5	3	4	49	4.1	7.4
D47	2	6	4	4	8	2	3	2	5	5	1	5	47	3.9	7.8
D48	5	4	3	5	9	2	4	2	5	6	2	4	51	4.3	7.2
D49	1	4	3	5	4	2	3	2	2	5	1	2	34	2.8	10.7
D50	1	3	3	4	2	2	3	2	3	7	2	4	36	3.0	10.1
D51	5	4	4	3	3	3	3	2	3	2	2	3	37	3.1	9.9
D52	1	3	3	2	1	2	3	2	3	3	2	3	28	2.3	13.0
D53	1	4	3	2	1	2	3	3	4	2	2	3	30	2.5	12.2
D54	1	4	3	2	1	2	4	2	3	4	2	2	30	2.5	12.2
D58	2	4	8	3	4	3	3	3	6	2	3	4	45	3.8	8.1
D61	1	4	2	1	1	2	4	2	3	2	1	2	25	2.1	14.6
D62	1	2	2	1	1	2	3	2	3	1	1	3	22	1.8	16.6
D63	1	4	3	1	1	2	4	2	4	2	1	3	28	2.3	13.0
D64	1	2	3	1	1	2	3	1	3	1	2	2	22	1.8	16.6
D65	1	2	2	1	1	2	2	1	6	2	1	2	23	1.9	15.9
D66	1	2	3	1	1	2	3	2	5	1	2	2	25	2.1	14.6
D67	3	4	2	3	1	3	2	3	3	2	2	2	30	2.5	12.2
D68	26	11	5	3	9	4	4	2	4	4	3	2	77	6.4	4.7
D69	5	8	4	2	4	3	1	3	4	2	2	1	39	3.3	9.4
D70	7	5	2	2	3	3	4	2	2	3	4	1	38	3.2	9.6
D71	3	3	1	1	2	2	2	3	3	3	3	1	27	2.3	13.5
D72	3	9	1	1	2	2	1	3	3	1	2	1	29	2.4	12.6
D73	1	2	1	1	1	2	1	1	2	4	2	1	19	1.6	19.2
D75	0	0	0	0	0	0	0	0	1	0	1	0	2	0.2	182.4
TOTAL	218	240	233	212	253	236	289	261	294	239	227	228	2930		
I/D/C	3.6	3.9	3.8	3.5	4.2	3.9	4.8	4.3	4.8	3.9	3.7	3.7			
UP	10	10	11	6	15	16	16	22	19	11	15	21	172	2.9	10.7
UDLL	33	16	26	31	35	33	38	34	31	27	40	32	376	2.6	12.4
LFC	13	12	9	11	13	14	22	21	19	19	12	12	177	2.5	12.8
LFLL	20	14	13	15	22	24	38	27	34	22	27	24	280	2.3	13.6
FHL	19	19	48	43	54	32	60	46	47	34	24	34	460	2.7	11.3
SLL	19	28	18	27	19	33	23	34	23	22	38	21	305	2.8	10.9
LDLL	104	141	108	79	95	84	92	77	121	104	71	84	1160	2.9	16.6

4	TOTAL DISCHARGES FOR NE & SE DISTRICTS
0.3	AVERAGE DISCHARGES PER MONTH
12.5	AVER. DAYS BEFORE RETURNING TO SITE
4.0	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
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													0
F10													0
F11													0
F12													0
FRANKFORD HIGH LEVEL 14 NEWPC UNITS													
T01													0
T03													0
T04													0
T05					1								1
T06													0
T07													0
T08													0
T09													0
T10				1									1
T11													0
T12												1	1
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	0	0	0	0	0	0	0	0
FHL	0	0	0	1	1	0	0	0	0	0	0	1	3
SLL	0	0	0	0	0	0	0	0	0	0	0	0	0
LDLL	0	0	1	0	0	0	0	0	0	0	0	0	1

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			1										1
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	1	1	0	0	0	0	0	0	1	4

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	0	0	0	0	0	0	0	0
FHL	0	0	0	1	1	0	0	0	0	0	0	1	3
SLL	0	0	0	0	0	0	0	0	0	0	0	0	0
LDLL	0	0	1	0	0	0	0	0	0	0	0	0	1

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
UPPER PENNYPACK 5 NEWPC UNITS													
P01		1											1
P02													0
P03	2	2		1	1								6
P04	1	2	1	1	2								7
P05					1								1
UPPER DELAWARE LOW LEVEL 12 NEWPC UNITS													
D02				1		1							2
D03	1		1	1	1	3	1						8
D04	1	1	1	2	2	1	1						9
D05				4	3	1	1	1					10
D06	1		1	1		1	1						5
D07				1	1	2	1						5
D08		1	1		1								3
D09													0
D11	1	1	1				1						4
D12	2			2		1	1						6
D13	1			2	1	2							6
D15	1		1	1	1	2	1						7
LOWER FRANKFORD CREEK 6 NEWPC UNITS													
F13			2		2	1	1	1					7
F14	1			1	3	1	2						8
F21													0
F23	2				1					1			4
F24	1					1							2
F25													0
LOWER FRANKFORD LOW LEVEL 10 NEWPC UNITS													
F03	1							1					2
F04							1						1
F05		1			1		1	1					4
F06	1			1									2
F07		1		1						1			3
F08					1								1
F09	2	1	1	1	1			1				1	8
F10					1				1				2
F11			1		1		1		1				4
F12			1			1			1	1			4
FRANKFORD HIGH LEVEL 14 NEWPC UNITS													
T01			1	1	1				1				4
T03			1	1	2								4
T04													0
T05					1								1
T06				1									1
T07				1	1								2
T08													0
T09	1		1		2	2	2						8
T10		2			2		1						5
T11			1				1						2
T12			2										2
T13		1	1	2			3						7
T14													0
T15					1		1						2

16.42 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													0
D19										1			1
D20	1												1
D21	1												1
D22	1					1							2
D23				2									2
D24													0
D25													0
LOWER DELAWARE LOW LEVEL 33 SEWPC UNITS													
D37	1				1					1			3
D38			1	1		1							3
D39			2									1	3
D40													0
D41													0
D42													0
D43													0
D44			1							1			2
D45												1	1
D46					1								1
D47				1	1								2
D48													0
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												1	1
D68							1						1
D69													0
D70	1												1
D71													0
D72													0
D73													0
D75													0
													TOTAL
	25	14	23	31	38	22	24	5	4	6	0	5	197

UP	3	5	1	2	4	0	0	0	0	0	0	0	15
UDLL	8	3	6	15	10	14	8	1	0	0	0	0	65
LFC	4	0	2	1	6	3	3	1	0	1	0	0	21
LFLL	4	3	3	3	5	1	3	3	3	2	0	1	31
FHL	1	3	7	6	10	2	8	0	1	0	0	0	38
SLL	3	0	0	2	0	1	0	0	0	1	0	1	8
LDLL	2	0	4	2	3	1	2	0	0	2	0	3	19

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	AVER	DTR
CENTRAL SCHUYLKILL EAST SIDE 18 SWWPC UNITS															
S05	7	7	4	8	4	5	5	4	6	4	5	6	65	5.4	5.6
S06	5	6	4	5	4	6	5	4	6	4	4	5	58	4.8	6.3
S07	9	6	4	5	4	5	5	4	6	4	5	4	61	5.1	6.0
S08	6	7	4	4	4	5	4	4	6	4	5	5	58	4.8	6.3
S09	5	6	4	5	4	5	4	4	6	3	4	3	53	4.4	6.9
S10	3	6	4	5	4	5	4	3	6	3	3	3	49	4.1	7.4
S12	6	7	5	6	5	6	5	4	7	4	5	4	64	5.3	5.7
S12A	6	7	5	6	5	6	5	4	7	4	5	4	64	5.3	5.7
S13	3	6	5	6	3	5	5	3	6	4	5	4	55	4.6	6.6
S15	4	7	5	6	4	5	3	4	6	4	5	4	57	4.8	6.4
S16	5	5	4	4	4	4	4	3	5	3	4	2	47	3.9	7.8
S17	6	4	4	5	4	4	4	3	5	3	4	3	49	4.1	7.4
S18	4	4	4	5	3	4	4	2	5	2	5	3	45	3.8	8.1
S19	3	5	4	6	5	5	5	4	6	2	5	3	53	4.4	6.9
S21	4	6	4	6	5	5	5	4	4	3	5	2	53	4.4	6.9
S23	2	4	5	5	4	4	6	3	4	1	4	3	45	3.8	8.1
S25	3	5	3	5	3	4	4	3	4	1	5	2	42	3.5	8.7
S26	3	4	3	5	3	4	3	3	4	1	3	2	38	3.2	9.6
LOWER SCHUYLKILL EAST SIDE 9 SWWPC UNITS															
S31	4	6	4	5	4	3	6	6	6	5	4	3	56	4.7	6.5
S35	4	4	4	4	4	4	6	5	5	4	4	1	49	4.1	7.4
S36	3	3	3	3	1	4	4	2	3	1	2	1	30	2.5	12.2
S36A	1	4	2	4	4	4	5	5	6	4	3	2	44	3.7	8.3
S37	4	3	4	3	1	4	4	2	3	1	2	1	32	2.7	11.4
S42	3	5	5	3	3	3	5	5	6	4	3	6	51	4.3	7.2
S42A	1	4	3	4	4	3	5	5	6	5	3	4	47	3.9	7.8
S44	2	3	2	3	1	4	4	2	3	1	2	1	28	2.3	13.0
S46	3	4	2	4	3	3	3	5	4	4	3	1	39	3.3	9.4
CENTRAL SCHUYLKILL WEST 9 SWWPC UNITS															
S01	3	3	5	4	3	4	4	3	5	3	8	8	53	4.4	6.9
S02	3	3	5	4	3	4	4	3	5	3	6	15	58	4.8	6.3
S03	3	2	4	4	1	4	3	3	4	3	4	3	38	3.2	9.6
S04	3	4	4	3	3	4	3	4	4	3	3	4	42	3.5	8.7
S11	2	3	5	4	2	4	3	4	4	3	3	2	39	3.3	9.4
S14	2	3	3	4	3	4	3	3	3	3	3	2	36	3.0	10.1
S20	2	3	4	5	3	4	3	4	1	3	3	2	37	3.1	9.9
S22	2	4	3	4	5	5	3	4	4	3	3	4	44	3.7	8.3
S24	3	4	4	4	5	5	3	4	4	3	3	4	46	3.8	7.9
SOUTHWEST MAIN GRAVITY 10 SWWPC UNITS															
S27	3	4	4	4	4	5	3	4	4	3	3	3	44	3.7	8.3
S28	3	4	4	4	4	5	3	4	4	3	3	3	44	3.7	8.3
S30	3	5	4	4	4	5	3	4	4	3	3	3	45	3.8	8.1
S34	3	5	3	4	4	4	3	4	4	3	4	3	44	3.7	8.3
S39	3	4	3	4	3	4	3	4	4	3	3	4	42	3.5	8.7
S40	2	3	3	4	3	3	3	4	2	3	3	2	35	2.9	10.4
S43	1	3	3	4	3	5	3	4	3	3	2	2	36	3.0	10.1
S47	1	4	4	3	3	4	3	4	2	3	2	2	35	2.9	10.4
S50	20	15	17	13	11	9	3	9	9	10	10	11	137	11.4	2.7
S51	9	10	11	12	11	9	3	8	9	9	8	9	108	9.0	3.4
LOWER SCHUYLKILL WEST SIDE 4 SWWPC UNITS															
S32	5	9	7	7	6	6	6	8	7	8	8	6	83	6.9	4.4
S33	9	8	7	7	6	7	6	7	6	6	7	6	82	6.8	4.4
S38	10	8	10	10	8	6	5	5	5	6	7	4	84	7.0	4.3
S45	8	7	5	5	6	3	7	6	5	6	4	5	67	5.6	5.4

9 TOTAL DISCHARGES IN SW DISTRICT DTR = DAYS TO RETURN TO SITE

0.8 AVERAGE DISCHARGES PER MONTH I/D/C = INSPECTIONS PER DAY PER CREW

8.6 AVER. DAYS BEFORE RETURNING TO SITE I/D = INSPECTIONS PER DISCHARGE

3.5 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	2	4	3	3	3	4	3	3	3	3	4	3	38	3.2	9.6
C02	2	3	3	3	3	4	3	3	3	3	4	3	37	3.1	9.9
C04	2	3	3	3	3	4	3	4	3	3	4	3	38	3.2	9.6
C04A	2	3	3	3	3	4	3	4	3	3	4	3	38	3.2	9.6
C05	2	3	3	3	2	3	3	3	3	4	3	3	35	2.9	10.4
C06	3	5	3	5	4	3	4	5	4	4	4	4	48	4.0	7.6
C07	2	4	2	3	3	5	3	4	3	3	4	5	41	3.4	8.9
C09	3	4	3	2	3	2	3	3	4	5	4	3	39	3.3	9.4
C10	2	2	3	2	3	3	3	3	4	4	4	3	36	3.0	10.1
C11	2	3	3	2	3	3	3	3	3	3	3	3	34	2.8	10.7
C12	2	3	3	2	3	3	3	3	3	4	3	3	35	2.9	10.4
C13	2	2	3	2	3	3	3	3	3	4	2	3	33	2.8	11.1
C14	2	4	3	4	4	3	2	3	4	4	2	2	37	3.1	9.9
C15	2	3	3	3	4	3	2	3	3	3	2	2	33	2.8	11.1
C16	2	3	3	3	2	3	2	3	3	3	2	2	31	2.6	11.8
C17	2	3	3	3	2	3	2	3	3	3	2	2	31	2.6	11.8
C31	2	6	4	4	5	4	3	3	4	3	3	5	46	3.8	7.9
C32	2	4	3	3	4	4	3	3	3	3	3	3	38	3.2	9.6
C33	2	4	3	4	4	4	3	3	4	3	3	5	42	3.5	8.7
C34	2	5	3	3	5	4	3	3	3	3	3	5	42	3.5	8.7
C35	2	4	3	3	4	4	4	3	3	3	3	5	41	3.4	8.9
C36	2	5	3	3	7	4	3	3	3	3	3	4	43	3.6	8.5
C37	2	5	3	3	4	4	3	3	3	3	3	4	40	3.3	9.1
COBBS CREEK LOW LEVEL 13 SWWPC UNITS															
C18	2	3	3	4	2	2	2	2	3	3	2	2	30	2.5	12.2
C19	2	3	3	3	4	2	2	2	3	3	3	2	32	2.7	11.4
C20	2	3	3	3	2	2	2	2	3	2	2	2	28	2.3	13.0
C21	2	3	3	3	2	2	2	2	4	2	2	2	29	2.4	12.6
C22	2	4	3	4	2	2	2	2	3	2	2	2	30	2.5	12.2
C23	3	2	4	3	2	2	2	2	3	2	2	2	29	2.4	12.6
C24	2	4	3	4	2	2	2	2	3	2	2	2	30	2.5	12.2
C25	2	3	4	2	3	3	3	3	4	3	3	3	36	3.0	10.1
C26	2	4	3	1	2	2	1	2	3	2	2	1	25	2.1	14.6
C27	2	4	4	2	3	3	2	3	4	2	3	2	34	2.8	10.7
C28A	1	3	3	1	2	2	1	2	2	2	2	1	22	1.8	16.6
C29	1	3	3	1	3	2	1	2	2	2	2	1	23	1.9	15.9
C30	2	3	3	1	2	2	1	2	2	2	2	1	23	1.9	15.9
TOTAL	285	383	337	352	313	341	295	309	357	285	311	290	3858		
I/D/C	3.1	4.2	3.7	3.9	3.4	3.7	3.2	3.4	3.9	3.1	3.4	3.2			
CSES	84	102	75	97	72	87	80	63	99	54	81	62	956	4.4	7.0
LSES	25	36	29	33	25	32	42	37	42	29	26	20	376	3.5	9.2
CSW	23	29	37	36	28	38	29	32	34	27	36	44	393	3.6	8.6
SWMG	48	57	56	56	50	53	30	49	45	43	41	42	570	4.8	7.9
LSW	32	32	29	29	26	22	24	26	23	26	26	21	316	6.6	4.7
CCHL	48	85	69	69	81	81	67	74	75	77	72	78	876	3.2	9.7
CCLL	25	42	42	32	31	28	23	28	39	29	29	23	371	2.4	13.1

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	1												1
S42													0
S42A													0
S44													0
S46													0
CENTRAL SCHUYLKILL WEST 9 SWWPC UNITS													
S01													0
S02											1	3	4
S03													0
S04													0
S11													0
S14													0
S20										1			1
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											1		1
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					1								1
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					1								1
C29													0
C30													0
													TOTAL DISC
	1	0	0	0	2	0	0	0	0	1	2	3	9

NO OF UNITS IN DISTRICT BLOCKED	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
CSE	0	0	0	0	0	0	0	0	0	0	0	0	0
LSE	1	0	0	0	0	0	0	0	0	0	0	0	1
CSW	0	0	0	0	0	0	0	0	0	1	1	1	3
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	1	0	0	0	0	0	1	0	2
CCLL	0	0	0	0	1	0	0	0	0	0	0	0	1

NO OF DISCHARGES IN DISTRICT	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
CSE	0	0	0	0	0	0	0	0	0	0	0	0	0
LSE	1	0	0	0	0	0	0	0	0	0	0	0	1
CSW	0	0	0	0	0	0	0	0	0	1	1	3	5
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	1	0	0	0	0	0	1	0	2
CCLL	0	0	0	0	1	0	0	0	0	0	0	0	1

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							1					1	2
S09													0
S10													0
S12									1				1
S12A			1										1
S13													0
S15							1						1
S16							1						1
S17													0
S18							1						1
S19													0
S21		1											1
S23		2		1		1	1				1		6
S25		1	1	1									3
S26													0
LOWER SCHUYLKILL EAST SIDE 9 SWWPC UNITS													
S31	1			1	1		1	1	1	1			7
S35	2	3	2	1	1	1					1		11
S36			2	2							1		5
S36A		1		2	1	2	1						7
S37	1		1										2
S42	1										1		2
S42A		1		2			1		1				5
S44													0
S46	1		1	1	1			1			1		6
CENTRAL SCHUYLKILL WEST 9 SWWPC UNITS													
S01													0
S02												2	2
S03													0
S04			1										1
S11													0
S14				1									1
S20											1		1
S22						1							1
S24	1	1	1		1								4
SOUTHWEST MAIN GRAVITY 10 SWWPC UNITS													
S27													0
S28					1	1							2
S30		1		1	1	1		1	1	1	2		9
S34													0
S39										1		1	2
S40				1							1		2
S43						1							1
S47		1											1
S50		2	1	2	2	1				2	2		12
S51		2	2	3	7	1				1	1		17
LOWER SCHUYLKILL WEST SIDE 4 SWWPC UNITS													
S32	1	2		1	2	1	1	1	1		2		12
S33	3	1	2	1	1			3					11
S38	3	3	6	3	1	1				1	2		20
S45	2	5	3		1		1			1	1	1	15

15.33 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							1						1
C02													0
C04												1	1
C04A													0
C05													0
C06											1		1
C07													0
C09											1		1
C10									1				1
C11					1								1
C12										1			1
C13													0
C14													0
C15													0
C16													0
C17													0
C31													0
C32													0
C33													0
C34													0
C35							1						1
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
	16	27	24	24	22	12	12	7	6	9	19	6	184

CSE	0	4	2	2	0	1	5	0	1	0	1	1	17
LSE	6	5	6	9	4	3	3	2	2	1	4	0	45
CSW	1	1	2	1	1	1	0	0	0	0	1	2	10
SWG	0	6	3	7	11	5	0	1	1	5	6	1	46
LSW	9	11	11	5	5	2	2	4	1	2	5	1	58
CCHL	0	0	0	0	1	0	2	0	1	1	2	1	8
CCLL	0	0	0	0	0	0	0	0	0	0	0	0	0

June 2007 **RELIEF SEWER MONTHLY INSPECTION**

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
THOMAS RUN RELIEF SEWER													
R01	1	4	4	5	3	4	5	5	5	4	3	3	46
R02	1	4	4	5	3	4	4	5	5	4	2	3	44
R03	1	4	4	5	3	4	4	5	5	4	2	3	44
R04	1	4	4	4	3	4	4	4	5	3	2	3	41
R05	1	4	4	4	2	4	4	2	5	3	3	3	39
R06	1	4	4	4	2	4	4	2	5	3	2	3	38
MAIN RELIEF SEWER													
R07	2	5	4	3	2	5	4	2	3	2	3	1	36
R08	1	5	4	3	3	4	4	2	3	3	2	1	35
R09	1	4	2	3	2	5	4	2	3	3	2	1	32
R10	1	4	3	3	2	5	4	2	3	2	2	1	32
R11	1	3	3	3	2	5	4	3	3	3	2	1	33
R11A	1	3	3	3	2	4	3	3	3	3	2	1	31
R12	1	3	3	3	2	4	3	2	3	2	2	1	29
WAKLING RELIEF SEWER													
R13	2	2	3	2	3	4	3	1	2	2	1	1	26
R14	2	2	1	2	3	4	3	1	2	2	1	1	24
ROCK RUN STORM FLOOD RELIEF SEWER													
R15	2	1	1	4	3	4	4	2	1	3	2	1	28
OREGON AVE RELIEF SEWER													
R16	1	2	1	1	3	5	2	2	2	2	2	1	24
R17	1	2	1	1	3	5	2	2	2	2	2	1	24
FRANKFORD HIGH LEVEL RELIEF SEWER													
R18	3	1	1	3	3	5	4	2	2	4	3	1	32
32ND ST RELIEF SEWER													
R19	2	2	1	3	2	5	4	2	1	2	1	1	26
MAIN STREET RELIEF SEWER													
R20	2	2	1	3	3	4	4	2	1	2	1	1	26
SOMERSET SYSTEM DIVERSION CHAMBER													
R21	2	1	2	2	3	4	3	1	1	2	1	1	23
TEMPORARY REGULATOR CHAMBER													
R22													
R23	2	2	1	2	3	4	3	2	1	2	1	1	24
ARCH ST RELIEF SEWER													
R24	1	3	2	4	2	4	3	2	4	3	2	3	33
16TH & SNYDER													
R25	1	3	3	4	2	4	3	5	5	2	2	1	35
GRANT & STATE RD. RELIEF													
R26	2	2	1	1	2	4	3	1	1	2	1	1	21
TOTAL	37	76	65	80	66	112	92	64	76	69	49	40	826
AVER	1.4	2.8	2.4	3.0	2.4	4.1	3.4	2.4	2.8	2.6	1.8	1.5	2.5

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	

June 2007 **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					1						3
R02	1	1											2
R03	1	1											2
R04		1											1
R05		1											1
R06													0
MAIN RELIEF SEWER													
R07													0
R08													0
R09													0
R10													0
R11		1				1							2
R11A		1											1
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		1						1				1	3
16TH & SNYDER													
R25		1											1
GRANT & STATE RD. RELIEF													
R26													0
TOTAL	3	9	0	0	0	1	1	1	0	0	0	1	16
AVER	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1

FY2007 CSO Dry Weather Discharges

Discharge Observed		Discharge Stopped		Last Inspection						
DateDO	TimeDO	DateDS	TimeDS	DateLI	TimeLI	SiteID	Collector	TypeUnit	Location	Comment
07/26/06	01:30 PM	07/26/06	02:00 PM	07/21/06	10:20 AM	S-37	LSES	B & B	Vare Ave. & Jackson St.	SHUTTER GATE BLOCKED WITH GRIT
09/07/06	09:30 AM	09/07/06	11:10 AM	09/05/06	10:50 AM	D-39	LDLL	B & B	Susquehanna Ave. E of Beach St.	CONSTRUCTION LUMBER BLOCKAGE IN TRUNK SEWER, REGULATOR CHAMBER AND TIDE GATES
10/11/06	12:50 PM	10/11/06	02:10 PM	10/06/06	09:30 AM	T-10	FHL	SLOT	Roosevelt Blvd. E of Tacony Creek	ROCKS & DEBRIS BLOCKED THE DWO PIPE.
11/01/06	01:30 PM	11/01/06	02:30 PM	10/25/06	01:10 PM	C-36	CCHL	SLOT	69th St. & Woodbine Ave S of Brentwood	LEAVES AND DEBRIS IN SLOT.
11/10/06	10:50 AM	11/10/06	11:40 AM	10/18/02	11:20 AM	C-28A	CCLL	SLOT	Island & Grays Aves.	STICKS AND DEBRIS.
11/28/06	11:10 AM	11/28/06	01:20 PM	11/15/06	12:10 PM	T-05	FHL	SLOT	Rising Sun Ave. W of Tacony Creek	GRIT AND GREASE BLOCKAGE IN DWO.
04/24/07	01:30 PM	04/25/07	09:50 AM	04/05/07	01:50 PM	S-20	CSW	B & B	NNW of South St. (Behind Penn Stad.)	ORFICE PLATE BLOCKED WITH GRIT, DEBRIS AND TREE BRANCHES.
05/30/07	09:30 AM	05/30/07	03:30 PM	05/16/07	09:30 AM	C-07	CCHL	SLOT	Lansdowne Ave. & 69th St.	SLOT BOX FILLED WITH GRIT.
05/31/07	08:50 AM	05/31/07	10:30 AM	05/23/07	10:40 AM	S-02	CSW	B & B	Haverford Ave. & West River Dr.	LUMBER AND DEBRIS FROM SEWER COLLAPSE AT 31ST. AND HAVERFORD AVE. BLOCKED REGULATOR INLET.
06/04/07	10:10 AM	06/04/07	03:30 PM	06/01/07	09:30 AM	S-02	CSW	B & B	Haverford Ave. & West River Dr.	DIRT AND ROCKS WASHED DOWN PIPE BY RAIN FROM SEWER REPAIR AT 31ST. AND HAVERFORD AVE. BLOCKED SHUTTER GATE AND DWO PIPE.
06/19/07	11:30 AM	06/20/07	06:00 AM	06/15/07	01:10 PM	S-02	CSW	B & B	Haverford Ave. & West River Dr.	SHUTTER GATE AND DWO BLOCKED WITH ROCKS AND DEBRIS FROM 31ST. & HAVERFORD AVE. SEWER REPAIR.
06/21/07	03:10 PM	06/21/07	09:20 PM	06/20/07	12:20 AM	S-02	CSW	B & B	Haverford Ave. & West River Dr.	REGULATOR BLOCKED WITH ROCKS AND DEBRIS FROM SEWER REPAIR AT 31ST. HAVERFORD AVE. (TRUNK SEWER CLEANING UP TO REPAIR WAS COMPLETED IN JULY)
06/26/07	01:30 PM	06/26/07	02:50 PM	06/23/07	08:00 AM	T-12	FHL	SLOT	Whitaker Ave. E of Tacony Creek	TWO SENSORS AND DEBRIS BLOCKING DWO PIPE.

PART 1 — PHILADELPHIA WATER DEPARTMENT — Section 1

DRY WEATHER STATUS REPORT — WASTE AND STORM WATER COLLECTION

FLOW CONTROL UNIT — July 2007 - June 2008

COLLECTOR	Jul-07	Aug-07	Sep-07	Oct-07	Nov-07	Dec-07	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Totals
UPPER PENNYPACK - 5 UNITS													
INSPECTIONS	10	12	11	16	16	11	15	11	12	12	11	16	153
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	0	0	1	1	0	0	0	3	1	1	0	1	8
UPPER DELAWARE LOW LEVEL - 12 UNITS													
INSPECTIONS	30	29	20	43	42	24	38	28	31	36	25	27	373
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	3	0	1	4	0	0	1	3	4	7	5	4	32
LOWER FRANKFORD CREEK - 6 UNITS													
INSPECTIONS	19	24	14	19	12	18	18	15	7	7	11	11	175
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	1	0	2	0	0	0	0	1	1	1	1	2	9
LOWER FRANKFORD LOW LEVEL - 10 UNITS													
INSPECTIONS	35	44	25	30	24	33	31	27	17	26	23	22	337
DISCHARGES	1	0	0	0	0	0	0	1	0	0	0	0	2
BLOCKS CLEARED	0	0	0	1	0	0	0	1	2	0	1	2	7
FRANKFORD HIGH LEVEL - 14 UNITS													
INSPECTIONS	33	47	30	22	37	35	32	21	18	32	38	37	382
DISCHARGES	0	1	0	0	0	0	1	1	0	0	1	0	4
BLOCKS CLEARED	0	0	0	0	2	1	0	2	0	0	0	1	6
SOMERSET - 9 UNITS													
INSPECTIONS	23	27	18	27	33	20	21	32	26	29	22	25	303
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	1	0	0	0	0	0	0	0	0	1	0	0	2
LOWER DELAWARE LOW LEVEL - 33 UNITS													
INSPECTIONS	71	118	75	107	83	90	81	103	56	99	78	72	1033
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	3	3	2	3	2	0	0	4	3	0	0	0	20
CENTRAL SCHUYLKILL EAST - 18 UNITS													
INSPECTIONS	75	80	80	88	72	82	88	87	40	63	72	59	886
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	1	2	2	3	0	1	2	1	0	6	4	7	29
LOWER SCHUYLKILL EAST - 9 UNITS													
INSPECTIONS	27	39	29	40	26	26	34	38	20	31	29	19	358
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	2	2	1	1	1	2	3	3	6	1	2	2	26
CENTRAL SCHUYLKILL WEST - 9 UNITS													
INSPECTIONS	53	50	32	37	42	42	39	41	20	33	34	32	455
DISCHARGES	0	0	0	0	0	0	0	0	2	0	1	1	4
BLOCKS CLEARED	3	0	0	1	0	0	0	0	4	1	1	1	11
SOUTHWEST MAIN GRAVITY - 10 UNITS													
INSPECTIONS	42	59	36	44	48	56	47	49	16	33	45	34	509
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	5	5	3	3	0	1	1	1	2	2	3	3	29
LOWER SCHUYLKILL WEST - 4 UNITS													
INSPECTIONS	17	22	18	25	25	20	19	33	10	23	29	31	272
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	0	0
BLOCKS CLEARED	2	2	3	5	0	0	1	2	8	4	8	10	45
COBBS CREEK HIGH LEVEL - 23 UNITS													
INSPECTIONS	84	93	95	67	94	80	88	108	39	62	74	87	971
DISCHARGES	1	0	0	0	0	0	1	0	0	1	1	0	4
BLOCKS CLEARED	0	0	2	1	1	2	2	8	11	3	4	1	35
COBBS CREEK LOW LEVEL - 13 UNITS													
INSPECTIONS	27	58	35	37	37	28	47	43	18	34	34	33	431
DISCHARGES	0	0	0	0	0	0	0	0	0	0	0	1	1
BLOCKS CLEARED	0	1	0	0	1	1	1	7	2	2	2	0	17
RELIEF SEWERS - 26 UNITS													
INSPECTIONS	43	72	39	65	42	64	85	115	67	97	76	79	844
DISCHARGES	0	0	0	0	0	0	0	0	1	0	0	0	1
BLOCKS CLEARED	0	0	1	0	0	1	0	0	0	0	0	0	2
TOTALS / MONTH for 201 REGULATOR UNITS													Totals
TOTAL INSPECTIONS	589	774	557	667	633	629	683	751	397	617	601	584	7482
TOTAL DISCHARGES	2	1	0	0	0	0	2	2	3	1	3	2	16
TOTAL BLOCKS CLEARED	21	15	18	23	7	9	11	36	44	29	31	34	278
AVER. # of INSP. / BC	28	52	31	29	90	70	62	21	9	21	19	17	37
DISC / 100 INSPECTIONS	0.3	0.1	0.0	0.0	0.0	0.0	0.3	0.3	0.8	0.2	0.5	0.3	0.2

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	AVER	DTR
UPPER PENNYPACK 5 NEWPC UNITS															
P01	2	2	2	3	3	3	3	2	2	2	2	3	29	2.4	12.6
P02	2	2	2	3	3	2	3	2	2	2	2	3	28	2.3	13.0
P03	2	3	2	3	3	2	3	2	3	3	2	3	31	2.6	11.8
P04	2	3	3	4	4	2	3	3	3	3	3	4	37	3.1	9.9
P05	2	2	2	3	3	2	3	2	2	2	2	3	28	2.3	13.0
UPPER DELAWARE LOW LEVEL 12 NEWPC UNITS															
D02	3	3	3	4	3	3	3	3	3	3	2	3	36	3.0	10.1
D03	3	2	2	6	3	2	3	2	2	2	2	2	31	2.6	11.8
D04	4	3	3	4	5	2	4	2	3	3	3	3	39	3.3	9.4
D05	3	2	3	3	5	1	3	2	2	2	1	2	29	2.4	12.6
D06	2	2	1	3	4	2	3	2	2	2	2	3	28	2.3	13.0
D07	2	2	1	3	3	2	3	2	2	2	2	2	26	2.2	14.0
D08	2	2	1	4	3	2	3	3	4	4	3	2	33	2.8	11.1
D09	2	3	1	3	4	2	3	2	2	2	2	2	28	2.3	13.0
D11	3	2	1	3	3	2	3	2	2	2	2	2	27	2.3	13.5
D12	2	2	1	3	3	2	3	2	2	2	2	2	26	2.2	14.0
D13	2	2	1	3	3	2	3	2	2	2	2	2	26	2.2	14.0
D15	2	4	2	4	3	2	4	4	5	10	2	2	44	3.7	8.3
LOWER FRANKFORD CREEK 6 NEWPC UNITS															
F13	4	4	4	4	2	3	3	3	1	1	1	0	30	2.5	12.2
F14	3	4	2	3	2	3	3	3	1	1	2	3	30	2.5	12.2
F21	3	4	2	3	2	3	3	2	1	1	2	2	28	2.3	13.0
F23	4	4	2	3	2	3	3	3	2	2	2	2	32	2.7	11.4
F24	3	4	2	3	2	3	3	2	1	1	2	2	28	2.3	13.0
F25	2	4	2	3	2	3	3	2	1	1	2	2	27	2.3	13.5
LOWER FRANKFORD LOW LEVEL 10 NEWPC UNITS															
F03	3	4	2	3	2	2	3	3	2	2	2	2	30	2.5	12.2
F04	2	5	3	3	2	3	4	2	2	3	2	2	33	2.8	11.1
F05	5	7	4	5	4	4	5	3	3	4	3	2	49	4.1	7.4
F06	4	5	2	3	2	3	4	3	1	2	2	2	33	2.8	11.1
F07	3	4	2	3	2	3	3	3	1	2	2	2	30	2.5	12.2
F08	3	4	2	2	2	4	2	3	1	2	2	2	29	2.4	12.6
F09	6	4	3	4	3	4	3	5	2	3	3	3	43	3.6	8.5
F10	3	4	2	2	2	4	2	3	2	3	2	2	31	2.6	11.8
F11	3	3	2	2	2	3	2	1	1	2	2	2	25	2.1	14.6
F12	3	4	3	3	3	3	3	1	2	3	3	3	34	2.8	10.7
FRANKFORD HIGH LEVEL 14 NEWPC UNITS															
T01	2	3	2	2	2	2	2	2	1	2	2	4	26	2.2	14.0
T03	2	4	3	3	3	3	2	2	2	3	3	4	34	2.8	10.7
T04	6	3	3	3	3	2	2	1	1	2	4	2	32	2.7	11.4
T05	2	3	2	2	2	2	2	1	1	2	3	2	24	2.0	15.2
T06	2	3	2	2	2	2	2	1	1	2	3	2	24	2.0	15.2
T07	2	3	2	1	3	2	2	1	1	2	3	2	24	2.0	15.2
T08	2	3	2	1	2	2	3	1	1	2	3	2	24	2.0	15.2
T09	3	3	2	1	2	2	2	1	1	2	5	2	26	2.2	14.0
T10	2	4	2	2	3	3	2	3	2	3	3	3	32	2.7	11.4
T11	2	4	2	1	3	3	2	1	2	3	2	4	29	2.4	12.6
T12	2	5	2	1	4	3	2	1	1	2	2	2	27	2.3	13.5
T13	2	3	2	1	4	3	4	4	2	3	2	4	34	2.8	10.7
T14	2	3	2	1	2	3	2	1	1	2	1	2	22	1.8	16.6
T15	2	3	2	1	2	3	3	1	1	2	2	2	24	2.0	15.2

6 TOTAL DISCHARGES FOR NE & SE DISTRICTS

0.5 AVERAGE DISCHARGES PER MONTH

12.3 AVER. DAYS BEFORE RETURNING TO SITE

3.8 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	4	2	5	4	3	3	4	3	4	4	4	43	3.6	8.5
D18	2	3	2	3	3	2	2	3	3	3	3	4	33	2.8	11.1
D19	3	3	2	4	5	3	4	4	3	4	4	3	42	3.5	8.7
D20	2	2	2	3	5	3	2	4	4	5	4	3	39	3.3	9.4
D21	2	3	2	2	3	2	1	3	4	4	2	2	30	2.5	12.2
D22	2	3	2	2	3	1	1	3	3	3	2	2	27	2.3	13.5
D23	2	3	2	4	3	2	3	4	2	2	1	2	30	2.5	12.2
D24	4	3	2	2	4	1	1	3	2	2	1	2	27	2.3	13.5
D25	3	3	2	2	3	3	4	4	2	2	1	3	32	2.7	11.4
LOWER DELAWARE LOW LEVEL 33 SEWPC UNITS															
D37	2	3	4	3	3	2	3	3	2	4	3	2	34	2.8	10.7
D38	1	3	2	3	4	3	1	3	2	2	1	2	27	2.3	13.5
D39	5	6	4	5	7	3	3	4	2	2	2	2	45	3.8	8.1
D40	2	3	2	2	1	2	1	3	2	2	1	2	23	1.9	15.9
D41	1	3	2	6	1	1	2	3	2	2	1	2	26	2.2	14.0
D42	1	3	2	2	1	1	1	3	2	2	1	2	21	1.8	17.4
D43	1	3	2	2	1	1	1	3	2	2	1	2	21	1.8	17.4
D44	2	3	2	3	2	2	1	3	2	2	5	3	30	2.5	12.2
D45	9	8	6	8	8	5	5	7	3	6	7	4	76	6.3	4.8
D46	3	4	3	3	3	3	2	3	2	3	1	2	32	2.7	11.4
D47	3	3	3	4	4	5	2	3	2	4	2	2	37	3.1	9.9
D48	3	3	4	6	4	4	3	5	2	4	2	2	42	3.5	8.7
D49	3	3	3	4	2	3	2	5	2	4	3	2	36	3.0	10.1
D50	3	3	3	5	3	9	6	3	2	3	2	2	44	3.7	8.3
D51	2	3	3	4	2	5	1	3	2	3	2	2	32	2.7	11.4
D52	3	3	3	3	2	4	2	3	2	3	2	2	32	2.7	11.4
D53	2	3	2	4	3	3	3	3	2	3	3	2	33	2.8	11.1
D54	2	4	2	4	2	2	2	3	2	3	2	3	31	2.6	11.8
D58	3	4	3	7	3	4	4	4	3	4	3	3	45	3.8	8.1
D61	2	3	1	3	2	3	2	3	2	3	2	2	28	2.3	13.0
D62	2	3	1	2	1	3	2	3	2	3	2	2	26	2.2	14.0
D63	3	11	1	3	2	4	4	4	2	4	2	3	43	3.6	8.5
D64	2	4	1	2	1	1	2	3	1	4	3	2	26	2.2	14.0
D65	2	3	1	2	1	1	2	3	1	3	2	2	23	1.9	15.9
D66	2	3	1	2	1	1	3	3	1	3	2	3	25	2.1	14.6
D67	1	3	2	1	1	2	3	3	1	3	3	3	26	2.2	14.0
D68	1	3	2	4	3	3	3	4	1	3	3	2	32	2.7	11.4
D69	1	3	2	2	3	1	4	1	1	3	3	2	26	2.2	14.0
D70	1	4	3	4	8	4	4	3	1	3	3	2	40	3.3	9.1
D71	1	3	2	2	2	2	3	2	1	3	3	2	26	2.2	14.0
D72	1	4	1	1	1	2	2	2	1	3	3	2	23	1.9	15.9
D73	1	3	2	1	1	1	2	2	1	3	3	2	22	1.8	16.6
D75	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	
TOTAL	221	301	193	264	247	231	236	237	167	241	208	210	2756		
I/D/C	3.6	4.9	3.2	4.3	4.1	3.8	3.9	3.9	2.7	4.0	3.4	3.5			
UP	10	12	11	16	16	11	15	11	12	12	11	16	153	2.6	12.1
UDLL	30	29	20	43	42	24	38	28	31	36	25	27	373	2.6	12.1
LFC	19	24	14	19	12	18	18	15	7	7	11	11	175	2.4	12.5
LFLL	35	44	25	30	24	33	31	27	17	26	23	22	337	2.8	11.2
FHL	33	47	30	22	37	35	32	21	18	32	38	37	382	2.3	13.6
SLL	23	27	18	27	33	20	21	32	26	29	22	25	303	2.8	11.1
LDLL	71	118	75	107	83	90	81	103	56	99	78	72	1033	2.6	12.2

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					2
F10													0
F11													0
F12													0
FRANKFORD HIGH LEVEL 14 NEWPC UNITS													
T01													0
T03													0
T04													0
T05													0
T06													0
T07													0
T08													0
T09											1		1
T10													0
T11													0
T12		1											1
T13							1	1					2
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	1	0	0	0	0	0	0	1	0	0	0	0	2
FHL	0	1	0	0	0	0	1	1	0	0	1	0	4
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
	1	1	0	0	0	0	1	2	0	0	1	0	6
	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	1	0	0	0	0	0	0	1	0	0	0	0	2
FHL	0	1	0	0	0	0	1	1	0	0	1	0	4
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

June 2008 **CSO REGULATING CHAMBER MONTHLY BLOCKS CLEARED** NEWPC & SEWPC PLANT REGULATORS

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
UPPER PENNYPACK 5 NEWPC UNITS													
P01													0
P02													0
P03								2	1	1		1	5
P04			1	1				1					3
P05													0
UPPER DELAWARE LOW LEVEL 12 NEWPC UNITS													
D02													0
D03	1			2			1			1	1	1	7
D04	1								3		1		5
D05													0
D06				1								1	2
D07													0
D08	1							1	1	2	2		7
D09													0
D11										1	1		2
D12													0
D13				1									1
D15			1					2		3		2	8
LOWER FRANKFORD CREEK 6 NEWPC UNITS													
F13	1		1										2
F14									1		1	2	4
F21													0
F23								1		1			2
F24			1										1
F25													0
LOWER FRANKFORD LOW LEVEL 10 NEWPC UNITS													
F03													0
F04													0
F05								1	1				2
F06													0
F07				1					1		1		3
F08													0
F09												1	1
F10													0
F11												1	1
F12													0
FRANKFORD HIGH LEVEL 14 NEWPC UNITS													
T01													0
T03													0
T04													0
T05													0
T06													0
T07													0
T08													0
T09													0
T10						1		1					2
T11													0
T12					1								1
T13					1			1				1	3
T14													0
T15													0

7 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													0
D18													0
D19													0
D20										1			1
D21													0
D22													0
D23	1												1
D24													0
D25													0
LOWER DELAWARE LOW LEVEL 33 SEWPC UNITS													
D37													0
D38													0
D39													0
D40													0
D41		1		1									2
D42													0
D43													0
D44	1	1	1	1	1								5
D45													0
D46	1												1
D47													0
D48	1							1					2
D49								2	2				4
D50													0
D51													0
D52		1		1									2
D53					1								1
D54													0
D58								1					1
D61													0
D62													0
D63									1				1
D64													0
D65													0
D66													0
D67													0
D68													0
D69													0
D70			1										1
D71													0
D72													0
D73													0
D75													0
													TOTAL
	8	3	6	9	4	1	1	14	11	10	7	10	84
UP	0	0	1	1	0	0	0	3	1	1	0	1	8
UDLL	3	0	1	4	0	0	1	3	4	7	5	4	32
LFC	1	0	2	0	0	0	0	1	1	1	1	2	9
LFLL	0	0	0	1	0	0	0	1	2	0	1	2	7
FHL	0	0	0	0	2	1	0	2	0	0	0	1	6
SLL	1	0	0	0	0	0	0	0	0	1	0	0	2
LDLL	3	3	2	3	2	0	0	4	3	0	0	0	20

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL	AVER	DTR
CENTRAL SCHUYLKILL EAST SIDE 18 SWWPC UNITS															
S05	4	6	4	6	5	4	5	5	3	4	4	4	54	4.5	6.8
S06	4	5	4	5	6	4	4	5	3	4	4	4	52	4.3	7.0
S07	4	5	4	5	5	3	6	5	3	4	4	4	52	4.3	7.0
S08	4	4	5	6	3	4	5	5	3	4	4	3	50	4.2	7.3
S09	4	4	5	5	3	4	4	5	3	3	4	4	48	4.0	7.6
S10	4	4	4	5	3	4	4	5	4	5	4	4	50	4.2	7.3
S12	6	5	5	6	5	6	6	6	3	4	5	5	62	5.2	5.9
S12A	6	5	5	5	5	6	6	6	3	4	5	5	61	5.1	6.0
S13	6	4	5	5	4	5	5	6	3	4	5	5	57	4.8	6.4
S15	6	5	5	5	4	5	6	5	2	3	5	4	55	4.6	6.6
S16	3	4	4	4	4	4	5	4	1	3	4	4	44	3.7	8.3
S17	3	4	4	4	3	4	4	4	1	3	4	3	41	3.4	8.9
S18	4	4	4	4	4	4	5	4	1	3	3	3	43	3.6	8.5
S19	4	5	5	5	4	5	5	5	2	3	4	2	49	4.1	7.4
S21	4	4	5	5	4	5	5	5	2	3	4	2	48	4.0	7.6
S23	3	4	4	5	4	5	5	4	1	3	3	1	42	3.5	8.7
S25	3	4	4	4	3	5	4	4	1	3	3	1	39	3.3	9.4
S26	3	4	4	4	3	5	4	4	1	3	3	1	39	3.3	9.4
LOWER SCHUYLKILL EAST SIDE 9 SWWPC UNITS															
S31	4	5	4	7	5	3	4	8	2	5	6	4	57	4.8	6.4
S35	3	4	4	7	4	2	4	7	2	4	5	3	49	4.1	7.4
S36	2	2	1	2	1	1	1	2	2	3	1	1	19	1.6	19.2
S36A	4	6	4	5	4	2	4	5	2	4	4	3	47	3.9	7.8
S37	2	2	1	2	1	1	1	2	2	3	1	1	19	1.6	19.2
S42	7	8	5	6	3	8	9	4	5	6	4	2	67	5.6	5.4
S42A	2	6	4	5	4	6	5	5	2	2	4	3	48	4.0	7.6
S44	1	2	1	2	1	1	1	2	1	2	1	1	16	1.3	22.8
S46	2	4	5	4	3	2	5	3	2	2	3	1	36	3.0	10.1
CENTRAL SCHUYLKILL WEST 9 SWWPC UNITS															
S01	8	10	3	4	5	7	4	4	3	4	7	7	66	5.5	5.5
S02	12	5	3	4	5	5	4	4	5	6	3	5	61	5.1	6.0
S03	4	5	2	5	4	4	5	5	4	5	3	3	49	4.1	7.4
S04	5	7	4	4	5	5	5	5	1	3	3	3	50	4.2	7.3
S11	6	4	4	5	4	4	3	4	1	3	3	2	43	3.6	8.5
S14	5	4	4	5	4	4	4	5	1	3	3	2	44	3.7	8.3
S20	5	3	3	4	5	4	3	4	1	3	3	2	40	3.3	9.1
S22	4	6	5	3	5	4	6	5	2	3	5	4	52	4.3	7.0
S24	4	6	4	3	5	5	5	5	2	3	4	4	50	4.2	7.3
SOUTHWEST MAIN GRAVITY 10 SWWPC UNITS															
S27	4	4	3	4	3	4	3	3	2	3	2	2	37	3.1	9.9
S28	4	4	3	3	3	4	4	3	1	1	3	2	35	2.9	10.4
S30	3	5	4	3	3	4	2	3	1	2	3	2	35	2.9	10.4
S34	3	5	3	3	4	3	3	4	1	2	4	2	37	3.1	9.9
S39	3	5	4	3	3	3	3	2	1	2	3	2	34	2.8	10.7
S40	3	4	3	3	2	3	3	2	1	2	2	2	30	2.5	12.2
S43	3	3	3	3	2	3	4	3	1	2	4	1	32	2.7	11.4
S47	3	3	3	3	2	3	4	3	1	2	4	1	32	2.7	11.4
S50	9	13	5	11	14	16	11	14	4	9	12	10	128	10.7	2.9
S51	7	13	5	8	12	13	10	12	3	8	8	10	109	9.1	3.3
LOWER SCHUYLKILL WEST SIDE 4 SWWPC UNITS															
S32	5	6	5	7	6	5	5	9	3	7	7	8	73	6.1	5.0
S33	5	6	5	7	7	5	5	9	3	6	9	10	77	6.4	4.7
S38	4	6	4	5	6	5	5	8	2	5	6	9	65	5.4	5.6
S45	3	4	4	6	6	5	4	7	2	5	7	4	57	4.8	6.4

9 TOTAL DISCHARGES IN SW DISTRICT DTR = DAYS TO RETURN TO SITE

0.8 AVERAGE DISCHARGES PER MONTH I/D/C = INSPECTIONS PER DAY PER CREW

8.8 AVER. DAYS BEFORE RETURNING TO SITE I/D = INSPECTIONS PER DISCHARGE

3.5 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	4	4	4	2	4	3	5	5	2	3	3	3	42	3.5	8.7
C02	4	4	4	2	4	3	4	5	2	3	3	4	42	3.5	8.7
C04	4	4	5	3	4	3	4	5	1	2	3	3	41	3.4	8.9
C04A	4	4	4	3	4	4	4	5	1	2	3	3	41	3.4	8.9
C05	4	4	5	2	4	4	3	4	1	2	4	3	40	3.3	9.1
C06	4	5	6	4	5	4	4	4	2	3	4	4	49	4.1	7.4
C07	3	4	3	3	4	3	3	4	1	2	3	3	36	3.0	10.1
C09	3	4	5	3	5	5	5	4	2	3	4	2	45	3.8	8.1
C10	3	4	4	2	4	2	3	4	1	2	3	5	37	3.1	9.9
C11	3	4	3	2	4	2	3	4	1	2	3	3	34	2.8	10.7
C12	3	4	4	2	4	2	3	4	1	2	3	3	35	2.9	10.4
C13	2	4	4	2	4	2	3	4	1	1	3	2	32	2.7	11.4
C14	6	4	4	3	4	4	4	5	2	3	3	4	46	3.8	7.9
C15	3	4	4	4	4	3	4	5	3	4	3	4	45	3.8	8.1
C16	3	4	4	4	4	3	4	5	3	4	3	5	46	3.8	7.9
C17	3	4	4	3	4	3	4	3	2	3	3	4	40	3.3	9.1
C31	4	4	4	4	4	6	4	6	2	5	3	4	50	4.2	7.3
C32	4	4	4	3	4	3	4	6	2	4	3	4	45	3.8	8.1
C33	4	4	4	4	4	6	4	7	2	3	3	5	50	4.2	7.3
C34	4	4	4	3	4	4	4	6	2	3	4	4	46	3.8	7.9
C35	4	4	4	3	4	4	4	4	2	2	3	5	43	3.6	8.5
C36	4	4	4	3	4	4	4	4	2	2	3	6	44	3.7	8.3
C37	4	4	4	3	4	3	4	5	1	2	4	4	42	3.5	8.7
COBBS CREEK LOW LEVEL 13 SWWPC UNITS															
C18	3	4	3	3	4	3	4	4	1	2	3	3	37	3.1	9.9
C19	2	4	3	3	3	4	4	3	1	2	3	2	34	2.8	10.7
C20	2	4	3	3	3	3	4	5	1	2	3	3	36	3.0	10.1
C21	2	4	3	4	3	3	4	4	1	2	3	2	35	2.9	10.4
C22	2	4	3	3	3	2	4	3	1	2	2	2	31	2.6	11.8
C23	2	5	2	3	3	2	3	3	2	3	2	3	33	2.8	11.1
C24	2	6	2	3	3	2	3	3	1	2	3	3	33	2.8	11.1
C25	3	6	4	3	4	3	5	3	2	3	3	4	43	3.6	8.5
C26	2	5	2	3	2	1	3	3	1	2	3	2	29	2.4	12.6
C27	3	5	4	3	3	2	4	3	2	3	3	3	38	3.2	9.6
C28A	2	4	2	2	2	1	3	3	1	3	2	2	27	2.3	13.5
C29	1	3	2	2	2	1	3	3	2	4	2	2	27	2.3	13.5
C30	1	4	2	2	2	1	3	3	2	4	2	2	28	2.3	13.0
TOTAL	325	401	325	338	344	334	362	399	163	279	317	295	3882		
I /D/C	3.6	4.4	3.6	3.7	3.8	3.7	4.0	4.4	1.8	3.1	3.5	3.2			
CSES	75	80	80	88	72	82	88	87	40	63	72	59	886	4.1	7.6
LSES	27	39	29	40	26	26	34	38	20	31	29	19	358	3.3	11.8
CSW	53	50	32	37	42	42	39	41	20	33	34	32	455	4.2	7.4
SWMG	42	59	36	44	48	56	47	49	16	33	45	34	509	4.2	9.2
LSW	17	22	18	25	25	20	19	33	10	23	29	31	272	5.7	5.4
CCHL	84	93	95	67	94	80	88	108	39	62	74	87	971	3.5	8.8
CCLL	27	58	35	37	37	28	47	43	18	34	34	33	431	2.8	11.2

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													0
S42A													0
S44													0
S46													0
CENTRAL SCHUYLKILL WEST 9 SWWPC UNITS													
S01											1	1	2
S02									1				1
S03									1				1
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	1												1
C15													0
C16							1			1			2
C17													0
C31													0
C32													0
C33													0
C34													0
C35													0
C36													0
C37											1		1
COBBS CREEK LOW LEVEL 13 SWWPC UNITS													
C18													0
C19													0
C20													0
C21													0
C22													0
C23													0
C24													0
C25												1	1
C26													0
C27													0
C28A													0
C29													0
C30													0
													TOTAL DISC
	1	0	0	0	0	0	1	0	2	1	2	2	9

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	0	0	0	0	0	0	0	0
CSW	0	0	0	0	0	0	0	0	2	0	1	1	4
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	1	0	0	0	0	0	1	0	0	1	1	0	4
CCLL	0	0	0	0	0	0	0	0	0	0	0	1	1

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	0	0	0	0	0	0	0	0
CSW	0	0	0	0	0	0	0	0	2	0	1	1	4
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	1	0	0	0	0	0	1	0	0	1	1	0	4
CCLL	0	0	0	0	0	0	0	0	0	0	0	1	1

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
CENTRAL SCHUYLKILL EAST SIDE 18 SWWPC UNITS													
S05												1	1
S06											1		1
S07				1			1				2	1	5
S08			1	1						1		1	4
S09										1		1	2
S10													0
S12				1								1	2
S12A												1	1
S13	1	1											2
S15													0
S16										1			1
S17													0
S18			1										1
S19		1					1						2
S21						1							1
S23								1		2			3
S25											1		1
S26										1		1	2
LOWER SCHUYLKILL EAST SIDE 9 SWWPC UNITS													
S31				1		1		2	1	1			6
S35													0
S36	1				1	1	1		1			1	6
S36A			1						2				3
S37													0
S42									1				1
S42A		2						1	1		2	1	7
S44													0
S46	1						2						3
CENTRAL SCHUYLKILL WEST 9 SWWPC UNITS													
S01													0
S02	3								2			1	6
S03				1									1
S04									1				1
S11													0
S14									1				1
S20													0
S22											1		1
S24										1			1
SOUTHWEST MAIN GRAVITY 10 SWWPC UNITS													
S27													0
S28									1		1		2
S30			1								1	1	3
S34												1	1
S39	1	1	2										4
S40													0
S43													0
S47										1			1
S50	1			3		1	1	1	1	1	1	1	11
S51	3	4											7
LOWER SCHUYLKILL WEST SIDE 4 SWWPC UNITS													
S32	2		1	3					2		1		9
S33		1		2				1	2	1	3	2	12
S38		1	1				1		1	1	2	5	12
S45			1					1	3	2	2	3	12

16 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													0
C04			1						2		2		5
C04A													0
C05										1			1
C06										1	1		2
C07													0
C09								2	1				3
C10								2	1				3
C11								1	1				2
C12									1				1
C13													0
C14			1	1		2	1					1	6
C15													0
C16													0
C17													0
C31													0
C32													0
C33								1	2	1			4
C34					1			1	1				3
C35								1	2				3
C36							1						1
C37											1		1
COBBS CREEK LOW LEVEL 13 SWWPC UNITS													
C18													0
C19								1					1
C20								1			1		2
C21													0
C22								1					1
C23									1				1
C24		1						2	1		1		5
C25					1	1	1	1		1			5
C26								1					1
C27										1			1
C28A													0
C29													0
C30													0
													TOTAL
	13	12	11	14	3	7	10	22	33	19	24	24	192

CSE	1	2	2	3	0	1	2	1	0	6	4	7	29
LSE	2	2	1	1	1	2	3	3	6	1	2	2	26
CSW	3	0	0	1	0	0	0	0	4	1	1	1	11
SWG	5	5	3	3	0	1	1	1	2	2	3	3	29
LSW	2	2	3	5	0	0	1	2	8	4	8	10	45
CCHL	0	0	2	1	1	2	2	8	11	3	4	1	35
CCLL	0	1	0	0	1	1	1	7	2	2	2	0	17

June 2008 **RELIEF SEWER MONTHLY INSPECTION**

SITE	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
THOMAS RUN RELIEF SEWER													
R01	3	3	2	4	3	4	4	6	3	4	4	5	45
R02	3	3	2	4	3	4	4	6	3	4	4	5	45
R03	3	3	2	4	3	4	4	6	3	4	4	5	45
R04	3	3	2	4	3	4	4	4	3	4	4	5	43
R05	3	3	2	4	3	4	4	4	3	4	3	5	42
R06	3	3	2	4	3	4	4	4	3	4	3	3	40
MAIN RELIEF SEWER													
R07	1	4	1	3	1	3	5	5	4	5	5	3	40
R08	1	4	1	4	1	3	5	5	4	5	4	3	40
R09	1	3	1	4	1	3	5	5	4	5	4	4	40
R10	1	2	1	4	1	3	4	5	4	5	4	3	37
R11	1	2	2	2	2	3	3	4	3	5	4	3	34
R11A	1	3	1	1	2	3	3	4	3	5	4	2	32
R12	1	2	1	1	1	1	3	4	3	5	4	2	28
WAKLING RELIEF SEWER													
R13	1	2	1	1	1	2	3	4	2	3	2	2	24
R14	1	2	2	2	1	2	2	4	2	3	2	2	25
ROCK RUN STORM FLOOD RELIEF SEWER													
R15	1	3	2	2	1	2	2	6	2	3	3	3	30
OREGON AVE RELIEF SEWER													
R16	1	3	1	1	1	1	2	2	1	2	1	2	18
R17	1	3	1	1	1	1	2	2	1	2	1	2	18
FRANKFORD HIGH LEVEL RELIEF SEWER													
R18	2	4	2	2	2	1	4	7	2	3	3	3	35
32ND ST RELIEF SEWER													
R19	1	2	1	2	1	2	4	5	2	3	2	3	28
MAIN STREET RELIEF SEWER													
R20	1	2	2	2	1	2	4	5	2	3	2	2	28
SOMERSET SYSTEM DIVERSION CHAMBER													
R21	1	0	0	0	0	0	0	0	0	0	0	0	1
TEMPORARY REGULATOR CHAMBER													
R22													
R23	1	3	2	2	1	2	2	5	2	3	2	3	28
ARCH ST RELIEF SEWER													
R24	3	4	2	2	2	3	3	5	2	4	3	3	36
16TH & SNYDER													
R25	3	4	1	4	2	2	3	4	4	6	2	3	38
GRANT & STATE RD. RELIEF													
R26	1	2	2	1	1	1	2	4	2	3	2	3	24
TOTAL	43	72	39	65	42	64	85	115	67	97	76	79	844
AVER	1.6	2.7	1.4	2.4	1.6	2.4	3.1	4.3	2.5	3.6	2.8	2.9	2.6

RELIEF SEWER MONTHLY DISCHARGE

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	0	0	0	0	1	0	0	0	1
UNITS	0	0	0	0	0	0	0	0	1	0	0	0	

June 2008 **RELIEF SEWER MONTHLY BLOCKS CLEARED**

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			1			1							2
16TH & SNYDER													
R25													0
GRANT & STATE RD. RELIEF													
R26													0
TOTAL	0	0	1	0	0	1	0	0	0	0	0	0	2
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

FY2008 CSO Dry Weather Discharges

Discharge Observed		Discharge Stopped		Last Inspection						
DateDO	TimeDO	DateDS	TimeDS	DateLI	TimeLI	SiteID	Collector	TypeUnit	Location	Comment
07/06/07	10:40 AM	07/06/07	11:20 AM	06/27/06	01:10 PM	C-14	CCHL	SLOT	Baltimore Ave. & Cobbs Creek	LOG AND DEBRIS IN SLOT BLOCKED OPENING TO DWO.
07/27/07	09:20 AM	07/27/07	10:30 AM	07/23/07	02:20 PM	F-09	LFLL	WH-S	Frankford Ave. N or Frankford Creek	ANTI-FREEZE BOTTLE AND 2 PIECES OF PLYWOOD BLOCKING MOUTH OF SHUTTER GATE.
08/17/07	11:00 AM	08/17/07	12:30 PM	06/26/07	01:30 PM	T-12	FHL	SLOT	Whitaker Ave. E of Tacony Creek	GRIT AND TRASH IN SLOT MOUTH.
01/03/08	12:00 PM	01/03/08	01:00 PM	12/20/07	09:50 AM	T-13	FHL	SLOT	Whitaker Ave. W of Tacony Creek	DEBRIS, STICKS AND RAGS IN SLOT BLOCKING MOUTH OF DWO PIPE.
01/23/08	01:30 PM	01/23/08	02:20 PM	01/15/08	09:40 PM	C-16	CCHL	SLOT	Thomas Ave. & Cobbs Creek	WOOD IN SLOT BLOCKING DWO PIPE.
02/09/08	08:20 AM	02/09/08	11:30 AM	01/22/08	02:10 PM	F-09	LFLL	WH-S	Frankford Ave. N or Frankford Creek	WOOD AND TRASH BLOCKING DWO PIPE.
02/12/08	12:30 PM	02/12/08	02:30 PM	01/25/08	09:10 AM	T-13	FHL	SLOT	Whitaker Ave. W of Tacony Creek	GRIT, STICKS AND MOPHEAD IN SLOT BLOCKING DWO PIPE.
03/14/08	10:10 AM	03/14/08	04:00 PM	03/11/08	10:20 AM	S-03	CSW	SLOT	Spring Garden St. W of Schuylkill Exp.	SLOT BOX FULL OF GRIT AND DEBRIS.
03/15/08	07:00 AM	03/15/08	01:20 PM	03/14/08	09:40 AM	S-02	CSW	B & B	Haverford Ave. & West River Dr.	ROCKS, GRIT AND DEBRIS BLOCKING REGULATOR INLET.
03/24/08	10:00 AM	03/24/08	02:00 PM	03/19/08	10:10 AM	R-01		DAM	56th St. & Locust St.	DWO PIPE BLOCKED WITH ROCKS AND DEBRIS.
04/15/08	10:30 AM	04/15/08	11:20 AM	04/07/08	01:40 PM	C-16	CCHL	SLOT	Thomas Ave. & Cobbs Creek	DEBRIS BLOCKING DWO PIPE.
05/01/08	11:40 AM	05/01/08	02:00 PM	04/22/08	02:00 PM	C-37	CCHL	SLOT	Cobbs Creek Park S of 67th St & Callowhill St.	WOOD AND BRICKS BLOCKING DWO. BLOCKAGE WAS CAUSED BY MANHOLE BEING DISLODGED.
05/14/08	11:50 AM	05/14/08	01:30 PM	04/29/08	10:00 AM	T-09	FHL	SLOT	Roosevelt Blvd. W of Tacony Creek	DEBRIS IN DWO PIPE.
05/23/08	09:30 AM	05/23/08	10:50 AM	05/15/08	01:40 PM	S-01	CSW	B & B	Mantua Ave. & West River Dr.	SHUTTERGATE STUCK IN CLOSED POSITION.
06/05/08	11:30 AM	06/05/08	02:20 PM	05/29/08	10:20 AM	S-01	CSW	B & B	Mantua Ave. & West River Dr.	SHUTTERGATE STUCK IN CLOSED POSITION. DEBRIS REMOVED FROM CHAMBER AND WEIGHTS WERE ADJUSTED.
06/16/08	11:10 AM	06/16/08	12:10 PM	05/19/08	12:50 PM	C-25	CCLL	SLOT	Woodland Ave. E of Island Ave.	DEBRIS IN SLOT.

Collector System - Flow Control Unit - Miscellaneous Major Maintenance - 2002 TO 2006

SOMERSET GRIT CHAMBER - GRIT REMOVAL REMOVAL

DATE	TONS
2/21/2007	66.61
5/15/2007	54.5
8/2/2007	54
10/23/2007	74.4
1/8/2008	35.55
3/10/2008	49.47
6/5/2008	48.61

CSO B&B REGULATOR PREVENTATIVE MAINTENANCE

SITE	DATE
D-63	1/20/2007
S-45	1/20/2007
D-41	1/29/2007
S-47	2/27/2007
D-69	3/10/2007
S-46	3/10/2007
S-15	4/3/2007
S-23	4/3/2007
S-33	4/19/2007
S-08	4/20/2007
S-1	5/5/2007
S-50	5/8/2007
S-31	6/5/2007
D-45	6/16/2007
D-53	6/20/2007
S-50	7/2/2007
D-17	7/2/2007
D-04	7/2/2007
S-22	7/2/2007
S-15	7/14/2007
S-45	7/16/2007
S-46	7/16/2007
D-63	8/4/2007
S-42	8/14/2007
S-8	9/15/2007
S-9	9/15/2007
D-69	9/22/2007
D-51	9/24/2007
S-50	10/15/2007
D-17	10/17/2007
S-34	10/17/2007
S-46	10/17/2007
S-47	10/18/2007
S-38	11/5/2007
S-45	11/5/2007
D-49	11/7/2007
S-43	11/7/2007
D-61	11/8/2007
D-18	11/27/2007
S-05	11/27/2007
S-06	11/27/2007
S-42A	11/27/2007
S-36A	11/28/2007
S-07	11/28/2007
D-19	11/28/2007
S-16	11/29/2007
S-18	11/29/2007
D-20	11/29/2007
D-37	11/29/2007
S-24	12/8/2007
S-25	12/11/2007
D-67	12/11/2007
D-68	12/11/2007
S-23	12/12/2007
S-26	12/12/2007
D-72	12/12/2007
D-38	12/12/2007
D-39	12/12/2007
S-19	12/13/2007
S-14	12/13/2007
D-44	12/17/2007
D-48	12/17/2007
D-49	12/17/2007
S-04	12/18/2007
S-42	1/26/2008
S-33	1/28/2008
S-50	1/28/2008
S-45	1/30/2008
S-42A	3/4/2008
S-46	3/5/2008
D-44	3/6/2008
S-1	3/18/2008
D-20	4/2/2008
D-73	4/12/2008
S-31	4/23/2008
D-71	5/13/2008
D-19	5/14/2008
F-!4	6/19/2008
S-22	6/24/2008
S-24	6/24/2008
D-68	6/26/2008

CSO TIDE GATE PREVENTATIVE MAINTENANCE

SITE	DATE
F-09	5/5/2007
D-63	8/4/2007
F-13	8/14/2007
S-42	8/14/2007
S-09	9/15/2007
S-42	1/26/2008
S-31	4/23/2008

COMPUTER CONTROL CHAMBER PREVENTATIVE MAINTENANCE

SITE	DATE
D-02	1/2/2007
D-03	1/3/2007
D-05	1/3/2007
D-07	1/5/2007
D-09	1/5/2007
D-11	1/5/2007
D-15	1/9/2007
F-25	1/9/2007
D-02	2/1/2007
D-03	2/1/2007
D-05	2/2/2007
D-07	2/2/2007
D-09	2/2/2007
D-11	2/5/2007
D-15	2/7/2007
F-25	2/7/2007
D-02	3/5/2007
D-03	3/5/2007
D-05	3/12/2007
D-07	3/13/2007
D-11	3/14/2007
D-09	3/15/2007
D-15	3/15/2007
F-25	3/15/2007
D-02	4/2/2007
D-03	4/2/2007
D-07	4/3/2007
D-15	4/3/2007
D-05	4/10/2007
D-09	4/10/2007
D-11	4/11/2007
F-25	4/11/2007
D-02	5/7/2007
D-03	5/7/2007
D-07	5/7/2007
D-09	5/7/2007
D-11	5/7/2007
D-15	5/7/2007
D-05	5/11/2007
F-25	5/14/2007
D-15	6/1/2007
D-11	6/6/2007
D-02	6/11/2007
D-03	6/11/2007
D-05	6/12/2007
D-07	6/12/2007
D-09	6/14/2007
F-25	6/14/2007
D-03	7/5/2007
D-05	7/6/2007
D-09	7/6/2007
D-07	7/10/2007
D-11	7/10/2007
D-15	7/10/2007
F-25	7/10/2007
D-02	9/5/2007
D-03	9/5/2007
D-05	9/6/2007
D-07	9/7/2007
D-09	9/7/2007
D-11	9/11/2007
D-15	9/11/2007
D-02	10/4/2007
D-03	10/4/2007
D-15	10/5/2007
D-05	10/11/2007
D-09	10/11/2007
D-11	10/11/2007
D-07	10/12/2007
F-25	10/30/2007
D-02	11/5/2007
D-03	11/5/2007
D-15	11/6/2007
D-05	11/7/2007
D-07	11/7/2007
D-09	11/7/2007
F-25	11/9/2007
D-11	11/11/2007
D-02	12/3/2007
D-03	12/3/2007
D-05	12/3/2007
D-07	12/4/2007
D-09	12/4/2007
D-11	12/4/2007
F-25	12/5/2007
D-15	12/7/2007
D-02	1/14/2008
D-03	1/14/2008
D-05	1/14/2008
D-07	1/16/2008
D-09	1/16/2008
D-11	1/16/2008
D-15	1/17/2008
F-25	1/17/2008
D-02	2/14/2008
D-03	2/14/2008
D-05	2/14/2008
D-07	2/19/2008
D-09	2/19/2008
D-11	2/19/2008
D-15	2/20/2008
F-25	2/20/2008
D-03	3/10/2008
D-05	3/10/2008
D-07	3/10/2008
D-02	3/12/2008
D-09	3/12/2008
D-11	3/12/2008
D-15	3/12/2008
F-25	3/12/2008
D-02	4/21/2008
D-03	4/21/2008
D-05	4/21/2008
D-07	4/22/2008
D-09	4/22/2008
D-11	4/22/2008
D-15	4/23/2008
F-25	4/23/2008
D-05	5/13/2008
D-07	5/13/2008
D-09	5/13/2008
D-02	5/14/2008
D-15	5/14/2008
D-03	5/15/2008
D-11	5/15/2008
F-25	5/15/2008
D-02	6/17/2008
D-03	6/17/2008
D-05	6/17/2008
D-07	6/18/2008
D-09	6/18/2008
D-11	6/18/2008
D-15	6/19/2008
F-25	6/19/2008

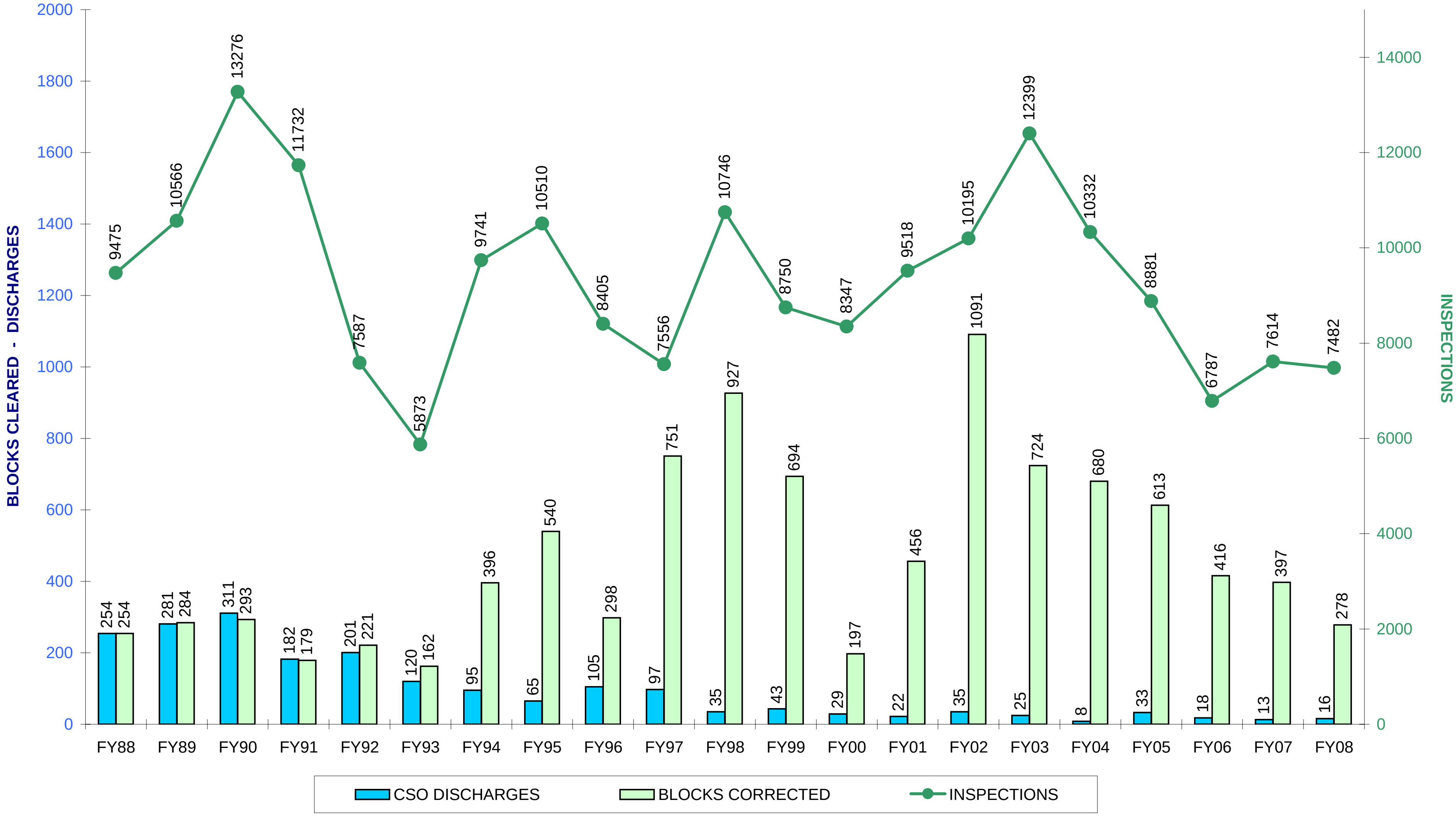
CSO OUTFALL - DEBRIS GRILL PREVENTATIVE MAINTENANCE

SITE	DATE
F-05	1/10/2007
Sandy Run	1/11/2007
F-04	1/31/2007
T-08	2/9/2007
F-05	2/21/2007
F-05	2/28/2007
D-5	3/3/2007
F-05	3/6/2007
F-05	3/22/2007
T-08	3/27/2007
T-08	4/3/2007
F-05	4/10/2007
Sandy Run	4/17/2007
F-05	4/24/2007
T-08	4/26/2007
T-08	5/10/2007
F-05	5/25/2007
D25	5/26/2007
F-05	6/8/2007
Sandy Run	6/12/2007
T-08	6/28/2007
Sandy Run	6/28/2007
F-05	7/6/2007
D-24	7/7/2007
T-08	7/12/2007
Sandy Run	7/12/2007
F-05	7/23/2007
D-65	7/23/2007
T-08	7/24/2007
F-4	8/4/2007
F-05	8/6/2007
T-08	8/8/2007
Sandy Run	8/10/2007
F-05	8/15/2007
T-08	8/17/2007
F-04	8/24/2007
D-63	8/25/2007
T-08	8/28/2007
F-05	8/31/2007
F-05	9/10/2007
Sandy Run	9/14/2007
F-05	9/25/2007
F-04	9/25/2007
T-08	9/27/2007
T-08	10/11/2007
F-25	10/13/2007
F-05	10/18/2007
F-05	10/25/2007
F-05	11/6/2007
T-08	11/8/2007
Sandy Run	11/14/2007
F-05	11/21/2007
T-08	11/26/2007
Sandy Run	11/27/2007
F-4	11/27/2007
F-05	12/6/2007
T-08	12/10/2007
F-05	12/17/2007
F-04	12/17/2007
T-08	12/19/2007
Sandy Run	12/20/2007
F-04	12/28/2007
F-05	1/8/2008
T-08	1/11/2008
F-05	1/22/2008
T-08	1/24/2008
F-05	1/26/2008
T-08	1/26/2008
Sandy Run	1/26/2008
F-05	1/30/2008
F-05	2/14/2008
T-08	2/20/2008
Sandy Run	3/13/2008
T-08	3/19/2008
F-05	3/27/2008
F-05	4/8/2008
T-08	4/11/2008
F-05	4/16/2008
Sandy Run	4/21/2008
T-08	4/29/2008
F-05	5/12/2008
Sandy Run	5/19/2008
F-05	6/6/2008
T-08	6/11/2008
F-05	6/20/2008

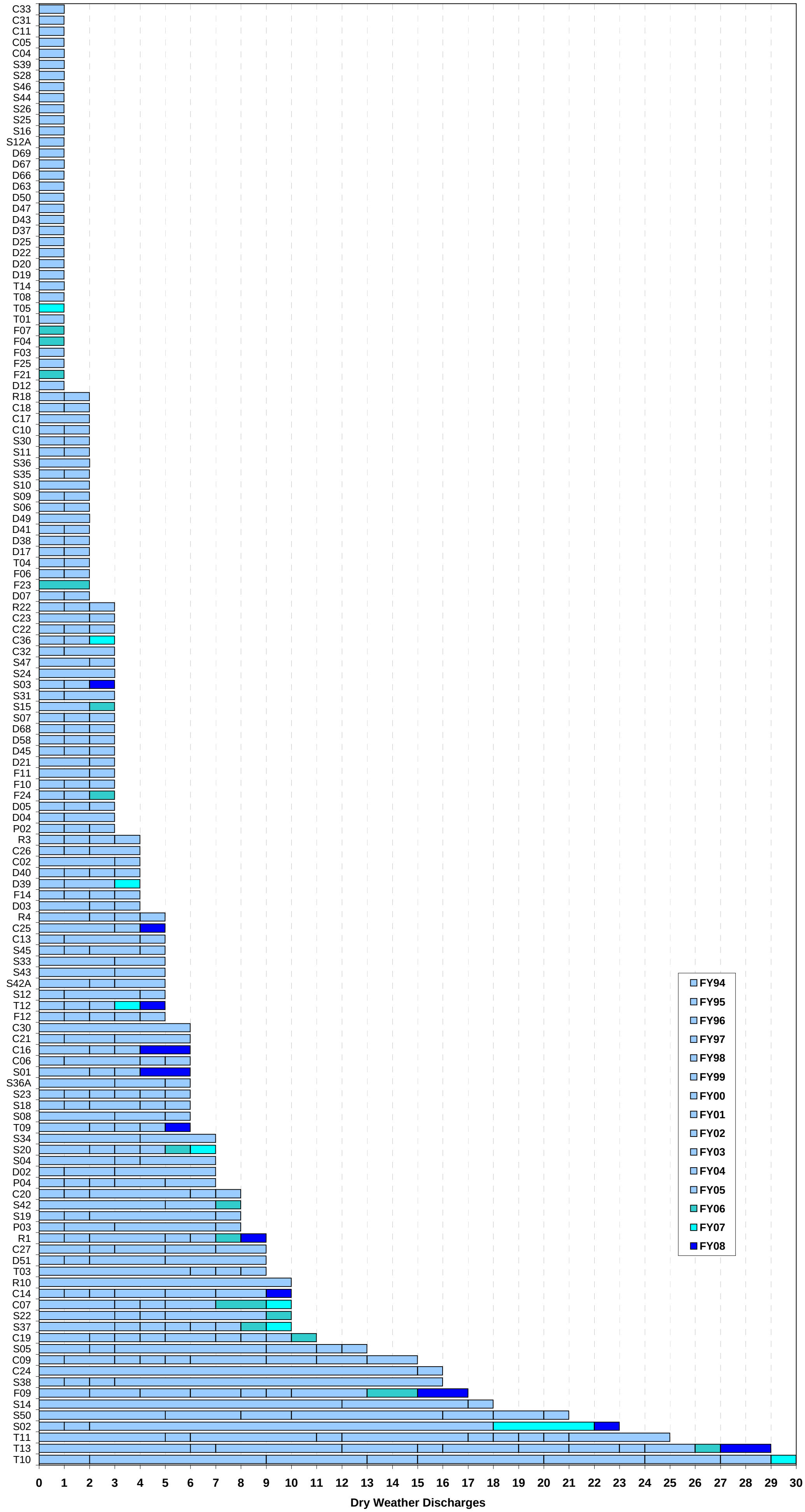
T-04 DEBRIS NET FLOATABLES REMOVAL

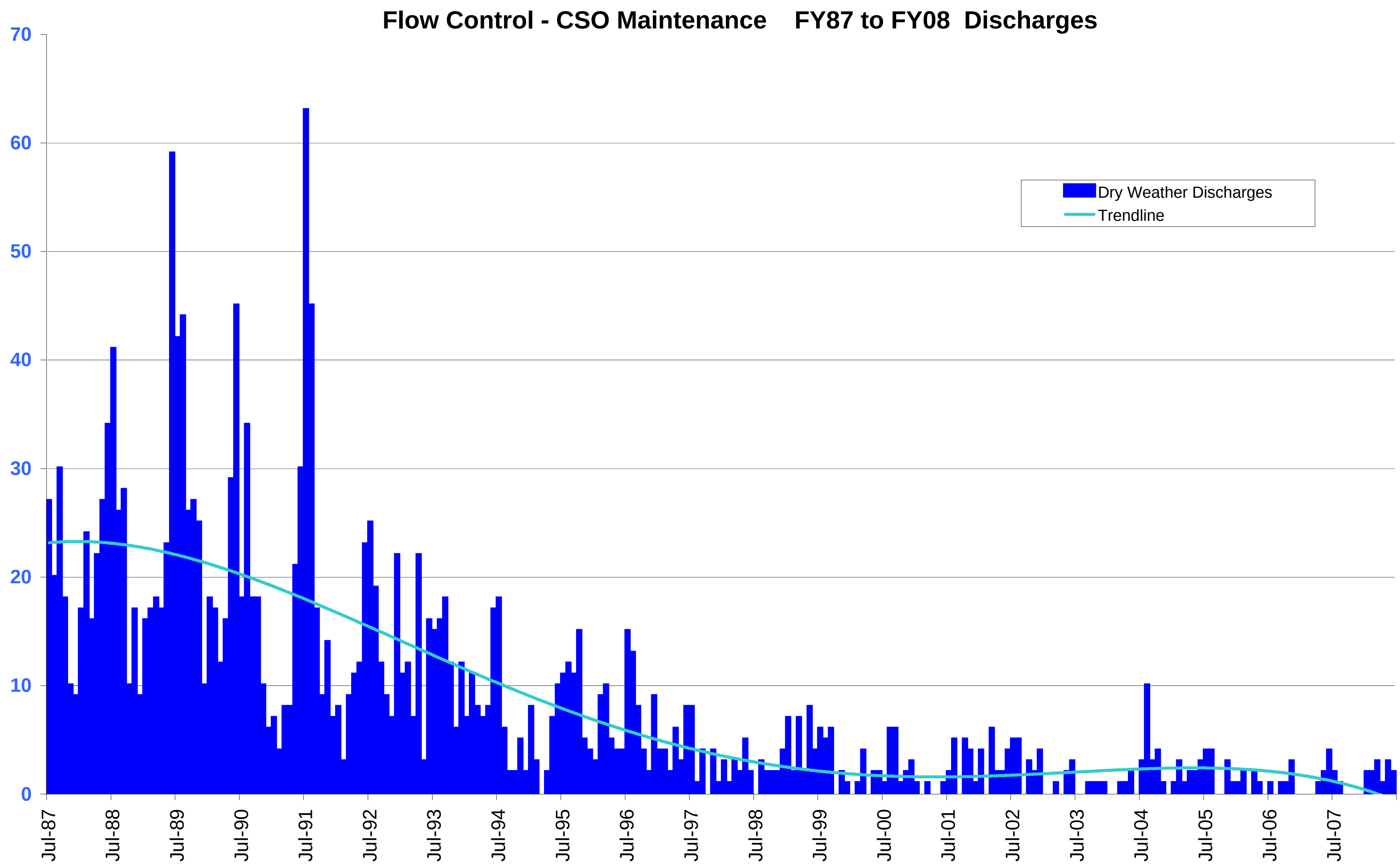
DATE	TOTAL WEIGHT
1/18/2007	70
3/9/2007	80
5/1/2007	50
5/31/2007	
7/26/2007	35
9/14/2007	45
10/30/2007	100
11/29/2007	70
3/19/2008	
5/30/2008	108

FISCAL YEAR 2008 - ANNUAL REPORT
FLOW CONTROL UNIT - CSO BLOCKAGES - DISCHARGES - INSPECTIONS



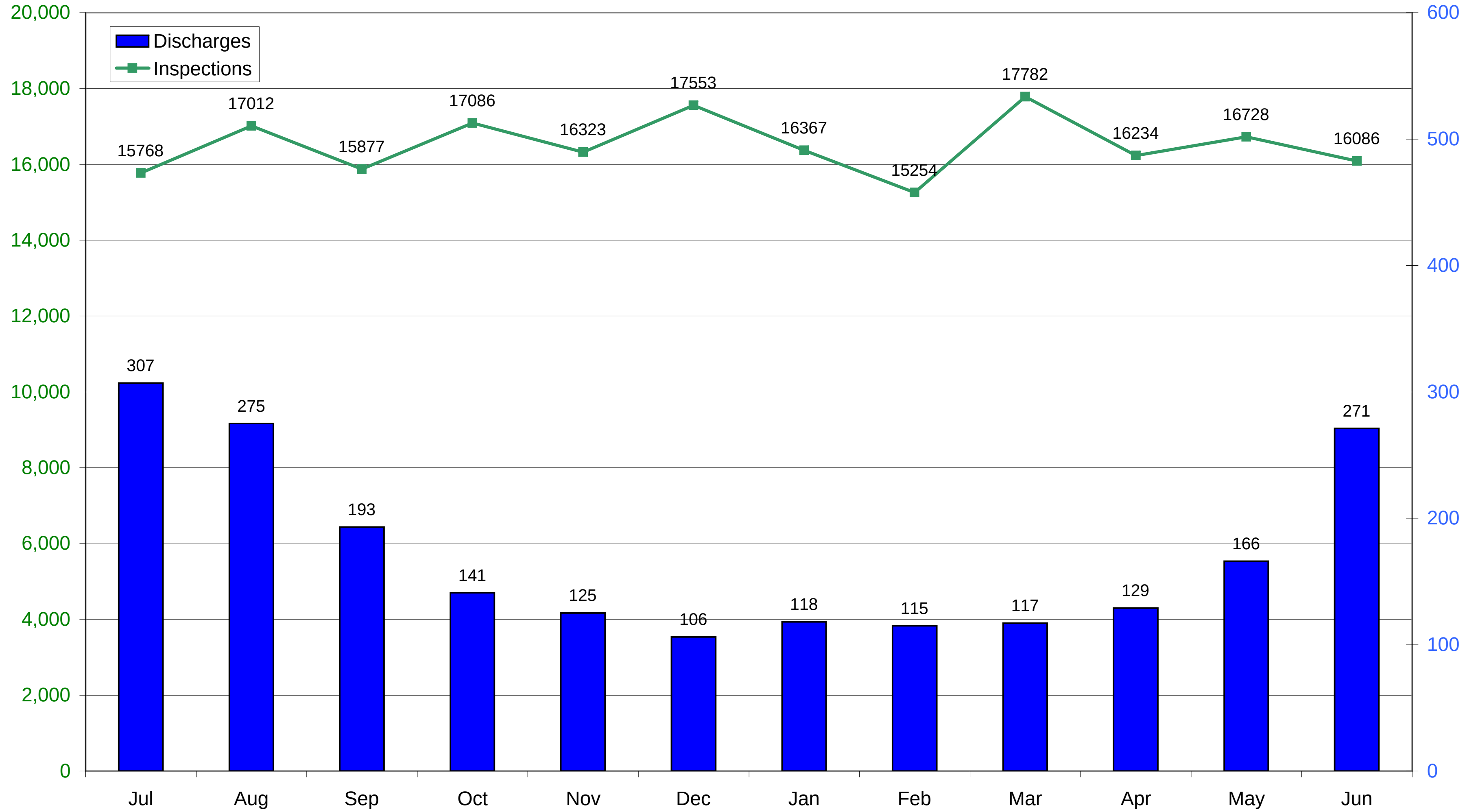
PWD FLOW CONTROL - CSO DISCHARGE HISTORY - FISCAL YEAR 1994 TO 2008





Flow Control - CSO Maintenance FY87 to FY08 Discharges
70
60
50
40
30
20
10
0
Dry Weather Discharges
Trendline
Jul-87
Jul-88
Jul-89
Jul-90
Jul-91
Jul-92
Jul-93
Jul-94
Jul-95
Jul-96
Jul-97
Jul-98
Jul-99
Jul-00
Jul-01
Jul-02
Jul-03
Jul-04
Jul-05
Jul-06
Jul-07

Flow Control - CSO Maintenance   FY87 to FY08 Inspections / Discharges By Month



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Appendix B
CSO Long Term Control Plan History and Background

THE CSO LONG TERM CONTROL PLAN

GREEN CITIES
CLEAN WATERS

History and Background

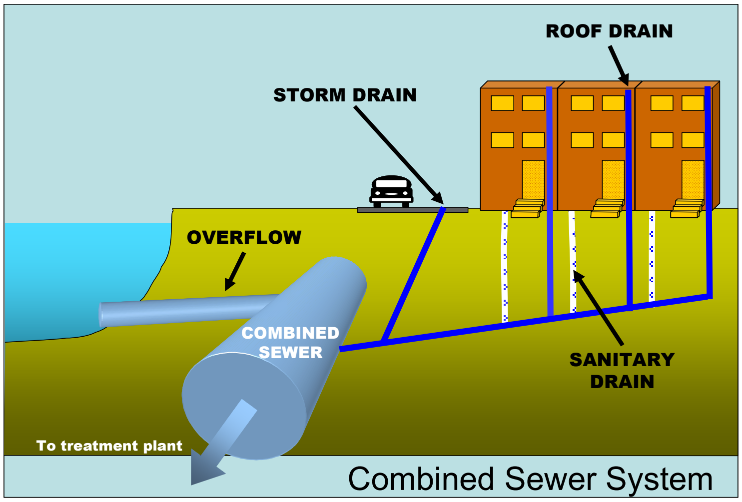
The City of Philadelphia

INTRODUCTION

Philadelphia is blessed with an abundance of creeks, open space, parkland and beautiful rivers. The Schuylkill and Delaware Rivers are not only scenic; they are the drinking water source for Philadelphia residents. These waterways, however, suffer from pollution from various sources, both within and outside the City limits. One such pollution source: Combined Sewer Overflows (CSOs)*.

What are Combined Sewer Overflows?

A combined sewer system is a wastewater collection system owned by a municipality which transports wastewater* from homes, businesses and industry, stormwater* from storm drains on our city streets and property roof leaders through a single-pipe system to a Water Pollution Control Plant (WPCP).

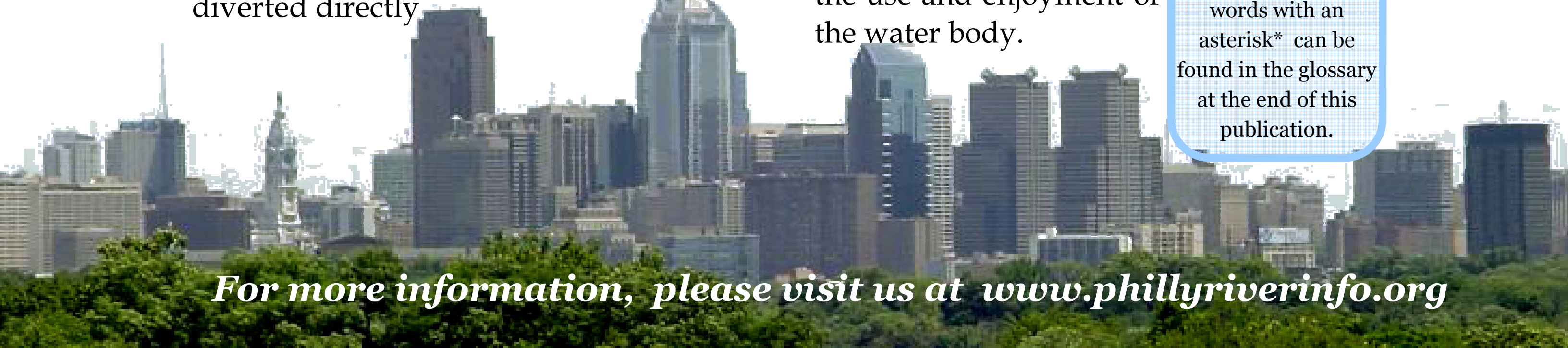


Combined Sewer System

In the City of Philadelphia, during dry weather conditions (when it is not raining) and during very small storm events, combined sewers* can adequately transport this mixture of sanitary wastewater and stormwater to one of the City's three WPCPs for treatment.

Under heavier rainfall conditions, however, the flow in combined sewers may exceed the capacity of the pipe or treatment facility. As a result, a portion of the wastewater and stormwater may be diverted directly to a nearby stream or river to prevent the flooding of homes and streets. This is what is known as a Combined Sewer Overflow (CSO). During heavy rainfalls or sudden snowmelts, Philadelphia may experience these overflows in various locations throughout the city from any of its 164 permitted combined sewer outfalls. Overflows from combined sewers may exceed water quality standards (WQS)*, threaten aquatic life and habitat, and impair the use and enjoyment of the water body.

The definitions of words with an asterisk* can be found in the glossary at the end of this publication.

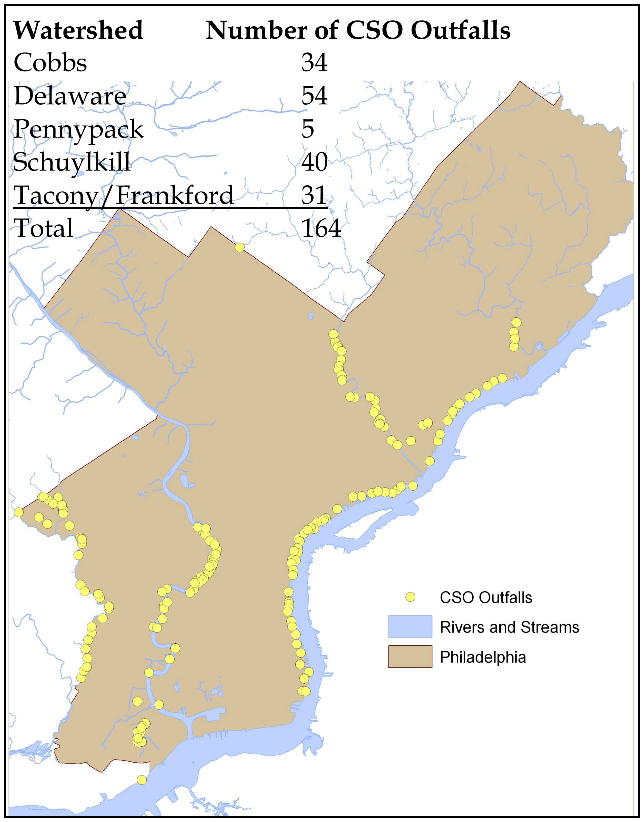


THE CSO LONG TERM CONTROL PLAN

History and Background

Fact Sheet #1

Watershed	Number of CSO Outfalls
Cobbs	34
Delaware	54
Pennypack	5
Schuylkill	40
Tacony/Frankford	31
Total	164



CSO outfalls in the City of Philadelphia

What is the Combined Sewer Overflow Program?

The fundamental goal of the Philadelphia Water Department's (PWD) combined sewer overflow program is to improve and preserve the water environment in the Philadelphia area and to fulfill the PWD's obligations under the Clean Water Act and the Pennsylvania Clean Streams Law by implementing technically viable, cost-effective improvements and operational changes.

The PWD's strategy to attain these goals has three primary phases: the first involves the aggressive implementation of a comprehensive program for Nine Minimum Controls (NMCs); second, planning, design and construction of numerous capital projects that would further enhance system performance and reduce CSO volume and frequency. The third involves the commitment of significant dollars for services and resources toward comprehensive watershed based planning and analyses that would identify additional priority actions to further improve water quality in Philadelphia area water bodies.

These three phases successively provide comprehensive programs that follow the direction of the EPA CSO Policy and its guidance documents and are consistent with the requirements of the Clean Water Act. The NMCs and the capital improvement program have resulted in implementation of cost-effective, technology-based improvements. They have provided a reduction in CSO volume and frequency and a greater percentage of combined sewer flow transported and treated at the PWD's three wastewater treatment plants.

Combined Sewer Overflow at Crescentville in Philadelphia

Nine Minimum Controls (NMCs) System "Tune-Up"

In the first phase of the PWD's CSO strategy, and in compliance with its National Pollutant Discharge Elimination System (NPDES)* permits, the PWD submitted to the Pennsylvania

Department of Environmental Protection (PADEP) on September 27, 1995, CSO Documentation: Implementation of Nine Minimum Controls (NMCs). The 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. This program ensures that our existing sewer system is operating to the best of its ability, providing a "tune-up" to the existing infrastructure.

To provide information needed for the development of the NMCs program, the PWD instituted a $6.5 million initiative aimed at upgrading its comprehensive system flow monitoring network. This program provides information necessary to identify and eliminate dry weather overflows, monitor system performance and operation, and configure and calibrate computer hydraulic models needed to develop the NMCs and long-term CSO control plans.

Extensive data from the PWD's Geographic Information System (GIS), flow monitoring system, the U.S. Army Corps of Engineer's Storage, Treatment, Overflow, Runoff Model (STORM), and the EXTRAN and RUNOFF blocks of the U.S. EPA Stormwater Management Model (SWMM) were used to support each phase of the CSO program. These tools were developed to support concept engineering through implementation and post-construction monitoring. The monitoring system, models, and GIS have and will serve as the basis for planning improvements and enhancing operation of the sewerage system over the long-term.

For more details on the NMCs, please visit the U.S.EPA on-line at: http://cfpub.epa.gov/npdes/home.cfm?program_id=5.

Capital Projects
Design and Build New Combined Sewer System Components

The second phase of the PWD's CSO strategy has been focused on technology-based capital improvements to the City's sewerage system that have and 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 water quality. The recommended capital improvement program is the result of a detailed analysis of a broad range of technology-based control alternatives. The capital improvement plan encompasses the three major areas of the City that are affected by CSOs: the Northeast, Southeast and Southwest drainage districts. Capital projects were selected by the PWD to provide significant CSO load reduction.

The total estimated cost of the selected capital improvement projects as of 1997 was in excess of $48 million. However, to date, current expenditures and future estimates bring this number to over $100 million. Hydraulic and hydrologic model simulations indicate that annual CSO volumes will be reduced by over two billion gallons system-wide in a typical hydrologic (average rainfall) year, upon completion of all these projects.

These significant, technology-based projects may not, in and of themselves, bring receiving waters into compliance with all water quality standards. Additional management plans, actions and projects needed to attain water quality standards will be defined through the process of watershed planning, as discussed below. However, these projects will not only reduce overall loadings, but will hopefully encourage other point* and non-point source* dischargers to implement similar technologies, over and above what their current permit mandates, while the development of a comprehensive watershed management plan proceeds.

Watershed Management & Watershed Partnerships - Integrated, Regional Watershed Planning & Implementation

The third component of the City's CSO strategy involves a substantial commitment by the City to conduct watershed planning to identify long term improvements throughout the watershed, including possibly additional CSO controls that will result in further improvements in water quality, and ultimately, the attainment of water quality standards. The need for this watershed initiative is rooted in the fact that insufficient physical, chemical and biological information currently exists on the nature and causes of water quality impairments, sources of pollution, and appropriate remedial measures. In addition, Philadelphia is downstream, meaning that the headwaters, some tributaries, and upper segments of our rivers and streams reside in municipalities north of Philadelphia. We do not always know the source, nor can we control stormwater runoff* or other pollutants* flowing into our streams above the city's boundaries. This creates a unique challenge in our goal to attain water quality standards, especially with respect to the effects of wet weather discharges and receiving water dynamics. These watershed realities have led to a broader, national recognition of the need for regional, watershed-based planning and management to properly define water quality standards and goals. Therefore, the PWD has adopted a holistic approach – a watershed management approach to control pollution to rivers and streams. This approach evaluates the impacts of both point and non-point pollution sources and aims to find regional, watershed solutions to restore water quality. Because watersheds are defined by natural features and do not adhere to political boundaries, the PWD believes that watershed management is the most practical and effective way to manage pollution and improve water quality.

> A watershed refers to the land that drains stormwater (rain or melting snow) to a specific body of water, such as a river or stream.

Through PWD's watershed management plans, water quality impairments are identified and addressed via comprehensive watershed based planning, stream water quality analysis, baseline water quality monitoring and the assessment of watershed-wide pollutants.

Consequently, the major sources of the impairments are explored, modeled, and defined to understand how to attain regulatory water quality standards and establish programs that will continue to monitor and ensure permanent improvements in water quality. The PWD forms partnerships with its suburban neighbors, businesses and industries, community and non-profit groups and all other watershed stakeholders to evaluate our regional watersheds and to develop an effective watershed management plan. To be successful, watershed management plans must be adopted and implemented by all participating stakeholders and their constituents.

To date, the PWD has initiated the formation of watershed partnerships in all of the City's watersheds. The combined sewer watersheds include the Darby-Cobbs Watershed Partnership, Tookany/Tacony – Frankford Watershed Partnership and Pennypack Watershed Partnership, while the separate sewer watersheds include the Poquessing Watershed Partnership and the Wissahickon Watershed Partnership. The Schuylkill Watershed is represented by the Schuylkill Action Network (SAN), a partnership of the City of Philadelphia, federal and state agencies, and local watershed groups protecting the drinking water supply in the Schuylkill River watershed.

This fall, the remaining watershed partnership will be formed - the Delaware Direct Watershed Partnership.

Tacony Creek

*Glossary**

Definitions are from the U.S. EPA Glossary unless marked with + symbol. Non-EPA definitions are cited.

Combined Sewer Overflow (CSO)
Discharge of a mixture of storm water and domestic waste when the flow capacity of a sewer system is exceeded during rainstorms.

Combined Sewer System (CSS)
A sewer system that carries both sewage and storm-water runoff. Normally, its entire flow goes to a waste treatment plant, but during a heavy storm, the volume of water may be so great as to cause overflows of untreated mixtures of storm water and sewage into receiving waters. Storm-water runoff may also carry toxic chemicals from industrial areas or streets into the sewer system.

Indirect Discharge
Introduction of pollutants from a non-domestic source into a publicly owned waste-treatment system. Indirect dischargers can be commercial or industrial facilities whose waste enter local sewers.

National Pollutant Discharge Elimination System (NPDES)
A provision of the Clean Water Act which prohibits discharge of pollutants into waters of the United States unless a special permit is issued by EPA, a state, or, where delegated, a tribal government on an Indian reservation.

Non-Point Source
Diffuse pollution sources (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet). The pollutants are generally carried off the land by storm water. In Philadelphia, examples include stream bank erosion and construction.

Point Source
A stationary location or fixed facility from which pollutants are discharged; any single identifiable source of pollution; e.g. a pipe, ditch, ship, ore pit, factory smokestack. Municipal sewer systems are regulated as point sources.

Pollutant
Generally, any substance introduced into the environment that adversely affects the usefulness of a resource of the health of humans, animals, or ecosystems.

Receiving Waters
A river, lake, ocean, stream or other watercourse into which wastewater or treated effluent is discharged.

Run-off
That part of precipitation, snow melt, or irrigation water that runs off the land into streams or other surface-water.

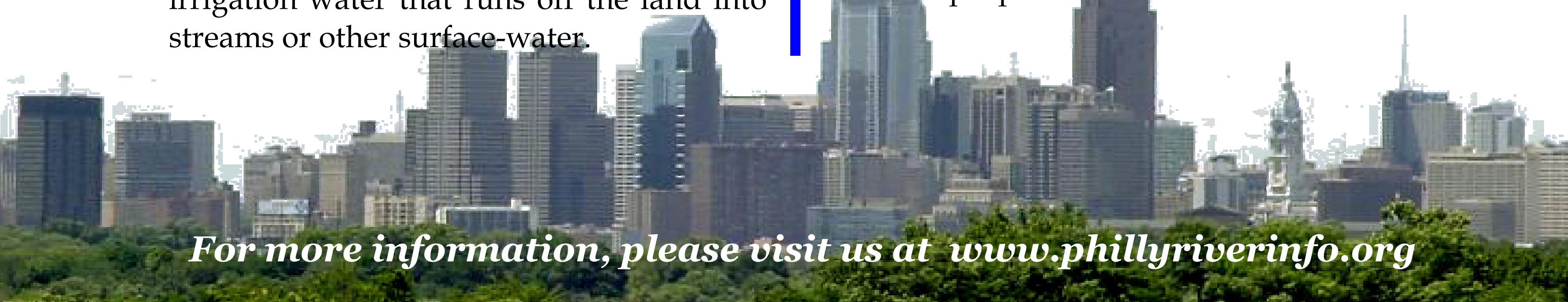
Sanitary Sewer
Underground pipes that carry only domestic or industrial waste, not storm water.

Sanitary Sewer Overflow (SSO)†
Untreated or partially treated sewage overflows from a sanitary sewer collection system. *Definition from Philadelphia Water Department, Office of Watersheds.*

Stormwater†
The water that runs off surfaces such as rooftops, paved streets, highways and parking lots. It can also come from hard grassy surfaces like lawns, play fields, and from graveled roads and parking lots. *Definition from King County, Water and Land Resources Division.*

Wastewater
The spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter. Water Pollution: The presence in water of enough harmful or objectionable material to damage the water's quality.

Water Quality Standards (WQS)
Water quality standards are provisions of state or federal law which consist of a designated use or uses for the waters of the United States, water quality criteria to protect the most sensitive uses for such waters, and an antidegradation policy and implementation procedures to protect water quality. Water quality standards are established to protect the public health or welfare, enhance the quality of water and serve the purposes of the CWA.



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Appendix C
CSO Long Term Control Plan Clean Water Benefits

THE CSO LONG TERM CONTROL PLAN *UPDATE*

GREEN CITIES
CLEAN WATERS

Clean Water Benefits and the Balanced Approach
The City of Philadelphia

Philadelphia PWD Water Department

INTRODUCTION

The Philadelphia Water Department (PWD) wants to transform Philadelphia's urban landscape into a vibrant, green community where people want to live and work. By merging the vision of a "green city" with "clean water" we can benefit not only our watershed environment, but the region's economic health, quality of life and sustainability.

The PWD is well suited to the development and implementation of a watershed approach to Combined Sewer Overflow (CSO) control. The PWD owns and operates the City's sanitary sewers, storm sewers, combined sewers and wastewater treatment plants. In cooperation with the Philadelphia City Planning Commission, the PWD regulates stormwater management during the construction and post-construction phases of most development and redevelopment projects.

In 2007, the PWD began to reevaluate its CSO Long Term Control Plan (LTCP) and capital improvements program to integrate additional projects that will reduce CSO frequency and volume. The CSO Long Term Control Plan Update (LTCPU) involves the development of additional management alternatives to ensure capture and treatment of sanitary sewer system flows and the reduction of discharges from CSOs by building on the experience and progress gained from the implementation of our original CSO LTCP.

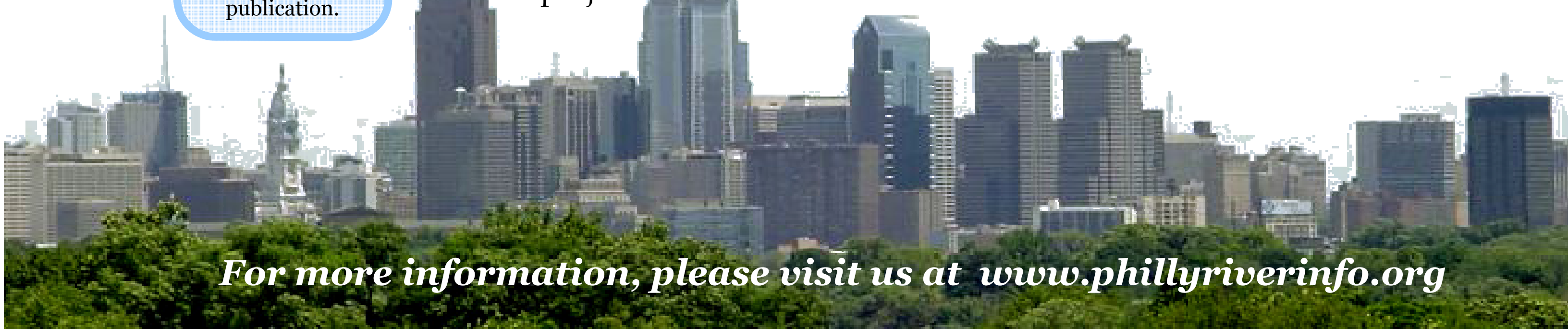
Benefits of Clean Water

The resources, amenities and socioeconomic impacts that could result from the implementation of watershed management approach are endless. A "Green Cities - Clean Waters" strategy will stimulate tourism, recreation, and riverfront development, along with achieving economic benefits and creating jobs. Cleaner rivers create increased civic pride in the riverfront area, higher property values, and greater potential for valuable riverfront projects.

The definitions of words with an asterisk* can be found in the glossary at the end of this publication.

An exciting day of fishing at the annual Philly Fun Fishing Fest!

Paddlers take to their boats for the Schuylkill Regatta.



CSO Long Term Control Plan Update (CSO LTCPU)

Philadelphia's CSO LTCPU seeks to implement the regulatory requirements of the National CSO Control Policy through a comprehensive watershed-based approach. The Long Term Control Planning Guidance set forth by the U.S. EPA supports the implementation of a comprehensive watershed management approach. It recognizes that the major advantage in using such an approach is that it identifies multiple solutions (land-water-infrastructure based) that are cost effective measures which result in site specific improvements to problems caused by the impacts of CSO and non-CSO sources of pollution on water quality.

The CSO Long Term Control Plan Update Falls under the "Green Cities - Clean Waters" Program.

The National CSO Control Policy

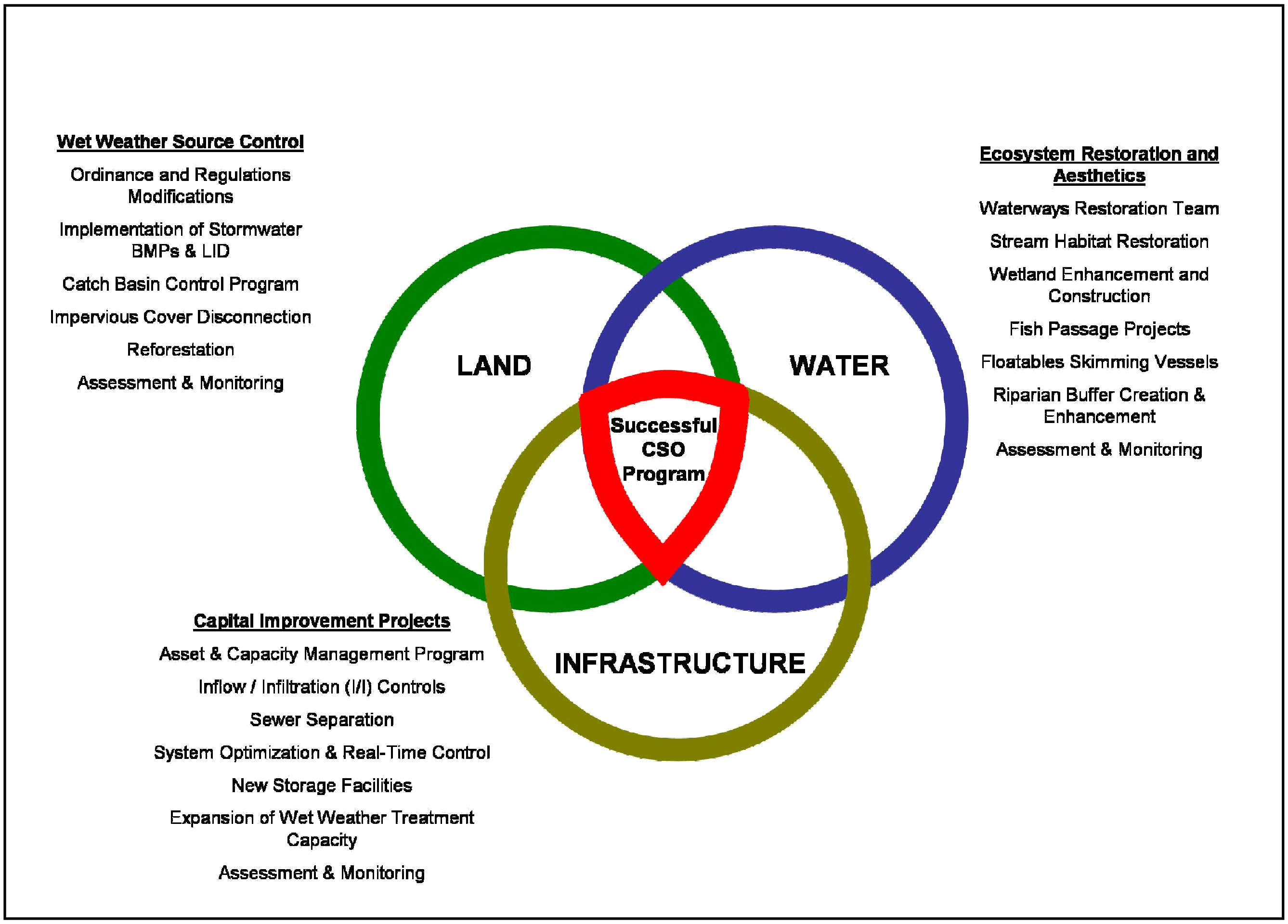
The National CSO Control Policy requires that the CSO LTCPU consist of the following nine elements:

- Characterization, monitoring, and modeling of the combined sewer system as the basis for selection and design of effective CSO controls
- A public participation process that actively involves the affected public in the decision-making to select long-term CSO controls
- Consideration of sensitive areas as the highest priority for controlling overflows
- Operational plan revisions to include agreed-upon long-term CSO controls
- Evaluation of alternatives that will enable the permittee, in consultation with the National Pollutant Discharge Elimination System (NPDES)* permitting authority, Water Quality Standards (WQS)* authority, and the public, to select CSO controls that will meet the Clean Water Act (CWA)* requirements
- Cost/performance considerations to demonstrate the relationships among a comprehensive set of reasonable control strategies
- Maximization of treatment at the existing wastewater treatment plant for wet weather flows
- An implementation schedule for CSO controls
- A post-construction compliance monitoring program adequate to verify compliance with water quality-based CWA requirements and to achieve the effectiveness of CSO controls.

A Successful CSO Program: The Balanced "Land-Water-Infrastructure" Approach

The Philadelphia Water Department is committed to implementing a balanced "land-water-infrastructure" approach to achieve its watershed management and CSO control goals. This method includes infrastructure-based approaches where appropriate, but also includes a range of land-based stormwater management techniques and the physical reconstruction of aquatic habitats, where appropriate.

The ultimate goal of PWD's approach is to restore and protect our rivers and streams including the floodplains, riparian buffers, stream channels, streambeds, wildlife, vegetation and other biomarkers that define a



healthy stream ecosystem that has been degraded as a result of urbanization within the City of Philadelphia and in the surrounding counties, while achieving full regulatory compliance in a cost-effective manner. The "Land-Water-Infrastructure" approach is made up of the following three programs, all of which enable the PWD to accomplish its goals under the CSO LTCPU.

LAND:
Wet Weather Source Control

The Wet Weather Source Control program promotes the use of Low Impact Development (LID)* and other structural and non-structural controls to reduce CSO volume through evaporation*, transpiration*, infiltration*, detention and controlled release* to the combined sewer system for treatment. The goal of our LID program, unlike past practices, is to keep stormwater runoff out of our sewer systems. One way that PWD is meeting its goals for this program is through the enactment of our recent stormwater management regulations for new development and redevelopment, established in 2006. These regulations focus on restoring a more natural balance between stormwater runoff and infiltration by requiring the capture of the first one inch of rainfall, reducing pollutant loads through infiltration and/or detaining and controlling runoff rates at levels that minimize stream bank erosion. Site designers can ensure the level of stormwater management performance required through the use of a variety of land-based practices that mimic the natural environment, (e.g., redirecting runoff from impervious surfaces* to green areas, bioretention*, subsurface storage* and infiltration, green roofs, swales*, and tree canopy).

Our planned Low Impact Development (LID) programs will include:

- Large-scale implementation of green, attractive measures to manage stormwater at the source on public land and streets to reduce demands on sewer infrastructure
- Requirements and incentives for green, attractive measures to manage stormwater at the source on private land and streets to reduce demands on sewer infrastructure
- A large-scale street tree program to improve appearance and manage stormwater at the source on city streets
- Incentives to preserve open space for use for stormwater management at the source


Infiltration garden at Buckman Heights in Portland, Oregon

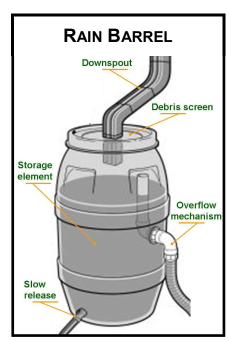

Green roof at The Fencing Academy of Philadelphia


Naturalized stormwater detention basin at Black Rock in Upper Providence Township


Porous parking lot at Johnson & Johnson Pharmaceutical Research and Development campus


Rain Garden at Wissahickon Creek installed as part of the Valley Green Environmental Restoration program

A rain barrel installed at a Philadelphia residence



WATER: Ecosystem Restoration and Aesthetics

The Ecosystem Restoration and Aesthetics program focuses on projects that contribute to the improvement of the aesthetic and ecological integrity of CSO receiving waters.

Such watershed-based approaches include stream bed and bank stabilization and reconstruction, aquatic habitat creation, plunge pool removal, improvement of fish passage, and floodplain reconnection. Restoring designated uses and ultimately removing streams from the state's list of impaired waters will require the restoration of the functions of a healthy aquatic ecosystem. These functions may be impossible to restore without restoration of the physical channel and the habitat required to support them.

PWD is designing and implementing projects that will restore and/or create stream and wetland habitat through programs that focus on stream habitat restoration, wetland enhancement and construction, fish passage projects and riparian buffer creation and enhancement.

Cobbs Creek at Marshall Road

Before

The creek at Marshall Road suffered from severely eroded banks (*triangle)* and exposed infrastructure (*star*).

In Progress

After

The natural design of the creek and healthy riparian buffer provides many benefits, including improved habitat for aquatic animals.

INFRASTRUCTURE: Capital Improvement Projects

The Capital Improvement Projects program continues to build CSO capital improvement projects that were planned during the previous CSO permit cycle in addition to new projects to continue to increase the capture and treatment of combined sewage.

These construction projects include traditional storage, conveyance, and treatment measures within the combined sewer collection and treatment system, (e.g., the installation of inflatable dams, underground sewage storage tanks, and storm relief sewers). Similar in-system construction projects will continue to be considered along with land-based and water-based measures, and they may be identified as the most cost-effective and feasible solutions in some situations.

However, if used alone, infrastructure-based measures can not address the root causes of impairment in urban streams. For example, the Cobbs Creek and Tookany/Tacony-Frankford Integrated Watershed Management Plans conclude that while some water quality problems exist, the primary causes of impairment in these streams are modified flow patterns and habitat degradation resulting from the urban development of our once natural watersheds. Controlling volume and quality of stormwater runoff is key for restoring the ecosystems of our streams. The Pennsylvania Department of Environmental Protection's (PADEP) integrated impairment listings agree with these findings.

Infrastructure-based measures are typically focused on removing loads of specific pollutants in our piping systems rather than restoring natural flow conditions and habitat. Controlling stormwater runoff (before it enters the sewer system) through rain gardens, tree infiltration trenches, bioswales* and other land-based practices that recreate the functions of the natural environment, is essential for achieving healthy streams. It is for this reason that PWD's strategies include a well defined evaluation of infrastructure solutions combined with LID.

From a story in the Philadelphia *Inquirer's* "Today" Magazine. January 29, 1961. *Research credit Adam Levine.*

Additional examples of our capital improvements program include the Real Time Control Center, Water Pollution Control Plant (WPCP) Wet Weather Treatment Maximization, In-Line System Storage Projects, an Asset & Capacity Management Program, Inflow/Infiltration (I/I) Controls, Sewer Separation, and New Storage Facilities.

Additional Watershed Projects

The PWD's integrated and adaptive management approach has the added benefit of meeting other stakeholder goals through participation in (at times leadership of) basin-specific initiatives such as: River Conservation Plans, Integrated Water Use Status Networks, Interpretive Signage, Interpretive Centers, Basin-Specific Stormwater Management Plans (Act 167*) and Sewage Facility Planning. For more information on the CSO LTCP, please visit our Watershed Information Center at http://www.phillyriverinfo.org

The encapsulation of Mill Creek in 1883. *Research credit Adam Levine.*

*Glossary**

Definitions are from the U.S. EPA Glossary unless marked with† symbol. Non-EPA definitions are cited.

Act 167†

The Pennsylvania Stormwater Act 167 of 1978 says that each county must prepare a stormwater management plan for each of its designated watersheds in consultation with the municipalities located within the boundaries of the watershed. *Definition from Philadelphia Water Department, Office of Watersheds.*

Bioretention†

The use of vegetation in retention areas designed to allow infiltration of runoff into the ground. The plants provide additional pollutant removal and filtering functions while infiltration allows the temperature of the runoff to be cooled. *Definition from City of Jefferson, Stormwater Division.*

Detention System †

A facility that collects water from developed areas and releases it at a slower rate than it enters the collection system. The excess of inflow is temporarily stored in a pond or vault and is typically released over a few hours or a few days. *Definition from King County, Water and Land Resources Division.*

Evapotranspiration

The loss of water from the soil by evaporation and by transpiration.

Impermeable

Not easily penetrated. The property of a material or soil that does not allow, or allows only with great difficulty, the movement or passage of water.

Impervious Surface†

A hard surface area which either prevents or retards the entry of water into the soil mantle as under natural conditions prior to development; and/or a hard surface area which causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions prior to development. *Definition from King County, Water and Land Resources Division.*

Infiltration

The penetration of water through the ground surface into sub-surface soil or the penetration of water from the soil into sewer or other pipes through defective joints, connections, or manhole walls.

Low Impact Development (LID)†

In urban areas such as Philadelphia, LID incorporates the concept of low impact redevelopment, where existing impervious surfaces are replaced in a way that does not impact water resources. *Definition from Philadelphia Water Department, Office of Watersheds.*

National Pollutant Discharge Elimination System (NPDES)

A provision of the Clean Water Act which prohibits discharge of pollutants into waters of the United States unless a special permit is issued by EPA, a state, or, where delegated, a tribal government on an Indian reservation.

Pervious or Permeable Surfaces†

Surfaces which allow the penetration of water into the ground. *Definition from City of Jefferson, Stormwater Division.*

Subsurface Storage†

Retaining or detaining water underground. Stored water can be released at a later time into natural waterways to reduce peak storm flows, or allowed to slowly infiltrate to recharge groundwater. *Definition from Philadelphia Water Department, Office of Watersheds.*

Swale / Bioswale†

A long, gently sloped, vegetated ditch designed to filter pollutants from stormwater. Grass is the most common vegetation, but wetland vegetation can be used if the soil is saturated. *Definition from King County, Water and Land Resources Division.*

Transpiration

The process by which water vapor is lost to the atmosphere from living plants.

Water Quality Standards (WQS)

Water quality standards are provisions of state or federal law which consist of a designated use or uses for the waters of the U.S., water quality criteria to protect the most sensitive uses for such waters, and an antidegradation policy and implementation procedures to protect health or welfare, enhance the quality of water and serve the purposes of the CWA.

Clean Water Act (CWA)

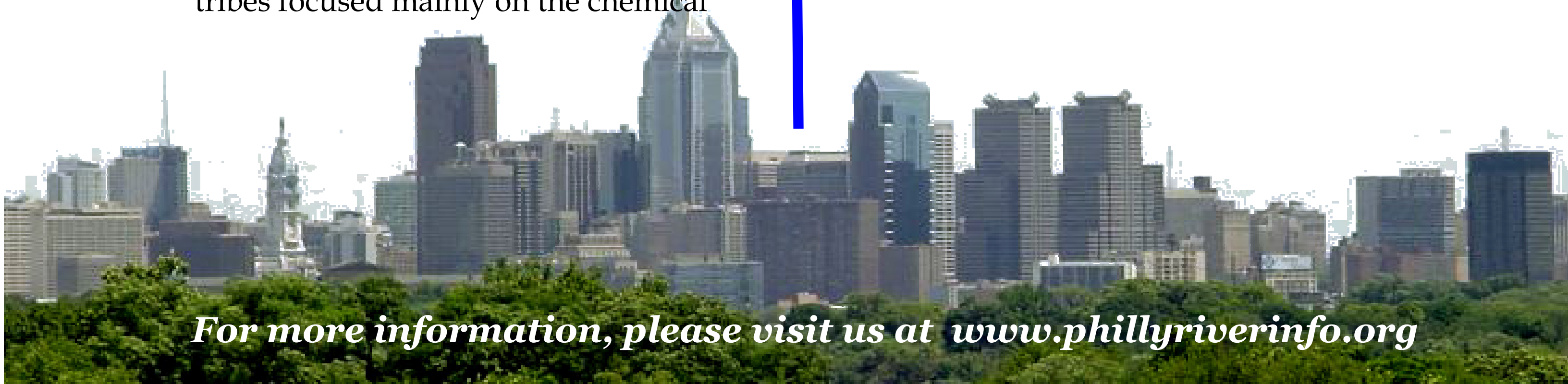
Introduction to the Clean Water Act as given by the EPA

The Clean Water Act (CWA) is the cornerstone of surface water quality protection in the United States. (The Act does not deal directly with ground water nor with water quantity issues.) The statute employs a variety of regulatory and nonregulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters so that they can support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water."

For many years following the passage of CWA in 1972, EPA, states, and Indian tribes focused mainly on the chemical aspects of the "integrity" goal. During the last decade, however, more attention has been given to physical and biological integrity. Also, in the early decades of the Act's implementation, efforts focused on regulating discharges from traditional "point source" facilities, such as municipal sewage plants and industrial facilities, with little attention paid to runoff from streets, construction sites, farms, and other "wet-weather" sources.

Starting in the late 1980s, efforts to address polluted runoff have increased significantly. For "nonpoint" runoff, voluntary programs, including cost-sharing with landowners are the key tool. For "wet weather point sources" like urban storm sewer systems and construction sites, a regulatory approach is being employed.

Evolution of CWA programs over the last decade has also included something of a shift from a program-by-program, source-by-source, pollutant-by-pollutant approach to more holistic watershed-based strategies. Under the watershed approach equal emphasis is placed on protecting healthy waters and restoring impaired ones. A full array of issues are addressed, not just those subject to CWA regulatory authority. Involvement of stakeholder groups in the development and implementation of strategies for achieving and maintaining state water quality and other environmental goals is another hallmark of this approach.



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Appendix D
Billstuffer – The CSO Program

The Combined Sewer Overflows: A Long Term Control Plan and Our Rivers

Introduction

Philadelphia is blessed with an abundance of creeks, open space, parkland and beautiful rivers. The Schuylkill and Delaware Rivers are not only scenic; they are the drinking water source for Philadelphia residents. These waterways, however, suffer from pollution from various sources, both within and outside of the City limits. One such pollution source: Combined Sewer Overflows (CSOs).

What is the Combined Sewer Overflow Program?

The goal of the Philadelphia Water Department's (PWD) combined sewer overflow program is to improve and preserve the water environment in the Philadelphia area and implement technically viable, cost-effective improvements and operational changes.

1. Nine Minimum Controls (NMC) – System "Tune-Up"

The first component of the PWD CSO strategy involves the Nine Minimum Controls (NMC). The NMC 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. This program ensures that our existing sewer system is operating to the best of its ability, providing a "tune-up" to the existing infrastructure.

For more details on the NMC, please visit the U.S.EPA online at: http://cfpub.epa.gov/npdes/home.cfm?program_id=5.

2. Capital Projects – Design and Build New Combined Sewer System Components

The second component of the PWD CSO strategy involves technology-based capital improvements to the City's sewer system. This program requires significant engineering, design and construction to improve the performance of the combined sewer system. This program has and will continue to increase the capacity of the City's combined sewer system, reduce infiltration into the system, decrease the volume of overflows and improve stream water quality.

What are Combined Sewer Overflows?

A combined sewer system is a wastewater collection system which transports sanitary wastewater (from homes, businesses and industry), stormwater from the storm drains on our streets (approximately 75,000 of them) and stormwater from property rain leaders - through a single-pipe system to a Water Pollution Control Plant (WPCP).

During dry weather conditions (when it is not raining) and during very small storm events, combined sewers can adequately transport this mixture of sanitary wastewater and stormwater to one of the City's three water pollution control plants for treatment.

Under heavier rainfall conditions, however, the flow in combined sewers may exceed the capacity of the pipe or treatment facility. As a result, a portion of the wastewater and stormwater may be diverted directly to a nearby stream or river to prevent the flooding of homes and streets. This is what is known as a Combined Sewer Overflow.

During heavy rainfalls or sudden snowmelts, Philadelphia may experience these overflows in various locations throughout the City from any of its 164 permitted combined sewer outfalls. These overflows may exceed water quality standards (WQS), threaten aquatic life and its habitat, and impair the use and enjoyment of the water body.

A watershed refers to the land that drains stormwater (rain or melting snow)to a specific body of water, such as a river or stream.

3. Watershed Management & Watershed Partnerships – Integrated Regional Watershed Planning Implementation

The watershed approach evaluates the impacts of both point and non-point pollution sources and aims to find regional, watershed solutions to restore water quality. Because watersheds are defined by natural features and do not adhere to political boundaries, PWD believes that watershed management is the most practical and effective way to manage pollution and improve water quality.

The PWD forms partnerships with its suburban neighbors, businesses and industries, community and non-profit groups and other stakeholders to evaluate the region's watersheds and to develop an effective watershed management plan. To be successful, watershed management plans must be adopted and implemented by all participating stakeholders and their constituents.

To date, PWD has initiated the formation of watershed partnerships in all of the City's watersheds. The combined sewer watersheds include the Darby-Cobbs Watershed Partnership, Tookany/Tacony – Frankford Watershed Partnership and Pennypack Watershed Partnership, while the separate sewer watersheds include the Poquessing Watershed Partnership and the Wissahickon Watershed Partnership. The Schuylkill Watershed is represented by the Schuylkill Action Network (SAN), a partnership of the City of Philadelphia, federal and state agencies, and local watershed groups protecting the drinking water supply in the Schuylkill River Watershed. This fall, the Delaware Direct Watershed Partnership will be formed.

If you are interested in joining a partnership or for further information on the PWD watershed management planning projects, visit: http://www.phillyriverinfo.org.

Clean Water, Green City: Long Term Control Plan Update

Crescentville CSO

The public participation program of the CSO Long Term Control Plan Update is also known as the "Clean Water, Green City Program."

Introduction

In 2007, PWD began to revaluate its combined sewer overflow program and capital improvements program to integrate additional projects that reduce CSO frequency and volume. As a result, the CSO Long Term Control Plan Update (LTCPU) was created. It involves the development of management alternatives that ensure capture and treatment of sanitary sewer system flows and CSO reductions.

PWD is committed to a balanced "land-water-infrastructure" approach to achieve its watershed management and CSO control goals. This method includes infrastructure-based approaches, where appropriate, but also includes a range of land-based stormwater management techniques and the physical reconstruction of aquatic habitats, where appropriate.

The "Land-Watershed-Infrastructure" approach is made up of three programs:

LAND: Wet Weather Source Control

The Wet Weather Source Control program promotes the use of Low Impact Development (LID) and other structural and non-structural controls to reduce CSO volume through evaporation, transpiration, infiltration and detained release to the combined system for treatment, such as an extensive street tree program, green roofs and rain gardens. This program also requires post-construction stormwater controls on land development and redevelopment in the combined sewer area to achieve CSO reductions.

WATER: Ecosystem Restoration and Aesthetics

The Ecosystem Restoration and Aesthetics program focuses on projects that contribute to the improvement of the aesthetic and ecological integrity of CSO receiving waters. Such water-based approaches include stream bed and bank stabilization and reconstruction, aquatic habitat creation, plunge pool removal, improvement of fish passage, and floodplain reconnection.

INFRASTRUCTURE: Capital Improvement Projects

The Capital Improvement Projects program continues to implement CSO capital improvement projects that were planned during the previous combined sewer overflow program in addition to new projects to increase the capture and treatment of combined sewage. Examples of such projects include the work of the Waterways Restoration Team, Stream Habitat Restoration, Wetland Enhancement and Construction, Fish Passage Projects and Riparian Buffer Creation and Enhancement.

GLOSSARY

Runoff refers to water from rain or melting snow or irrigation that flows over the ground and into the nearest body of water. It can contribute to soil erosion and carry harmful pollutants.

Point source pollution refers to any discernible, confined, and discrete conveyance, such as a pipe, tunnel or ditch, from which pollutants are or may be discharged.

Nonpoint source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, such as lawn fertilizers, oil and dog waste, finally depositing them into the nearby creeks and rivers.

Receiving Waters: All distinct bodies of water that receive runoff or wastewater discharges, such as streams, rivers, ponds, lakes, and estuaries.

Water Quality Standards (WQS) are state-adopted and EPA-approved standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.

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Appendix E
Billstuffer – CSO Public Notification Means You're in the Know

Philadelphia PWD Water Department

WATER Wheel

Protecting Your Environment / 2008

CSO: Public Notification Means You're in the Know

Stormwater Best Management Practices Awards

What is a WATERSHED?

A watershed is the land surrounding a system of rivers (or streams or creeks), or a particular river, that, when it rains, sheds the runoff into that waterway. Everything you do impacts your watershed. Runoff from garden fertilizers, hazardous substances like used motor oil, and trash dumped into one area of a river bank can pollute water many miles downstream. Protecting and preserving our watersheds helps protect our water resources.

The watersheds that drain directly to Philadelphia are: Darby Cobbs Watershed, Schuylkill Watershed, Wissahickon Watershed, Delaware Watershed, Pennypack Watershed, Tookany/Tacony-Frankford Watershed and Poquessing Watershed.

Combined Sewer Overflow (CSO) Public Notification Signage Program

What is a Combined Sewer Overflow (CSO)?

A combined sewer system transports sanitary wastewater (from homes, businesses and industry), stormwater from the storm drains on our streets and stormwater from property downspouts through a single-pipe to a Water Pollution Control Plant (treatment plant).

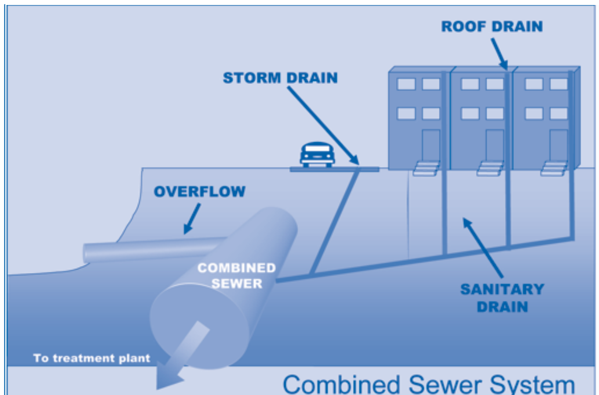
Under heavier rainfall conditions, however, the flow in combined sewers may exceed the capacity of the pipe or treatment facility. As a result, a portion of the wastewater and stormwater may be sent directly to a nearby stream or river to prevent the flooding of homes and streets. This is what is known as a Combined Sewer Overflow.

During heavy rainfalls or sudden snowmelts, Philadelphia may experience these overflows in various locations throughout the City. These overflows may exceed water quality standards, threaten aquatic life and its habitat, and impair the use and enjoyment of the water body.

What is the goal of the Combined Sewer Overflow (CSO) Public Notification Program?

The goal of the Philadelphia Water Department's (PWD) CSO program is to improve and preserve the water environment in the Philadelphia area.

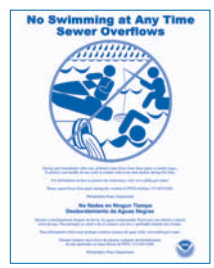
The goal of the CSO Public Notification Program is to educate the public on CSOs using a variety of methods that will reach different segments of the population. One method that we are implementing is the CSO Public Notification Signage Program. This program informs the public of the potential hazards of primary contact with creeks and rivers during combined sewer overflow events.



Combined Sewer System

What is the goal of the Signage Program?

PWD is striving to educate citizens about water quality conditions in our rivers and streams during and after a rain storm.



In 2005, PWD initiated its pilot signage program and installed signs at stream and river locations with good public access. The goal of the pilot program is to gauge the effectiveness of signage as compared to other public outreach efforts. PWD is concerned about primary contact with the water (skin contact) in CSO areas during or immediately after a rain event. The signs warn the public to avoid fishing, use of PWCs (Personal water crafts, such as jet-skis or wave runners), wading and particularly swimming. CSOs contain bacteria and pathogens that could make someone sick if they swallow water or eat fish that have come in contact with CSOs. The public should not go in the water, near the CSOs, for 48 hours after a heavy rain event.

The signs are in English and Spanish. PWD recognizes that there are many native-Spanish speakers that use our parks and waterways for recreation, as well as other non-English native speakers.

The signs also include the Philadelphia Water Department Hotline – 215-685-6300. PWD should be contacted if there is flow coming from the outfall during dry weather (when it is not raining).

Philadelphia Water Department

Frequently Asked Questions (FAQs)

Can I swim in the water near a CSO?

Swimming and bathing are not permitted in the City's rivers and streams due to risks of drowning, injury from submerged objects, strong currents, and other hazards. An additional risk to the public is ingesting tainted water from an overflow as untreated sewage contains bacteria. Women of child bearing age, children, the elderly, and persons with compromised immune systems are at an even higher risk of getting sick.

Is it safe for my dog to drink the water near a CSO?

PWD recommends that your dog not drink the water after a rainstorm. Despite their superior sense of smell, dogs are known to get "up close and personal" with things that might seem gross to you, or stop to take a drink out of a muddy puddle. If this really concerns you, consider carrying plenty of drinking water and a "packable" drinking bowl for your dog. Dogs that are offered plenty of water in this manner may be less likely to drink out of the creek.

Can I eat the fish?

The Pennsylvania Fish and Boat Commission and Pennsylvania Department of Environmental Protection have jointly issued a statewide "blanket" consumption advisory recommending no more than one meal (up to 8oz) per week of recreationally caught fish, including hatchery raised stocked trout.

Mercury and PCBs can be harmful to humans, and all fish, whether wild caught or farm raised, will contain some level of these contaminants. Women of child bearing age, children, elderly, and persons with compromised immune systems may wish to limit their consumption of fish. If you still plan to consume the fish, please follow the cooking and cleaning directions for eating skinned and trimmed fish. These instructions, along with other information, may be found at http://www.depweb.state.pa.us.

Stormwater Best Management Practices (BMP) Recognition Program

On May 3, 2007, the Stormwater Best Management Practices (BMP) Recognition Program announced the exemplary and innovative stormwater management projects that were recognized for helping to transform the health of our watersheds in the region. The event took place at the third annual Urban Watersheds Revitalization Conference, held at the Kanbar Center at Philadelphia University.

The Stormwater BMP Recognition Program is sponsored by the Philadelphia Water Department, American Water Resources Association (AWRA), Montgomery County Conservation District, Villanova University, and the Department of Environmental Protection (Coastal Zone Management).

Please visit the website for more information and to submit an application: http://www.stormwaterBMP.org.

2007 Stormwater Best Management Practices (BMP) Recognition Program Recipients

Andropogon Associates & Friends of Wissahickon
Valley Green Environmental Restoration Program
Type of Project: Rain Garden

Gilmore & Associates
Chatham Financial Corporate Headquarters
Type of Projects: Retention Basin/Wet-Pond & Native Species Landscape Restoration (Meadows)

Johnson & Johnson
Pharmaceutical Research and Development Spring House Road Property
Type of Projects: Porous Asphalt Parking Lot, Underground Infiltration Beds, and Bioretention Swales

Lower Merion Environmental Advisory Council
Riverbend Environmental Education Center
Type of Projects: Porous Pavement Parking Lot and Vegetative Swale

Lower Merion Township
Aqua America Headquarters
Type of Project: Bioretention Parking Lot

Lower Providence Township
Type of Project: Naturalized Stormwater Basin

Pennoni Associates, Inc.
3925 Walnut Street Mixed Use Facility
Type of Project: Green Roof

Upper Darby Township & Cahill Associates
Second Ward Park
Type of Project: Stormwater Retrofit - Porous Pavement Basketball Courts, Bioretention, and Tree Trench

Upper Perkiomen High School (UPHS)
UPHS Stormwater BMPs
Type of Project: Wet-Pond and Vegetated Swales

Upper Providence Township
Black Rock
Type of Project: Naturalized Basin

Warrington Environmental Advisory Committee
Igoe, Porter, Wellings Memorial Field
Type of Project: Rain Garden

Wissahickon Valley Watershed Association
Sandy Run
Type of Project: Wetland Restoration

Wissahickon Charter School
Harmony Garden
Type of Project: Infiltration Basin

Roofscapes, Inc.
Lifetime Achievement Award
Philadelphia Fencing Academy
Type of Project: Green Roof

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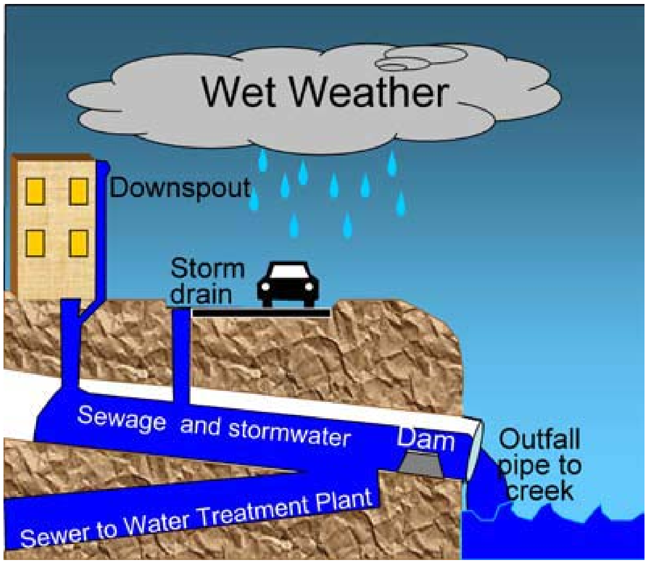
Appendix F
Billstuffer – Green Cities, Clean Waters Program

WATER Wheel

"Green Cities — Clean Waters Program"

Green Cities/2008



The Vision for Our Creeks & Our City

Imagine a Philadelphia where you can walk along any creek in the City and find yourself surrounded by wildflowers under a shady canopy, listening to birds chirp, watching butterflies and dragonflies flutter by and where you can rest and fish peacefully in clean waters. This is the vision the Philadelphia Water Department (PWD) has for the future of Philadelphia – for a greener city with cleaner waters.

PWD believes that this vision can become a reality through PWD's "Green Cities-Clean Waters Program." This program is also referred to as the Combined Sewer Overflow (CSO) Long Term Control Plan. It is a plan that will help us reduce combined sewer overflows and clean up our waters – the plan that will help us transform Philadelphia into a more desirable place to live, work and play.

The Warning on Our Creeks

Combined Sewer Overflows (CSOs) are not just a Philadelphia problem. They are an old problem in cities throughout the country, where combined sewer outfalls are present. CSOs discharge a mix of sewage and stormwater during rainstorms, resulting in swimming and fishing advisories and habitat destruction. Therefore, it is important that the public avoid contact with the waters in our creeks and rivers during and immediately following rain events.

The History behind Those Pipes

Philadelphia was once a city of water (see Map 1 on the next page) – where hundreds of creeks flowed through the city. It was because of these creeks and rivers that industry flourished. However, as Philadelphia grew, so did the pollution. Waste from slaughterhouses, used dye, trash and sewage – all were discharged to our rivers and creeks. It was standard practice in the 18th and 19th centuries to use creeks as sewers.

At one point, the creeks and rivers were so filthy that they became a health hazard. Thousands of Philadelphians died from disease. The creeks also became an obstacle to development. Eventually, they were driven underground, their streambeds replaced with the sewers that now contain them. By the late nineteenth century, many of the creeks had disappeared – the map of the city's surface streams was disturbingly blank (see Map 2 on the next page).

What is a Combined Sewer Overflow (CSO)?

A combined sewer system transports sewage (from homes, businesses and industry), stormwater from the storm drains on our streets and stormwater from property rain leaders through a single underground pipe to a Water Pollution Control Plant (treatment plant).

Under heavier rainfall conditions, however, the flow of the sewage and stormwater in combined sewers may exceed the capacity of the pipe or treatment facility. As a result, a portion of the sewage and stormwater may be sent directly to a nearby stream or river to prevent the flooding of homes and streets. This is what is known as a Combined Sewer Overflow.

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WATER Wheel

"Green Cities—Clean Waters"

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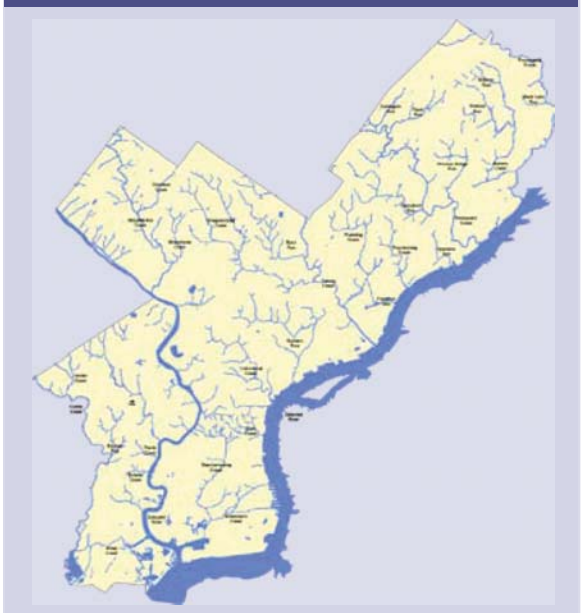
However, by the twentieth century, City leaders realized the benefits of preserving our remaining streams and creating watershed parks (East and West Parks, Wissahickon, Cobbs, Tacony, Pennyack). But for many of those streams, it was too late.

In addition, the 1972 Clean Water Act required utilities to significantly reduce pollution from its treatment facilities, combined sewers and storms. As a result, the creeks and rivers in the City are cleaner now than they have been in half a century.

Over the next 20 years, we will build upon this progress, implementing a mix of new infrastructure, green land practices, stream restoration and community involvement. Through the "Green Cities-Clean Waters Program," and with your support, we will transform Philadelphia into a place where all want to live, work and play. The creeks will become a place where we can find respite in the City; where we can walk amongst wildflowers, listen to the songs of birds, and fish in clean waters again.

For more information and to learn how you can help support the Green Cities-Clean Waters Program, please visit our website: http://www.phillyriverinfo.org.

Map 1: Historic Streams



Map 2: Today's Streams

Clip out and fold this information and carry it in your wallet, so you can report flows.

No Swimming at Any Time in Philadelphia Creeks.
Sewers May Overflow.
During and immediately after rain, polluted water may flow from pipes.

To protect your health, do not come in contact with rivers and streams during and immediately after rain events.

For information on how to protect our waterways, visit: www.phillyriverinfo.org.

Please report flows from pipes during dry weather to PWD's hotline: 215-685-6300.

Philadelphia Water Department (PWD)

Cortelo, doblelo y guardelo en tu billetero, para que puedes reporter desbordamientos.

No Nades en Ningun Tiempo en las Quebradas de Filadelfia. Puede Ocurrir Desbordamiento de Aguas Negras

Durante e imediatamente después de llover, las aguas contaminadas pueden fluir por tubería.

Para proteger su salud, evite el contacto con ríos y quebradas durante e imediatamente después de llover.

Para información sobre como proteger nuestros cuerpos de agua visite: www.phillyriverinfo.org.

Favor de reportar cualquier desbordamiento (durante tiempos secos) a la línea directa de PWD: 215-685-6300.

Philadelphia Water Department (PWD)

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Appendix G
Factsheets and Brochures from LTCPU Public Meetings

Real-Time Control - Main Relief Sewer Storage

Infrastructure Project

Schuylkill Watershed

Contact: Marc Cammarata
215.685.4948
marc.cammarata@phila.gov

Status: Monitoring

Partners:

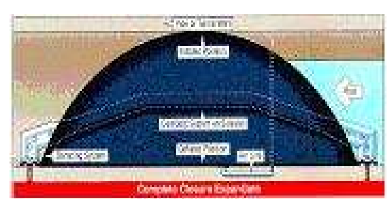
Philadelphia Water Department

Real-Time Control - Main Relief Sewer Storage...

The Main Relief Sewer, a set of five sewers which provide flood relief to combined sewer areas in all of PWD's drainage districts, discharges to the Schuylkill River at Fairmount Park. Prior to this project, CSO was released into the river at the Main Relief Sewer outfalls. An inflatable dam was installed in the Main Relief sewer (13.5' by 13.5') with a potential storage volume of 6.2 million. This dam will reduce CSO discharges to the creek by utilizing the sewer for in-system storage. The inflatable dam retains the stored flow in the sewer and a new connecting sewer drains the stored flow to a nearby interceptor. The dam became fully operational in Fall 2006.

Benefits:

•The installation of the inflatable dam results in significant reductions in CSO discharge volumes and frequencies at the outfall. Specifically, there is a 70% reduction in overflow volume and an average of 4 overflow events per year .



Clean Water........
Green City
www.phillyriverinfo.org

Real-Time Control - Tacony Creek Park Storage

Infrastructure Project | **Tacony-Frankford Watershed**

Contact: Marc Cammarata
215.685.4948
marc.cammarata@phila.gov

Status: Concept Design

Partners:

Philadelphia Water Department

Real-Time Control - Tacony Creek Park Storage...

CSO outfall T14, a very large sewer (21' by 24'), discharges into the Tacony Creek during periods of moderate to heavier rainfall. T14 has a volume of approximately 10 million gallons and to use as much of this storage as possible, a control structure is needed in the sewer. Installation of a crest gate is proposed in order to retain flow within the sewer. This gate will reduce 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 still 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.

Benefits:

•The Tacony Creek will realize a consistent average annual reduction of approximately 600 million gallons in CSO discharges with the completion of both the Rock Run Relief and T14 Real-time Control Projects.

• This represents a reduction of roughly 12% in the average annual volume of CSO and a significant reduction in the associated pollutants (bacteria and organic matter from untreated wastes, litter and other solid materials in both wastewater and stormwater runoff, etc.)

Waterways Restoration Team

Restoration Project

Multiple Watersheds

Contact: Joanne Dahme
215.685.4944
joanne.dahme@phila.gov

Status: Monitoring

Partners:

Fairmount Park Commission (FPC)

Philadelphia Water Department

Waterways Restoration Team...

The Philadelphia Water Department has instituted a Waterways Restoration Team (WRT), a crew dedicated to removing large trash, cars, shopping carts, and other dumped debris from the 100 miles of stream systems that define our City's neighborhoods. This crew is also restoring eroded streambanks and streambeds around outfall pipes and in tributaries as a part of PWD's goal to restore our streams while meeting Clean Water Act permit requirements. The Waterways Restoration Team is working in partnership with the Fairmount Park Commission staff and the various Friends of the Parks groups to maximize resources and the positive impacts to our communities.

Benefits:

● Removal of trash and large debris, such as cars, tires, and shopping carts, from our waterways

● Ensuring that our streams and rivers are clean and beautiful

Establishment of a Real-time Control Center at PWD's Collection System Headquarters

Infrastructure Project

Multiple Watersheds

Contact: Marc Cammarata
215.685.4948
marc.cammarata@phila.gov

Status: Monitoring

Partners:

Philadelphia Water Department

Establishment of a Real-time Control Center at PWD's Collection System Headquarters...

In 2006, the PWD completed a Real-time Control Center at Collection System Headquarters that allows telemetered commands to be sent to automated controls located throughout collection and treatment facilities. These signals may be transmitted in response to rainfall and are intended to enhance capture of CSO volume. Establishing a RTC center enables PWD to provide 24-hr monitoring and control of key collection system facilities. By use of RTC, flows are diverted or stored where capacity exists in the system. This function prevents wet-weather overflows prior to maximum use of available conveyance and storage capacities allowing for prioritization of overflow locations based on hydraulic or pollutant load characteristics.

Benefits:

● Will maximize the use of the collection system to store and deliver wet weather flows to the water pollution control plants for treatment

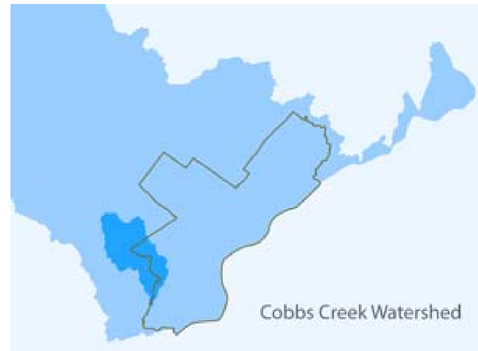
● Will provide PWD with the ability to identify and respond to blockages and non-chronic, dry weather discharges

Clean Water........ Green City
www.phillyriverinfo.org

Stream Restoration of Cobbs Creek at Marshall Road

Restoration Project — **Darby-Cobbs Watershed**

Downstream view of Cobbs Creek post construction



Contact: Marc Cammarata
215.685.4948
marc.cammarata@phila.gov

Status: Monitoring

Partners:

Academy of Natural Sciences
City of Philadelphia

Delaware River Basin Commission (DRBC)
PA Department of Environmental Protection (DEP)
US Fish and Wildlife Service (USFWS)

ArmyCorps of Engineers
Cobbs Cr Community Environmental Education Cente
(CCCEEC)
Fairmount Park Commission (FPC)
Pennsylvania Environmental Council (PEC)

Stream Restoration of Cobbs Creek at Marshall Road...

●Implemented restoration techniques targeted at removing stream impairments and restoring ecological resources.
●Served as a pilot project for habitat restoration, stream bank stabilization, natural channel design, water quality improvement, and infrastructure protection.
●Mitigated the impacts of urban runoff and non-point source pollution.
●Restored native vegetation to the riparian corridor to enhance bank stability.
●Reduced the likelihood of further stream erosion and exposure of sanitary sewage infrastructure.
●Completed a fluvial geomorphologic assessment of the Cobbs Creek to serve as a tool for integrated bank stabilization/habitat restoration for this and future projects.

Tree and shrub planting at restoration site

Benefits:

●A stable channel in dynamic equilibrium with its surrounding watershed

●Stream bank stabilization measures featuring soil bioengineering and natural channel design measures that protect infrastructure and the environment

●A healthy, vegetated riparian zone to add biological diversity to the stream system

●Enhanced, in-stream aquatic habitat

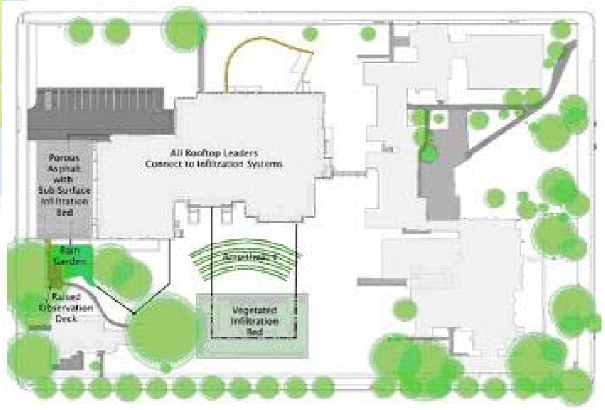
●Opportunities for the community to learn about stream ecology and morphology

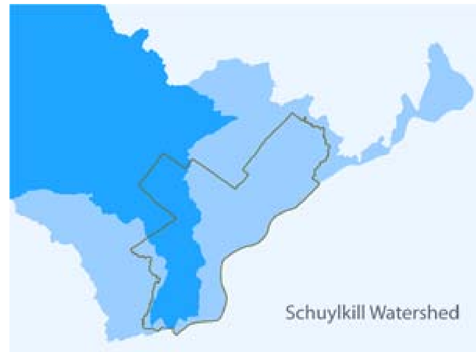
US view of Cobbs Creek post construction

Penn Alexander School

Stormwater BMP Project

Multiple Watersheds





Contact: Amy Leib
215.685.6035
amy.leib@phila.gov

Status: Monitoring

Partners:

Pennsylvania Department of Environmental Protection (PADEP)

University of Pennsylvania (UPENN)

Philadelphia School District (PSD)

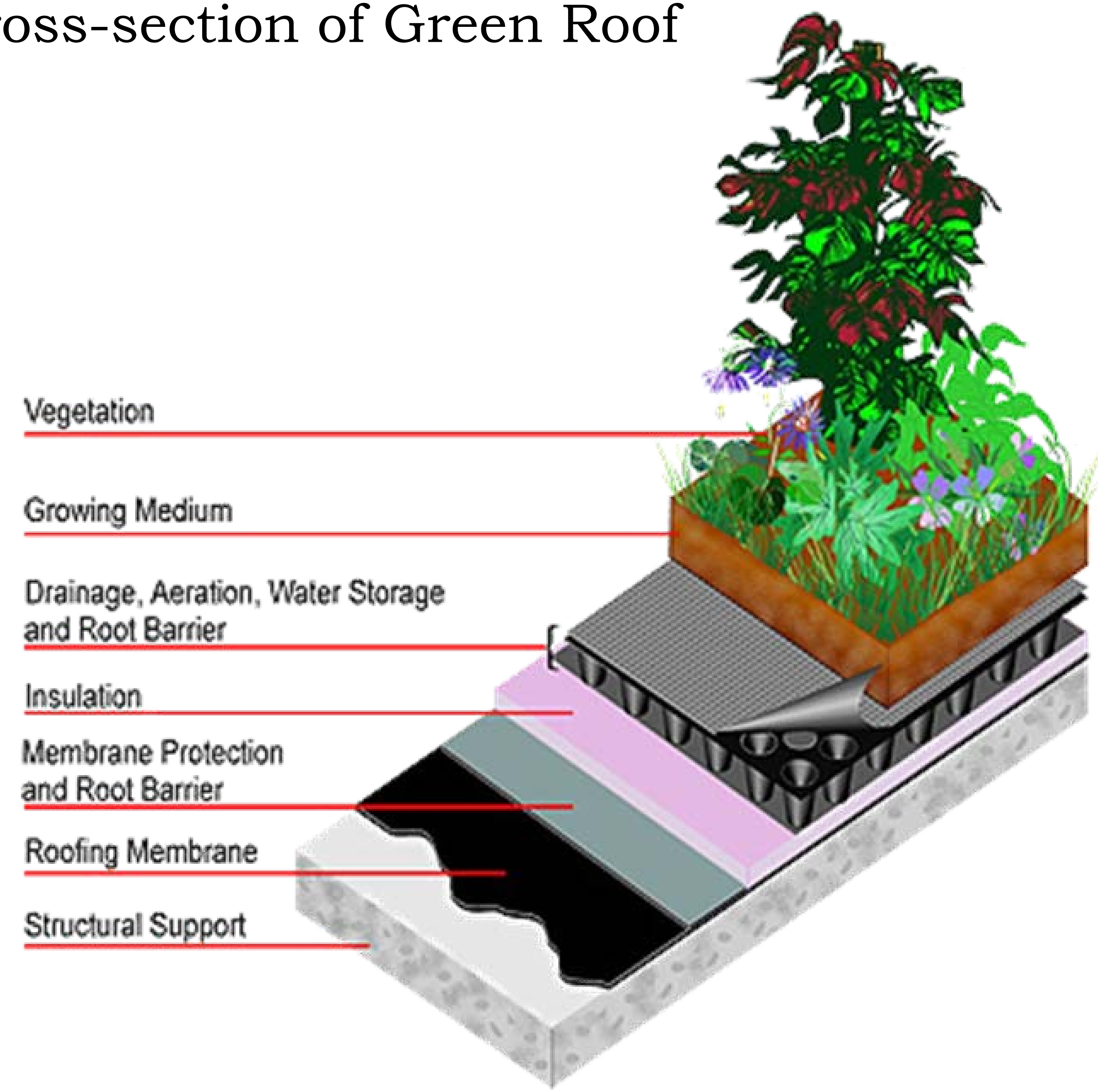
Penn Alexander School...

The University of Pennsylvania and the School District of Philadelphia, working in partnership with the Philadelphia Water Department Office of Watersheds, implemented an innovative storm water management project on the site of Alexander Elementary School in West Philadelphia. The school site posed significant challenges in terms of stormwater retention and soil erosion and offered significant opportunities to provide environmental education and environmental diversity to the community. Major components of the project include rooftop collection, an underground infiltration bed, porous pavement play yard, and a rain garden.

Benefits:

•Reduces the flow of storm water into the combined sewer system through on-site infiltration, thus reducing overflows to the river.
•Reduces non-point source pollution from storm water runoff through volume reduction and vegetative treatment.
•Provides significant opportunities for on-site environmental education for school children.

Cross-section of Green Roof



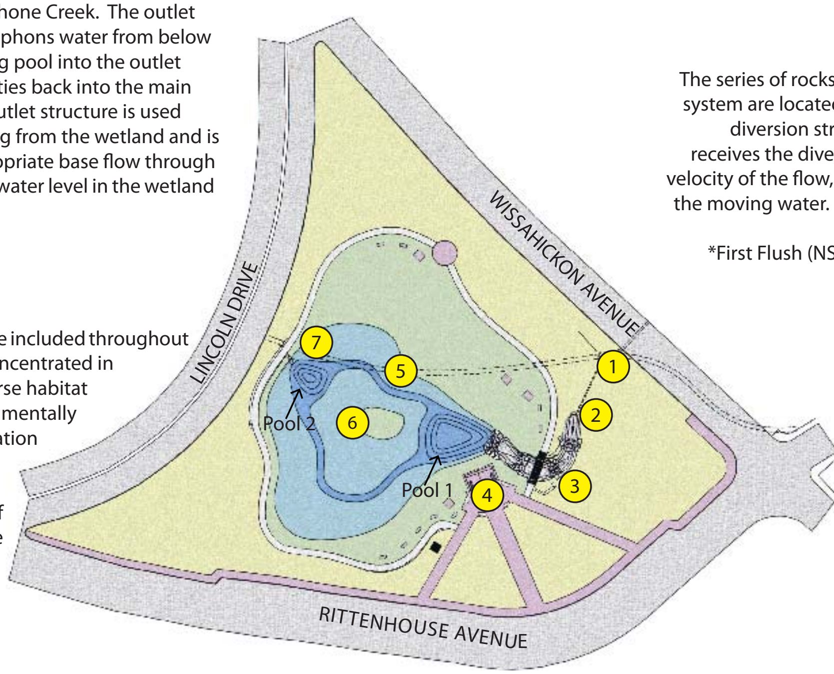
Venice Island Pumping Station with Green Roof

SAYLOR GROVE STORMWATER WETLAND
& ITS STORMWATER MANAGEMENT FEATURES

Stormwater Diversion Chamber #1:
A 48" storm sewer carries the stormwater runoff from this region and connects to a diversion chamber, which intercepts the stormwater flow and directs it to the weir (cascade) for treatment. This structure also acts as a settling chamber where it captures the metals, hydrocarbons and/or other pollutants found in the sediment carried by stormwater runoff, before it enters the wetland. If the two manholes at this site were to be removed, you could view the encapsulated stream flowing right below you into the park.
*Watersheds, Nonpoint Source Pollution (NSP), Stormwater Runoff, Cross Connections/Illicit Discharges

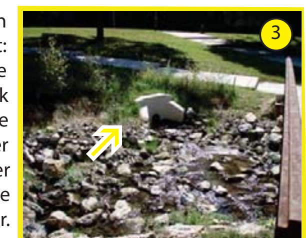
Final Outlet/ Stormwater Diversion Chamber #2
This is the final outlet structure. It diverts the flow back into the original storm sewer after treatment before it enters the Monoshone Creek. The outlet has an 8" storm pipe that siphons water from below the surface of the collecting pool into the outlet structure. The outlet then ties back into the main 48" stormwater line. The outlet structure is used to regulate flow discharging from the wetland and is used to maintain the appropriate base flow through the wetland system. If the water level in the wetland goes above 2 feet, it will spill into the outlet structure.
*Stream Bank Erosion, Stream Restoration

Cascade (Energy Dissipator System):
The series of rocks and pools that make up the cascade system are located just downstream of the stormwater diversion structure outlet (Image 2). The cascade receives the diverted stormwater and slows down the velocity of the flow, reducing the energy associated with the moving water. It also removes coarse sediment and aerates the water.
*First Flush (NSP), Water Quality and Water Quantity Issues, Energy Dissipation



Island/Wetland Meadow
Plants, shrubs, and trees are included throughout the site, but are heavily concentrated in this area to provide a diverse habitat community in this environmentally sensitive zone. The vegetation also filters and removes pollutants from the water, slows down the velocity of the flow, and increases the uptake of water.
*Native Species, Removal of Pollution by Plants, Indicators of Water Quality (Aquatic Organisms)

Stormwater Diversion Chamber #2 Outlet:
Stormwater runoff from the Rittenhouse Avenue side of the Park is diverted into the Park as well. The outlet for this diversion chamber is also visible at the cascade. Refer to Site #1 for a description of the chamber.
*Stream Daylighting



Permanent Pool (Pool #1), Channels, Collecting Pool (Pool #2)
The permanent pool is located at the base of the cascade. It removes the majority of the fine particulate matter in the stormwater wetland. The collecting pool is a smaller version of the permanent pool. It is located directly across – on the other side of the wetland where the outlet structure is located. The surrounding channels reduce the velocity of the flow.
*Water Quality Sampling

Scenic Overlook/Site of Old Fountain:
Surface stormwater runoff from the surrounding parkland on this side of the site drains to the fountain area. There are two drains that release runoff into the wetland underneath this structure.
*Surface Stormwater Runoff

*IndicatesPossibleEducationalDiscussionTopics

BACKGROUND

Stormwater Runoff Impacts

The Monoshone Creek flows alongside Lincoln Drive, just across from Saylor Grove, through Historic RittenhouseTown. The majority of the Monoshone Creek now exists in storm sewer pipes. The creek and its tributaries were encapsulated over a century ago to allow for development of the Germantown community. When development occurs, the natural features of a landscape, such as vegetation and soil, are replaced with hard surfaces, such as pavement and buildings. These hard surfaces prevent stormwater from soaking back into the earth during a rainstorm. As a result, stormwater flows across these impenetrable surfaces, picking up all of the pollutants in its path such as oil, pesticides, fertilizers, or anything else that will float and/or dissolve in stormwater. These pollutants can be transported either directly over land into nearby water bodies or into storm drains which are connected to storm sewer pipes that discharge to streams and creeks. Polluted stormwater not only impacts the water quality of streams, but when the runoff rushes out of the stormwater pipes in great volumes and at high velocities, the form and shape of the streams also become jeopardized. Among many impacts that result from such conditions, the stream beds become scoured, erosion is accelerated, aquatic habitats are damaged, and stream banks become unstable. Stormwater is a water quantity and water quality issue, as we have seen in the Monoshone Creek.

Drinking Water Impacts

The Monoshone Creek and its surrounding sub-shed (smaller scale watershed) are located within the Philadelphia Water Department's (PWD) highest priority zone for source water (drinking water) protection — the Queen Lane and Belmont intakes. The Monoshone is a tributary to the Wissahickon Creek, which empties into the Schuylkill River, near the drinking water intake for Philadelphia's Queen Lane Water Treatment Plant. Because 24% of Philadelphia's drinking water comes from Queen Lane, the health of the entire Wissahickon Creek Watershed, including the Monoshone Creek, is critical to all who live and work in Philadelphia.

In Conclusion

At Saylor Grove, the stormwater treatment wetland will help detain (temporarily hold back) and treat the stormwater which was originally piped directly to the Monoshone Creek. This project will help reduce the quantity of stormwater entering the Monoshone at any given time and help improve the quality of the stormwater runoff as well. The Philadelphia Water Department would like to see every stream mile in the City of Philadelphia meet its designated use as a fishable and "swimmable" stream. This project is an exemplary demonstration of how the City and its partners are reaching this goal together.

SITE FACTS

- Saylor Grove Park is approximately 3.2 acres. The Saylor Grove Wetland makes up about one-third to one acre of the park.
- Saylor Grove Wetland drains approximately 156 acres of stormwater runoff from Germantown. The wetland is designed to drain the stormwater within 24 hours.
- Saylor Grove Wetland will filter a significant portion of the estimated 70 million gallons of stormwater per year.
- The wetland will remove approximately 13 tons of total suspended solids from the Monoshone Creek.
- The first 0.7 inches of every rainfall event will be sent to and treated at the wetland. According to the long-term historical record of the airport's rainfall data, 70% of all storms make up 0.7 inches or less of rainfall.
- The wetland will improve flow variability of the Monoshone Creek.
- The wetland will increase biodiversity (vegetation and animals).
- Approximately 3,000 trees, shrubs, and herbaceous plugs have been planted.

For more information on the stormwater management features, refer to the inside of this document.

Saylor Grove Stormwater Treatment Wetland Tour Guide

Stormwater Management Practices Demonstration Site

Spring 2006

Welcome to the Saylor Grove Stormwater Treatment Wetland! The Philadelphia Water Department (PWD), the Fairmount Park Commission (FPC), and its many partners like to dream big in their shared mission to protect and improve the environment. Fortunately for the Germantown section of Philadelphia, the dreaming (and hard work!) has transformed Fairmount Park's parcel of parkland — Saylor Grove — into one of Philadelphia's first stormwater treatment wetlands. The one-acre wetland, constructed in the fall of 2005, helps to slow down stormwater runoff and filter polluted stormwater from approximately 156 acres of Germantown before it enters the Monoshone Creek. A significant portion of this estimated 70 million gallons of urban stormwater runoff will be treated naturally every year! Saylor Grove not only boasts a stormwater treatment wetland, but also a new educational trail, interpretive signage, historic memorials and sculptures previously located in the park and a renovated, beautified space for all visitors to enjoy.

Why a Wetland?

Wetlands clean stormwater, replenish groundwater, reduce flooding risks, and provide habitats for wildlife. The Saylor Grove Stormwater Treatment Wetland is a highly visible project in the historic Wissahickon Watershed and was selected as a demonstration to illustrate how wetlands can successfully treat stormwater in an urban environment. In demonstrating the success of this project, we hope that similar wetland projects will be replicated throughout the City and in neighboring communities to improve water quality and to help bring back healthy streams and creeks throughout the region.

Prepared for the Center in the Park (Senior Environment Corps)
by the Office of Watersheds, Philadelphia Water Department

CONSTRUCTION & SPECS

The R. E. Roy is a 39-ft, front-end loader, single hull, shallow draft, debris skimming vessel. It is powered by a main diesel engine, Caterpillar Model 3056 205 hp and a four-blade, magnesium bronzed propeller. The vessel is also equipped with a 122-gallon fuel tank, a 150 gpm, 100 psi Water Canon system, and a 5.6 yd^3 hydraulically controlled, grated bucket. Its construction began in June, 2004 and the vessel was delivered in March, 2005

THE DEDICATION

The dedication took place on July, 16, 2005 where the R. E. Roy was officially commissioned. The skimming vessel is named for Richard E. Roy, a former Water Commissioner who gave more than 30 years of gracious service to the City of Philadelphia and the Philadelphia Water Dept.

PARTNERS

PENNSYLVANIA COASTAL ZONE MANAGEMENT PROGRAM

PARTNERSHIP FOR THE DELAWARE ESTUARY INC.

Philadelphia PWD Water Department

Office of Watersheds philadelphia water

Philadelphia Water Department
Office of Watersheds
Aramark Tower – 4th Floor
1101 Market Street
Philadelphia, PA 19107

Philadelphia PWD Water Department

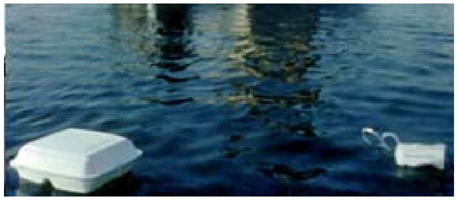
The R. E. Roy

Floatable Skimming Vessel

Commissioned July, 2005

HISTORY AND BACKGROUND

The Philadelphia Water Department Office of Watershed's (PWD OOW) vision is to unite the city with its waterways, creating a green legacy for future generations while incorporating a balance between ecology, economics and equity. PWD's Combined Sewer Overflow Long-Term Control Plan (PWD CSO LTCP), completed in 1997, highlights the need to improve public awareness of an individual's contribution to coastal aesthetics, notably in the Delaware and Schuylkill Rivers, and to improve water quality and aesthetics of surrounding parks and recreational areas. As such, the plan recommends the use of a floatables skimming vessel to remove debris from targeted reaches of the Delaware and Schuylkill Rivers. Similar waterfront enhancement programs have been very successful in New York City, Passaic Valley, NJ, Baltimore, MD, and Washington D.C.



WHY THE NEED FOR THE VESSEL?

The Schuylkill and Delaware Rivers are both undergoing a renaissance of development, ranging from hotel and entertainment centers and new housing, to the restoration of museums, greenways, gardens, and open space. The floatable skimming vessel enables the Philadelphia Water Department to monitor and remove floatables that accrue on the City of Philadelphia's waterways. In addition, it demonstrates to our citizens the value that the City of Philadelphia places on its waterways

HOW IT WORKS!

The front-end loader design allows the skimmer to utilize a grated bucket to lift floatables from the water surface into an on-board hold. The vessel collects debris in the bucket through two means. As the vessel drives through a mat of debris, the debris enters the bucket and is held by the grates as water passes through the grates. In addition, the vessel is designed to create a strong suction current that draws water through the vessel hull and the grated bucket, thus, drawing floatables into the bucket. The grated bucket is capable of holding over 5 yd³ of material. Once the vessel returns to the dock, a crane lifts the grated bucket from the deck for disposal. The R. E. Roy is scheduled to be operated through PWD's Flow Control Unit five days per week from March through Novmber each year, with December to February allotted for annual maintenance.

PROJECT BENEFITS

- Address water quality by collecting trash of a wide variety -- identified through the qualitative assessment.

- Directly affect the interface of land and water by educating the public about where to put trash and better managing non-point source pollution in river.

- Improve and expand public access to coastal zone by drawing people to cleaner and more aesthetically pleasing rivers and providing a cleaner tourist destination point.

- Manage and protect coastal natural, historic, cultural or recreational resources.

- Provide a regional model that can serve as an example for similar projects that will address watershed management that directly impacts the Delaware Estuary by serving as a key implementation project in the abatement of trash as a result of non-point and point source pollution.

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A Homeowner's Guide to Stormwater Management

You can make a difference!

Learn what you can do on your property and in your community to improve the health of your watershed.

Prepared by: **Office of Watersheds**
Philadelphia Water Department

Volume 1 • January 2006

The Office of Watersheds would like to thank the following organizations and partners for their assistance and for the use of their materials in this guide:

Center for Watershed Protection

Fairmount Park Commission

Montgomery County Conservation District

NAM Planning & Design, LLC

National Oceanic & Atmospheric Administration (NOAA)

Pennsylvania Department of Environmental Protection (DEP)

Pennsylvania Horticultural Society

Philadelphia Department of Streets

South River Federation

TreeVitalize

University of Wisconsin — Extension

Washington State Puget Sound Action Team

Wisconsin Department of Natural Resources

Wissahickon Valley Watershed Association

Disclaimer

The information contained in this guide is being offered by the City of Philadelphia (City) through its Water Department (PWD) for the use of residents of the City. Please note that the stormwater management projects or Best Management Practices (BMPs) in this guide are voluntary projects recommended strictly for homeowners. They are not designed for professionals required to comply with the City's Stormwater Regulations.

If you plan to install any of the following structural projects on your property in the City, please notify PWD via its e-mail address (WaterShedsPWD@phila.gov): Rain Barrels, Rain Gardens, or Dry Wells. PWD would like to register your project with the City's Department of Licenses & Inspections (L&I). Also, PWD encourages you to take photographs of your project and to send them to PWD via the above e-mail address

If you experience problems with any water or sewer piping on your property, you should contact a registered plumber.

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A Homeowner's Guide to Stormwater Management

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Introduction

The Office of Watersheds of the Philadelphia Water Department has a vision for Philadelphia—"Clean Water—Green City." We want to unite the City with its water environment, creating a green legacy for future generations while incorporating a balance between ecology, economics and equity.

In order to achieve the goal of "Clean Water-Green City," we must work together with our partners, local residents, homeowner associations and municipalities on managing stormwater in a manner that will restore our watersheds. We can all play a part in taking an active role in converting our streams, creeks and surrounding green spaces into healthy systems that local residents, along with native fish and wildlife, can use as amenities, sanctuaries and habitats. As a homeowner, your part can be as simple as maintaining your car properly or building a rain garden on your lawn. This guide provides you with the steps and actions you can take to improve stormwater management on your property or in your community. These stormwater management projects will not only help protect our invaluable drinking water sources, but they will help green the city, restore our waterways and improve quality of life for all residents.

For more information, please visit www.PhillyRiverInfo.org or e-mail WaterShedsPWD@phila.gov.

Vehicle Maintenance

By maintaining your car properly you can prevent oil leaks, heavy metals and toxic materials from traveling from your car onto the street. Rain washes oil and other hazardous chemicals from the street into the nearest storm drain, ultimately draining into the Delaware and Schuylkill Rivers, the source of drinking water for many. Just imagine the number of cars in our region and the amount of oil that finds its way into our local waterways! It has been estimated that each year over 180 million gallons of used oil is disposed of improperly (Alameda CCWP, 1992), and that a single quart of oil can pollute 250,000 gallons of drinking water (NDRC, 1994). Please follow proper automotive maintenance.

Maintaining your Vehicle

- Maintain your car and always recycle used motor oil.
- Check your car or truck for drips and oil leaks regularly and fix them promptly. Keep your vehicle tuned to reduce oil use.
- Use ground cloths or drip pans under your vehicle if you have leaks or if you are doing engine work. Clean up spills immediately and properly dispose of clean up materials.
- Collect all used oil in containers with tight-fitting lids. Old plastic jugs are excellent for this purpose.
- Recycle used motor oil. Many auto supply stores, car care centers, and gas stations will accept used oil. Do not pour liquid waste down floor drains, sinks or storm drains.
- Do not mix waste oil with gasoline, solvents, or other engine fluids. This contaminates the oil which may be reused, increases the volume of the waste, and may form a more hazardous chemical.
- Never dump motor oil, antifreeze, transmission fluid or other engine fluids into road gutters, down the storm drain or catch basin, onto the ground, or into a ditch.
- Many communities have hazardous waste collection days where used oil can be brought in for proper disposal. Find out about your program. Recycling just one gallon of used oil can generate enough electricity to run the average household for almost 24 hours.
- Try to use drain mats to cover drains in case of a spill.
- Store cracked batteries in leak proof secondary containers.

Lawn & Garden Care

When fertilizing lawns and using other common chemicals, such as pesticides and herbicides, remember you're not just spraying the lawn. When it rains, the rain washes the fertilizers, pesticides and herbicides along the curb and into storm drains, which ultimately carry runoff into the Schuylkill and Delaware Rivers, our drinking water source. In addition to degrading the water quality of our streams and rivers, pesticides can kill critters in the stream and fertilizers can cause algal blooms, which rob our waterways of oxygen that fish need to survive. If you have to use fertilizers, pesticides, and herbicides, carefully read all labels and apply these products sparingly.

Many homeowners are unaware of the actual nutrient needs of their lawns. According to surveys conducted by the Center for Watershed Protection, over 50% of lawn owners fertilize their lawns, yet only 10 to 20% of lawn owners take the trouble to perform soil tests to determine whether fertilization is even needed (CWP, 1999). *Organic lawn care practices (no chemical pesticides and fertilizers) can also be a wise environmental choice and will save you money.* Conduct a soil test on your lawn and follow the below practices to reduce the need to fertilize on your lawn and garden.

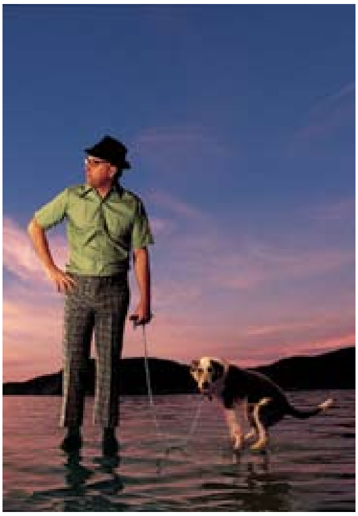
Caring for your Lawn and Garden

- Use fertilizers sparingly. Lawns and many plants do not need as much fertilizer or need it as often as you might think. Test your soil to be sure!
- Consider using organic fertilizers; they release nutrients more slowly.
- Never fertilize before a rain storm (the pollutants are picked up by stormwater during rain events).
- Keep fertilizer off of paved surfaces—off of sidewalks, driveways, etc. If granular fertilizer gets onto paved surfaces, collect it for later use or sweep it onto the lawn.
- Use commercially available compost or make your own using garden waste. Mixing compost with your soil means your plants will need less chemical fertilizer and puts your waste to good use. Another alternative is to use commercial compost, called Earthmate, which is available for free through PWD. Call 215-685-4065 or visit the website to learn more about Earthmate: www.phila.gov/water/brc/brchow2get.html
- Let your grass clippings lay! Don't bag the grass. Use a mulching lawn mower to cut one-third of the blade length each week and naturally fertilize your lawn in the process.

Lawn & Garden Care

- Wash your spreader equipment on a pervious (penetrable) vegetated area, like the lawn, to allow for the natural absorption of excess fertilizer.
- Never apply fertilizer to frozen ground or dormant lawns.
- Maintain a buffer strip of unmowed natural vegetation bordering waterways and ponds to trap excess fertilizers and sediment from lawns/gardens.
- Grow an organic garden (no pesticides or fertilizers). Call the Organic Landscape Alliance at 1-866-820-0279 or visit www.organiclandscape.org.

Pet Waste



When animal waste is left on the ground, rainwater or melting snow washes the pet waste into our storm drains or directly into our local creeks. The disease-causing bacteria found in pet waste eventually flows from our local waterways into the Delaware and Schuylkill Rivers, our drinking water source. In addition to contaminating waterways with disease-carrying bacteria, animal waste acts like a fertilizer in the water, just as it does on land. This promotes excessive aquatic plant growth that can choke waterways and promote algae blooms, robbing the water of vital oxygen.

Scooping Up the Poop

- Bag it! When going for dog walks, take a shopping bag or sandwich bag. When doggy makes a deposit, turn the baggie inside out over your hand and use it as a glove to pick up the waste.
- Flush the pet waste down the toilet because then it is treated at a sewage treatment plant.
- If flushing down the toilet is not a viable option, put the pet waste in the trash, but never put waste into storm drains.
- Encourage your neighbors to provide pet waste stations for collection and disposal of waste. Check to see if the parks in your neighborhood have them.
- Dig a small trench in your yard where your pets tend to defecate and toss the waste in the trench, cover with a layer of leaves, grass clippings, and dirt.
- Dispose waste in disposal units called Doggy Loos where they are installed into the ground. Decomposition occurs within the unit.
- At the park, set up a pooch patch which has a pole surrounded by a light scattering of sand around it. Dog owners can introduce their dog to the pole upon entry to the park. Dogs will then return to the patch to defecate and then you can place the pet waste in special bins for disposal.

Vehicle Washing

Car washing is a common routine for residents and a popular way for organizations, such as scout troops, schools, and sports teams to raise funds. However, most of the time, cars are washed in driveways and parking lots which allow wash water (dirty water) to finds its way to the nearest storm drain, ultimately draining into our drinking water sources, the Delaware and Schuylkill Rivers. The wash water often contains pollutants, such as oils and grease, phosphates (from the soap), and heavy metals—all of which are unhealthy for people and fish.

Washing Your Car Properly

- The best action is to take your vehicle to a commercial car wash, especially if you plan to clean the engine or the bottom of the car. Most car washes reuse water several times before sending it for treatment at a sewage treatment plant.

If you still want to wash your car at home...

- Wash your car on gravel, grass or another permeable surface, so the ground can filter the water naturally.
- Use soap sparingly. Try to use non-phosphate detergents. Phosphates are nutrients that can cause problems for nearby waterways.
- Use a hose that is high pressure, low volume. Use a hose with a nozzle that automatically turns off when left unattended or one that has a pistol grip or trigger nozzle to save water. Wash one section of the car at a time and rinse it quickly.
- When you're done, empty your bucket of soapy water down the sink, not the street.
- Block off the storm drain during charity car wash events or use an insert with a vacuum pump to catch wash water and empty it into the sink, not the street.

Tree Planting

If you have any tree planting questions and need to ask an expert, go to www.pennsylvaniahorticulturalsociety.org/garden/ask_gardener

Trees are not only a beautiful addition to the landscape, but they also provide invaluable benefits to cities. They reduce heat by cooling and shading homes during the hot summer months, decreasing the amount of energy required to cool a home and its related electric bills. Mature trees can actually cut summer cooling costs by 40% and tree-lined blocks can even decrease local temperatures. Trees naturally clean the air of pollutants and create a neighborhood noise buffer. Trees also improve stormwater management, reducing the amount of polluted stormwater that normally would go directly into storm drains. Tree roots also allow rainwater to filter back into the soil, recharging the often thirsty water table. A 2005 study by the University of Pennsylvania found that trees can increase property values. Planting a tree within 50 feet of a house can increase its sale price by 10 to 15%. Some studies even indicate that the mere presence of trees can create stronger neighborhood ties and reduce crime.

Planting a Tree

Before getting started, you may be interested in participating in the TreeVitalize rebate program where you may be eligible to receive up to a $25 rebate on the purchase of a tree. Whether you are planting a tree in your yard or hiring a contractor to plant a street tree, you may qualify. For more information, visit www.treevitalize.net and www.pennsylvaniahorticulturalsociety.org/phlgreen/tree-pledge.html.

Also, the Pennsylvania Horticultural Society's Tree Tenders Program offers a basic training course designed to teach general tree-care skills to organized community groups and individuals in Philadelphia. If you are interested in the course or a free copy of the *Tree Tenders Handbook* or *Mini-Guide to Tree Planting,* visit www.pennsylvaniahorticulturalsociety.org/phlgreen/treetenders.

1. Now, if you are ready to get started with your tree planting, select a site appropriate for your tree.
2. Dig the hole at least 1½ to 2 times the width of the root ball (container) to be installed, and no deeper than the height of the root ball so that the root flare (the top of the root mass) is flush with the existing ground. The planting pit should be dug so the walls of the pit are angled like a bowl or sloping outward in heavy soils.
3. Break up the walls of the pit after digging, so that fine roots can penetrate the soil. The soil that you dig out of the hole is what you will use to backfill around the root ball. Soil amendments are not recommended when planting a tree; therefore, no compost, moss, or shredded pine bark should be added to the backfill.

Tree Planting

You can also volunteer to plant trees elsewhere in the city—along creeks and streams in Fairmount Park and at local schools. The more trees in Philadelphia, the healthier we will be! Contact Fairmount Park, Greater Philadelphia Cares and UC Green to learn how you can volunteer to plant trees.

4. Remove all debris from the pit and gently tightly pack the loose soil in the bottom of the pit by hand.
5. Cut and remove the rope and burlap from around the trunk and check for root flare. Remove all nails. Drop the burlap down to the bottom of the hole.
6. Do not handle the plant by the branches, leaves or stem. Place the plant straight in the center of the planting pit, carrying the plant by the root ball. Never carry a plant by the trunk or branches.
7. After the tree is in the pit, carefully cut and remove the top third of the wire basket and as much burlap as possible using the least amount of disturbance.
8. Backfill planting pit with existing soil and pack it in there tightly to fill all voids and air pockets. Do not over compact soil. Make sure plant remains straight during backfilling/packing procedure.
9. The top of the root mass (root flare) of the tree should be flush with the final grade. Do not cover stem with soil. If your tree has soil over the trunk flare (where the trunk cures outward into the root system), it is essential to plant the trunk flare above soil. Remove the soil from the root ball if the flare is buried by it.
10. Water plant thoroughly and slowly, immediately after planting to saturate backfill. For the first year after planting, water the tree with 15 gallons per week. Use your index finger to check the soil moisture under the mulch. If the soil is cool to the touch, do not water. If it is warm and dry, then water. A layer of mulch (i.e. shredded bark, compost) should be placed around the tree, at a depth between 3 to 4 inches and with a radius of approximately 2 to 4 inches from the tree stem. Do not rest the mulch directly against the tree stem. The mulch makes it easier to water the tree and reduces weed competition.
11. Remove all tags, labels, strings and wire form the plant material.

Many homeowners ask how a newly planted tree can affect the sewer, water lines, sidewalk and/or building's foundation? If you choose the correct tree, site, and planting conditions, your tree shouldn't interfere with your sewer, waterline, etc. Most tree roots grow in the soil's top 12 inches and spread well beyond the tree's canopy in search of water and nutrients. They don't "attack" underground mains, unless these are already damaged, providing entrances for developing roots. An adequate and generous tree pit, or long, narrow continuous "tree lawn" will provide the best conditions for establishing and maintaining a "well behaved" tree with the environment needed to survive in the city.

Tree Planting

Street Trees

If you do not have a yard, but you would like to have a tree in front of your property—on your sidewalk—you have several options in Philadelphia.

You can get a tree for free and installed at no cost by **Fairmount Park**, however, this may involve being placed on a waiting list

You or a group from your neighborhood can sign up for a **Tree Tenders program** through the Pennsylvania Horticultural Society, where you can get trained to care for your tree, learn how to organize a tree planting project and receive free tree care tools in exchange for your participation.

Lastly, you can **hire a contractor** approved by Fairmount Park to plant a tree in front of your house. However, the contractor you hire must apply for a Street Tree Permit from Fairmount Park before any work can be done. The private planting could cost you up to $500 (not including the price of the tree).

Talk to your neighbors and find out if there is a neighborhood organization or Tree Tenders group organizing a street tree planting project. Some local groups that do tree plantings, include The South of South Neighborhood Organization, UC Green and Citizens Alliance.

Recommended Street Tree List for Philadelphia

The Fairmount Park Commission recommends the below list of approved trees which will thrive in an urban setting, have a good track record, and won't interfere with overhead wires in Philadelphia.

Small Trees—Under 30 feet

Acer buergeranum—Trident Maple

Acer campestre—Hedge Maple

Acer ginnala—Amur Maple

Acer tataricum—Tartarian Maple

Crataegus crus-galli 'Inermis'—Thornless Hawthorn, tree form

Crataegus laevigata 'Superba'—Crimson Cloud Hawthorn tree form

Crataegus phaenopyrum—Washington Hawthorn, tree form

Crataegus viridis—Winter King Hawthorne

Prunus triloba—Flowering Plum

Malus (selected varieties)—Crabapple

Syringa reticulata—Japanese Tree Lilac

Medium Trees 30–46 feet

Aesculus x carnea 'Briotii'—Ruby Red Horsechestnut

Cercidiphyllum japonica—Katsura tree

Cladrastis lutea—Yellowwood

Crataegus lavallei—Lavalle Hawthorn

Koelreuteria paniculata—Golden Rain Tree

Malus (selected varieties)—Crabapple

Ostrya virginiana—Hop Hornbeam

Phellodendron amurense—Amur Cork Tree

Prunus x yedoensis—Yoshino Cherry

Ulmus parvifolia—Chinese Elm

Quercus acutissima—Sawtooth Oak

Large Trees Over 47 feet

Acer rubrum (selected cultivars)—Red Maple

Celtis occidentalis—Hackberry

Corylus colurna—Turkish Filbert

Fraxinus pennsylvanica 'Patmore'—Patmore Green Ash

Gleditsia triacanthos (selected cultivars)—Honey Locust, a) Halka, b) Moraine, c) Shademaster

Ginkgo biloba (male selections only)—Ginkgo

Liquidambar styraciflua—Sweetgum

Quercus rubra—Red Oak

Quercus macrocarpa—Bur Oak

Quercus palustris—Pin Oak

Sophora japonica—Japanese Pagoda Tree

Tilia cordata—Little Leaf Linden

Zelkova serrata (selected cultivars)—Japanese Zelkova—a) Green Vase, b) Village Green

Columnar Trees for Narrow Streets

Acer rubrum 'Armstrong'—Armstrong Columnar Red Maple

Carpinus betulus fastigiata—Pyramidal European Hornbeam

Ginkgo biloba 'Princeton Sentry'—Princeton Sentry Ginkgo Grafted Male Variety

Prunus sargentii 'Columnaris'—Columnar Sargent Cherry

Quercus robur 'Rose Hill'—Rose Hill English Oak

Backyard Stream

Establish a streamside (riparian) buffer—a vegetated area along the edge of the stream that protects it from pollution and erosion. This buffer zone absorbs pollutants and nutrients that would otherwise end up running directly into the stream. Plant material slows runoff and filters out pollutants and sediments. Well-planted streamside buffers are also a great low-cost way to control erosion. While plants slow runoff, filter pollutants, and help control erosion, trees cast shade on the stream, cooling the water, reducing algae growth and improving fish habitat. A buffer with trees and shrubs also becomes a home to birds, butterflies and other creatures. Trees and plants that grow in the buffer play a critical role in keeping streams healthy.

Caring for Your Stream

- Begin with a "no mow" or "no graze" zone along your stream banks. Make your buffer as wide as possible.
- Plant trees and shrubs in your buffer zone. They provide many long-lasting benefits and can be quite inexpensive to establish and maintain.
- Using shrubs will give your buffer a quick start; many reach full size in just a few years.
- Set your mower blades at least three inches high. Taller grass slows runoff, resists drought and needs less fertilizer
- Use hay bales or a special silt fence to prevent soil from washing off your site and into the stream while establishing your stream buffer.
- Cover piles of soil with tarps to protect them from rain.
- Use good farm practices by not cultivating the soil and planting winter cover crops to conserve soil.
- Contact your local DEP office or county conservation district if you see soil runoff in the stream from a nearby construction site.
- Limit your overall use of pesticides and herbicides, and use extreme caution when using them near streams.
- Keep grazing and other farm animals out of and away from the stream. Contact your county conservation district or the U.S. Fish and Wildlife Service to find out about farm fencing programs.
- Compost yard waste. Don't bag lawn trimmings or throw them into the stream; leave them in place for effective recycling of nutrients.
- Store firewood, trash and other materials well away from streams.

Winter De-icing

As snow piles up in the winter, we oftentimes turn to salt to melt snow and ice. Salt, however, causes adverse environmental impacts, especially on our streams and rivers, our drinking water source in Philadelphia. Excess salt can saturate and destroy a soil's natural structure and result in more erosion to our waterways. High concentrations of salt can damage and kill vegetation. Salt poses the greatest danger to fresh water ecosystems and fish. Studies in New York have shown that as salt concentrations increase in a stream, biodiversity decreases. Excess salt can seep into groundwater and stormwater runoff. Effective ice control can help prevent excess salt runoff to our waterways.

De-icing in the Winter

There are many alternatives to salt including potassium chloride, calcium chloride and magnesium chloride, corn processing byproducts, and calcium magnesium acetate (CMA). Most can be found in your local hardware stores under various trade names, so check the labels for chemical content. While these alternatives can be spread in a dry form or sprayed as a liquid, their best use occurs when they are used with salt. They tend to increase the efficiency of salt thereby reducing the amount that needs to be applied. When over-applied, all chloride compounds can be harmful to the environment. Non-chloride corn byproducts recycled from mills and breweries have been shown to be effective de-icers as well. While they are often advertised as organic or natural, they can have extremely high phosphorus content, a major water pollutant. Numerous studies have shown calcium magnesium acetate (CMA) to be the most environmentally benign de-icer. Many northern states use CMA on roads in sensitive areas (wetlands, endangered species' habitat, drinking water supply, etc.). A couple of disadvantages with CMA however, is that it does not work well below 25° Fahrenheit and it is the most expensive de-icer. Because all de-icers can be harmful to the environment when applied in excess, the best strategy is to reduce the use of these chemicals as much as possible.

- The first line of defense should simply be to shovel sidewalks and pathways to keep them clear and to prevent ice from forming. Also, consider that salt and de-icers are not effective when more than 3 inches of snow have accumulated.
- Consider the temperature. Salt and calcium magnesium acetate (CMA) have a much slower effect on melting snow and ice at temperatures below 25° Fahrenheit.

Winter De-icing

- Track winter weather and only use salt and de-icers when a storm is about to come through. If a winter storm does not occur, sweep up any unused material, store, and reuse for the next big storm.
- Apply de-icing products discriminately, focusing on high-use areas and slopes where traction is critical. Apply the least amount necessary to get the job done. This will save money in product costs and will also help minimize property damage to paved surfaces, vehicles, and vegetation.
- Reduce salt and other chemicals by adding sand for traction.
- Become familiar with various de-icing products and wetting agents such as magnesium chloride and calcium chloride, which can improve the effectiveness of salt and reduce the amount needed.
- If you observe ongoing issues of ineffective ice management or examples of poor application, such as excess piles of road salt left to disperse, share your concerns with the property manager of your residence or business, or with the City of Philadelphia Streets Department. The Streets Department Hotline is 215-686-5560 and their website is www.phila.gov/streets.
- Plant native vegetation that is salt tolerant in stormwater drainage swales and ponds that may receive salt-laden runoff. Not only will these native species have a greater chance for survival, but they will continue to act as an effective buffer for our local waterways.
- Store salt and other products on an impervious (impenetrable) surface, such as a basement floor, to prevent ground contamination. Also store products in a dry, covered area to prevent stormwater runoff.

Planters (Container Gardens)

Planters reduce impervious cover (impenetrable surfaces, such as concrete sidewalks, parking lots, etc.) by retaining stormwater runoff rather than allowing it to directly drain into nearby sewers and creeks. Planters offer "green space" in tightly confined urban areas by providing a soil/plant mixture suitable for stormwater capture and treatment. They can be used on sidewalks, parking areas, back yards, rooftops and other impervious areas.

Contained Planters

Contained planters are used for planting trees, shrubs, and ground cover. The planter is either prefabricated or permanently constructed and has a variety of shapes and sizes. Planters may range from large concrete planters to potted plants arranged on an impervious surface like the roof garden shown in the bottom photos to left. Planters can be placed on impervious surfaces like sidewalks, back yards, rooftops, or along the perimeter of a building in order to catch stormwater runoff from the roof. Contained planters may drain onto impervious surfaces through holes in their base or by an overflow structure so the plants do not drown during larger rain events.

Plants should be hardy and self-sustaining native species with little need for fertilizers or pesticides. Planters can be made of stone, concrete, brick, wood, or any other suitable material. However, treated wood should be avoided if it leaches any toxic chemicals.

Planters can be permanently fixed in place or easily moved around to enable you to change the look of the planter garden that you have created. Numerous manufactured pots and planters are available at your local hardware or landscaping store. You can create a "do-it-yourself" planter or use recycled items to create planters. Homemade planters may be constructed by stacking and fastening wood beams or laying and mortaring stones. There are many websites with detailed instructions to help with this type of project, such as www.taunton.com, www.hgtv.com, www.diynetwork.com.*

Creating a Contained Planter

- Purchase planters at the local hardware or landscaping store, if you are not building your own planter box.
- Drill holes in the bottom of the planter if they are not already there.
- Fill the planter with soil and leave a 12 inch area from the soil to the top of the planter.
- Choose native drought and saturation tolerant plants and trees to plant in the planter.
- Occasionally turn or till the soil to improve infiltration.

*These are just a few of the websites PWD came across during our research. These particular companies are not endorsed by PWD, nor can PWD verify any information on these companies.

Rain Barrels

Please read the Disclaimer on the inside cover, if you are interested in installing this project.

A rain barrel collects and stores stormwater runoff from rooftops. By detaining (temporarily holding) the stormwater runoff during a rain event, you can help add capacity to the city's sewer system and reduce sewer overflows to our creeks and rivers, our drinking water source. Also, the collected rain water can be reused for irrigation to water lawns, gardens, window boxes or street trees.

Rain barrels can be purchased on-line or they can be built. If you would like to purchase a rain barrel on-line, view the list of retailers we came across in our research.*

Whether you buy or build a rain barrel, the most important thing to remember is that they are only effective at stormwater management when the stored water is emptied in between storms, making room in the barrel for the next storm.

Building a Rain Barrel

- Rain barrels help lower water costs when the stored water is recycled for lawn irrigation, for example.
- Rain barrels help reduce water pollution by reducing stormwater runoff, which oftentimes picks up pollutants in its path, such as oil, grease and animal waste, and transports these pollutants to the nearest creek, river or stormdrain.
- Storing rainwater for garden and lawn use helps recharge groundwater naturally.

Materials Needed for Building a Rain Barrel

- One 55 gallon drum
- One 5 foot section vinyl garden hose
- One 4 foot diameter atrium grate (basket used in garden ponds and pool skimmers)
- One ½ inch PVC male adapter
- One ¾ inch x ½ inch PVC male adapter
- One 5 foot section of drain hose, drain line, or sump pump line (1¼ inch)
- One 1¼ inch female barbed fitting and
- One 1¼ inch male threaded coupling
- One vinyl gutter elbow
- Drill (or a hole saw)
- Router, jig saw or coping saw
- Measuring tape

Optional:

- Waterproof sealant (silicone caulk, PVC glue)
- Teflon tape
- Fiberglass window screen material or mosquito netting
- Cinder blocks or wooden crate

Rain Barrels

***Rain Barrel Distributors**

Clean Air Gardening
Composters.com
Day's Garden
ENVIRO ENERGY International Inc.
Gardener's Supply Company
GARDENWARe
Green Culture
Green Venture
Jerry Baker
Lee Valley Tools
Midwest Internet Sales
New England Rain Barrel and Composter Company
RainCatcher 4000
Plow&Hearth
Rain King
Rainsaver USA
Real Goods
Riversides
The Rain King
Spruce Creek Rainsaver
The Rain Pail
Urban Garden Center

This is not a comprehensive list of rain barrel distributors or suppliers. This is a list of rain barrel distributors that PWD came across during our rain barrel research. The particular companies are not endorsed by PWD, nor can PWD verify any information on these companies.

Instructions for Building a Rain Barrel

Step 1. Cut Holes in Rain Barrel:

- Cut lower drain hole: Measure about 1 inch above the bottom of the barrel (55 gallon drum) where the barrel side begins to rise toward the top. Using a ¾ inch bit (or hole saw), drill a hole through the barrel.
- Cut upper drain hole: Mark the upper drain hole according to where you want the overflow to be in the upper region of the barrel and in relationship to the lower drain. Use a 1⅝ inch hole saw to cut out the overflow hole.
- Cut top hole for atrium grate (filter): Using the atrium grate as a template for size, mark a circle at the center of the top of the drum (locating the rainwater inlet in the center of the barrel lets you pivot the barrel without moving the downspout). Drill a ½ inch hole inside of the marked circle. Use a router, jigsaw or coping saw to cut until the hole is large enough to accommodate the atrium grate, which filters out large debris. Don't make the hole too big—you want the rim of the atrium grate to fit securely on the top of the barrel without falling in.
- Cut notch to hold hose: Using a ½ inch bit or hole saw, cut out a notch at the top of the barrel rim (aligned so that it is above the lower drain hole). The notch should be large enough so that the end of the hose with the adapter will firmly snap into place.

Step 2. Set Up Barrel and Modify Downspout:

- Set up barrel: Since water will only flow from the garden hose when the hose is below the barrel, place the barrel on high ground or up on cinder blocks or a sturdy wooden crate underneath your downspout, making sure the barrel is level.
- Modify your downspout: Cut your existing downspout using a saw so that the downspout's end can be placed over the top of your rain barrel. Use a vinyl downspout elbow that fits the size of your downspout (usually 3 inch or 4 inch) to aim the stormwater into the rain barrel or just simply place the barrel right under the downspout.

Step 3. Assemble Parts:

- Attach garden hose to lower drain hole: Screw in the ½ inch PVC male adapter to the lower drain hole. The hard PVC threads cut matching grooves into the soft plastic of the barrel. Unscrew the ½ inch PVC male adapter from the hole. Wrap threads tightly with teflon tape (optional). Coat the threads of the coupler with waterproof sealant (optional). Screw the coated adapter back into the hole and let it sit and dry for 24 hours (optional). Attach 5 foot garden hose to the PVC male adapter. Attach the ¾ inch x ½ inch PVC

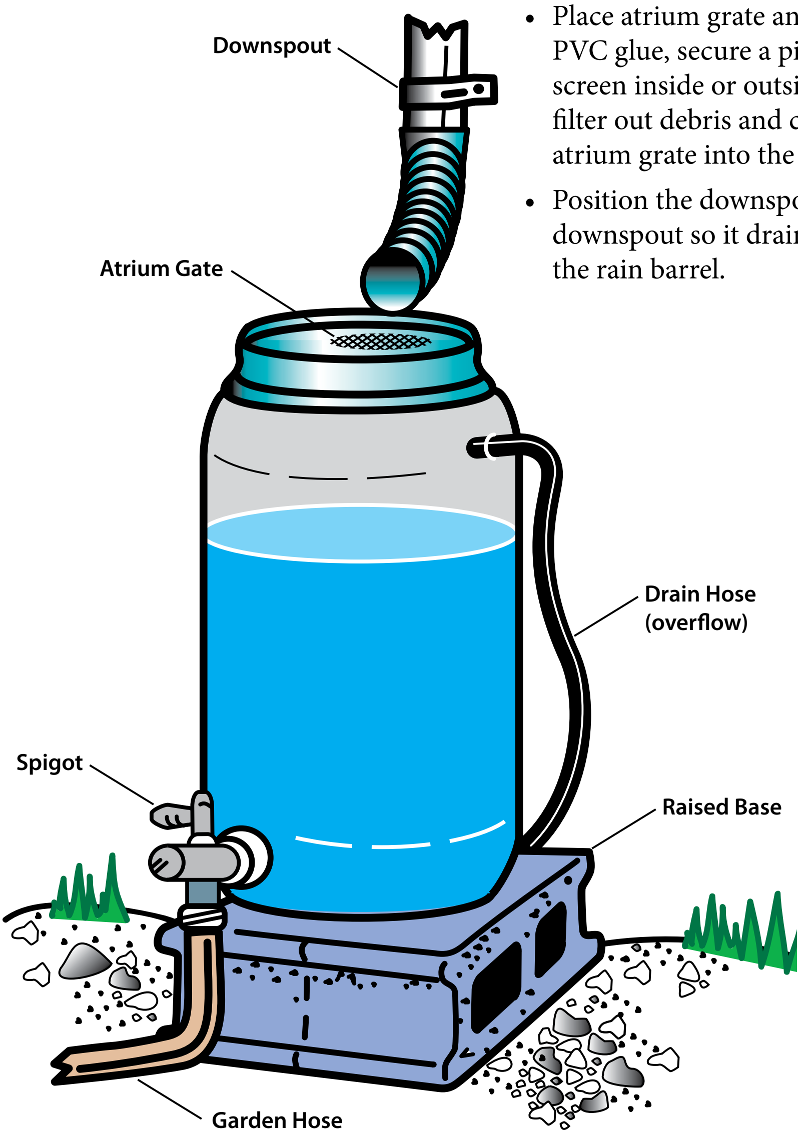
Don't forget to empty your rain barrel after the storm!

male adapter to the other end of the hose (this can be readily adapted to fit a standard garden hose).

- Attach drain hose (overflow hose) to upper drain hole: Put the 1¼ inch male threaded coupling inside the barrel with the threads through the hole. From the outside, screw the 1¼ inch female barbed fitting onto the threaded coupling. Use silicone on the threads (optional). Attach 5 foot section of drain hose to upper fitting and connect it to where the original downspout was connected (sewer riser) in order to transport the overflow into the sewer.

The overflow must be conveyed safely away from your property and your neighbor's property. If your downspout was not originally connected to the sewer, place a splash pad on the ground under the overflow hose to direct the flow away from the foundation of your home.

- Place atrium grate and screen in top hole: Using PVC glue, secure a piece of fine mesh window screen inside or outside of the atrium grate to filter out debris and control mosquitoes. Place the atrium grate into the hole (basket down).
- Position the downspout: Position the end of your downspout so it drains onto the atrium grate on the rain barrel.



Rain Gardens

Please read the Disclaimer on the inside cover, if you are interested in installing this project.

Materials

- Plants for the garden (see plant list)
- Hose, rope or string
- Level
- Shovel or spade
- Measuring tape
- Humus or other soil amendments (optional)
- Downspout extension (also optional).

A rain garden uses native plants and landscaping to soak up rain water (stormwater) that flows from downspouts or simply flows over land during a rain event. The center of the rain garden holds several inches of water, allowing the stormwater to slowly seep into the ground instead of flow directly from your roof, yard or driveway into the nearest storm drain, creek or river.

Creating a Rain Garden

- A rain garden allows 30% more water to seep into the ground than a conventional lawn (South River Federation & Center for Watershed Protection, 2002). This increase helps replenish the groundwater supply (important during a drought!), and also helps hold back stormwater from contributing to the stormwater and sewage overflows into nearby creeks and rivers.
- A rain garden reduces the amount of water pollution that would otherwise eventually reach the streams and rivers through stormwater runoff. Scientific studies have demonstrated that the first inch of rainfall is responsible for the bulk of the pollutants in stormwater runoff. A rain garden is designed to temporarily hold this one-inch of rainfall and slowly filter out many of the common pollutants in the water, such as oil, grease, and animal waste, that would otherwise flow into the waterways via the nearest stormdrain or stormwater runoff.
- The native plants used in rain gardens require less water and less fertilizer than conventional lawns. They also require less maintenance and provide habitat for birds and other wildlife.

Instructions

Before starting this project, please conduct an Infiltration Test (pages 26–27) to determine if your soil conditions are adequate for a rain garden.

Step 1. Size and Locate your Rain Garden:

- First, measure the footprint of your house by getting the area (length x width) of your house and then determine how much of your rooftop area drains to the downspout you are disconnecting to your garden (for gutters with a downspout at

Sizing Example

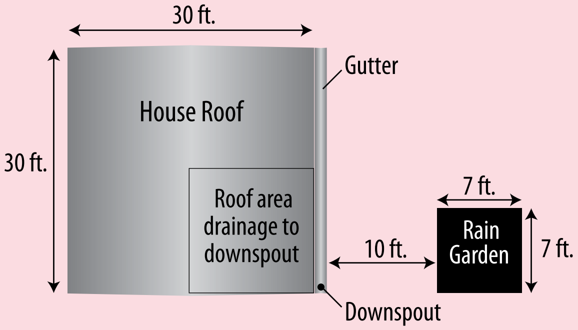
If the area of the house is 30 ft. x 30 ft. and ¼ of this area drains to one downspout:

15 ft. x 15 ft. = 225 ft.^{2}

20% of 225 ft.^{2} = 45 ft.^{2}

30% of 225 ft.^{2} = 67.5 ft.^{2}

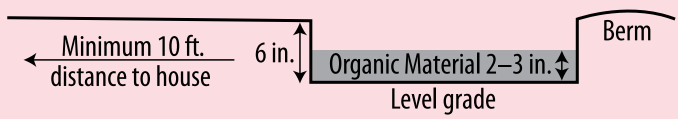
The rain garden area should be between 45 and 67.5 square feet, depending on soil type (use 20% for sandier soils).



each end, assume that half the water goes to each downspout). Refer to the sizing example for guidance. Be sure you measure the house footprint only, but include the area of any driveway or patio areas that will drain to the rain garden (do not take the roof slope into account). The surface area of your rain garden should be between 20% and 30% of the roof area that will drain into the rain garden.

- Locate the garden at least 10 feet away from your house and your neighbor's house (to prevent water leakage), and create the garden in the lowest point of this section of your lawn, maintaining a minimum 1% slope from the house down to the rain garden. If your yard drain is also located in this section of the lawn, you can build the rain garden around the drain. The bottom of the rain garden would be a few inches lower than the drain and the overflow would actually be in the middle of the rain garden.
- If you build the rain garden around your yard drain, when it fills up with water, the water that overflows from the garden will be conveyed safely to the yard drain. If you are not building around the yard drain, it is imperative that the overflow is safely conveyed to a drain nearby to prevent it from flowing into your neighbor's property.
Make sure the drain is in a suitable location in relation to the rain garden in order to effectively manage the garden's overflow.

Garden Cross Section



- When finding the right spot for your rain garden, keep in mind that you will want to create a shallow ditch or swale that carries the stormwater runoff from the disconnected downspout to the rain garden. The swale will help slow the runoff before it reaches the rain garden.
- Finally, lay out the boundary of the garden with a rope.

Step 2. Dig the Rain Garden:

- To enable the rain garden to hold several inches of water during a storm, you'll have to dig a hole 3 to 4 inches deep across the entire surface of the rain garden. If the soil lacks organic material, you can improve it by digging the hole 5 to 6 inches deep, and adding 2 to 3 inches of humus or other organic material. Make sure the bottom is level, but gently slopes from the bottom to the ground level around the edges. If the drop at the edge is too steep, you might get some erosion around the edges.

Rain Gardens

- Next, test how the garden will hold water during a storm by letting water flow into the rain garden from a hose placed at the downspout. Based on this test, make any necessary adjustments (e.g., create a berm on the lower side of the garden using the diggings—the soil that was excavated).

Step 3. Add Plants to the Rain Garden:

- Choose native plants that won't require much watering, but make sure they can withstand wet soils for up to 24 hours. (Refer to the list of native plants below.)
- Also, take into account how much sun your garden receives. It's often helpful to draw out a planting plan before you start, and mark planting areas within the garden with string. After planting, weeding may be required until the plants become established. You may also need to periodically prune some of the plants to let others grow. In the winter, leave dead or dormant plants standing and cut back in the spring.
- Your garden may need a bit more maintenance than a lawn in the beginning, but in the long run it will be easier to care for and provide many added benefits!

Native Plants Recommended by Fairmount Park for Rain Gardens

Perennials

Bee-balm—*Monarda didyma*

Black-eyed Susan—*Rudbeckia hirta*

Blazing star—*Liatris spicata*

Blue flag iris—*Iris versicolor*

Boneset—*Eupatorium perfoliatum*

Butterfly weed—*Asclepias tuberosa*

Cardinal flower—*Lobelia cardinalis*

Early goldenrod—*Solidago bicolor*

Golden alexander—*Zizia aurea*

Joe-pye weed—*Eupatorium purpureum*

New England aster—*Aster novae-angliae*

New York ironweed—*Veronia novaboroscensis*

Obedient plant—*Physostegia virginiana*

Ox-eye—Heliopsis helianthoides

Solomon's seal—*Polygonatum biflorum*

White snakeroot—*Eupatorium rugosum*

Grasses and Grass-like plants

Big bluestem—*Andropogon gerardii*

Bottle brush grass—*Elymus hystrix*

Canada wild rye—*Elymus canadensis*

Path rush—*Juncus tenuis*

Purple-top—*Tridens flavus*

Soft rush—*Juncus effusus*

Switch-grass—*Panicum virgatum*

Virginia wild rye—*Elymus virginicus*

Ferns

Christmas fern—*Polystichum acrostichoides*

Hay-scented fern—*Dennstaedtia punctilobula*

Rattlesnake fern—*Botrychium virginianum*

Sensitive fern—*Onoclea sensibilis*

Shrubs

Gray dogwood—*Cornus racemosa*

Highbush blueberry—*Vaccinium corymbosm*

Mountain laurel—*Kalmia latifolia**

Ninebark—*Physocarpus opulifolius*

Pasture rose—*Rosa carolina*

Red osier dogwood—*Cornus sericea*

Spicebush—*Lindera benzoin*

Sweet pepperbush—*Clethra alnifolia*

*Pennsylvania's state flower

When purchasing plants, pay close attention to the scientific names to ensure the correct species are selected.

Wildflower Meadow

Wildflower meadows present excellent opportunities for stormwater management, promoting ground-water infiltration, water quality treatment, and even flood control. Also, when using native plants in a meadow you are not only providing an aesthetically pleasing landscape, but preserving native species and biodiversity, and creating habitat for wildlife. Meadows allow you to spend less time mowing, less time applying fertilizers and lawn chemicals, and less time watering in the summer months. This low maintenance structure helps protect our nearby local streams from pollutants and other chemicals, in addition to flooding conditions, thereby helping to protect the Delaware and Schuylkill Rivers, the source of our drinking water in Philadelphia.

Creating a Wildflower Meadow

Step 1. Site Selection: First, you need to choose a suitable location, preferably an open sunny site that gets at least six hours of sun every day. It should have good air movement. This helps keep diseases down, and the movement caused by wind will make plants sturdier, and stems stronger. The site should have few weeds. An already cultivated site such as a field or garden plot is ideal. A lawn can work too. The hardest is an overgrown garden bed, or old field full of aggressive weeds and grasses. A site next to such an area to transform is also difficult, due to weed seeds blowing in. A site next to a formal landscape may also be a hard sell. In such formal areas, an informal transition area may be necessary.

Step 2. Plant Selection: Plant selection is important for long bloom, as noted already, but more importantly for species that will last under your conditions. Soil type is not as important as whether the site is dry or moist. A dry site is best. The key is to have a diversity of species, as found in nature, with a mix of graminoides (grasses and grass-like plants) and forbs (flowering meadow wildflowers). If you don't create your own mixture, buy a good quality seed mix from a reputable supplier. When it comes to these seeds, you truly get what you pay for. Inexpensive mixes often contain mainly annuals which are gone after the first year, contain non-native species, seeds that have poor germination, potential weedy species, or just a lot of seed debris. Another consideration under species selection, whether you buy a mix or make your own mixture, is whether you want a short term (1 to 5 years) or longer term meadow. In the former you may have more annuals for color up front, but keep in mind that they may be out competed with weeds after a few years. A long term meadow may have mainly perennials which may take several years to begin a good display, but will last and out compete many weeds.

Wildflower Meadow

The number of plants of any one type will depend on how you will be viewing the meadow. If seeing it from a distance, you'll want to use larger numbers of each plant type, and place them in sweeping masses. If creating a small area, or one viewed at close range, you may have few of any one type plant, and have them all mixed.

Step 3. Site Preparation: This is the step often overlooked, yet the key to success or failure. Since these wildflowers are usually less competitive than weeds, the site should contain no weeds or weed seeds. Unless the site has been cultivated already, with few to no weeds, there are several methods you may use.

You may smother vegetation with black plastic for a whole growing season. You may also smother existing growth with thick layers of leaves, grass clippings, or newspapers. Another method is to plant a summer buckwheat crop, cut and tilled in before going to seed, followed by fall planting of winter wheat, cut and tilled in late winter. You may need to repeat this a second season. Or you may repeat deep soil tillage every three weeks for a full growing season. If it's a lawn with no weeds, remove the sod using a sod-cutter that can be rented from equipment rental firms. Many use a systemic herbicide, but avoid those that are residual (last in the soil).

Step 4. Sowing or Planting: You may sow in spring or early summer, which favors grasses over the forbs. Keep the spring-sown meadow watered as you would a newly seeded lawn, often for a month or two. Sowing in early fall favors the forbs, as some grass seeds rot then. Since many seeds will either not germinate until the following spring, or germinate and not grow until then, you should also use annual rye as a winter cover crop with fall sowings. Avoid sowing in mid to late summer when there may be droughts or seeds drying out before germinating. For sowing, aim for about 80 seeds per square foot. In several years this will result in one or two plants in this space. Of this number per square foot, for spring sowing use about 60 forb and 20 grass seeds. This is about 9 lbs. and 3 lbs. per acre. For fall sowing, use a higher proportion of grass seeds.

For small areas (for instance under 1000 square feet), consider using already-germinated small plants you can buy in trays as "plugs." These are more costly than seeds, but will establish more quickly. You can find these at specialty suppliers, either local, mail-order, or online.

Step 5. Post-planting management: In the first two years, seeds of annual and biennial weeds still in the soil or blown in will grow faster than your perennial wildflowers. Don't allow such weeds the first year to get above one foot tall before cutting back to four to six inches high. The wildflowers will, for the most part, remain short and below this height. The second year, cut back to about one foot high since plants will be larger. A weed or string trimmer works well for this. Don't pull weeds, as this may also disturb wildflower seedlings. Don't use herbicides as these may drift, killing large patches of both weeds and wildflowers!

In the third and future years, mow it close to the ground. This should be done in late fall or early spring, removing the debris from mowing. This exposes the soil to the rapid warmth from the sun in spring, encouraging your wildflowers over cool-season weeds. Learn your wildflowers, and over the years you can selectively weed out any weeds or woody plant seedlings.

Dry Well

Please read the Disclaimer on the inside cover, if you are interested in installing this project.

Materials

- Measuring tape
- Shovel
- Saw
- Wheelbarrow
- Vinyl downspout elbow to fit your downspout (typically 3 in. or 4 in.)
- Landscape non-woven geotextile fabric
  - Make sure the fabric is porous enough to allow water to pass through it.
- Crushed stone
  - Use stone that is approximately 1–1½ in. diameter.
  - Wash the stone to make sure that it is clean. You can use a sieve to remove fine material if the stone seems to have a lot of small particles.
  - It is important that the stone is washed (no dust or particles) and that the stone is uniformly the same size.
  - The stone does not have to be very large; it just has to be roughly of a similar size to get the maximum amount of void space in the stone while maintaining the structure of the well.

Dry wells are small, excavated pits, filled with stone or gravel that temporarily stores stormwater runoff until it infiltrates (soaks) into the surrounding soil. The stormwater can come straight off of the roof of your house via a downspout that either indirectly or directly connects to the dry well. It can travel indirectly to the dry well through a grassy swale or it can travel directly into the well through a pipe. This design guide describes how you can disconnect your downspout to a swale and dry well that is sized based on the included sizing table (noted below). Dry wells help protect our rivers and streams in combined and separate sewered areas. They help add capacity to Philadelphia's sewer system during heavy rainfalls by helping prevent the stormwater runoff from reaching the system and instead allowing the runoff to soak into the surrounding soil. In separate sewered areas, the impact of stormwater runoff on neighborhood streams, is reduced. By infiltrating the stormwater runoff on land, the combined (sewage and stormwater) sewer overflows into the Delaware and Schuylkill Rivers are reduced, thereby decreasing pollution in our streams, lessening flooding impacts and improving water quality in our rivers, our drinking water source. Dry wells also recharge groundwater through infiltration, which leads to more flow in streams during dry weather (when it is not raining) and less streambank erosion during wet weather (when it is raining).

Building a Dry Well

Site Preparation

- Conduct an Infiltration Test (see pages 24–25) to determine if your soil conditions are suitable for a dry well.
- Make sure buried electrical, telephone, and TV cables and gas piping are not going to be a problem in the area that you will be digging your dry well. If you don't know where they are located, call PA One Call at 1-800-242-1776 at least three days before you dig.
- Install leaf guards to prevent leaves and other plant material from entering the downspout and clogging the dry well.
- Determine the size of the well. Read through the Dry Well Sizing section of this fact sheet.
- Determine the volume of crushed stone you will need.
  Volume of Stone = Dry Well Area x 1½ feet
  For example: 33 square feet x 1½ feet = 49.5 cubic feet of stone.

Dry Well

Dry Well Sizing

- Refer to the sizing table. Decide what size storm you would like to store and infiltrate in your dry well. Find the closest number in Column A. About one-third of storms in the Philadelphia area are 0.25 inches or less, 60% are 0.5 inches or less, and 85% are 1.0 inch or less.
- Estimate the roof area draining to the dry well (length [ft.] x width [ft.] = area in square feet). Find the closest value in Column B for the storm depth you have chosen. At this point, you have narrowed your choice down to just one line of the table.
- Find the area required for your dry well in Column D. When you multiply your dry well length and width, the resulting number (area) needs to be at least as great as the number in Column D. Columns E and F show examples of lengths and widths that will work.
- Determine whether your yard and budget will allow you to build a dry well of this size with a safe overflow. If not, choose a smaller storm and repeat the steps. Storing a larger storm provides a greater benefit, but also requires more space and costs more. Storing even the smallest storm in the table will provide benefits.
- **The dry well should have a safe overflow**, such as an overflow to your yard drain. In larger storms, your dry well will fill up, and you need to make sure that the overflow doesn't damage your property or your neighbors' properties. Keep in mind that the yard drain has to be slightly downhill from the dry well.
- **The dry well should be at least 10 feet from your house** and any other buildings that are level with yours. It should be at least 25 feet from buildings that are downhill from the dry well.

Example

Storm Depth =
0.5 inches (Lines 4-6, Column A)

Roof Area =
250 square feet (Line 5, Column B)

Dry Well Area =
19 square feet (Line 5, Column D)

Possible Dimensions:
7 feet long by 3 feet wide =
21 square feet
(Line 5, Columns E and F)

4 feet long by 5 feet wide =
20 square feet

6 feet long by 3.5 feet wide =
21 square feet

	A Storm Depth (in.)	B Roof Area Draining to Dry Well (sq. ft.)	Dry Well Dimensions			
			C Depth (ft.)	D Area (sq. ft.)	E Example Length (ft.)	F Example Width (ft.)
1	0.25	100	1.5	3.8	2	3
2	0.25	250	1.5	9.4	4	3
3	0.25	500	1.5	19	7	3
4	0.5	100	1.5	7.5	3	3
5	0.5	250	1.5	19	7	3
6	0.5	500	1.5	38	13	3
7	1.0	100	1.5	15.1	6	3
8	1.0	250	1.5	38	13	3
9	1.0	500	1.5	75	26	3

Dry Well

Step 1. Modify your downspout. Cut your existing downspout close to the ground using a saw so that a vinyl downspout elbow can fit over the disconnected downspout (usually 3 or 4 inches). The elbow should aim the stormwater runoff into the swale

Step 2. Dig a swale—a small channel or ditch starting from the point below the disconnected downspout to the dry well location. The swale should be just a few inches deep and wide. The swale should slope downward from the downspout to the dry well. The runoff draining from the disconnected downspout through the swale should drain readily toward the dry well.

Step 3. After preparing the site and determining the size of your well, shape the well, using the Dry Well Sizing Table.

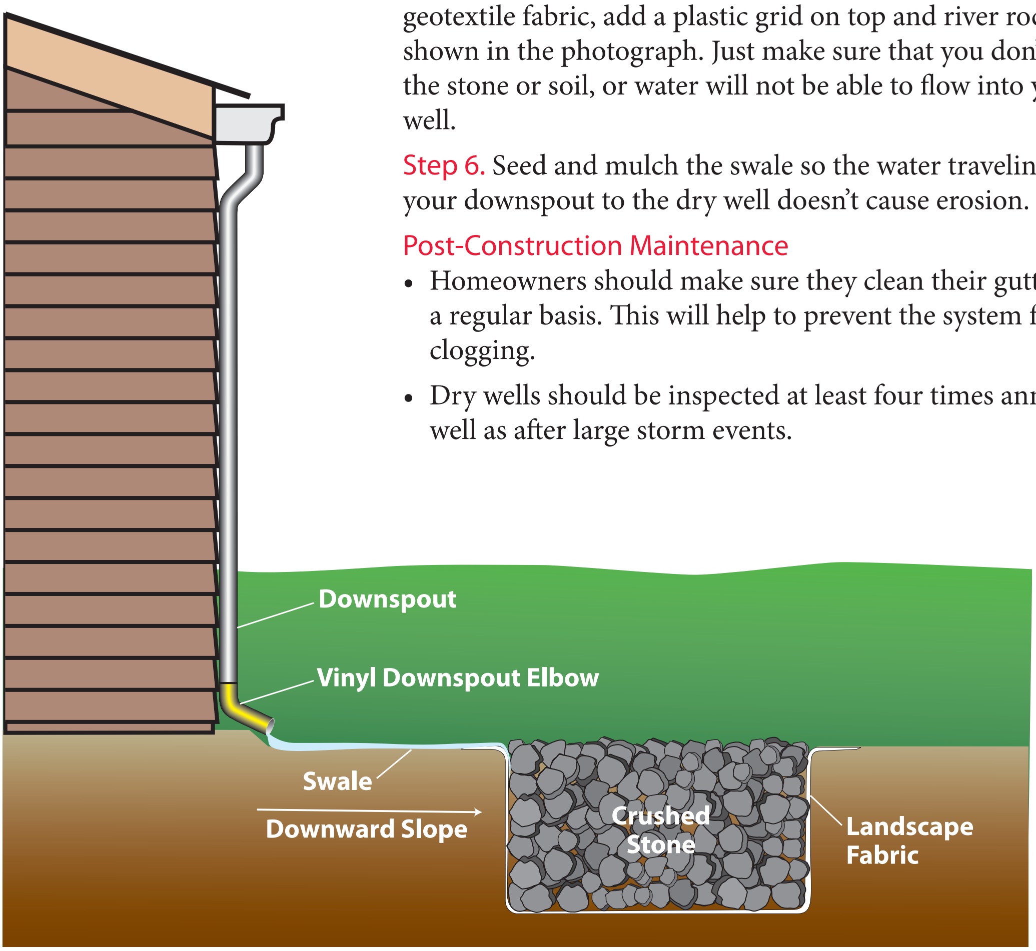
Step 4. Line the well with landscape fabric (non-woven geotextile fabric or filter cloth). Make sure it is porous enough to allow water to pass through it. Also, excess fabric should be folded over the edges of the well. The fabric prevents surrounding soil from getting into the system and clogging it up.

Step 5. Fill the well with the crushed stone. You can either a) fill the well with stones all of the way to the top until flush with the surrounding soil, b) fill the well with stones just a few inches from the top of the well, add a layer of geotextile fabric and backfill over the well with soil to plant in it (make sure the layer of fabric is between the stone and soil), or c) fill the well with stones just a few inches from the top of the well, add a layer of geotextile fabric, add a plastic grid on top and river rocks, as shown in the photograph. Just make sure that you don't mound the stone or soil, or water will not be able to flow into your dry well.

Step 6. Seed and mulch the swale so the water traveling from your downspout to the dry well doesn't cause erosion.

Post-Construction Maintenance

- Homeowners should make sure they clean their gutters on a regular basis. This will help to prevent the system from clogging.
- Dry wells should be inspected at least four times annually as well as after large storm events.



Infiltration Test

It is important that water infiltrate well even during saturated conditions. Conduct your infiltration test after a rain storm.

An infiltration test will help you determine if the soil on your property is suitable for certain types of stormwater management measures, such as a dry well or rain garden. An infiltration test measures how quickly water can soak in and flow through the soil. It is important to know how your soil infiltrates water before building a dry well, rain garden or any other stormwater management structure.

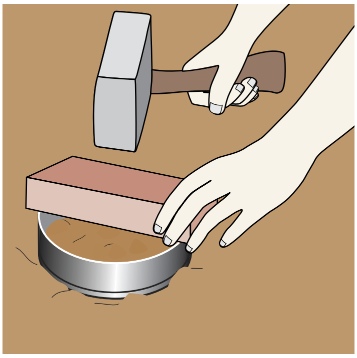
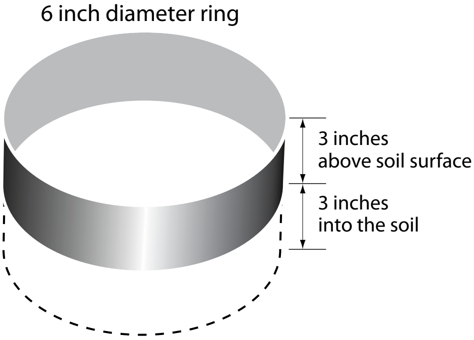


Figure 1
Using the hand sledge and block of wood, drive the 6 inch diameter ring, beveled edge down, to a depth of three inches.

Materials

- 6 inch diameter ring
- Hand sledge and wood block
- Plastic wrap
- 500 mL plastic bottle or graduated cylinder
- Water
- Stopwatch or timer
- Pen and paper



Step 1. Drive Ring into Soil:

- Clear the sampling area of surface residue, etc. If the site is covered with vegetation, trim it as close to the soil surface as possible.

Figure 2
Pour the 444 mL of water (1 inch of water) into the ring lined with plastic wrap.

- Using the hand sledge and block of wood, drive the 6 inch diameter ring, beveled edge down, to a depth of three inches (see Figure 1).
- If the soil contains rock fragments, and the ring cannot be inserted to the depth, gently push the ring into the soil until it hits a rock fragment.

Step 2. Firm Soil:

- With the 6 inch diameter ring in place, use your finger to gently firm the soil surface only around the inside edges of the ring to prevent extra seepage. Minimize disturbance to the rest of the soil surface inside the ring.

Step 3. Line Ring with Plastic Wrap:

- Line the soil surface inside the ring with a sheet of plastic wrap to completely cover the soil and ring as shown in Figure 2. This procedure prevents disturbance to the soil surface when adding water.

Infiltration Test

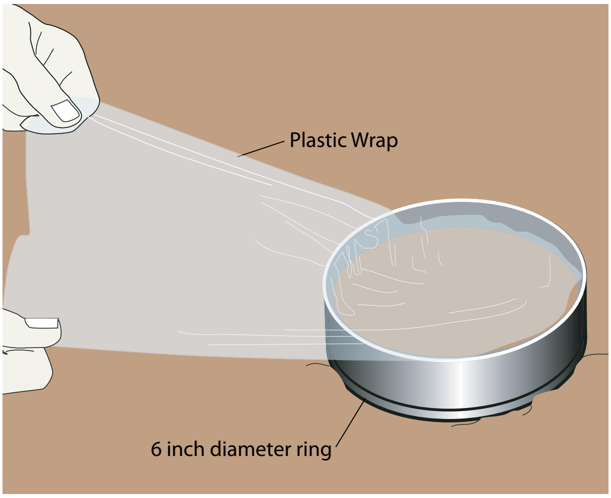


Figure 3
Remove the plastic wrap by gently pulling it out, leaving the water in the ring.

Step 4. Add Water:

- Fill the plastic bottle or graduated cylinder to the 444 mL (1 inch) mark with water. Pour the 444 mL of water (1 inch of water) into the ring lined with plastic wrap as shown in Figure 2.

Step 5. Remove Wrap and Record Time:

- Remove the plastic wrap by gently pulling it out, leaving the water in the ring (Figure 3). Note the time. Record the amount of time (in minutes) it takes for the 1 inch of water to infiltrate the soil. Stop timing when the surface is just glistening. If the soil surface is uneven inside the ring, count the time until half of the surface is exposed and just glistening. Record the time.

Step 6. Repeat Infiltration Test:

- In the same ring, perform Steps 3, 4, & 5 with a second inch of water. Record the number of minutes elapsed for the second infiltration measurement. Repeat the test (Steps 3, 4, & 5) a few more times. All of the tests should be conducted consecutively. If the test continues to yield the same results, you will have a good idea of the saturated infiltration rate. If the soil infiltrates the water under 1 hour, your soil is ready for a dry well, rain garden or any of the other structural projects in this manual.

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Tree Planting
page 8 – TreeVitalize

Backyard Stream
NAM Planning & Design

Winter De-Icing
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Planter Boxes
Multiple planters – Miriam Manon
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page 15 – Three Rivers Wet Weather Demonstration Program
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Rain Gardens
page 19-20 – Roger Bannerman, Wisconsin Department of Natural Resources

Creating a Wildflower Meadow
Robin Sasek, CDM

Dry Wells
Wissahickon Valley Watershed Association

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TreeVitalize

A partnership to restore tree cover in Southeast PA

To stop your rain from going down the drain, plant more trees. Trees catch rainfall on leaves, branches and trunks. A single London Plane tree will intercept over 130 gallons during a minor (1/4 inch) rainstorm.

Plus, trees help conserve water.

For more info on TreeVitalize planting projects, Tree Tender education classes and homeowner rebates go to **www.treevitalize.net.**

TreeVitalize Partners

TreeVitalize — A partnership to restore tree cover in Southeast PA
The Pennsylvania Horticultural Society 1827 — Philadelphia Green, Philadelphia Flower Show, Meadowbrook Farm
AQUA Pennsylvania
DCNR
Dep
Philadelphia Eagles
Fairmount Park — Philadelphia's Park System
Morris Arboretum of the University of Pennsylvania — Official arboretum of the Commonwealth of Pennsylvania
PECO
PLNA 1904 — Pennsylvania Landscape & Nursery Association
PennState College of Agricultural Sciences
Forest Service — U.S. Department of Agriculture
William Penn Foundation


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Appendix H
Pennypack 85 Percent Capture Technical Memo

City of Philadelphia
Combined Sewer Overflow Program

Pennypack 85% Capture Technical Memo

Office of Watersheds
philadelphia water

Philadelphia
PWD
Water Department

Introduction

The Philadelphia Water Department (PWD) developed a list of Combined Sewer Overflow (CSO) regulator modifications needed to increase capture of combined sewer flows tributary to the Pennypack Creek regulators as part of its Combined Sewer Overflow Long Term Control Plan (LTCP), {PADEP: January 27, 1997}. The primary objectives of the capital project were to achieve 85% capture of combined flows tributary to Pennypack CSO regulators without significantly increasing system-wide CSO volumes.

The project objectives were achieved through modification of regulating structures intended to increase capacity of Pennypack regulators and to shift the location of CSO discharges from the Pennypack Creek to the Delaware River. Pennypack Creek is a smaller receiving stream when compared to the Delaware River. Because the Delaware River is larger with a greater assimilation capacity, it is less sensitive to the adverse effects of CSOs.

In addition to reducing CSO volumes to a sensitive receiving stream, it was assumed that a reduction of CSO discharges to the Pennypack Creek would minimize the effects of Pennypack CSOs on Baxter Water Treatment Plant intakes located on the Delaware River.

Currently, there are five regulators (P01, P02, P03, P04, & P05) that discharge to the Pennypack Creek, which contribute flows to the Pennypack interceptor or the Upper Delaware Low Level interceptor. The Pennypack interceptor primarily conveys sanitary flows from separate sanitary sewersheds and becomes a combined system at its connection with the dry weather outlet (DWO) conduit of P01. The interceptor connects into the Upper Delaware Low Level interceptor after the connection with the DWO conduit of P05. All of the Pennypack regulators, with the exception of P05 (static dam regulator), were slots with dams where dry weather flow was diverted to the DWO through an orifice at the bottom of the combined trunk sewer. During storms, wet weather flow can exceed the capacity of the orifice and/or DWO and pass over the orifice and on to the receiving water. Originally regulators P01, P02, & P04 did not have dams and when the capacity of the orifice/DWO was exceeded, the regulators would discharge to Pennypack Creek. Dams were installed in 1996 as part of PWD's Nine Minimum Controls (NMC4) to maximize flows to the water pollution control plants. The dams allowed for head to build on the orifice during wet weather and increase conveyance through the orifice/DWO. The dams also limit or prevent dry weather discharges should dry weather flow exceed the orifice/DWO capacity or if the orifice becomes obstructed by debris. The dam heights were sized to be 15% of the trunk height.

Modeling Work

Hydrologic and hydraulic computer models of PWD's wastewater collection system were developed as part of PWD's CSO Program to analyze the system's response to wet weather and characterize its CSO capture.

The baseline model of the Northeast Drainage District, developed as part of the Combined Sewer Overflow Long-Term Control Plan Update (LTCPU), was used to evaluate the CSS performance before and after implementation of the Pennypack 85% system modifications. The current LTCPU model is a refinement of the Tier II model developed as part of the Long Term CSO Control Plan, {PADEP: January 27, 1997}. The baseline hydraulic model is used to represent pre-existing conditions, and changes are then made based on as-built drawings to represent the Pennypack 85% capture post-construction conditions.

High, Median, and Low Flow estimates
High, median, and low estimates are used for hydrologic parameters in separate LTCPU models in order to represent the range of uncertainty in estimates of directly connected impervious area (DCIA), rainfall dependent inflow and infiltration (RDII), and baseflow rates.

Rainfall Data
A representative one year precipitation record, developed as part of the LTCPU, is used for running continuous model simulations in order to evaluate changes in CSS performance under average annual hydrologic conditions.

External Input Hydrograph Time Series
Input hydrograph time series derived from flow monitoring data are used for three major outlying community sanitary sewer basins: Lower Southampton Township, Bucks County Water and Sewer Authority, and the Bensalem Township connection at Grant Avenue and James Street. The time series data for each of these basins has had the baseflow removed by hydrograph separation methods using CDM SHAPE software in order to represent RDII. The separated baseflow is added to the system as an average daily value through the SWMM EXTRAN l D1 lines where it is easily adjusted by the scaling factor entered on the SWMM EXTRAN BD line in order to generate either low, median, or high baseflow estimates.

Pre and post construction modeling results are presented in the Appendix below.

Proposed Designs

Three proposed scenarios were initially analyzed to determine their potential for achieving 85% capture of combined flows in the Pennypack. Each scenario described regulator modifications such as increased DWO pipe sizes, raised dam heights, lowered discharge elevations, and minimized gate settings.

Proposed Scenario 1 considers the initial LTCP scenario.

Proposed Scenario 2 involved modifying only P02, P03 and P04 to reach 100% capture at these regulators. It is currently impossible to capture all flow from these regulators. These regulators currently act as a relief for the interceptor to backflow and prevent flooding.

Proposed Scenario 3 involves modifying only regulator P01. Study of this scenario indicated 85% capture is not possible through modification of P01 alone.

Further review indicated that none of the initial proposed scenarios would achieve the goal of 85% capture on an average annual basis; all three scenarios would result in a decrease in system-wide CSO volumes for the modeled time period.

A modified version of Proposed Scenario 1 was created which would meet the following criteria:

- Achieve 85% capture in the Pennypack.
- Minimize system-wide increase in overflows.
- Insure that the modifications will not directly result in basement/street surface flooding or to exacerbate any known existing flooding problems.

Refined Proposed Scenario 1:

P05 - raising of diversion dam by six inches
D02 - lowering the discharge set points for computer controlled regulators; not allowing the regulator shutter gates to close
D03 - lowering the discharge set points for computer controlled regulators; not allowing the regulator shutter gates to close
D05 - not allowing the regulator shutter gates to close
P04 - increasing DWO to 36 inches; lowering the diversion dam from 2.5' to 1'.

The raising of the dam height at P05 was done to increase capture at this site and raise system-wide capture to 85%. The dam was lowered at P04 and the DWO was increased to provide interceptor relief in large storm events that may otherwise result in basement and street surface flooding. The set points were lowered at D02 and D03 to reduce wet weather inflows at these regulators and provide further capacity for flow from the Pennypack interceptor. The lowered discharge elevations also provide capacity to the Pennypack and Upper Delaware Low Level interceptors.

As Built

The LTCP Project NE15: 85% CSO Capture in the Pennypack Watershed has been completed. As built regulator modifications have changed from design specifications in July 2000 Design Memorandum (<u>Long-Term Control Plan Project NE15: 85% Percent CSO Capture in the Pennypack Watershed Design Memorandum</u>**)**. Modifications to regulator P01, P02, P04, P05, D02, D09, D12, D13, F07, F08, F09, & F23 were not performed as proposed. The following as-built modifications are given in detail below:

D02 – Lower set point elevation by 3 feet. Do not allow shutter gate to close. Maintain gate at 18 inches during wet weather.
D03 – Lower set point elevation by 3 feet. Do not allow shutter gate to close.
D04 – No changes to existing structure
D05 – Do not allow shutter gate to close.
D07 – Set maximum height of shutter gate at 12 inches.
D09 – No changes to existing structure
D12 – No changes to existing structure
D13 – No changes to existing structure
D15 – No changes to existing structure
F07 – No changes to existing structure
F08 – No changes to existing structure
F09 – No changes to existing structure
F23 – No changes to existing structure
P01 – Raise diversion dam to a total height of 1.5 feet; replace 622 feet of 10-inch DEO pipe with 36-inch DWO pipe; raise chamber height to 6 feet.
P02 – Raise diversion dam to a total height of 1.0 foot; replace 20 feet of 12-inch DWO pipe with 36-inch DWO pipe; raise chamber height to 6.25 feet.
P03 – No changes to existing structure
P04 – Raise diversion dam to a total height of 30 inches; replace 40 feet of 12-inch DWO pipe with 36-inch DWO pipe; raise chamber height to 4.75 feet.
P05 – No changes to existing structure

Summary

Based on the modeling results, the percent capture from the Pennypack CSOs is between 70% to 92% capture using the High and Low modeling estimates. The median estimate shows approximately an 85% CSO capture in the Pennypack.

Appendix A: Modeling Results

High

		Pre Pennypack 85%			Post Pennypack 85%		
Year	RegID	Overflow Vol. (MG)	Capture Vol. (MG)	% Capture	Overflow Vol. (MG)	Capture Vol. (MG)	% Capture
2005	P01	20.1	32.8	62.0	3.8	50.8	93.0
	P02	24.5	65.0	72.6	17.5	71.9	80.4
	P03	3.5	20.3	85.3	3.2	20.6	86.7
	P04	15.1	19.8	56.7	19.2	13.8	41.8
	P05	71.9	80.3	52.8	60.8	91.0	59.9
		135.2	218.1	**61.7%**	104.5	248.0	**70.4%**

Median

		Pre Pennypack 85%			Post Pennypack 85%		
Year	RegID	Overflow Vol. (MG)	Capture Vol. (MG)	% Capture	Overflow Vol. (MG)	Capture Vol. (MG)	% Capture
2005	P01	16.4	30.2	64.8	3.3	44.8	93.1
	P02	17.6	60.8	77.5	11.2	67.1	85.7
	P03	2.2	18.4	89.4	2.1	18.5	89.7
	P04	7.0	22.8	76.5	6.4	22.5	77.9
	P05	30.9	103.4	77.0	28.1	106.0	79.1
		74.1	235.6	**76.1%**	51.2	258.9	**83.5%**

Low

		Pre Pennypack 85%			Post Pennypack 85%		
Year	RegID	Overflow Vol. (MG)	Capture Vol. (MG)	% Capture	Overflow Vol. (MG)	Capture Vol. (MG)	% Capture
2005	P01	12.4	28.3	69.5	2.5	39.3	94.0
	P02	12.2	56.4	82.2	7.7	60.9	88.8
	P03	1.4	16.2	91.9	1.4	16.2	92.1
	P04	2.5	23.5	90.5	0.3	25.0	98.9
	P05	9.0	108.4	92.4	8.8	109.0	92.5
		37.6	232.7	**86.1%**	20.6	250.4	**92.4%**

Appendix B: Long-Term Control Plan Project NE15: 85% Percent CSO Capture in the Pennypack Watershed Design Memorandum

Appendix I
Monitoring Locations

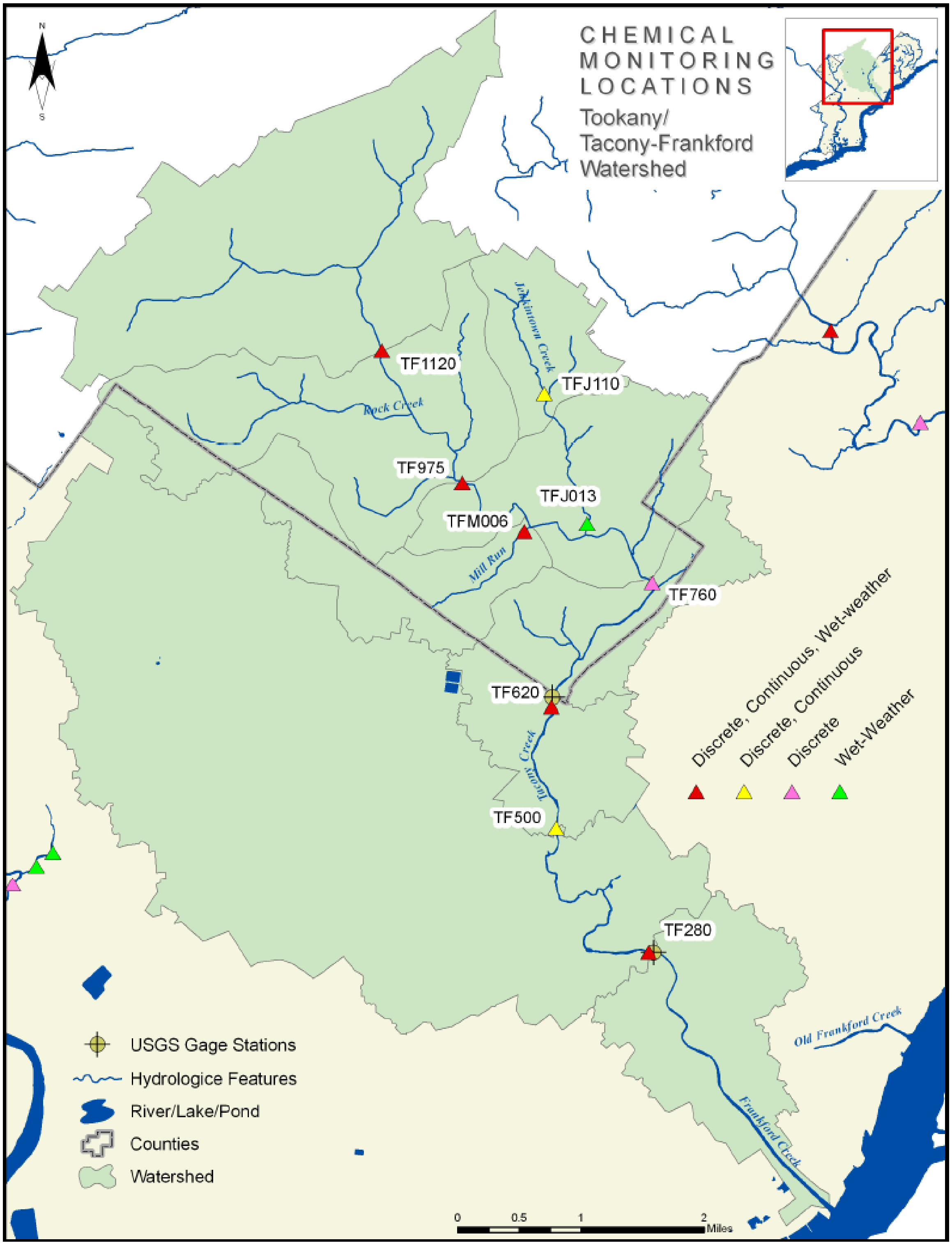

Figure I-1 Chemical monitoring locations in Tacony-Frankford Watershed.

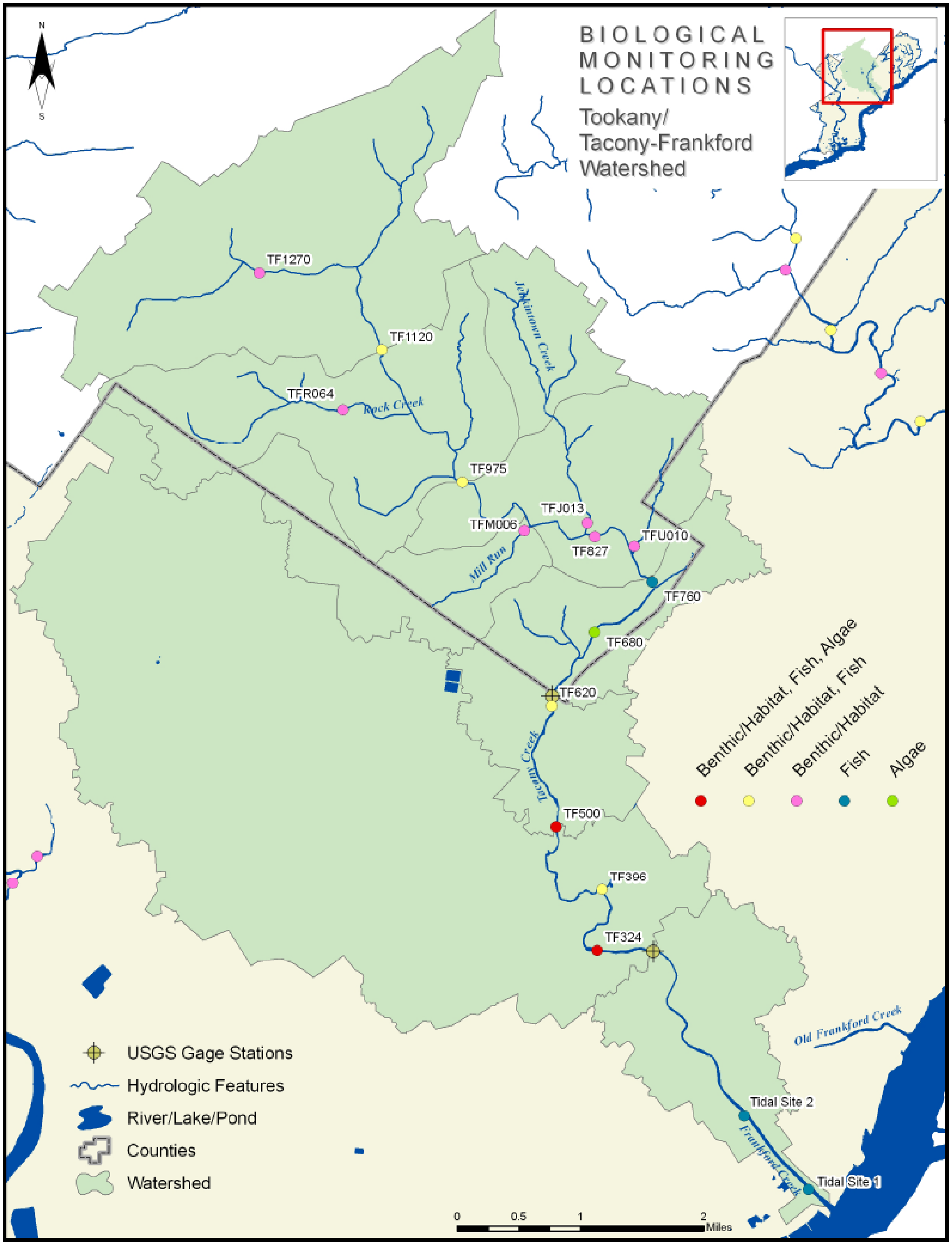

Figure I-2 Biological and physical assessment locations in Tacony-Frankford Watershed.

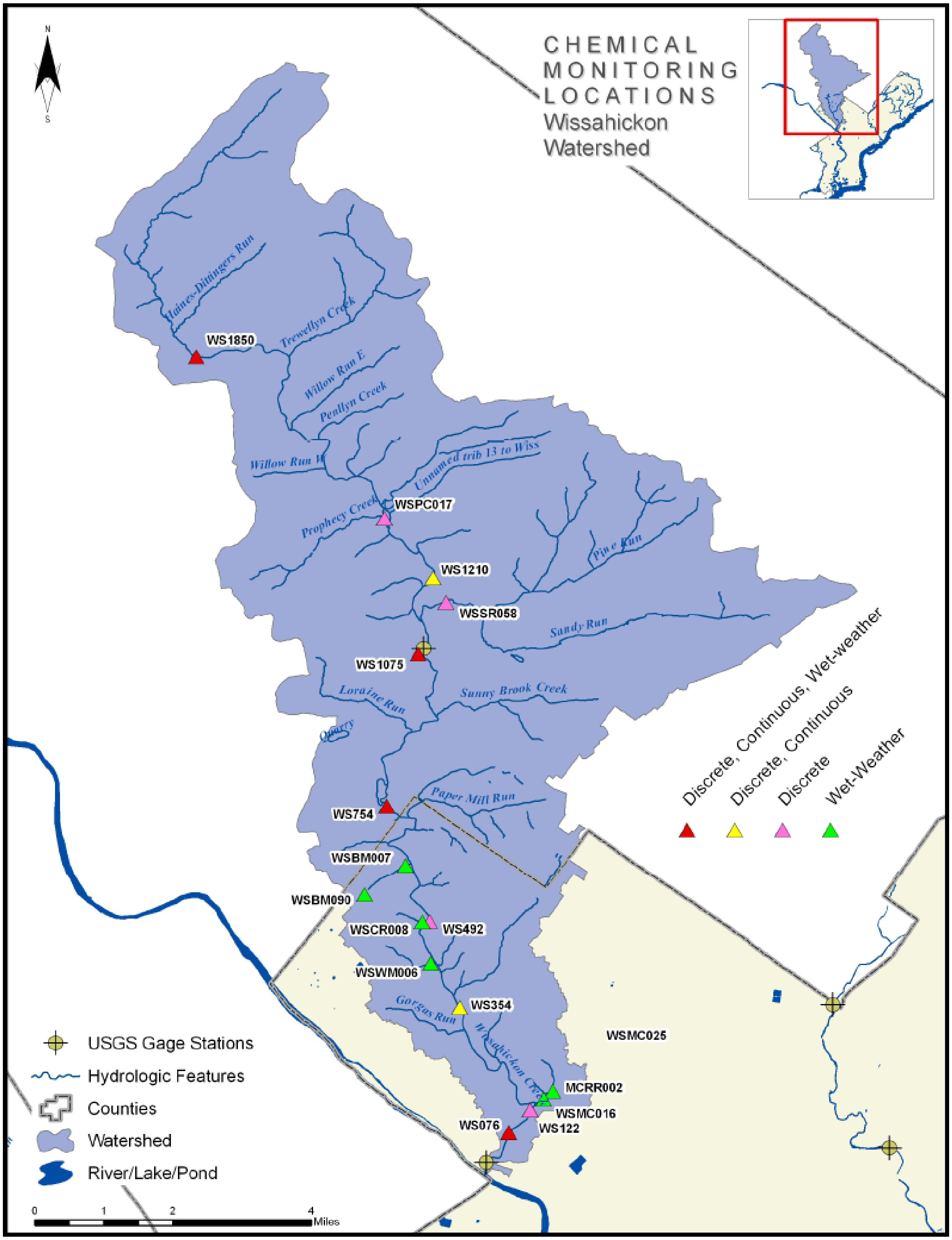

Figure I-3 Chemical monitoring locations in Wissahickon Watershed.

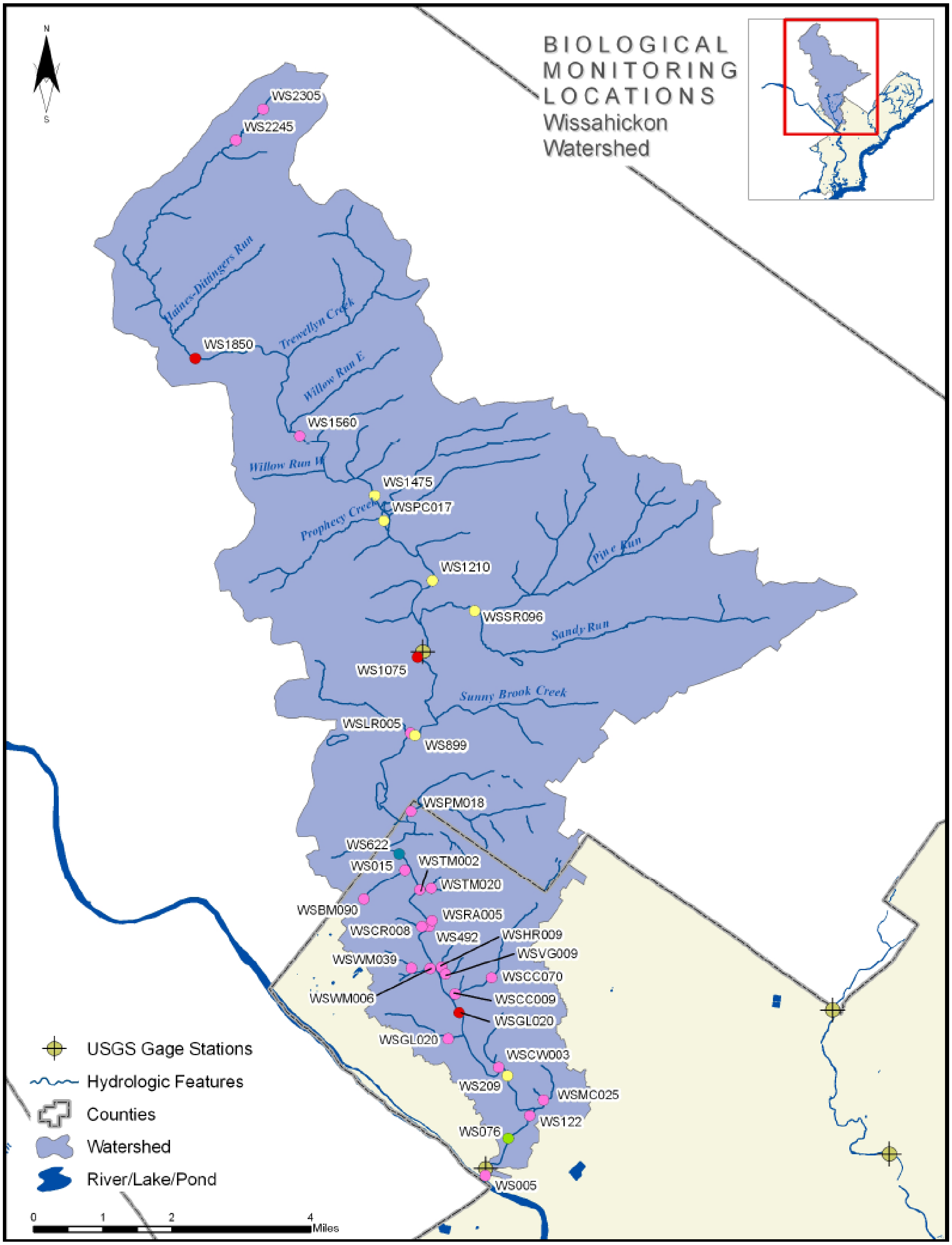

Figure I-4 Biological and physical assessment sites in Wissahickon Watershed

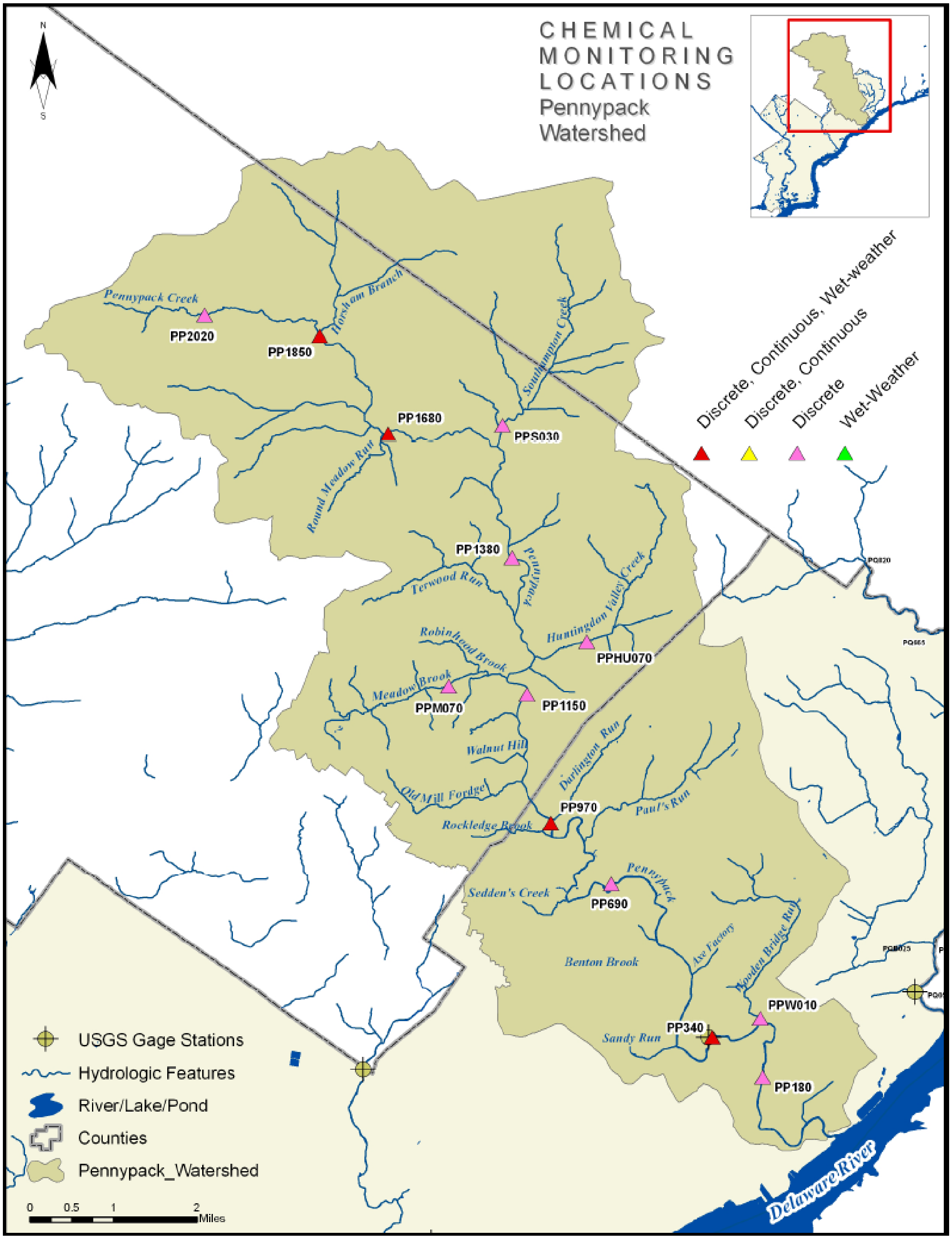

Figure I-5 Chemical monitoring locations in Pennypack Watershed

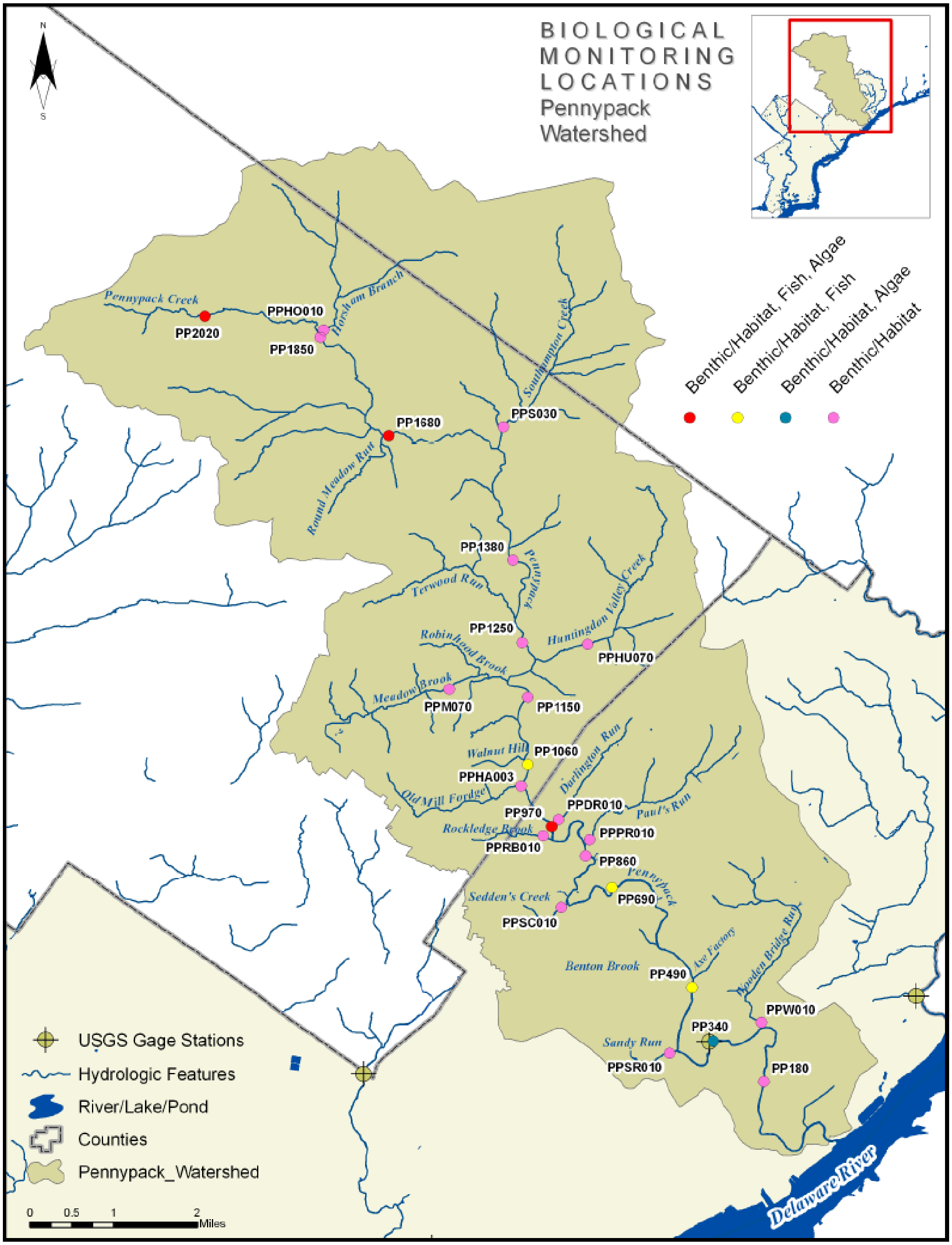

Figure I-6 Biological and physical assessment sites in Pennypack Watershed

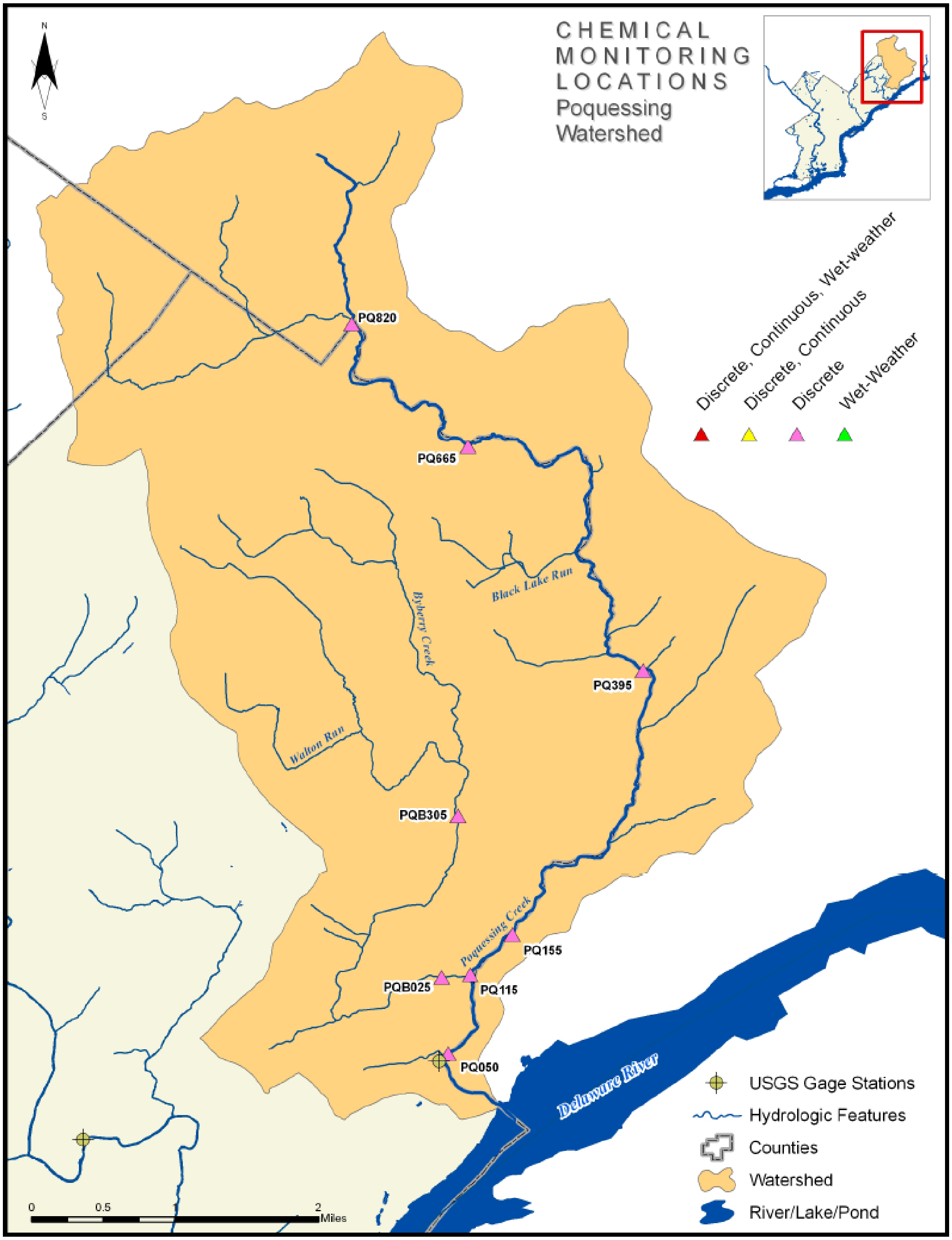

Figure I-7 Chemical monitoring locations in Poquessing-Byberry Watershed

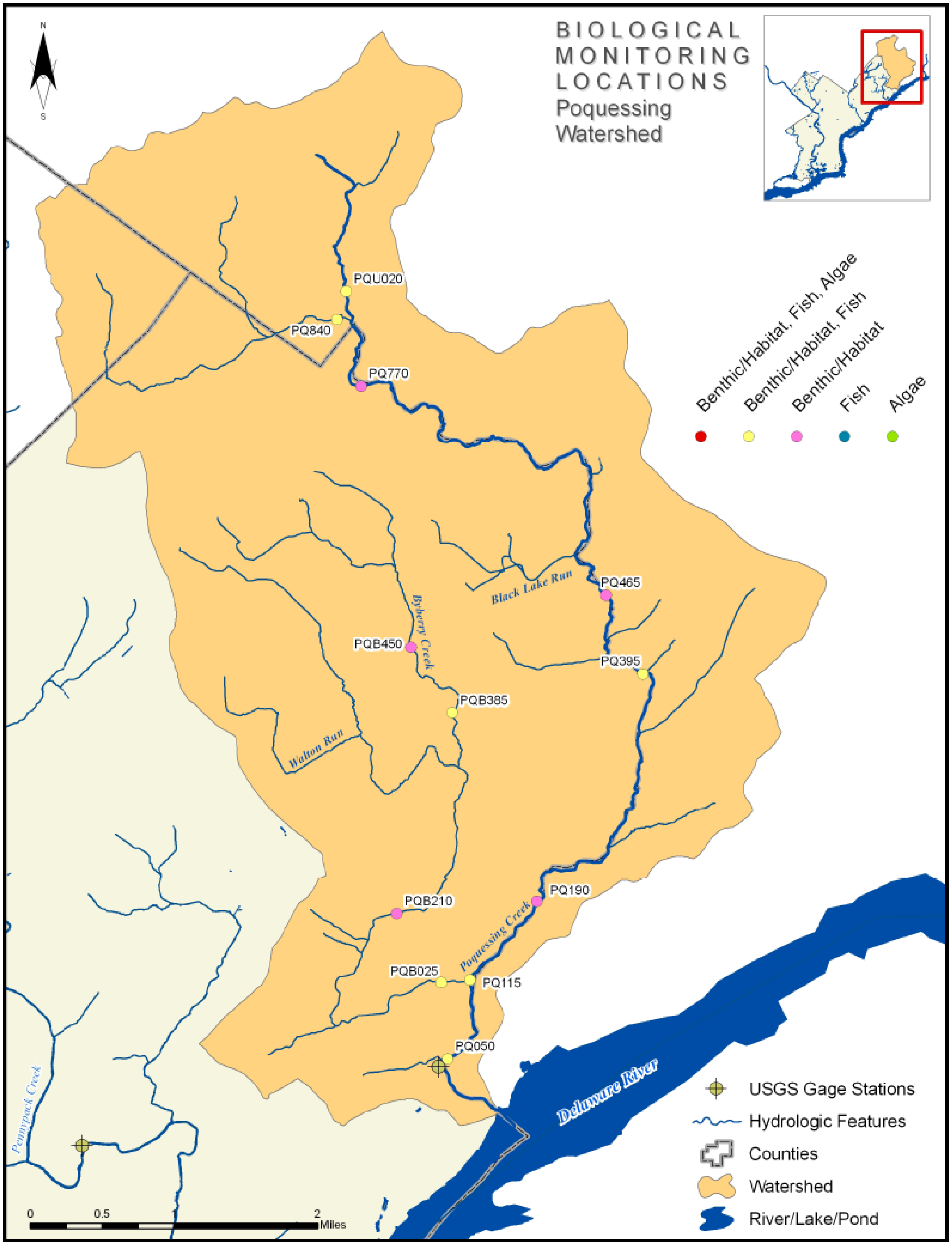

Figure I-8 Biological and physical assessment sites in Poquessing-Byberry Watershed

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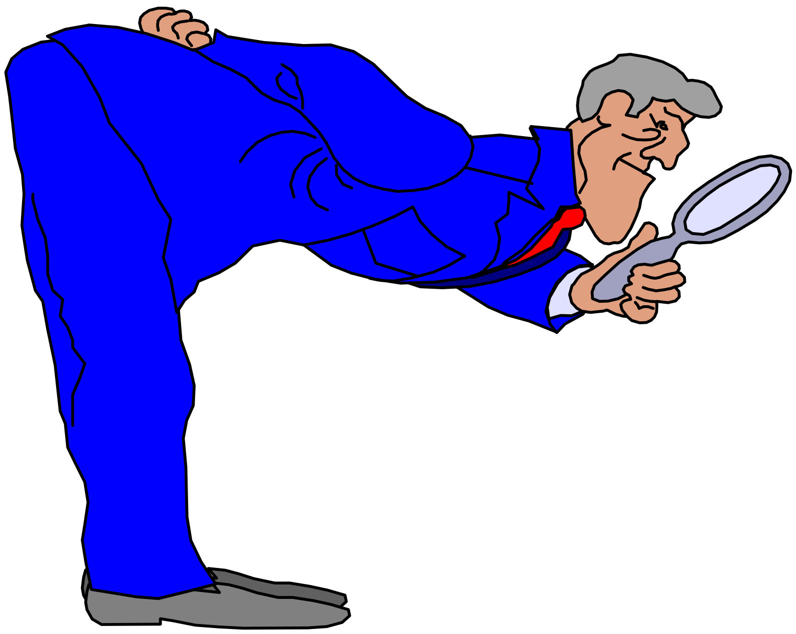
Appendix J
Pollutant Minimization Plan

PCB

Pollutant Minimization Plan



Philadelphia PWD Water Department

C I T Y   O F   P H I L A D E L P H I A

Bernard Brunwasser
Water Commissioner

WATER DEPARTMENT
1101 Market Street, 5th floor
Philadelphia, Pa 19107 - 2994

4th floor
September 30, 2005

Ms. Carol Collier
Executive Director
Delaware River Basin Commission
PO Box 7360
25 State Police Drive
West Trenton, New Jersey 08628-0360

Subject: Pollutant Minimization Plan for Polychlorinated Biphenyls
NPDES Permit Nos. PA00266689, PA0026671, PA0026662

Dear Ms. Collier:

In accordance with Section 4.30.9.A.2 of the DRBC regulations and your letter to the Philadelphia Water Department on June 30, 2005, we submit the attached report entitled *"PCB Pollutant Minimization Plan, Philadelphia Water Department"*.

Sincerely,

Bruce S. Aptowicz
Deputy Director of Operations

cc: Commissioner Bernard Brunwasser
Deputy Commissioner David Katz
Deputy Commissioner Debra McCarty
William McKeon, Chief of Wastewater Treatment
Robert Lendzinski, Manager, Northeast Plant
Leonard Gipson, Manager, Southeast Plant
Christopher Harris, Manager, Southwest Plant

PMP
Northeast Plant
Summary

Known Sources

Two known sources of PCBs entering the Northeast Plant sewer shed have been identified as the intake of Delaware River water and the addition of ferric chloride as a treatment coagulant into the Baxter Water Treatment Plant and the resultant discharge of most of the plant's process wastes into the sewer.

The intake of Delaware River water into the plant occurs about river mile 111. It is estimated that approximately 2,280 mg/day of PCBs from the Delaware River loading influent to the Baxter Plant is discharged into the Northeast Plant sewer shed.

The second known source is discharge of spent ferric chloride, which contains PCBs in the delivered product, from the Baxter Plant into the sewer. The Baxter Plant uses ferric chloride as a water treatment chemical to coagulate and flocculate fine particle solids from the river water. It is estimated that approximately 15.6 mg/day of PCBs from the ferric chloride source is discharged into the Northeast Plant sewer shed.

Potential Sources

Identification of potential sources of PCB focused first on those sources which stored PCBs in equipment. In addition to PWD's inventory of PCB containing equipment, information from the following agencies: Philadelphia Fire Department, Philadelphia Department of Public Health, USEPA, PaDEP, DRBC, Partnership for the Delaware Estuary and PECO produced a listing of 167 sites potentially housing PCB devices with many sites containing several devices.

Pollution Minimization Measures

The Northeast Plant has one probable on-site source of PCBs – the Northeast Plant Lagoons. As part of the Northeast Plant trackdown program, PWD will sample and analyze for PCBs in order to quantify their impact upon the plant.

Two known sources of PCBs were reported in the collection system. The transmission of PCBs from the Delaware River into sewer via treatment processes of the Baxter Water Treatment Plant will require a reduction in its ambient river PCB concentration by others. The second known source of PCBs is the water treatment coagulant used at the Baxter Water Treatment Plant. The producer, the DuPont Company, has reported its commitment to implement a $15+million project in 2007 to reduce PCB generation by approximately 90% from the 2001 PCB levels in ferric chloride.

PWD believes that the release of potential sources of PCBs into the environment represents a significant threat to the consistent reduction of PCB concentrations in the nearby rivers and streams. We will visit all current, known owners of PCB equipment and will attempt to collect and record forty (40) descriptors for each source. Additionally, we will identify vulnerable PCB sources and seek measures, in concert with the regulatory agencies, which would minimize those risks.

The Philadelphia Department of Public Health provided PWD with 10 historical sites of past PCB spills. PWD will inspect all sites to determine their current status and recommend additional risk reduction measures when appropriate.

Source Prioritization

Potential sources were prioritized on the basis of weight of contained PCBs. The reduction of PCBs in ferric chloride was prioritized among the known sources.

PMP
Southeast Plant
Summary

Known Sources

Two known sources of PCBs entering the Southeast Plant sewer shed have been identified as the intake of Schuylkill River water and the addition of ferric chloride as a treatment coagulant into the Queen Lane Water Treatment Plant and the resultant discharge of most of the plant's process wastes into the sewer.

The intake of Schuylkill River water into the plant occurs at a location which is significantly influenced by the Wissahickon Creek. It is estimated that approximately 381 mg/day of PCBs from the Schuylkill River loading influent to the Queen Lane Plant is discharged into the Southeast Plant sewer shed.

The second known source is discharge of spent ferric chloride, which contains PCBs in the delivered product, from the Queen Lane Plant into the sewer. The Queen Lane Plant uses ferric chloride as a water treatment chemical to coagulate and flocculate fine particle solids from the river water. It is estimated that approximately 17.27 mg/day of PCBs from the ferric chloride source is discharged into the Southeast Plant sewer shed.

Potential Sources

Identification of potential sources of PCB focused first on those sources which stored PCBs in equipment. In addition to PWD's inventory of PCB containing equipment, information from the following agencies: Philadelphia Fire Department, Philadelphia Department of Public Health, USEPA, PaDEP, DRBC, Partnership for the Delaware Estuary and PECO produced a listing of 73 sites potentially housing PCB devices with many sites containing several devices.

Pollution Minimization Measures

Two known sources of PCBs were reported in the collection system. The transmission of PCBs from the Schuylkill River into sewer via treatment processes of the Queen Lane Water Treatment Plant will require a reduction in its ambient river PCB concentration by others. The second known source of PCBs is the water treatment coagulant used at the Queen Lane Water Treatment Plant. The producer, the DuPont Company, has reported its commitment to implement a $15+million project in 2007 to reduce PCB generation by approximately 90% from the 2001 PCB levels in ferric chloride.

PWD believes that the release of potential sources of PCBs into the environment represents a significant threat to the consistent reduction of PCB concentrations in the nearby rivers and streams. We will visit all current, known owners of PCB equipment and will attempt to collect and record forty (40) descriptors for each source. Additionally, we will identify vulnerable PCB sources and seek measures, in concert with the regulatory agencies, which would minimize those risks.

The Philadelphia Department of Public Health provided PWD with 6 historical sites of past PCB spills. PWD will inspect all sites to determine their current status and recommend additional risk reduction measures when appropriate.

Source Prioritization

Potential sources were prioritized on the basis of weight of contained PCBs. The reduction of PCBs in ferric chloride was prioritized among the known sources.

PMP
Southwest Plant
Summary

Known Sources

Two known sources of PCBs entering the Southwest Plant sewer shed have been identified as the intake of Schuylkill River water and the addition of ferric chloride as a treatment coagulant into the Belmont Water Treatment Plant and the resultant discharge of most of the plant's process wastes into the sewer.

The intake of Schuylkill River water into the plant occurs at a location which is located above the Fairmont Dam. It is estimated that approximately 306 mg/day of PCBs from the Schuylkill River loading influent to the Belmont Plant is discharged into the Southwest Plant sewer shed.

The second known source is discharge of spent ferric chloride, which contains PCBs in the delivered product, from the Belmont Plant into the sewer. The Belmont Plant uses ferric chloride as a water treatment chemical to coagulate and flocculate fine particle solids from the river water. It is estimated that approximately 10.6 mg/day of PCBs from the ferric chloride source is discharged into the Southwest Plant sewer shed.

Potential Sources

Identification of potential sources of PCB focused first on those sources which stored PCBs in equipment. In addition to PWD's inventory of PCB containing equipment, information from the following agencies: Philadelphia Fire Department, Philadelphia Department of Public Health, USEPA, PaDEP, DRBC, Partnership for the Delaware Estuary and PECO produced a listing of 157 sites potentially housing PCB devices with many sites containing several devices.

Pollution Minimization Measures

The Southwest Plant has one probable on-site source of PCBs – the Southwest Plant Lagoons. As part of the Southwest Plant trackdown program, PWD will sample and analyze for PCBs in order to quantify their impact upon the plant.

Two known sources of PCBs were reported in the collection system. The transmission of PCBs from the Schuylkill River into sewer via treatment processes of the Belmont Water Treatment Plant will require a reduction in its ambient river PCB concentration by others. The second known source of PCBs is the water treatment coagulant used at the Belmont Water Treatment Plant. The producer, the DuPont Company, has reported its commitment to implement a $15+million project in 2007 to reduce PCB generation by approximately 90% from the 2001 PCB levels in ferric chloride.

PWD believes that the release of potential sources of PCBs into the environment represents a significant threat to the consistent reduction of PCB concentrations in the nearby rivers and streams. We will visit all current, known owners of PCB equipment and will attempt to collect and record forty (40) descriptors for each source. Additionally, we will identify vulnerable PCB sources and seek measures, in concert with the regulatory agencies, which would minimize those risks.

The Philadelphia Department of Public Health provided PWD with 15 historical sites of past PCB spills. PWD will inspect all sites to determine their current status and recommend additional risk reduction measures when appropriate.

Source Prioritization

Potential sources were prioritized on the basis of weight of contained PCBs. The reduction of PCBs in ferric chloride was prioritized among the known sources.

Item 1
Good Faith Commitment

The Philadelphia Water Department makes a good faith commitment to reducing discharges of Polychlorinated Biphenyls (PCBs) from the

Northeast Water Pollution Control Plant
Southeast Water Pollution Control Plant
Southwest Water Pollution Control Plant

to the Delaware Estuary through the Pollutant Minimization Plan (PMP) process in accordance with the Delaware River Basin Commission PMP Rule 4.30.9.

____ ____________________

David Katz, Deputy Commissioner — date
Philadelphia Water Department

Item 2
Name of Facility Contact

The individual who will serve as the contact for information concerning this PMP is:

Bruce S. Aptowicz
Deputy Director of Operations
Philadelphia Water Dept.
1101 Market Street
4th floor
Philadelphia, PA 19107
(Tel.) 215.685.6205
(FAX) 215.685.6207
bruce.aptowicz@phila.gov.

Mr. Aptowicz will coordinate the project.

Working with Mr. Aptowicz on this project will be Mr. Keith Houck, Industrial Waste Unit, Dr. Christopher Crockett, Office of Watersheds, Mr. William McKeon, Wastewater Treatment Plants, Mr. Drew Mihocko, Collector Systems, Mr. Earl Peterkin, Organics Laboratory, Bureau of Laboratory Services, and Mr. Roy Romano, all of the Philadelphia Water Department.

Mr. Houck's responsibility will be to manage the effort of the Industrial Waste Unit's inspectors who will conduct the planned field visits to potential and known PCB sites as well as collect samples involved in the trackdown investigations.

Mr. McKeon's responsibility will be to provide assistance regarding all tasks associated with the wastewater treatment plants.

Dr. Crockett's responsibility will be to provide input regarding the collector system flow analysis

Mr. Mihocko's responsibility will be to provide input regarding the details of the physical collector system.

Mr. Peterkin's responsibility will be to manage all required sample analyses.

Mr. Romano's responsibility will be to review and interpret all analytical data emanating from this project.

PMP
Northeast Plant
Facility Description
Item 3

3.a. Facility Name and Address

Northeast Water Pollution Control Plant
3895 Richmond Street
Philadelphia, PA 19137-1415
PaDEP Site ID #: 451994
NPDES Permit No. PA 0026671

3.b. Facility Description and Map

The Northeast Water Pollution Control Plant, located on a 160-acre site in the Richmond section of Philadelphia, treats wastewater from the Northeast section of the city and adjacent suburban areas.

The original treatment plant began operation in 1923, with the capacity to treat 60 million gallons per day (MGD) of wastewater. Facilities included barscreen, grit channel, a pumping station, Imhoff tanks and sludge lagoons.

In 1952, a high rate (modified aeration) activated sludge plant was placed into service. The grit chamber and pumping station from the original plant were kept in service with primary sedimentation tanks, aeration tanks, air blowers, final clarifiers, sludge heaters and anaerobic digesters added. The additions were designed for a flow of 25 m.g.d. with 75% suspended solids (SS) and biochemical oxygen demand (BOD) removal.

In 1962, the secondary facilities were expanded to treat a flow of 175 m.g.d. New aeration tanks were added and half the existing tanks were modified to allow the use of contact stabilization and step aeration mode of treatment. Additional clarifiers were constructed and blower capacity was increased. The mechanical equipment in the grit chamber was also replaced at this time. With the additional facilities, the capacity of the new plant was 175 MGD with 75% SS and BOD removal.

During this period, the Northeast Water Pollution Control Plant was the only secondary treatment plant serving the City of Philadelphia.

The Clean Water Act of 1972 required that all publicly owned treatment facilities provide secondary treatment and set levels of plant performance. To meet this challenge, the Philadelphia Water Department committed itself to an expansion program. Plant operations personnel were consulted extensively during the design of the expanded plant, and considerable time was spent converting operating experience into engineering data and plans.

Construction at Northeast started in 1978 and by 1986 the major equipment items and systems were complete. Most of the major construction elements were in service and being operated by plant personnel. The N.E.W.P.C.P. uses a supervisory digital computer system. The digital system logs data and alarms, changes set point on controllers and displays unit process data in real-time at each of the Operation and Control Stations (OCS).

The Process Control Center (PCC) is located in the Administration Building with the digital computer and the operator interface equipment.

In November of 1986, the Northeast Plant met the Consent Decree's secondary effluent quality limitation of 30 p.p.m of suspended solids (SS) and biochemical oxygen demand (BOD) at 90% removal for design flow of 210 m.g.d.

The Northeast Water Pollution Control Plant includes the following structures:

1. **PRELIMINARY TREATMENT BUILDING (PTB)**

   Approximately 70% of the influent wastewater flow must be lifted from low-level sewers to the plant headworks. The Influent Pumping Station uses six single stage, variable speed drive pumps. Each pump is rated at 59000 g.p.m. at 45 feet total dynamic head. Screenings and grit are removed from the wastestream, transported to Southwest, limed then ultimately disposed at a landfill. Screenings, removed by eight Mensch screens with ¾ inch (1.9 cm) clear openings are deposited into a 5 cubic yard dumpster for transport. Grit, settled and collected in four 55-foot (16.8 m) square detritor basins, is dewatered by cyclone separators and classifiers, and discharged onto belt conveyors which transport the grit to storage bins. From the grit storage bins, belt conveyors transport the grit to a 20 cubic yard trailer before being hauled to the Southwest WPC Plant.

2. **PRIMARY SEDIMENTATION**

   Twelve primary sedimentation tanks are divided into two batteries. The first battery contains eight tanks with a total volume of 9.35 million gallons (36,000 m^3) with a total surface area of 125,000 square feet (12,000 m^2). Each of the eight setting tanks includes a flight and chain sludge collection system, sludge pumps and scum removal system. The second battery contains four tanks with a total volume of 9.35 million gallons (36,000 m^3) and a total surface area of 125,000 square feet (12,000 m^2). Each of the four settling tanks includes a flight and chain sludge collection system, sludge pumps and scum removal system.

3. **AERATION TANKS**

   The secondary system contains seven aeration tanks, each containing four bays with a total volume of 23 million gallons (87,055 m^3). Process air is supplied from the blower building which houses six variable vane centrifugal blowers, four of which are rated at 51,000 SCFM and two at 39,000 SCFM. Process air is supplied through 12,000 dome diffusers at the bottom of each tank. The first bay (A pass) of each tank receives activated sludge from final tanks. Typically, the return sludge is re-aerated in the 280 ft. long pass. Primary effluent from Set 2 Primary Tanks is then introduced at the end of the A pass and the beginning of the B pass under anaerobic conditions (unaerated feed zone). The mixed liquor is then aerated. At the end of the B pass and the beginning of the C pass, effluent from Set 1 Primary Tanks is introduced under anaerobic conditions. The mixed liquor is then aerated for the remainder of the C pass and the D pass. The airflow into the aeration tank is controlled by a programmable logic controller (PLC) based on a dissolved oxygen concentration setpoint or by an airflow setpoint.

4. FINAL SEDIMENTATION TANK

Sixteen rectangular final sedimentation tanks are divided into two batteries. Each set has an operating gallery which contains a return sludge pumping station and metering system and other related equipment. The mixed liquor from the aeration tanks is settled in the final clarifiers, collected the influent and effluent ends of the tank by chain and flight longitudinal collectors to a cross collector located at mid-tank. The cross collector moves the sludge to a sump from which the sludge is withdrawn and returned to the Aeration Tanks. Excess solids are wasted from the system. A scum removal system at both ends of the aeration tank removes floating materials. The total volume of the two sets of tanks is 23.2 million gallons (87,812 m^3) with a total surface area of 258,400 square feet (24,006 m^2).

5. DISINFECTION

The final tank effluent is conveyed to chlorine contact tanks. Sodium hypochlorite is delivered in Flash mechanical mixers at the influent to the contact tanks ensure good mixing at the initial contact point of the chlorine solution with the effluent. Effluent flows through two contact tanks with a volume of over four million gallons (16,000 m^3) and the total surface area of 50,400 square feet (5,000 m^2). Three effluent water pumps are provided to supply plant water throughout the plant for various uses.

6. SLUDGE THICKENER BUILDING

Excess waste activated sludge (WAS) from the final sedimentation tank is thickened by dissolved air floatation in the 12 thickener tanks. Thickened WAS is combined with Primary Sludge in a mixing chamber before distribution to the Sludge Digestion Tanks. The total volume of the thickener tanks is 1.95 million gallons (7,400 m^3) with a total surface area of 21,600 square feet (2,000 m^2). The building also houses dual fuel (Sludge gas or fuel oil) heating plants that provided heat for the sludge digestion heat exchangers and for most of the plant building. This is accomplished through a heated glycol which is circulated through the system.

7. SLUDGE DIGESTION TANKS

Each of the eight anaerobic digesters is a circular tank with a fixed cover, with a total interval volume of 18 million gallons (68,130 m^3). External heat exchangers are used to maintain proper sludge temperatures. To ensure adequate mixing, each digestion tank has a circulating pump and a recirculated gas mixing system. Digested sludge is transferred from the digesters to a Transfer Station and then to barges at the docking facilities. The sludge is then barged to a dewatering facility adjacent to the Southwest Water Pollution Control Plant.

8. SLUDGE TRANSFER STATION

The digested sludge is barged to Sludge Processing and Distribution Center for dewatering and composting.

9. SLUDGE GAS FACILITY

Sludge gas collection at low pressure from the sludge digestion tanks is compressed by two rotary, positive displacement gas compressors (rated capacity 2,250 SCFM at 7#PSIG) for distribution throughout the Plant. A 50,000 cubic foot (1,400 m^3) low pressure sludge gas storage tank receives the sludge gas from the anaerobic digesters and feed the compressors.

10. SCUM DISPOSAL FACILITY

Scum and grease from the primary and secondary sedimentation tanks is pumped to Scum Concentration Tanks.

11. ELECTRICAL BUILDING

Electricity is the principal source of energy used in the Northeast Plant. Electrical power is supplied by Philadelphia Electric Company (PECO) through two 13,200 volt (13 KV) cables to the 13 KV switchgear in Electrical Building. A distribution system which is split into two parallel networks distributes electrical power to plant equipment through intermediate step-down substation transformers.

12. ADMINISTRATION BUILDING

The Administration Building contains the general services offices, engineering offices and laboratory. The laboratory houses the necessary equipment used to evaluate the biological and chemical processes to determine efficient operation and to produce the data required to generate the regulatory agencies' reports.

13. SERVICES BUILDING

The work areas, tools, instrumentation, machinery and personnel necessary for the maintenance and repair of the process equipment are housed in the Service Building

14. **WAREHOUSE**

The warehouse provides storage area for spare parts, lubricants, tools, and equipment required to maintain the treatment process equipment.

Please find the following attached maps and diagrams:

1. PMP Plant Process Diagrams –NE
2. PMP Facility Plan Drawing – NE
3. PMP Stormwater Drainage Plan - NE

3.c. Description and Maps of Collection System

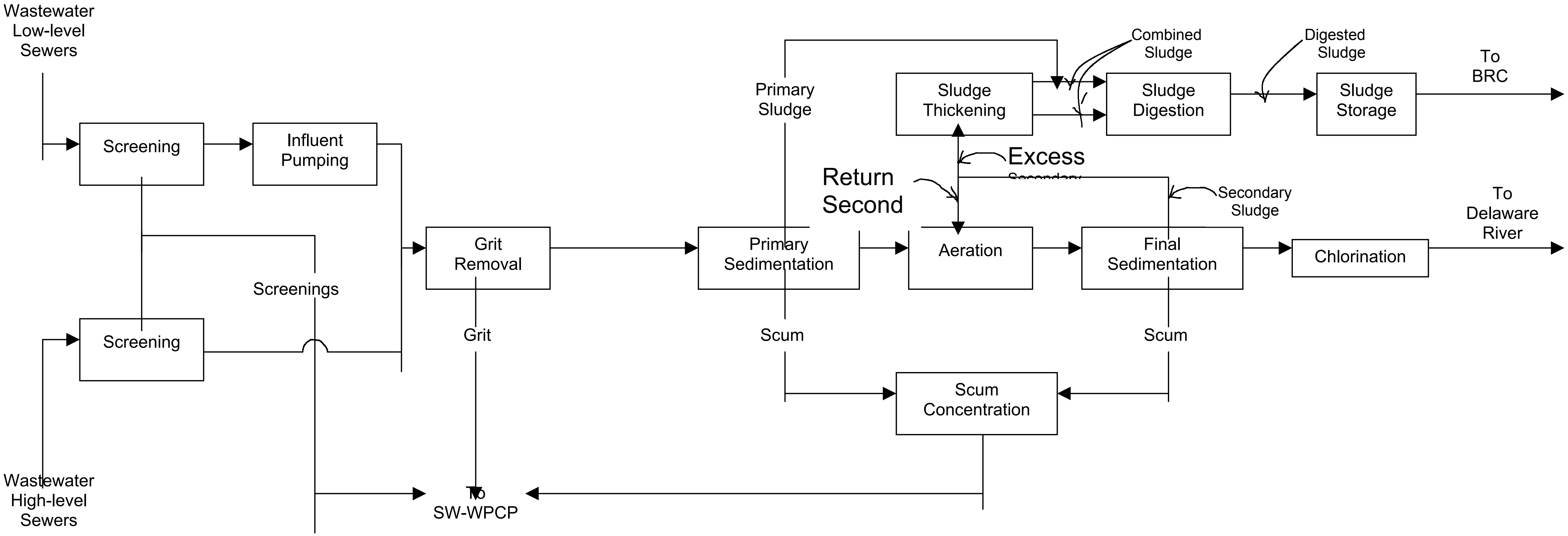
The PWD service area is divided into three drainage districts: Northeast, Southeast, and Southwest. Each of these drainage districts conveys flow to the respective WPCP of the same name. These three drainage basins are hydraulically independent except during conditions of high flow, when cross connections in the trunk sewer system allow conveyance of some flow between the Northeast and Southeast drainage districts. The service areas are itemized in Table 1 by collection system type.

Table 1 Wastewater Service Areas by Drainage District and Collection System Type

	SE (ac)	SW (ac)	NE (ac)	Total (ac)	%
Combined	8,475	12,741	19,934	41,150	19%
Separate	31	9,732	15,737	25,500	12%
Suburban Sanitary	300	76,600	70,800	147,700	69%
			Total	**214,350**	

Each drainage district contains a network of branch sewers, trunk sewers, combined sewer interceptors, separate sanitary interceptors, and storm relief sewers as shown on Figure 1. Branch sewers collect wastewater from catch basins and lateral connections from drainage areas. The branch sewers convey flow to the trunk sewers, which are larger arterial sewers that convey wastewater to regulating chambers. Combined sewer interceptors convey flow from regulating chambers and separate sanitary interceptors to the WPCPs. Storm relief sewers convey flow from storm relief diversion chambers to the receiving waters during extreme high flow conditions. This network of sewers has been subdivided into 17 interceptor systems and 10 storm relief sewer systems. Table 2 identifies each of the interceptor systems. Table 3 identifies the storm relief sewers systems. Table 4 identifies the major separate sanitary sewer interceptors that are tributary to combined sewer interceptors. Table 5 identifies contributing communities and their associated interceptor systems.

Figure 2-1-3

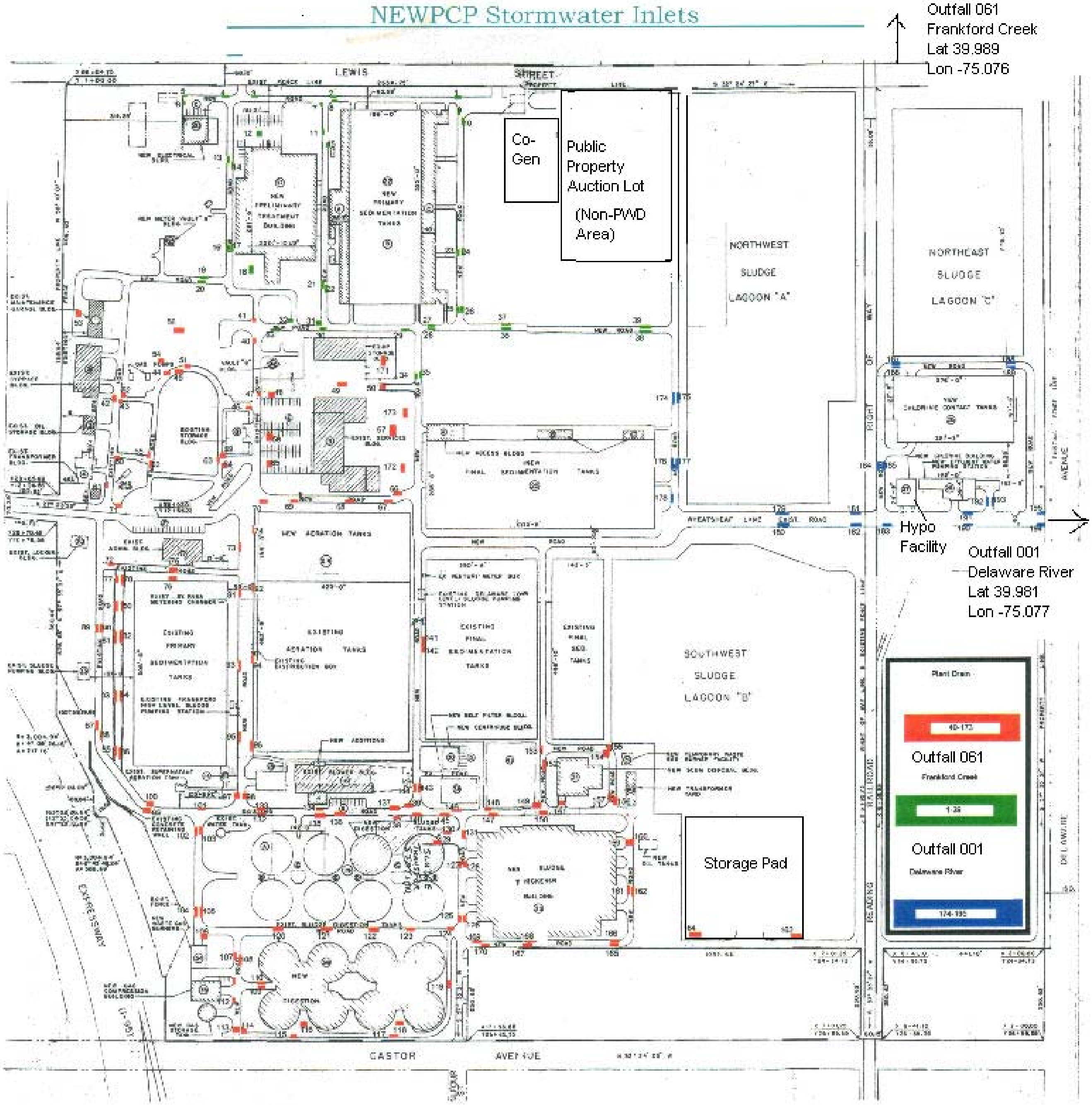


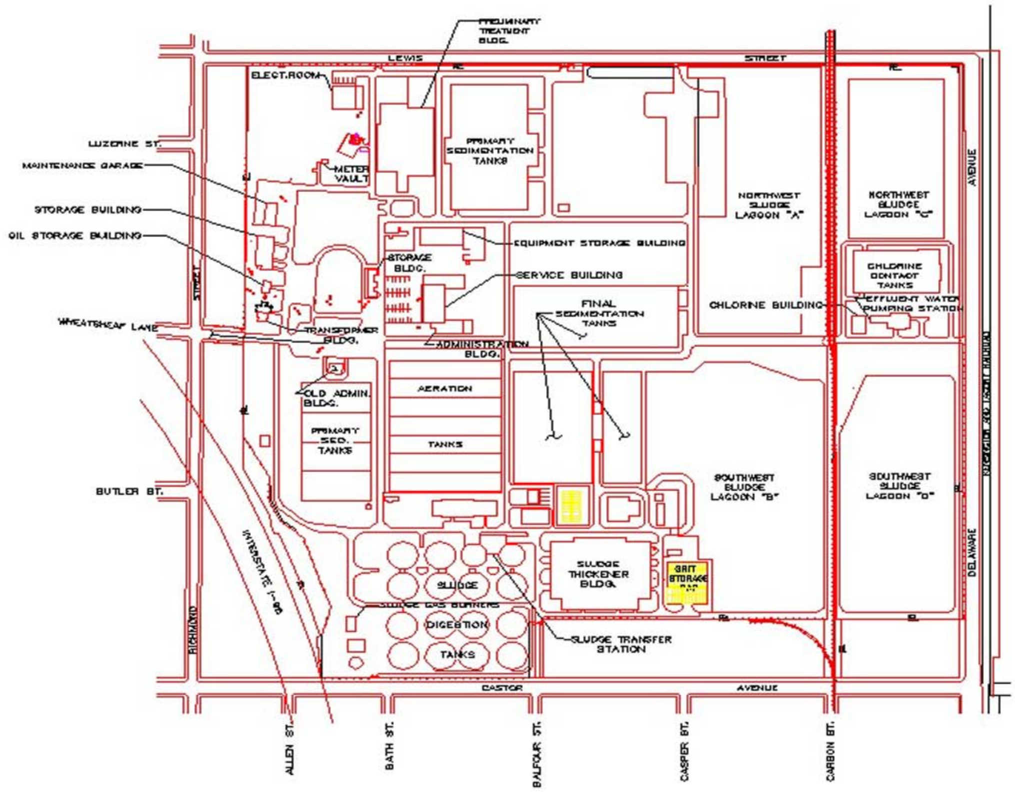
Process Plan Diagram

Northeast Water Pollution Control Plant
Operation and Maintenance Manual

Philadelphia Water Department

NEWPCP Stormwater Inlets




PRELIMINARY TREATMENT BLDG.
LEWIS
STREET
ELECT. ROOM
LUZERNE ST.
MAINTENANCE GARAGE
STORAGE BUILDING
OIL STORAGE BUILDING
METER VAULT
PRIMARY SEDIMENTATION TANKS
NORTHWEST SLUDGE LAGOON "A"
NORTHWEST SLUDGE LAGOON "C"
AVENUE
EQUIPMENT STORAGE BUILDING
STORAGE BLDG.
SERVICE BUILDING
CHLORINE CONTACT TANKS
STREET
FINAL SEDIMENTATION TANKS
CHLORINE BUILDING
EFFLUENT WATER PUMPING STATION
WHEATSHEAF LANE
TRANSFORMER BLDG.
ADMINISTRATION BLDG.
AERATION
OLD ADMIN. BLDG.
PRIMARY SED. TANKS
TANKS
SOUTHWEST SLUDGE LAGOON "B"
SOUTHWEST SLUDGE LAGOON "D"
BUTLER ST.
DELAWARE
INTERSTATE I-95
SLUDGE
SLUDGE THICKENER BLDG.
GRIT STORAGE
SLUDGE GAS BURNERS
DIGESTION
TANKS
SLUDGE TRANSFER STATION
RICHMOND
CASTOR
AVENUE
ALLEN ST.
BATH ST.
BALFOUR ST.
CASPER ST.
CARBON ST.

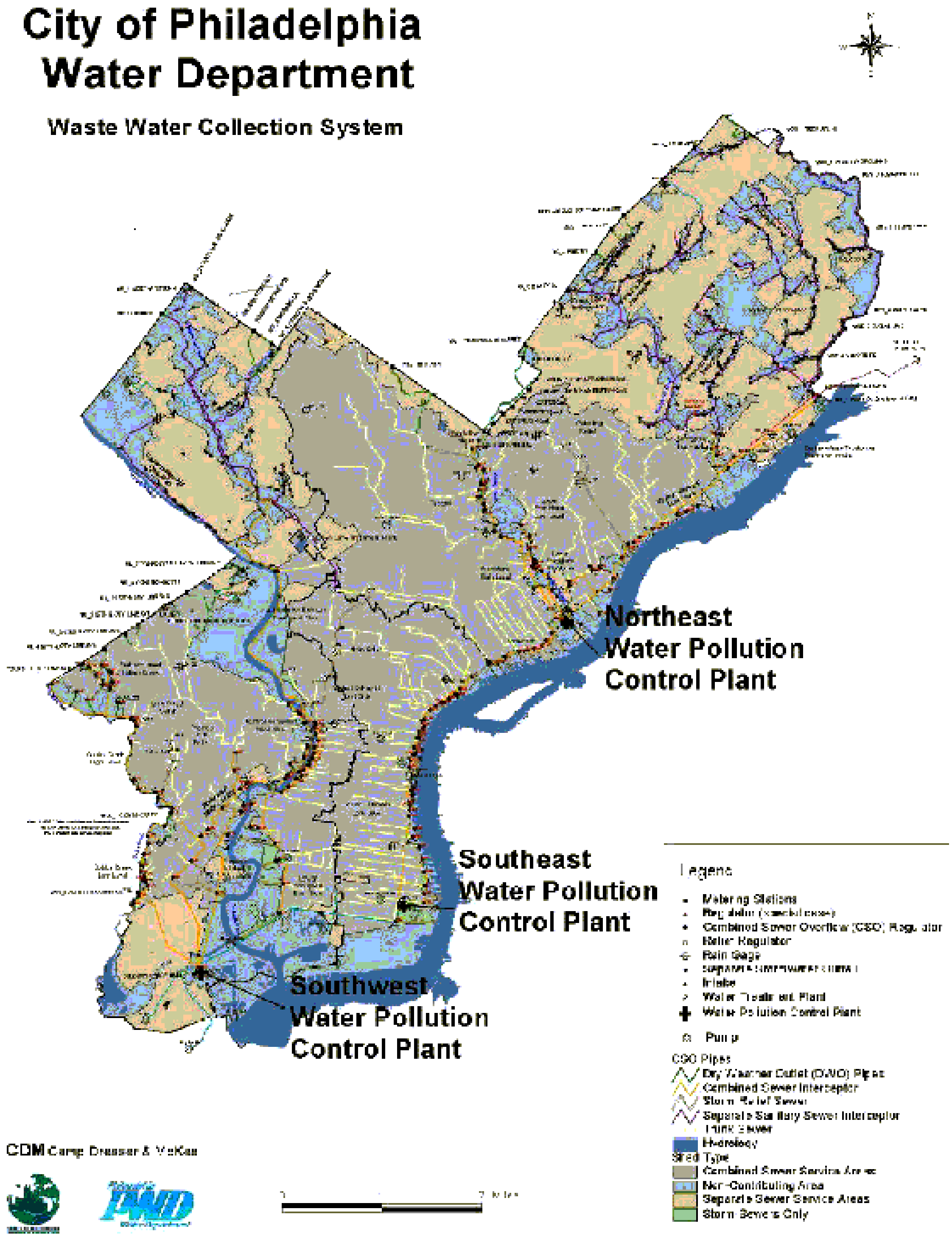


Figure 1 - PWD wastewater collection System

Table 2 Combined Sewer Interceptor Systems in the NE Service Areas

Combined Sewer Interceptor	Abbreviation	Drainage District
Frankford High Level	FHL	Northeast
Lower Frankford Creek	LFC	Northeast
Lower Frankford Low Level	LFLL	Northeast
Upper Frankford Low Level	UFLL	Northeast
Pennypack	P	Northeast
Somerset	S	Northeast
Tacony	T	Northeast
Upper Delaware Low Level	UDLL	Northeast

Table 3 Storm Relief Systems in the NE Service Areas

Storm Relief System	Abbreviation	Drainage District
Frankford High Level Relief Sewer	FR_F	Northeast
Rock Run Relief Sewer	FR_RR	Northeast
State Road Relief Sewer	FR_ST	Northeast
Wakeling Relief Sewer	FR_W	Northeast

Table 4 Separate Sanitary Interceptors Tributary to Combined Interceptors

Separate Sanitary Interceptor	Abbreviation	Receiving Interceptor	Drainage District
Pennypack Creek	S-P	UDLL	Northeast
Wooden Bridge Run	S-WB	UDLL	Northeast
Poquessing Creek	S-PQ	UDLL	Northeast
Byberry Creek	S-BY	UDLL	Northeast
Walton's Run	S-WAL	UDLL	Northeast

Table 5 Summary of Contributing Communities to the PWD Collection System

Municipality/Authority	Drainage District	Intercepting System
Bensalem Township	NE	UDLL
Bucks County Water and Sewer Authority	NE	UDLL
Lower Southampton Municipal Authority	NE	UDLL
Township of Abington	NE	PP
Township of Cheltenham	NE	FHL
Township of Lower Moreland and the Lower Moreland Township Authority	NE	PP

A brief description of the collection system for the drainage district is as follows.

Northeast Drainage District

Figure 2 shows the collection system for the Northeast drainage district. This figure depicts the combined sewer interceptors and the major separate sewer interceptors, as well as, the location of the CSO regulators, storm relief chambers, and major hydraulic control points. Regulators and storm relief chambers are described in Section 1.1.4; major hydraulic control points are described in Section 1.1.5. Suburban communities served by the Northeast WPCP include:

- Abington Township
- Bensalem Township
- Bucks County
- Cheltenham Township
- Lower Moreland Township
- Lower Southhampton Township

The combined sewer system in the Northeast drainage district conveys flows to two hydraulically independent interceptor systems. The low level system includes the Upper Delaware Low Level (UDLL), Upper Frankford Low Level (UFLL), Lower Frankford Low Level (LFLL), Pennypack (P), and Somerset Low Level (S). These interceptors convey wastewater and stormwater to the WPCP where it is pumped into to preliminary treatment building. The Pennypack and Lower Frankford Low Level interceptors are tributary to the Upper Delaware, which conveys flow to the Northeast WPCP. The Somerset and Upper Frankford Low Level interceptors combine outside of the WPCP at Diversion Chamber A, at which point flows are conveyed to the preliminary
treatment building to be pumped. The high level interceptor system consists of the Tacony (T) interceptor and the Frankford High Level (FHL) interceptor. The Tacony interceptor conveys flows to the Frankford High Level interceptor. The Frankford High Level conveys flows into the WPCP by gravity. Table 6 lists ranges of interceptor sewer diameters in the Northeast Drainage district by interceptor system.

Table 6 Interceptor Sewer Systems in the Northeast Drainage District

Interceptor System	Length (miles)	Size Range (ft)
Upper Delaware Low Level	7.0	4 - 12.25
Pennypack Low Level	3.0	1.67 - 6
Lower Frankford Low Level	1.0	1 - 5
Somerset Low Level	2.1	4 by 4 - 5 by 5.5
Upper Frankford Low Level	2.5	1.67 - 4.5
Tacony High Level	3.5	3 - 8.5
Frankford High Level	3.0	5.5 - 11 by 8.5

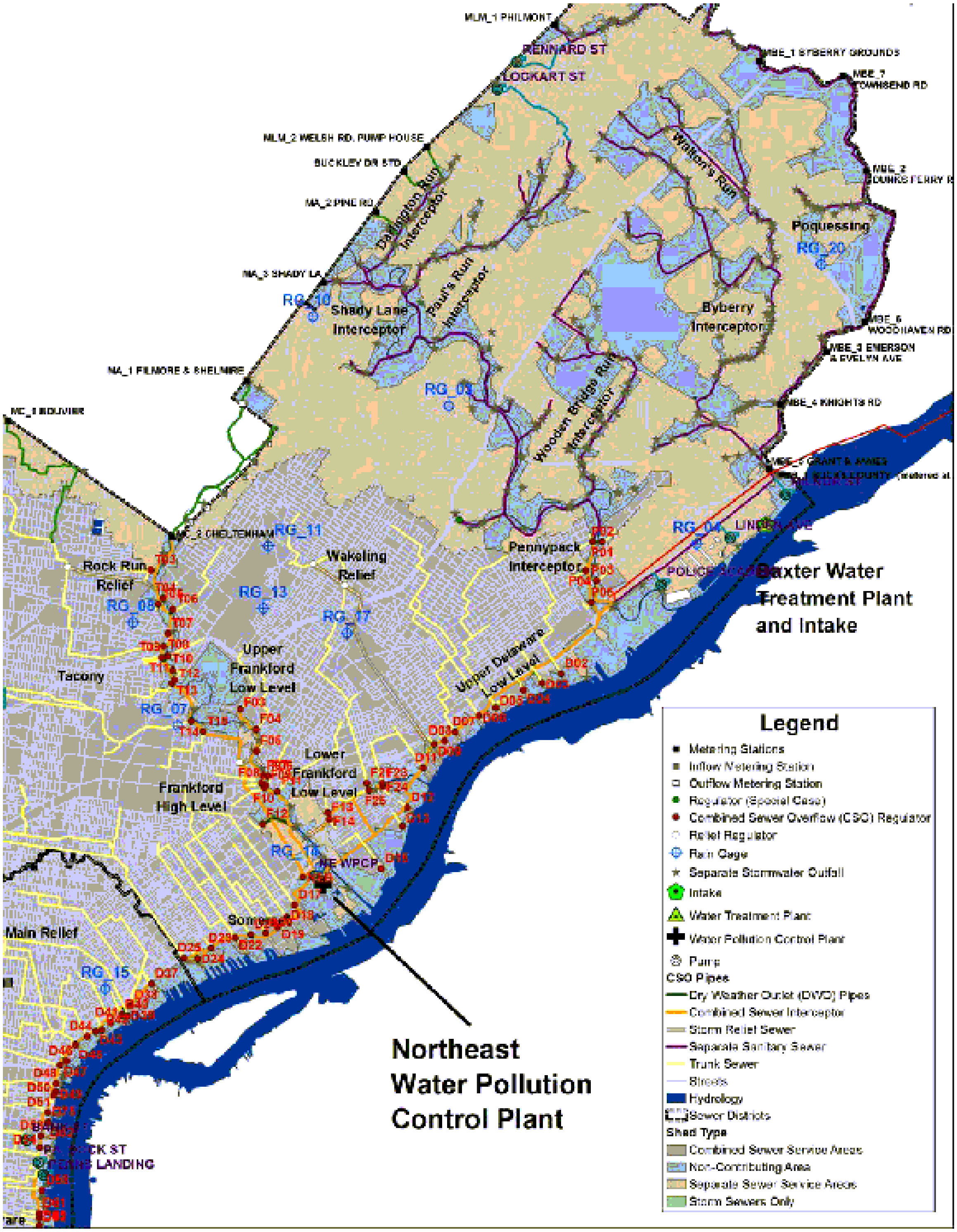
Upper Delaware Low Level: The UDLL interceptor originates in the northern most sections of Philadelphia, near the confluence of the Poquessing Creek and the Delaware River. Several small interceptors contribute flow here, and metered flow from Bensalem, Southampton, and Lower Moreland also enter the PWD system here. Wastewater flow from Bucks County enters the UDLL interceptor just upstream of Pennypack Creek through a 42 inch force main. The interceptor flows southwest, parallel to the Delaware River until it reaches the NE WPCP.

The Pennypack (P) interceptor conveys flows from Holmes Avenue in northeast Philadelphia to the UDLL interceptor on the south side of Pennypack Creek. The Pennypack interceptor receives sanitary flows from several small interceptor systems and metered flow from Abington.

The <u>Lower Frankford Low Level (LFLL)</u> lies between the Delaware Expressway and the UDLL interceptor. It conveys flows from Church Street on the southwest and Bridget Street on the northeast to the junction with the UDLL near Margaret and Garden Streets.

<u>Somerset/Upper Frankford Low Level:</u> The Somerset Low Level (S) interceptor originates near Somerset Street and conveys flow along the Delaware River northeast into the NE WPCP. The UFLL interceptor begins near Wyoming and Castor Streets, and conveys flows southeasterly toward the WPCP, parallel to New Frankford Creek. The UFLL interceptor combines with the Somerset interceptor near Luzerne and Richmond Streets at Diversion Chamber A.
<u>Tacony/Frankford High Level:</u> The Tacony (T) and FHL interceptors combine to convey flows from near Cheltenham Township southeasterly along the Tacony and New Frankford Creeks to the NE WPCP. The Tacony interceptor runs along the Tacony Creek to where the FHL interceptor begins at the Frankford Grit Overflow Chamber (R_18) located near Hunting Park Avenue and Castor Street. From here, the FHL interceptor conveys flow to the "O" Street and Erie Avenue Dispersion Chamber (H_22), where flows split into parallel sewers. The parallel sewers convey wastewater and stormwater along New Frankford Creek to the NE WPCP.

Figure 2 Northeast Drainage District



3.d. Description of Wastes Accepted from Outside Collection System

The Northeast Plant receives no wastes from outside its collection system.

3.e. Map and Description of Point and Non-Point Source Releases From Facility

As described below, the Northeast Plant contains sludge impoundments which, as indicated in the chart entitled *"March 2000 Northeast Sludge Samples",* has PCBs contained in some samples of the sludge. Although we believe that it is unlikely that the limited runoff from these impoundments which is directed into the headworks of the Northeast Plant represents a significant PCB contribution to the facility's overall load, we have included below a description of the impoundments together with available PCB information. As part of the Northeast Plant trackdown study, we intend to sample the impoundment runoff and analyze for PCBs.

Philadelphia Water Department Northeast WPCP Sludge Impoundments

The Philadelphia Water Department owns sludge impoundments at the Northeast Water Pollution Control Plant (3899 Richmond St). These impoundments were used to store treated sludge during the 1950's and 60's, and have been inactive since. There are four impoundments that are unlined, except for the natural clay layer beneath, which covers almost 40 acres (see attached maps). The sludge is between 8-10 feet deep and totals approximately 580,000 cubic yards. In preparation for closing this site under the PA Recycling and Environmental Remediation Standards Act (Act 2), a Site Characterization Study and a Remedial Investigation/Baseline Risk Assessment Reports were generated. These reports were developed by our consultant RETTEW Associates, and their findings are summarized below.

A groundwater well network comprised of 12 wells was developed around the perimeter of the impoundments with four rounds of quarterly sampling analyzed for a wide range of parameters. Analytical method 8082 (arochlor) was used for PCB testing with a detection limit of 0.5 ppb. The results are presented in the attached table entitled *"Northeast Groundwater Samples"*. All of the samples analyzed were below the detection limit.

Five sludge samples were collected from three different depths within each impoundment. A similar arochlor method was employed for analyzing these samples, with varying detection limits based upon the moisture content of the sample. There was only one reported value over the detection limit for PCB-1254 (10,000 ug/kg), with several measurable values for PCB-1260. (ranging from 4,000 – 500,000 ug/kg) Attached is a table which details these results.

The nature and composition of the sludge explains why measurable quantities of PCBs were not found in the groundwater. The sludge is composed of organic waste solids that have very high carbon content and a very low permeability. Combine this with the fact that PCB compounds have an affinity for solids, (e.g. 1260 migrates in the sludge 2,500,000 times slower than water) explains the groundwater results.

Any runoff from these impoundments is returned to the plant. Any overflow from impoundments B and D drain into a line that returns to the plant influent stream. Impoundment

C drains into impoundment A, which is pumped when needed into the Primary Tanks. This ensures that nothing leaves the site without treatment.

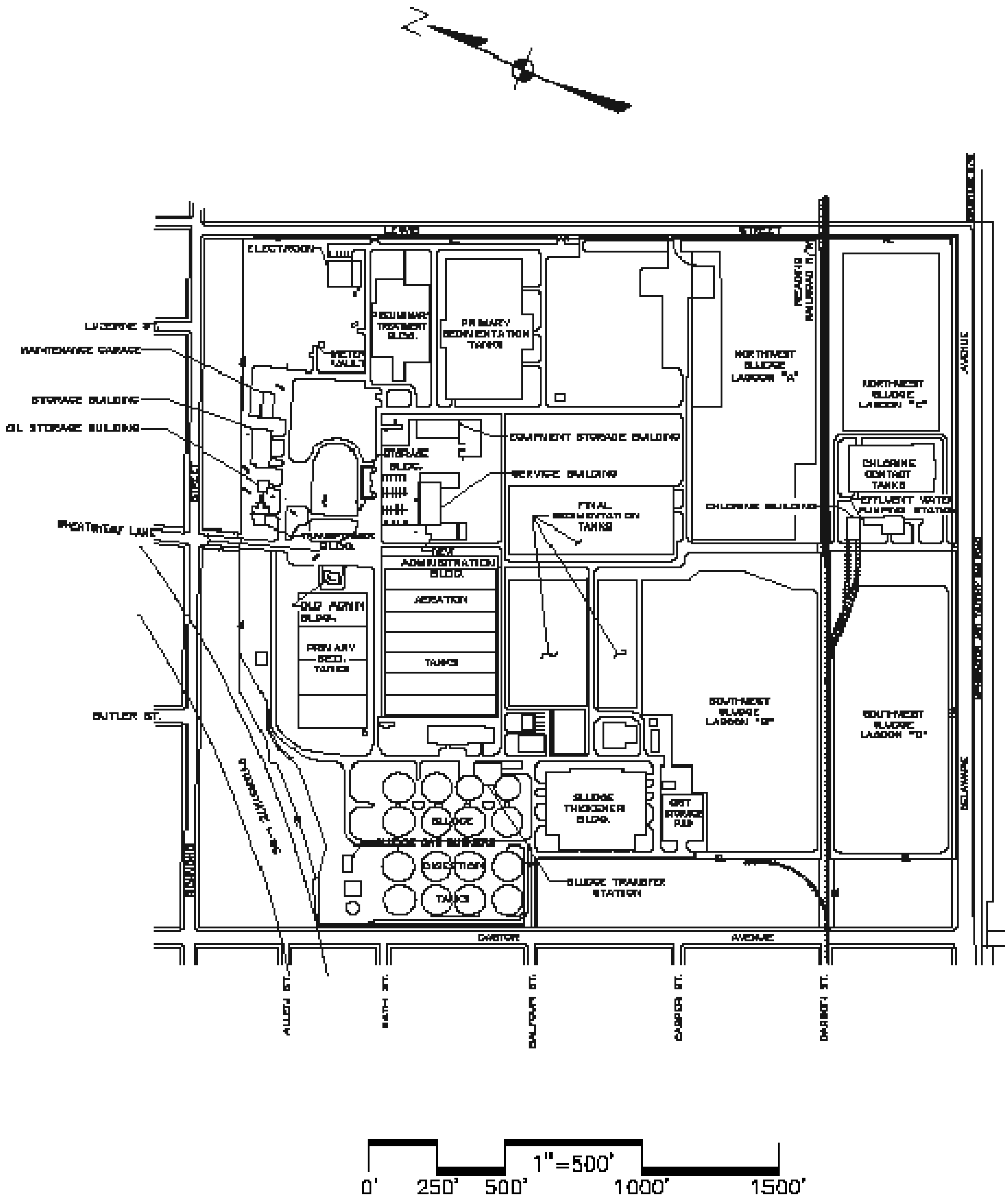


FIGURE 2

H:\02\02159701\CADD\GEOSCI\Site Plan.dwg

SITE MAP
FOR
PWD-NEWPCP SLUDGE IMPOUNDMENTS

RETTEW

RETTEW Associates, Inc.
3020 Columbia Ave., Lancaster, PA 17603
Phone (717) 394-3721 • Fax (717) 394-1063

DRAWN BY: T.A.B.
DATE: 9/28/04
SCALE: 1"=500'
DWG. NO. 02-01597-001

Northeast WPCP Impoundments

NORTHEAST GROUNDWATER SAMPLES

Location:		NEMW-1	NEMW-DD	NEMW-FS	NEMW-FD	NEMW-CD	NEMW-BS	NEMW-BD	NEMW-5	NEMW-4	NEMW-ED	NEMW-ES	NEMW-CS
Sample type:		grab	grab	grab	grab	grab	grab	grab	grab	grab	grab	grab	grab
Mar-00													
PCB-1016	ug/L	< 0.55	< 0.48	< 11	< 0.48	< 0.47	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.51	< 9.6
PCB-1221	ug/L	< 0.55	< 0.48	< 11	< 0.48	< 0.47	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.51	< 9.6
PCB-1232	ug/L	< 0.55	< 0.48	< 11	< 0.48	< 0.47	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.51	< 9.6
PCB-1242	ug/L	< 0.55	< 0.48	< 11	< 0.48	< 0.47	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.51	< 9.6
PCB-1248	ug/L	< 0.55	< 0.48	< 11	< 0.48	< 0.47	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.51	< 9.6
PCB-1254	ug/L	< 0.55	< 0.48	< 11	< 0.48	< 0.47	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.51	< 9.6
PCB-1260	ug/L	< 0.55	< 0.48	< 11	< 0.48	< 0.47	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.51	< 9.6
Jun-00													
PCB-1016	ug/L	< 0.47	< 0.47	< 0.48	< 0.47	< 0.48	< 0.48	< 0.48	< 0.48	< 0.47	< 0.47	< 0.48	< 4.7
PCB-1221	ug/L	< 0.47	< 0.47	< 0.48	< 0.47	< 0.48	< 0.48	< 0.48	< 0.48	< 0.47	< 0.47	< 0.48	< 4.7
PCB-1232	ug/L	< 0.47	< 0.47	< 0.48	< 0.47	< 0.48	< 0.48	< 0.48	< 0.48	< 0.47	< 0.47	< 0.48	< 4.7
PCB-1242	ug/L	< 0.47	< 0.47	< 0.48	< 0.47	< 0.48	< 0.48	< 0.48	< 0.48	< 0.47	< 0.47	< 0.48	< 4.7
PCB-1248	ug/L	< 0.47	< 0.47	< 0.48	< 0.47	< 0.48	< 0.48	< 0.48	< 0.48	< 0.47	< 0.47	< 0.48	< 4.7
PCB-1254	ug/L	< 0.47	< 0.47	< 0.48	< 0.47	< 0.48	< 0.48	< 0.48	< 0.48	< 0.47	< 0.47	< 0.48	< 4.7
PCB-1260	ug/L	< 0.47	< 0.47	< 0.48	< 0.47	< 0.48	< 0.48	< 0.48	< 0.48	< 0.47	< 0.47	< 0.48	< 4.7
Sep-00													
PCB-1016	ug/L	< 0.5	< 0.48	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.47
PCB-1221	ug/L	< 0.5	< 0.48	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.47
PCB-1232	ug/L	< 0.5	< 0.48	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.47
PCB-1242	ug/L	< 0.5	< 0.48	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.47
PCB-1248	ug/L	< 0.5	< 0.48	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.47
PCB-1254	ug/L	< 0.5	< 0.48	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.47
PCB-1260	ug/L	< 0.5	< 0.48	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.49	< 0.48	< 0.47	< 0.48	< 0.47
Dec-00													
PCB-1016	ug/L	< 0.47	< 0.47	< 0.5	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.48	< 0.48	< 0.47	< 0.47
PCB-1221	ug/L	< 0.47	< 0.47	< 0.5	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.48	< 0.48	< 0.47	< 0.47
PCB-1232	ug/L	< 0.47	< 0.47	< 0.5	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.48	< 0.48	< 0.47	< 0.47
PCB-1242	ug/L	< 0.47	< 0.47	< 0.5	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.48	< 0.48	< 0.47	< 0.47
PCB-1248	ug/L	< 0.47	< 0.47	< 0.5	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.48	< 0.48	< 0.47	< 0.47
PCB-1254	ug/L	< 0.47	< 0.47	< 0.5	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.48	< 0.48	< 0.47	< 0.47
PCB-1260	ug/L	< 0.47	< 0.47	< 0.5	< 0.48	< 0.47	< 0.47	< 0.47	< 0.47	< 0.48	< 0.48	< 0.47	< 0.47

MARCH 2000 NORTHEAST SLUDGE SAMPLES

Location:		NELAGA1S	NELAGA1M	NELAGA1D	NELAGA2S	NELAGA2M	NELAGA2D	NELAGA3S	NELAGA3M	NELAGA3D	NELAGA4S	NELAGA4M	NELAGA5S	NELAGA5M	NELAGA5D
Sample type:		grab	grab	grab	grab	grab	grab	grab	grab	grab	grab	grab	grab	grab	grab
PCB-1016	ug/kg	< 46000	< 23000	< 440000	< 24000	< 210000	< 27000	< 230000	< 22000	< 22000	< 21000	< 23000	< 23000	< 23000	< 22000
PCB-1221	ug/kg	< 46000	< 23000	< 440000	< 24000	< 210000	< 27000	< 230000	< 22000	< 22000	< 21000	< 23000	< 23000	< 23000	< 22000
PCB-1232	ug/kg	< 46000	< 23000	< 440000	< 24000	< 210000	< 27000	< 230000	< 22000	< 22000	< 21000	< 23000	< 23000	< 23000	< 22000
PCB-1242	ug/kg	< 46000	< 23000	< 440000	< 24000	< 210000	< 27000	< 230000	< 22000	< 22000	< 21000	< 23000	< 23000	< 23000	< 22000
PCB-1248	ug/kg	< 46000	< 23000	< 440000	< 24000	< 210000	< 27000	< 230000	< 22000	< 22000	< 21000	< 23000	< 23000	< 23000	< 22000
PCB-1254	ug/kg	< 46000	< 23000	< 440000	< 24000	< 210000	< 27000	< 230000	< 22000	< 22000	< 21000	< 23000	< 23000	< 23000	< 22000
PCB-1260	ug/kg	< 46000	< 23000	< 440000	< 24000	< 210000	< 27000	< 230000	< 22000	< 22000	< 21000	< 23000	< 23000	< 23000	< 22000

		NELAGB1S	NELAGB1M	NELAGB1D	NELAGB2S	NELAGB2M	NELAGB2D	NELAGB3S	NELAGB3M	NELAGB3D	NELAGB4S	NELAGB4M	NELAGB4D	NELAGB5S	NELAGB5M	NELAGB5D
PCB-1016	ug/kg	< 270000	< 360000	< 250000	< 3800	< 45000	< 38000	< 6200	< 57000	< 56000	< 3800	< 53000	< 54000	< 35000	< 45000	< 43000
PCB-1221	ug/kg	< 270000	< 360000	< 250000	< 3800	< 45000	< 38000	< 6200	< 57000	< 56000	< 3800	< 53000	< 54000	< 35000	< 45000	< 43000
PCB-1232	ug/kg	< 270000	< 360000	< 250000	< 3800	< 45000	< 38000	< 6200	< 57000	< 56000	< 3800	< 53000	< 54000	< 35000	< 45000	< 43000
PCB-1242	ug/kg	< 270000	< 360000	< 250000	< 3800	< 45000	< 38000	< 6200	< 57000	< 56000	< 3800	< 53000	< 54000	< 35000	< 45000	< 43000
PCB-1248	ug/kg	< 270000	< 360000	< 250000	< 3800	< 45000	< 38000	< 6200	< 57000	< 56000	< 3800	< 53000	< 54000	< 35000	< 45000	< 43000
PCB-1254	ug/kg	< 270000	< 360000	< 250000	< 3800	< 45000	< 38000	< 6200	< 57000	< 56000	10100	< 53000	< 54000	< 35000	< 45000	< 43000
PCB-1260	ug/kg	< 270000	< 360000	< 250000	3900	< 45000	121000	< 6200	< 57000	< 56000	13400	< 53000	< 54000	< 35000	< 45000	61000

		NELAGC1S	NELAGC1M	NELAGC1D	NELAGC2S	NELAGC2M	NELAGC2D	NELAGC3S	NELAGC3M	NELAGC3D	NELAGC4S	NELAGC4M	NELAGC4D	NELAGC5S	NELAGC5M	NELAGC5D
PCB-1016	ug/kg	< 420000	< 440000	< 480000	< 29000	< 290000	< 320000	< 30000	< 300000	< 450000	< 430000	< 490000	< 430000	< 410000	< 31000	< 340000
PCB-1221	ug/kg	< 420000	< 440000	< 480000	< 29000	< 290000	< 320000	< 30000	< 300000	< 450000	< 430000	< 490000	< 430000	< 410000	< 31000	< 340000
PCB-1232	ug/kg	< 420000	< 440000	< 480000	< 29000	< 290000	< 320000	< 30000	< 300000	< 450000	< 430000	< 490000	< 430000	< 410000	< 31000	< 340000
PCB-1242	ug/kg	< 420000	< 440000	< 480000	< 29000	< 290000	< 320000	< 30000	< 300000	< 450000	< 430000	< 490000	< 430000	< 410000	< 31000	< 340000
PCB-1248	ug/kg	< 420000	< 440000	< 480000	< 29000	< 290000	< 320000	< 30000	< 300000	< 450000	< 430000	< 490000	< 430000	< 410000	< 31000	< 340000
PCB-1254	ug/kg	< 420000	< 440000	< 480000	< 29000	< 290000	< 320000	< 30000	< 300000	< 450000	< 430000	< 490000	< 430000	< 410000	< 31000	< 340000
PCB-1260	ug/kg	< 420000	< 440000	< 480000	< 29000	< 290000	< 320000	< 30000	< 300000	< 450000	< 430000	< 490000	< 430000	< 410000	< 31000	< 340000

		NELAGD1S	NELAGD1M	NELAGD1D	NELAGD2S	NELAGD2M	NELAGD2D	NELAGD3S	NELAGD3M	NELAGD3D	NELAGD4S	NELAGD4M	NELAGD4D	NELAGD5S	NELAGD5M	NELAGD5D
PCB-1016	ug/kg	< 3600	< 41000	< 41000	< 5700	< 47000	< 47000	< 40000	< 500000	< 260000	< 560000	< 540000	< 460000	< 35000	< 500000	< 490000
PCB-1221	ug/kg	< 3600	< 41000	< 41000	< 5700	< 47000	< 47000	< 40000	< 500000	< 260000	< 560000	< 540000	< 460000	< 35000	< 500000	< 490000
PCB-1232	ug/kg	< 3600	< 41000	< 41000	< 5700	< 47000	< 47000	< 40000	< 500000	< 260000	< 560000	< 540000	< 460000	< 35000	< 500000	< 490000
PCB-1242	ug/kg	< 3600	< 41000	< 41000	< 5700	< 47000	< 47000	< 40000	< 500000	< 260000	< 560000	< 540000	< 460000	< 35000	< 500000	< 490000
PCB-1248	ug/kg	< 3600	< 41000	< 41000	< 5700	< 47000	< 47000	< 40000	< 500000	< 260000	< 560000	< 540000	< 460000	< 35000	< 500000	< 490000
PCB-1254	ug/kg	< 3600	< 41000	< 41000	< 5700	< 47000	< 47000	< 40000	< 500000	< 260000	< 560000	< 540000	< 460000	< 35000	< 500000	< 490000

3.f. Facility State and Federal Permit Numbers

PaDEP Site ID #: 451953
NPDES Permit No. PA 0026689

3.g. Name of Receiving Stream Including River Mile

The discharge of the Northeast Plant is received by the Delaware River at mile point 104.03

3.f. List of all known industrial users of the collection System and permit numbers

List of Industrial Dischargers in the Northeast Sewershed

FACILITY NAME	STREET ADDRESS	CITY	STATE	ZIP	PRETREATMENT PERMIT NO.
Lustrik, Inc.	4317 Paul St.	Philadelphia	PA	19124	LUST00020842WS
Frankford Plating, Inc.	2505 Orthodox St.	Philadelphia	PA	19137	FRAN00030892WS
Abaco	1814 E. Russell St.	Philadelphia	PA	19134	ABAC00010802WS
J.P. Cerini Technologies, Inc.	4600 N. Fairhill St.	Philadelphia	PA	19140	CCLC00010898WS
Lannett Co. Inc.	9000 State Road	Philadelphia	PA	19136	LANN00010862OM
McNeil Consumer Products Co.	7050 Camp Hill Road	Fort Washington	PA	19034	MCNE00011028BD
Brite Clean, Inc	1000 Imperial Road	Bensalem	PA	19020	MATL00010833OM
Lannett Co. Inc (Torresdale)	9001 Torresdale Ave.	Philadelphia	PA	19136	LANN00021129OM
Model Finishing Co., Inc.	4949 Cottman Ave.	Philadelphia	PA	19135	MODE00050877WS
Harvey M. Stern & Co.	6350 Germantown Ave.	Philadelphia	PA	19144	HARV00010911WS
SPD Technologies	13500 Roosevelt Blvd.	Philadelphia	PA	19116	SPDT00010817WS
Aeco, Inc.	4925 Arendell St.	Philadelphia	PA	19114	AECO00010856WS
Computer Components Corporation	2751 Southampton Rd.	Philadelphia	PA	19116	COMP00011059WS
CW Industries	130 James Way	Southampton	PA	18966	CWIN00010922WS
Automotive Rebuilders, Inc.	1670 B Winchester Rd.	Bensalem	PA	19020	AUTO00020993ND
Premier Medical Division of Premier Dental	10090 Sandmeyer La.	Philadelphia	PA	19116-3506	PREM00010971WS
Vibroplating, Inc.	353 Camer Dr.	Bensalem	PA	19020	VIBRO00010991WS
Q Tech Corporation	Building 8C Headley Pl.	Fallsington	PA	19054	QTEC00010974FP
Pennway Corporation	623 Center Ave.	Bensalem	PA	19020	PENN00031132ND
Adelphia Steel Equipment, Inc.	7372 State Rd.	Philadelphia	PA	19136	ADEL00011024BD
DGM Custom Polishing & Finishing Corporation	8301 Torresdale Avenue	Philadelphia	PA	19136	DGMC00011064WS
Metal Improvements	400 Winks Lane	Bensalem	PA	19020	BREN00110791WS
Custom Powder Coatings	4831 Ashburner Street	Philadelphia	PA	19136	CUST00011080FP
Metlab/Potero	1000 E. Mermaid Lane	Wyndmor	PA	19038-8093	METL00011087WS
Augusta Aerospace Corporation	3050 Red Lion Road	Philadelphia	PA	19114	AGUS00011094FP
Medical Products Laboratories	9990 Global Road	Philadelphia	PA	19115	MEDI00011095BD
Gill Powder Coating	1384 Byberry Road	Bensalem	PA	19020	GILL00011097WS
AJ Daw Ink Printing Co	1705 Winchester Rd	Bensalem	PA	19020	DAWI00011125ND
Woodbine Industries					WOOD00011133ND
SPS Technologies	Highland & Mt. Carmel Aves.	Jenkintown	PA	19046	SPST00010857WS
Hillock Anodizing, Inc.	5101 Comly St.	Philadelphia	PA	19135	HILL00020880WS
Mutual Pharmaceutical Company	1100 Orthodox St.	Philadelphia	PA	19124	MUTU00010966OM
Newman and Comapnay Paper	6101 Tacony St.	Philadelphia	PA	19135	NEWM00010361OM
Cardone Industries	5660 Rising Sun Ave.	Philadelphia	PA	19120	CARD00050925WS
Gryphin Company	3501 Richmond St.	Philadelphia	PA	19134	GRYP00010930OM
Max Levy Autograph, Inc.	220 W. Roberts Ave..	Philadelphia	PA	19144-4298	MAXL00010982FP
Delavau, LLC	10101 Roosevelt Blvd.	Philadelphia	PA	19154	JWSD00021054OM
Advanced Technologies	2925 E. Ontario St	Philadelphia	PA	19134	ADVA00011128OM
Garfield Refining Company	810 E. Cayuga Street	Philadelphia	PA	19124	GARF00021136ND
Cardinal Health Clinical Services	10381 Decatur Road	Philadelphia	PA	19114	CARD00011145MS
James Abbott, Inc.	2105-11 E. Wishart Street	Philadelphia	PA	19134	JAME00050808WS
Action Manufacturing Co.	100 E. Erie Avenue	Philadelphia	PA	19134	ACTI00050979WS
Abington Metal Refinery	4924 Wellington Street	Philadelphia	PA	19135	ABIN00011023BD

Purolite, Ltd.	3620 G Street	Philadelphia	PA	19134	PURO00010150BD
Allied Tube & Conduit, Inc.	11350 Norcum Road	Philadelphia	PA	19154	ALLI00040840WS
Philadelphia Rustproof	2086 E. Willard Street	Philadelphia	PA	19134	PHIL00880830WS
Curtiss Labs	2538 State Road	Bensalem	PA	19020	CURT00010928BD
Henshell Corporation	2922 N. 19th Street	Philadelphia	PA	19132	HENS00010884WS
United Color Manufacturing	2940 E. Tioga Street	Philadelphia	PA	19134	UNIT00111007WS
United Chemical Technologies	2731 Bartrum Road	Bristol	PA	19007	UNIT00110989WS
Roto Die Company, Inc.	2850-78 Comly Road	Philadelphia	PA	19154	ROTO00011061WS
Sunoco, Inc., Frankford Plt.	Margaret & Bermuda Streets	Philadelphia	PA	19137	SUNO00060380DS
Rohm & Haas	5000 Richmond Street	Philadelphia	PA	19137	ROHM00010464DS
Martin/F. Weber	2727 Southampton Road	Philadelphia	PA	19154	MART00011104WS
Economy Service & Sales	4252 Whitaker Avenue	Philadelphia	PA	19124	ESSC00011101ZD
Polysat, Inc.	7240 State Road	Philadelphia	PA	19135	POLY00011110ND
NEL Metal Restoration	2127-35 Margaret Street	Philadelphia	PA	19124	NELM00011131ND
I. Rice	11500D Roosevelt Blvd.	Philadelphia	PA	19116	not permitted
Fresh Made	810-820 Bleigh Avenue	Philadelphia	PA	19111	not permitted
Ben Franklin Foods, Inc.	2729 E. Butler St	Philadelphia	PA	19137	not permitted
Perfection Foods Co. Inc.	3901 Old York Road	Philadelphia	PA	19140	not permitted
Colorado Beef / Mid Atlantic Foods	2060 E. Tioga St.	Philadelphia	PA	19134	not permitted
Krispy Kreme	2327 Cottman Avenue	Philadelphia	PA	19149	not permitted
Wyszynski	5419 N. Mascher St.	Philadelphia	PA	19120	not permitted
Irene's Bakery	10085-B Sandmeyer Lane	Philadelphia	PA	19116	not permitted
Cardone Industries	321 E. Chew St.	Philadelphia	PA		not permitted
Lensco	2917 E. Hedley St.	Philadelphia	PA	19137	not permitted
Lever Dies	73 Dunks Ferry Rd.	Bensalem	PA	19020	not permitted
Superior Tool & Die Co.	3170 Tucker Rd.	Bensalem	PA	19021	not permitted
Specialty Ring Products, Inc.	2374 State Rd.	Bensalem	PA	19022	not permitted
Northeast Philadlephia Airport	9800 Ashton Rd.	Philadelphia	PA	19114	not permitted
Blendco Systems	1 Pearl Buck Court	Bristol	PA	19007	not permitted
Northern Liberty Foods	5419 Mascher St.	Philadelphia	PA	19120	not permitted
Court Record Services, Inc.	5301 Tacony St. Bldg 210-3	Philadelphia	PA	19135	not permitted
International Chemical Company	2628-48 N. Mascher St.	Philadelphia	PA	19133	not permitted
Para Chem Southern Inc.	Ontario & Rover Sts.	Philadelphia	PA	19134	PARA00010390OM
Pepsi Cola Metro Bot. Co.	E. Roosevelt Blvd. & Comly Rd.	Philadelphia	PA	19116	PEPS00030304OM
Philadelphia Baking Co.	9088 Blue grass Road	Philadelphia	PA	19114	PHIL00140151OM
Smurfit-Stone West Plant	9820 Blue Grass Rd.	Philadelphia	PA	19114	STON00020367OM
Cutler Dairy Products	612 W. Sedgley	Philadelphia	PA	19140	CUTL00010200OM
Dietz and Watson	05701 Tacony St.	Philadelphia	PA	19135	DIET00010028OM
Micheles Family Bakery	5698 Rising Sun Ave.	Philadelphia	PA	19120	MLDE00010152OM
Kraft Foods NA Nabisco-Phila. Bakery	12000 Roosevelt Blvd.	Philadelphia	PA	19115	NATI00020155OM
Penn Maid/Crowley Foods, Inc.	10975 Dutton Rd.	Philadelphia	PA	19154	READ00020089OM
Interstate Brands Corp./Continental Baking	9801 Bluegrass Rd.	Philadelphia	PA	19114	CONT00030148OM
Philadelphia Coca Cola Bottling Co.	E. Erie Avenue & "G" Streets	Philadelphia	PA	19134	PHIL00010302OM
Degussa Flavors and Fruit Systems	Tomlinson Rd. & Jamison Ave.	Philadelphia	PA	19116	SANO00010111OM
Clean Rental Services, Inc.	4352 N. American Street	Philadelphia	PA	19140	CLEA00020952OM
O'Neill Industries, Inc.	5101 Unit I Comly St.	Philadelphia	PA	19135	ONEI00011005FP

Luithlen Dye Corp.	J & Tioga Sts.	Philadelphia	PA	19134	LUIT00010330OM
Caledonian Dye Works	3300 Emerald St.	Philadelphia	PA	19134	CALE00021021OM
Northeast Donut Shops Management Corp.	5201-11 Darrah Street	Philadelphia	PA	19124	NORT00011048OM
Philadelphia Cooked Steak Company	124 W. Venango St.	Philadelphia	PA	19140	PHIL01051060OM
David Michael Company, Inc.	10801 Decatur Rd.	Philadelphia	PA	19154	DMIC00011057OM
Smurfit-Stone East Plant	Tulip & Decauter Streets	Philadelphia	PA	19136	STON00010947OM
Domestic Uniform	4100 Frankford Ave.	Philadelphia	PA	19124	DOME00030964OM
Philadelphia Gas Works - Venango	3100 Venango Street	Philadelphia	PA	19134	PHIL00860949OM
Schutte & Koering	2233 State Road	Bensalem	PA	19020	SCHU00010944OM
Arbill Industries, Inc.	2207 West Glenwood Ave.	Philadelphia	PA	19132	ARBI00010953OM
Philadelphia Cheesesteak Co.	520 E. Hunting Park Avenue	Philadelphia	PA	19124	ORGI00011072OM
Bethayres Reclamation Corp.	2310 Terwood Drive	Huntington Valley	PA	19006	BETH00011055QR
GE Betz	4636 Somerton Rd	Trevose	PA	19053	GEBE00011120OM
Perfecseal	9800 Bustleton Ave.	Philadelphia	PA	19115	PAPE00010366OM
Abbey Color & Chemical, Inc.	400 E. Tioga St.	Philadelphia	PA	19134	ABBE00010926BD
Fleetwash, Inc.	744 Walnut Ave., Walnut Commons Unit 3A	Bensalem	PA	19020	FLEE00011004WS
Columbia Silk Dyeing Co., Inc.	1726 N. Howard St.	Philadelphia	PA	19122	COLUOOO20996OM
United States Filter Corporation	95 Lower Morrisville Rd.	Fallsington	PA	19054	USFI00011010OM
Concord Cleaning	1729 Griffith Street	Philadelphia	PA	19111	CONC001113BD
HMMT Environmental	725 Wicker Avenue	Bensalem	PA	19020	HMMT00011096OM
Fishtown Fleet Wash	2709 Livingston Street	Philadelphia	PA	19125	FISH00011103OM
Regal International Leathers, Ltd	3795 Speviva Street	Philadelphia	PA	19137	REGA0020165WS
Neatsfoot Oil Corp.	2925 E. Ontario St.	Philadelphia	PA	19134	NEAT00010552OM
Globe Dye Works	4550 Worth St.	Philadelphia	PA	19124	GLOB00030975OM
Cintas Corporation	10080 Sandmeyer Lane	Philadelphia	PA	19116	CINT00010955OM
Arway Apron and Uniform Rental	1696 Foulkrod St.	Philadelphia	PA	19124	ARWA00010988OM
Kinder-Morgan Liquid Terminals, LLC	Delaware River & Allegheny Ave.	Philadelphia	PA	19134	KMEP00010936BD
Tanner Industries, Inc.	5811 Tacony St.	Philadelphia	PA	19135	TANN00011100WS
GE International Inc.	1040 E. Erie Avenue	Philadelphia	PA	19124	GENE00010973OM
N. Jonas & Co.	1301 Adams Road	Bensalem	PA	19020	NJON00011115WS
Dickler Chemical Laboratories, Inc.	4201 Torresdale Avenue	Philadelphia	PA	19124	DICK00011119OM

PMP
Northeast Plant
Known Sources
Item 4

Two known sources of PCBs entering the Northeast Plant sewer shed are the intake of Delaware River water and the addition of ferric chloride as a treatment coagulant into the Baxter Water Treatment Plant and the resultant discharge of most of the plant's process wastes into the sewer. The remaining wastes are stored onsite in the plant's raw water basin which is periodically dredged to containers which are then removed from the site and the sewer shed.

The intake of Delaware River water into the plant occurs about river mile 111 which approximately where two ambient water samples were taken and analyzed for PCBs in September, 2001 and October, 2002. The results were 3.902 and 5.607 ng/l, respectfully, for an average concentration of 4.75 ng/l. An average intake flow of 160 MGD into the plant results in an intake of PCBs of 2,877 mg/day. Based upon an approximate solids balance, we estimate 99 percent of the influent loading is captured within the treatment processes. Ten percent of that captured loading immediately settles in the raw water basin and another ten percent is captured by the filtering process which is subsequently cleaned and flushed into the same raw water basin. Therefore, we estimate that approximately 79 percent, or 2,280 mg/day, of the Delaware River loading influent to the Baxter Plant is discharged into the Northeast Plant sewer shed.

The second source is discharge of spent ferric chloride, which contains PCBs in the delivered product, from the Baxter Plant into the sewer. The Baxter Plant uses ferric chloride as a water treatment chemical to coagulate and flocculate fine particle solids from the river water. PWD currently purchases ferric chloride from Kemiron. In 2001 PWD was informed by Eaglebrook (now Kemiron) that low levels of polychlorinated biphenyls were detected in the ferric chloride. The source of the ferric chloride is from the DuPont Edge Moor plant that produces ferric chloride as a by-product. The DuPont Company has analyzed their ferric chloride product for PCBs and estimates that the current concentration is 0.00055 mg/l. Based on the average dosage of ferric chloride and the average plant flow, the average contribution of PCBs to the plant is 17.51 mg/day. However, as described above, we estimate that the plant captures approximately 99 percent of the solids produced as a result of the chemical addition and ten percent of those captured solids are, due the filtering process, directed into the raw water basin and not into the sewer. Therefore, we estimate that approximately 89 percent, or 15.6 mg/day, of the PCBs from ferric chloride source is discharged into the Northeast Plant sewer shed.

The DuPont Company has already undertaken measures to reduce the concentration of PCBs in the ferric chloride produced from their Edge Moor Plant and has committed to further reductions. Their previous actions will be presented in *Section 7. Previous Minimization Activities* of this report. Their future plans will be presented in *Section 9. Pollutant Minimization Measures*.

PMP
Northeast Plant
Potential Sources
Item 5

Identification of potential sources of PCB focused first on those sources which stored PCBs in equipment. In addition to PWD's inventory of PCB containing equipment, we requested identification of such equipment from the following agencies:

1. Philadelphia Fire Department
2. Philadelphia Department of Public Health
3. USEPA (including the Mega Rule's database)
4. PaDEP
5. DRBC
6. Partnership for the Delaware Estuary
7. PECO

Copies of our original letter requesting the information from the above agencies other than those that are part of City of Philadelphia government, together with their responses, are attached to this section. **I bring to your attention the request for business confidentiality by Exelon**. Note that these attachments also serve the Southeast Plant and the Southwest Plant submissions.

The following pages of the spreadsheet entitled *"List of Potential Sources, Item 5, Northeast Plant"* contain a complete listing of equipment containing PCBs resulting from the above request. PWD believes that considerable information concerning each source should be gathered and maintained in order to both understand the characteristics of the particular source as well as identify the owner who is responsible for its proper operation and ultimate disposal. PWD intends to gather the following information regarding each potential source:

1. Name of POTW in whose drainage shed the equipment is located
2. PWD identification #
3. Name of agency referring PCB source to PWD
4. Date of last inspection of equipment by PWD or its agent
5. Name of inspector
6. Name of company which owns equipment
7. Street address of facility where source is located
8. Township address of facility where source is located
9. Zip Code address of facility where source is located
10. GIS coordinates of facility where source is located
11. County address of facility where source is located
12. Name of site or complex where source is located
13. Name of building where source is located
14. Name of contact at site who maintains PCB equipment
15. Phone number of contact at site who maintains PCB equipment

16. Name of company official responsible for management of PCB equipment
17. Title of company official responsible for management of PCB equipment
18. Street address of company official responsible for management of PCB equipment
19. Township address of company official responsible for management of PCB equipment
20. State address of company official responsible for management of PCB equipment
21. Zip Code address of company official responsible for management of PCB equipment

    (For PCB sources located in suburban townships which discharge into the PWD collection system)

22. Name of suburban utility under contract w/PWD
23. Location or name of connection to PWD System

    For PCB sources located within Philadelphia

24. Name of Trunk Sewer connected to site
25. Name of Intercepting Sewer connected to site
26. Is the site in a combined or separate sewer district?
27. Name of agency responsible for management of pretreatment permit
28. Identification of pretreatment permit number
29. Type of PCB source/equipment
30. Number of identical PCB sources at location
31. Type of Aroclor contained in equipment
32. Total PCB concentration
33. Fluid volume (gal)
32. PCB mass (lbs)
33. PCB mass (kg)
    Status of PCB equipment
34. In use
35. Out of service
36. Disconnected
    Status of building housing PCB equipment
37. Operating
38. Closed
39. Abandoned/not secure
40. Comments including any past spills from source, or company plans regarding future of source, etc

The electronic copy of this spreadsheet contains columns to allow recording of the above information. All information currently available regarding each source has been incorporated into the spreadsheet. For ease of printing, only some of the columns have been identified in the printed version of this PMP.

Please see attached spreadsheet PCB Devices

C I T Y   O F   P H I L A D E L P H I A

Bernard Brunwasser
Water Commissioner

WATER DEPARTMENT
1101 Market Street, 5th floor
Philadelphia, Pa 19107

June 10, 2005

Re: Request for PCB Information in
Compliance with PMP Rule

Executive Director
Delaware River Basin Commission
25 State Police Drive
P.O. Box 7360
West Trenton, New Jersey 08628-0360

Dear Carol:

On May 18, 2005, the Delaware River Basin Commission (DRBC) passed a resolution adopting the Pollution Minimization Plan (PMP) rule. The rule directs dischargers, including the Philadelphia Water Department (PWD) by reason of its three POTWs:

Northeast Water Pollution Control Plant, NPDES Permit No. PA0026689
Southeast Water Pollution Control Plant, NPDES Permit No. PA0026661
Southwest Water Pollution Control Plant, NPDES Permit No. PA0026671

to develop and submit its PMP for PCBs within 90 days of receipt of notice from the Executive Director of DRBC.

In compliance with the rule, PWD requests your agency's assistance in obtaining information, if any, regarding of the existence of PCBs in PWD's sewersheds. PWD has already received such information from both the Philadelphia Fire Department as well as the Philadelphia Department of Public Health and, of course, gleaned the records of its own Industrial Waste Unit. We are now reaching out to other agencies which might possess useful information. The agencies to whom we are inquiring include:

USEPA
(including information from CERCLA, TSCA and RCRA databases)

PaDEP
DRBC
Delaware Estuary Program
PECO (Excelon) -electric service provider

If you have knowledge of other agencies, which could provide useful information regarding PCB sources affecting PWD, we would appreciate your sharing that information

The PMP rule, in part, requires that the discharger include, in its PMP submission for PCBs, the following information:

(4.30.9 E.) 4. <u>Description and Map of Known Sources</u>

a. Description of all materials, equipment, process, soil area or sediment area within a facility, site or service area, from which PCBs are released directly or indirectly into a wastewater treatment system, sewage collection system, stormwater collection system, stream or river, including a description of the pathways, if known
b. Site map or collection system map showing location of known sources and pathways

5. <u>List of Potential Sources</u>

b. Identify any material, equipment, process, soil area or sediment area or facility that is part of the collection system or that is within the service area and known to contain PCBs, but that is not deemed a source because no pathway to surface water or groundwater exists. Provide estimate of the mass of PCBs, if known.

7. <u>Previous, Ongoing or Planned Minimization Activities Undertaken Voluntarily or Required by Other Regulatory Programs</u>

Previous, ongoing or planned PCB minimization activities underway or to be undertaken voluntarily or in accordance with a federal or state requirement including the level of PCB reduction attained, level of PCB reduction targeted, measures completed, measures underway, and the schedule for planned activities

8. <u>Recommendations for Action Under Other Regulatory Programs</u>

Based on information known at the time of PMP submission or identified during implementation of the PMP, recommendations for remedial activities to be undertaken under the auspices of other local, state or federal regulatory agencies or programs

The collection area to be considered for the purpose of this PCB PMP includes not only the land within the boundaries of the City of Philadelphia, but also includes the areas of our suburban townships which discharge, under a service contract, sewage into the PWD sewershed. I have identified the various zip codes associated with suburban discharge into each of our three (3) POTWs and they are as follows:

Northeast Water Pollution Control Plant
City of Philadelphia:

Zip Code	County	Township
18940	Bucks	Northampton & Newtown Township & Newtown Borough
18954	Bucks	Northampton
18966	Bucks	Southampton
19001	Montgomery	Abington
19006	Montgomery	Lower Southampton
19007	Bucks	Bristol Township
19020	Bucks	Bensalem
19046	Montgomery	Jenkintown
19047	Bucks	Hulmeville Borough & Langhorne Borough
19053	Bucks	Lower Southampton
19056	Bucks	Middleton Township
19054	Bucks	Levittown
19075	Montgomery	Oreland
19090	Montgomery	Willow Grove
19067	Bucks	Lower Makefield

Southeast Water Pollution Control Plant
City of Philadelphia:

Zip Code	County	Township
19038	Montgomery	Glenside
19095	Montgomery	Wyncote

Southwest Water Pollution Control Plant
City of Philadelphia:

Zip Code	County	Township
19003	Delaware	Ardmore
19008	Delaware	Broomall
19018	Delaware	Clifton Hts.
19023	Delaware	Darby
19026	Delaware	Drexel Hill
19029	Delaware	Essington
19032	Delaware	Folcroft
19033	Delaware	Folsom
19036	Delaware	Glenolden
19041	Delaware	Haverford
19043	Delaware	Holmes
19050	Delaware	Lansdowne
19057	Delaware	Wayne

19066	Montgomery	Lower Merion
19070	Delaware	Morton
19073	Delaware	Newtown Sq.
19074	Delaware	Norwood
19076	Delaware	Prospect Park
19078	Delaware	Ridley Park
19079	Delaware	Sharon Hill
19082	Delaware	Upper Darby
19083	Delaware	Upper Darby
19085	Delaware	Villanova
19087	Delaware	Wayne
19004	Montgomery	Bala Cynwyd
19010	Delaware	Bryn Mawr
19017	Delaware	Chester Heights
19035	Montgomery	Gladwyne
19096	Montgomery	Wynnewood
19444	Montgomery	Lafayette Hill

If you prefer a method of describing the collection area other than the use of zip codes, please advise me with your proposal.

With respect to responding to the PMP requirement regarding information on potential sources, it is PWD's objective to create a comprehensive database of all known potential sources of PCBs within each facility's service area and collection system and to provide the following information, as available, for each source location:

3. Company's name
4. Name of site, if any
   (Address of facility where source resides including)
5. Street
6. Township
7. Zip Code
8. County
9. GIS coordinates
10. Name of company's official responsible for management of PCB source
11. Phone number of official
    (Address of company's official responsible for management of source, if different than above)
12. Street
13. Township
14. Zip Code
15. State
    (For PCB sources located in suburban townships which discharge into the PWD collection system)
16. Name of entity under whose contract with PWD the source's company is permitted to discharge its waste into PWD's collection system*

17. Location or name of connection through which waste from source's company enters PWD's collection system*
    (For PCB sources located within the City of Philadelphia's collection system)
18. Name of the trunk sewer which transports the wastes of the source company*
19. Name of the intercepting sewer which transports the wastes of the source company*
20. Identification of pretreatment permit numbers, if any*
21. Agency responsible for management of pretreatment permit*
22. Location (within company's facility) or other identification of PCB source
23. Type of PCB source/device
24. Number of devices at location
25. Type of Aroclor
26. PCB concentration
27. Fluid volume
26. PCB mass
27. Name of agency that initially identified the PCB source*
28. Comments including any past spills from source, or company plans regarding future of source, etc

28. Status of PCB source (in use, out of service, disconnected)*
29. Status of facility (in operation, closed, abandoned/not secure)*

* Denotes information most readily provided by PWD.

Information your agency may process which could assist PWD in populating this database would be appreciated as well as providing information pertinent to responding to PMP section numbers: 4.30.9 E 4
4.30.9 E 7
4.30.9 E 8
as identified above. Thank you.

Sincerely yours,

Bruce S. Aptowicz
Deputy Director of Operations
Philadelphia Water Department

1101 Market Street, 4th floor
Philadelphia, PA 19107

(215) 685-6205
Bruce.Aptowicz@phila.gov

cc: Commissioner Bernard Brunswasser
Deputy Commissioner David Katz
Deputy Commissioner Debra McCarty

Legal Department

Telephone 215.841.5544
www.exeloncorp.com

Exelon Business Services Company
2301 Market Street
P.O.Box 8699
Philadelphia, PA 19101

Exelon Business Services Company

August 22, 2005

Mr. Bruce S. Aptowicz
Deputy Director of Operations
Philadelphia Water Department
1101 Market Street, 4th Floor
Philadelphia, PA 19107

Re: Exelon Corporation response to City of Philadelphia Water Department (PWD) letter, dated 6/10/05, requesting PCB information from Exelon to support PWD compliance with the Delaware River Basin Commission (DRBC) Pollutant Minimization Plan (PMP) rule.

Dear Mr. Aptowicz:

The purpose of this letter, and its appendix, is to respond to your June 10, 2005 letter requesting PCB information from Exelon. We are pleased to respond to your inquiry but do request that you treat this information as business confidential. First, we are concerned that disclosure of information related to Exelon's electrical system infrastructure beyond the PWD could have Homeland Security implications. Second, while Exelon operates in compliance with federal and state regulations governing PCBs, we are concerned that any disclosure of our information to third parties beyond the PWD could be subject to misinterpretation by members of the public unfamiliar with current environmental laws and regulations. We therefore, again, request that the PWD treat the supplied information on a "business confidential" basis.

In developing this response, we have reviewed our databases with regard to PECO Energy and Exelon Power facilities. These are the only two Exelon business units that have physical infrastructure operations within the City of Philadelphia. With regard to these fossil generation plants, Exelon Power has determined that, with the exception of domestic sewage hookups with the PWD, its plants within the City limits discharge directly to either the Schuylkill or Delaware Rivers under existing NPDES permits. Therefore, Exelon Power has no information to report to the PWD. The balance of this letter will therefore focus on providing information related to PECO Energy's operations (hereafter referred to as PECO).

Operating Practices

PECO complies with the Toxic Substance Control Act (TSCA) regulations for PCBs (40 CFR 761). While these regulations banned the manufacture and sale of PCBs in the late 1970s, they specifically authorize the continued use of PCBs in electrical equipment, provided that the equipment is not leaking and that certain other steps are taken, depending on equipment size, concentration and location. These other steps include actions such as periodic inspections, labeling and recordkeeping.

Business Confidential

PCB Reduction Activities

As part of a plan instituted almost a decade ago, PECO is continuing the phase-out of equipment containing PCBs. In 2004, PECO removed 288 PCB capacitors from substations, disposing of all PCB fluid in accordance with the TSCA requirements. PECO has now removed or replaced almost all PCB sources from its system, including all known PCB transformers in commercial buildings, all known PCB distribution equipment outside of substations, and 68 percent of all PCB capacitors in PECO substations. When compared to its total inventory of all electrical equipment, a limited number of PCB transformers and PCB capacitors remain in service on the system. This equipment is monitored and periodically reviewed for replacement or retrofill.

Potential Sources of PCBs

The vast majority of PECO's current distribution equipment in service on the system are filled with mineral or silicon oil and do not contain PCBs. Testing of this equipment that are taken out of service verifies this observation. Since the mid-1980s, manufacturers have labeled all distribution transformers purchased by PECO as being non-PCB (blue sticker).

However, currently, and historically, pole top, pad mount, underground distribution transformers, and certain smaller substation oil filled equipment purchased by PECO, are totally enclosed and sealed units. These types of equipment are not equipped with oil drain ports to allow oil samples to be taken for testing purposes. Therefore, the PCB concentrations in this equipment manufactured prior to 1980 are unknown. Essentially, testing equipment that does not have drain ports would destroy the equipment. PECO does not have a regulatory requirement to test the oil of this type of in-service equipment for PCB content. However, per regulations, any oil filled electrical equipment whose oil is untested is assumed to be PCB contaminated until proven otherwise.

PECO is responsible for the operation and maintenance of its electrical equipment. Any failure of the equipment resulting in the release of oil from the equipment into the environment is the responsibility of PECO and is responded to in accordance with applicable regulations. These regulations require PECO to report spills and releases and to complete remediation of the spilled oil.

PECO has in place spill reporting procedures and has the capability to remediate spills using both internal resources and external contractors. Under PECO's procedures, any oil reaching a storm drain is reported to the appropriate regulatory agencies, including notification to the PWD if the occurrence is in Philadelphia. Although there are limited number of transformers and capacitors located at PECO substations containing PCBs ≥50 ppm, PECO's spill control plans and procedures should prevent the release of PCBs from electrical equipment to the PWD system in all but the most extreme cases.

While we question whether PECO's substation equipment should be considered a "potential source" to the PWD for PMP purposes, the attached appendix contains a listing of our latest information regarding PECO Energy substation transformers and capacitors that contain ≥50 ppm PCBs that are located within the City limits. With regard to potential sources of PCB

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outside of Philadelphia, PECO has contacted the townships listed in your letter to determine if they have combined sewers that discharge to the PWD sewer system. All of the townships, except for Lower Merion and Darby Borough, provided a response indicating that they do not have combined sewers that are connected to the PWD sewer system. Based on this information, PECO was able to identify one PCB contaminated regulator located in Upper Darby that may be a potential source of PCB and it is included in the appendix.

We believe the information contained in this letter responds to your request for information, as we have interpreted your request. However, we would be glad to meet with you, and the relevant PWD staff, at any time to discuss the content and extent of the information provided. Should you have any questions, please feel free to contact me at 215-841-6855.

Sincerely,

H. Alfred Ryan
Assistant General Counsel
Exelon Business Services Co.

cc (via e-mail): Bruce Alexander

Business Confidential

APPENDIX

Substation Name	Address	Zip Code	Equipment Type	Equipment	Gallons	SerialNumber	PCB Result (ppm)
ANGORA	1155 S. 57th Street	19143	Regulator	14MT Regulator	290	D554369	605
SPENCER	6106 N. 5th Street	19120	Regulator	#9 Regulator	88	B672304	649
LANGHORNE	LeGrande Avenue	19047	Light & Power	#1 L&P	28	Langh #1 LP	553
SALMON	3440 Richmond Street	19134	Light & Power	#5 L&P	28	8803119	78
CHESTNUT-HILL	7735 Germantown Avenue	19138	Regulator	CHEST 039A REG	69	C714933	377
CHESTNUT-HILL	7735 Germantown Avenue		Regulator	CHEST 039B REG	69	C714937	452
CHESTNUT-HILL	7735 Germantown Avenue		Regulator	CHEST 039C REG	69	C714940	382
CHESTNUT-HILL	7735 Germantown Avenue		Regulator	CHEST 037A REG	115	D570509	171
CHESTNUT-HILL	7735 Germantown Avenue		Regulator	CHEST 037B REG	115	D270507	116
CHESTNUT-HILL	7735 Germantown Avenue		Regulator	CHEST 037C REG	115	D570506	292
STATE	Pennypack St	19136	Cable Compartment	STATE 4 CC	65	3116072	55
TAYLOR	24th & Washington Avenue	19146	Transformer	TAYLO 2 TRN	1365	6535906	318
WIGARD	7515 Ridge Avenue	19128	Transformer (Tap Changer)	WIGAR 2 TC	180	C658161	181
CALLOWHILL	1121 W. Callowhill Street	19123	PCB Capacitors	350 cans	*		Pure PCB
CEDARBROOK	1100 Ivy Hill Road	19150	PCB Capacitors	360 Cans	*		Pure PCB
CRESCENTVILLE	651 Foulkrod Street	19120	PCB Capacitors	260 Cans	*		Pure PCB
FOX CHASE	7738 Tabor Road	19111	PCB Capacitors	90 Cans	*		Pure PCB
HOLMESBURG	4601 Rhawn Street	19136	PCB Capacitors	130 Cans	*		Pure PCB
ROXBOROUGH	7200 N. Umbria Street	19128	PCB Capacitors	180 Cans	*		Pure PCB
TACONY	5031 Elbridge Street	19135	PCB Capacitors	130 Cans	*		Pure PCB
OUTSIDE OF PHILADELPHIA							
Upper Darby	2230 Township Line Rd.	19082	Regulator	Llane 005P REG	?	8049997	390

*Oil Replaced, resample scheduled during next outage to confirm PCB results

* Capacitor cans contain 3 gallons of oil

Delaware River Basin Commission
DELAWARE • NEW JERSEY
PENNSYLVANIA • NEW YORK
UNITED STATES OF AMERICA

Delaware River Basin Commission
25 State Police Drive
PO Box 7360
West Trenton, New Jersey
08628-0360
Phone: (609) 883-9500 Fax: (609) 883-9522
Web Site: http://www.drbc.net

Carol R. Collier
Executive Director

Robert Tudor
Deputy Executive Director

July 19, 2005

City of Philadelphia, Philadelphia Water Department
The Aramark Tower
1101 Market Street, 4th Floor, PWD
Philadelphia, PA 19107-2994

Attention: Bruce Aptowicz

Subject: PCB information for Pollution Minimization Plans

Dear Mr. Aptowicz:

This is in response to your letter of June 10, 2005 to Carol Collier, Executive Director of the Delaware River Basin Commission, regarding information on PCB sources, which could impact the Philadelphia Water Department (PWD) Wastewater Treatment Plants. We commend your efforts in complying with the Commission recently passed resolution No. 2005-9 which requires PWD to develop and submit a pollutant minimization plan (PMP) for PCBs. The Commission is continuing its efforts to obtain information regarding the locations of known and potential sources of PCBs as part of our TMDL efforts. At this time and in response to your request, we have undertaken the following analysis utilizing the information provided in your letter:

1. Input the information provided in your letter into a spreadsheet format.
2. Queried EPA's transformer database, available at http://www.epa.gov/pcb/data.html
3. Compared all known locations of PCB containing transformers in the EPA database, by zip code, to the townships which supply waste water to the three City of Philadelphia Water Pollution Control Plants
4. Identifying hazardous waste sites with PCB contribution to the Delaware Basin via Delaware Toxic Reduction Program (DELTRIP). This program is in its early stages and information will be provided in annual reports.

Results are given in Table 1. Information regarding transformer locations, number of transformers, amount of dielectric fluid, company name, and contact person are provided.

In support of your and others efforts, the Commission is also continuing to explore available information regarding PCB sources. We have requested EPA's PCB Activity Database (PADS) and upon receipt will conduct additional analyses to provide further information to assist in PMP efforts. However, available databases are limited in their scope, and should not be considered to be without omissions.

Therefore, we suggest that you contact the municipal officials, fire departments of the township identified in your letter and inquire as to the availability of additional information regarding sources of PCBs.

Pollutant minimization plans by their nature are long-term endeavors and we wish you success in your efforts. We look forward to the status report on PWD's track-down study at the next TMDL IAC Meeting.

Sincerely,

Gregory J. Cavallo

Gregory J. Cavallo, PG

c: CRC

Table 1.

Known locations of PCB containing transformers in watersheds which supply waste water to the City of Philadelphia Waste Water Treatment Plants

Waste Water Treatment Plant	Zip Code	Company Name	Contact Name	Contact Phone Number	Street Address of Transformer Location	Weight of Transformer Dielectric Fluid	Number of Transformers
Southwest WPCP	19033	Goebelwood Ind. Inc,	Ronald Goebel	(610) 532-4644	100 Sycamore Ave.	52	3
Southwest WPCP	19082	PECO Energy Co.	David Mobraaten	215-841-5679	380 Long Lane	57	1
Southwest WPCP	19096	PECO Energy Co.	David Mobraaten	215-841-5679	E. Wynnewood Road, SW/O Lancaster Pike	3686	1
Northeast WPCP	19047	PECO Energy Co.	David Mobraaten	215-841-5679	Legrande Avenue	3806	1
Southwest WPCP	19082	Peco Energy Company	John McMenamin	610-970-2228	2131 N 62nd Street	460	1
Northeast WPCP	19067	Peco Energy Company	John McMenamin	610-970-2228	900 Big Oak Road	3806	1
Northeast WPCP	19054	Peco Energy Company	John McMenamin	610-970-2228	Walnut & Fourth Street	7612	2
Southwest WPCP	19083	Peco Energy Company	John McMenamin	610-970-2228	WesterChester Pike & Ashton Rd	3806	1
Northeast WPCP	19006	Peco Energy Company	John McMenamin	610-970-2228	Betharyes Road & 2nd St Pike	68	1

SOURCE: PROVIDED BY DRBC 7/05

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Bruce S. Aptowicz
Deputy Director of Operations
Philadelphia Water Department
1101 Market Street, 4th Floor
Philadelphia, PA 19107

JUL 2 0 2005

Re: Freedom of Information Act Request: 03-RIN-01213-05

Dear Mr. Aptowicz:

This is in response to your Freedom of Information Act Request regarding PCB information in compliance with the Pollution Minimization Plan Rule.

A search of the records of the Waste & Chemicals Management Division (WCMD), encompassing the City of Philadelphia and the various suburban zip codes identified in your request, revealed three facilities that reported the discharge of PCBs into POTWs for the reporting years 1989 and 2003. We are enclosing reports from our Toxics Release Inventory System for each of these facilities, namely:

Rohm & Haas Co., Old Route 13 and Route 413, Bristol, PA 19007
PPM, Inc., 4105 Whitaker Avenue, Philadelphia, PA 19124
GE Co. Re-Entry System, 3198 Chestnut Street, Philadelphia, PA 19101

In addition, in February 2002, WCMD provided information directly to the Delaware River Basin Commission (DRBC) regarding Item 5 of your request. Specifically the information given to DRBC was a GIS map and corresponding list of the locations of PCB transformers in the Delaware River Basin. Since DRBC already has this information, we have not included it again in this response.

If you have any questions, feel free to contact Mildred Oruska, a member of my staff, at (215) 814-3405.

Sincerely,

Jeffrey A. Pike

Jeffrey A. Pike
Senior Program Manager
Waste & Chemicals Management Division

Enclosures
cc: R. Vanholt (3CG00)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

Mr. Bruce S. Aptowicz
Deputy Director of Operations
Philadelphia Water Department
1101 Market Street, 4th Floor
Philadelphia, PA 19107

Dear Mr.Aptowicz:

This is in response to your Freedom of Information Act request received on June 14, 2005.

Request Identification No. : 03-RIN-01213-05 Cost: $-0-

( ) Positive Determination (Material Enclosed).

(X) The Office of Municipal Assistance, Water Protection Division has no information related to this FOIA. If you have any questions, please do not hesitate to contact me at 215-814-5790.

( ) Your request of [date received] modified per discussion with [discussed with] (Remarks Attached)

( ) Fee Waiver under $14.00

( ) Processing Request: Partial information included. If there is remaining information, it will be provided after next review by requester.

( ) Processing Request:

( ) Please see attached bill. Make check payable to U.S. Environmental Protection Agency. Include the Request Identification Number (RIN) on check and mail to EPA-Region III, P.O. Box #360515, Pittsburgh, PA 15251-6515.

Sincerely,

John Lovell
Pretreatment Coordinator

cc: Laura Shields (3PM30)
Richard Van Holt, FOIA Coordinator (3CG10)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

July 12, 2005

SUBJECT: 3RIN-1213-05

TO: Richard VanHolt (3CG00)
Freedom of Information Officer

FROM: Helen DuTeau, Chief (3HS52)
Community Involvement and
Outreach Branch

We wish to advise you that after a search of our CERCLIS database the PCBs- PWDs Sewer sheds, located in the City of Philadelphia, Pennsylvania,, was not found. Therefore, the Superfund Program Office has no records responsive to this request. Although this response is not a denial, if the requester considers this response to be a denial, the requester may appeal it by addressing their written appeal to the U. S. Environmental Protection Agency, Office of Environmental Information, Records, FOIA and Privacy Branch, (2822T), 1200 Pennsylvania Avenue, N. W. Washington, DC 20460.

If you have any questions regarding this matter please contact Henrietta Woodard (Environmental Protection Assistant) at 215-814-3164.

TRI FORM R REPORTS

PART I. FACILITY IDENTIFICATION INFORMATION *(FORM R)*

DOCUMENT CONTROL NUMBER: 1303201672591

more info Facility Registry System ID: 110000740342

Section 1. Reporting Year

Reporting Year: 2003

Section 2. Trade Secret Information

2.1 Trade Secret: NO

2.2 Sanitized Copy: Unsanitized

Section 3. Certification

CERTIFYING OFFICIAL'S NAME	CERTIFYING OFFICIAL'S TITLE	CERTIFYING OFFICIAL'S SIGNATURE	DATE SIGNED
TIMOTHY MONTGOMERY	PLANT MANAGER	Original	30-JUN-04

Section 4. Facility Identification

TRI Facility ID: 19007RHMNDOLDRT

4.1 Facility Name and Address.

Facility Information

NAME	STREET	CITY	COUNTY	STATE	ZIP CODE
ROHM & HAAS CO	200 RT 413	BRISTOL	BUCKS	PA	19007

Mailing Information

NAME	STREET	CITY	COUNTY	STATE	ZIP CODE

ROHM & HAAS CO	200 RT 413	BRISTOL		PA	19007

PROVINCE	COUNTRY (NON - US)
NO DATA	NO DATA

4.2 Facility Classification

ENTIRE FACILITY	PARTIAL FACILITY	FEDERAL FACILITY	GOCO FACILITY
YES	NO	NO	NO

4.3 Technical Contact

NAME	PHONE	PHONE EXT.	EMAIL
LLOYD DAVIS	2157858871		LLOYDDAVIS@ROHMHAAS.COM

4.4 Public Contact

NAME	PHONE
RICHARD WILLIAMS	2157858828

4.5 SIC Codes

SIC CODE	SIC CODE DESCRIPTION
2821	PLASTICS MATERIALS, SYNTHETIC RESINS, AND NONVULCANIZABLE ELASTOMERS
2869	INDUSTRIAL ORGANIC CHEMICALS, NOT ELSEWHERE CLASSIFIED

4.6 Location

LATITUDE	LONGITUDE
040-05-42	074-52-05

4.7 Dun & Bradstreet Numbers

DUNS NUMBER
002292043
NA

4.8 RCRA ID Numbers

RCRA ID NUMBER

NA
PAD002292068

4.9 NPDES Permit Numbers

NPDES PERMIT NUMBER
NA
PA0012769

4.10 Underground Injection Well Code (UIC) ID Number

UIC ID NUMBER
NA

5 Parent Company Information

Parent Company Name: ROHM & HAAS CO

Parent Company DUNS Number: 002292043

PART II. CHEMICAL - SPECIFIC INFORMATION

DOCUMENT CONTROL NUMBER: 1303201672591

Section 1. Toxic Chemical Identity

1.1 CAS Number: 001336363

1.2 Toxic Chemical or Chemical Category Name: POLYCHLORINATED BIPHENYLS

1.3 Generic Chemical Name: NA

1.4 Distribution of Each Member of the Dioxin and Dioxin like Compounds Category

NA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
NO																	

Section 2. Mixture Component Identity

2.1 Supplier Provided Generic Chemical Name: NA

Section 3. Activities and Uses of the Toxic Chemical

3.1 Manufacture the Toxic Chemical:

Produce: NO Import: NO On-Site Use/Processing: NO
Sale/Distribution: NO Byproduct: NO Impurity: NO

3.2 Process the Toxic Chemical:
Reactant: NO Formulation Component: NO Article Component: NO Repackaging: NO Impurity: YES

3.3 Otherwise Use the Toxic Chemical:
Chemical Processing Aid: NO Manufacturing Aid: NO Ancillary or Other Use: NO

Section 4. Maximum Amount of the Toxic Chemical Onsite During the Calendar Year

Maximum Chemical Amount: 1,000 - 9,999 pounds

Section 5. Quantity of the Toxic Chemical Entering each Environmental Medium Onsite

5.1 Fugitive or Non-Point Air Emissions

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
NO	0	Pounds	O - Other Approaches

5.2 Stack or Point Air Emissions

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
NO	0	Pounds	O - Other Approaches

5.3 Discharges to Receiving Streams or Water Bodies

STREAM/WATER BODY NAME	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	% FROM STORMWATER
NA				

5.4.1 Underground Injection Onsite to Class I Wells.

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.4.2 Underground Injection Onsite to Class II-V Wells.

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.5 Disposal to Land Onsite

5.5.1A RCRA Subtitle C Landfills

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.5.1B Other Landfills

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.5.2 Land Treatment/Application Farming

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.5.3A RCRA Subtitle C Surface Impoundments

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.5.3B Other Surface Impoundments

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.5.4 Other Disposal

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

Section 6. Transfers of the Toxic Chemical in Wastes to Off-Site Locations

6.1 Discharges to Publicly Owned Treatment Works (POTWs)

6.1.A Total Quantity Transfered to POTWs and Basis of Estimate

6.1.A.	TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
1	NO DATA		NO DATA

6.1.B POTW Locations

6.1.B.	POTW NAME	ADDRESS	CITY	STATE	COUNTY	ZIP CODE
1	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA

6.2 Transfers to other Off-Site Locations

RCRA Number: NA	Parent Company Controlled:
Name: NA	Address:
City:	State:
County:	Zip Code:
Country Code (Non - US):	Province:

TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	WASTE MANAGEMENT TYPE
NO DATA		NO DATA	NO DATA

Section 7A. On-Site Waste Treatment Methods and Efficiency

7A.1a. Waste Stream: NA

7A.1b.	WASTE TREATMENT METHOD(S) SEQUENCE
1	NO DATA

7A.1c. Range of Influent Concentration:

7A.1d. Waste Treatment Efficiency Estimate:

7A.1e. Based on Operating Data?:

Section 7B. On-Site Energy Recovery Processes

ON SITE ENERGY RECOVERY PROCESSES
NA

Section 7C. On-Site Recycling Processes

ON SITE RECYCLING PROCESSES
NA

Section 8. **Source Reduction and Recycling Activities**

SECTION	TYPE OF QUANTITY	UNITS	PRIOR YEAR	CURRENT REPORTING YEAR	FOLLOWING YEAR	SECOND FOLLOWING YEAR
8.1a	Total on-site disposal to Class I Underground Injection Wells, RCRA Subtitle C landfills, and other landfills		NA	NA	NA	NA

8.1b	Total other on-site disposal or other releases	Pounds	0	0	0	0
8.1c	Total off-site disposal to Class I Underground Injection Wells, RCRA Subtitle C landfills, and other landfills		NA	NA	NA	NA
8.1d	Total other off-site disposal or other releases		NA	NA	NA	NA
8.2	Quantity Used for Energy Recovery Onsite		NA	NA	NA	NA
8.3	Quantity Used for Energy Recovery Offsite		NA	NA	NA	NA
8.4	Quantity Recycled Onsite		NA	NA	NA	NA
8.5	Quantity Recycled Offsite		NA	NA	NA	NA
8.6	Quantity Treated Onsite		NA	NA	NA	NA
8.7	Quantity Treated Offsite		NA	NA	NA	NA

8.8 **One-Time Event Release:**

8.9 Production Ratio: 0

8.10 **Source Reduction Activities**

SOURCE REDUCTION ACTIVITIES	METHOD 1	METHOD 2	METHOD 3
NA			

8.11 Additional Data Indicator: NO

EPA United States Environmental Protection Agency

Envirofacts Warehouse | Toxics Release Inventory | Report Error
EZ Query | Batch Reports | Form R Reports
Overview | Law EXIT EPA | Customized Query | State Reports | Query | Model | Feedback | EF Home

TRI FORM R REPORTS

PART I. FACILITY IDENTIFICATION INFORMATION *(FORM R)*

DOCUMENT CONTROL NUMBER: 1389035481264

more info Facility Registry System ID: 110011481146

Section 1. Reporting Year

Reporting Year: 1989

Section 2. Trade Secret Information

2.1 Trade Secret: NO

2.2 Sanitized Copy: Unsanitized

Section 3. Certification

CERTIFYING OFFICIAL'S NAME	CERTIFYING OFFICIAL'S TITLE	CERTIFYING OFFICIAL'S SIGNATURE	DATE SIGNED
STEVE HANDWERK	FACILITY MANAGER	Original	29-JUN-90

Section 4. Facility Identification

TRI Facility ID: 19124PPMNC4105W

4.1 Facility Name and Address.

Facility Information

NAME	STREET	CITY	COUNTY	STATE	ZIP CODE
PPM INC.	4105 WHITAKER AVE.	PHILADELPHIA	PHILADELPHIA	PA	19124

Mailing Information

NAME	STREET	CITY	COUNTY	STATE	ZIP CODE

PPM INC.	4105 WHITAKER AVE.	PHILADELPHIA		PA	19124

PROVINCE	COUNTRY (NON - US)
NO DATA	NO DATA

4.2 Facility Classification

ENTIRE FACILITY	PARTIAL FACILITY	FEDERAL FACILITY	GOCO FACILITY
YES	NO	NO	No Data

4.3 Technical Contact

NAME	PHONE	PHONE EXT.	EMAIL
BRETT MORTON	4049340902		

4.4 Public Contact

NAME	PHONE
BRETT MORTON	4049340902

4.5 SIC Codes

SIC CODE	SIC CODE DESCRIPTION
4511	
INVA	
NA	

4.6 Location

LATITUDE	LONGITUDE
040-00-38	075-07-13

4.7 Dun & Bradstreet Numbers

DUNS NUMBER
069277549

4.8 RCRA ID Numbers

RCRA ID NUMBER
PAD981113749

4.9 NPDES Permit Numbers

NPDES PERMIT NUMBER
NO DATA

4.10 Underground Injection Well Code (UIC) ID Number

UIC ID NUMBER
NO DATA

5 Parent Company Information

Parent Company Name: UNION PACIFIC CORP.

Parent Company DUNS Number: 048341283

PART II. CHEMICAL - SPECIFIC INFORMATION

DOCUMENT CONTROL NUMBER: 1389035481264

Section 1. Toxic Chemical Identity

1.1 CAS Number: 001336363

1.2 Toxic Chemical or Chemical Category Name: POLYCHLORINATED BIPHENYLS

1.3 Generic Chemical Name: NA

1.4 Distribution of Each Member of the Dioxin and Dioxin like Compounds Category

NA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
NO																	

Section 2. Mixture Component Identity

2.1 Supplier Provided Generic Chemical Name: NA

Section 3. Activities and Uses of the Toxic Chemical

3.1 Manufacture the Toxic Chemical:
Produce: NO Import: NO On-Site Use/Processing: NO
Sale/Distribution: NO Byproduct: NO Impurity: NO

3.2 Process the Toxic Chemical:

Reactant: YES Formulation Component: NO Article Component: NO Repackaging: YES Impurity: NO

3.3 Otherwise Use the Toxic Chemical:
Chemical Processing Aid: NO Manufacturing Aid: NO Ancillary or Other Use: NO

Section 4. Maximum Amount of the Toxic Chemical Onsite During the Calendar Year

Maximum Chemical Amount:

Section 5. Quantity of the Toxic Chemical Entering each Environmental Medium Onsite

5.1 Fugitive or Non-Point Air Emissions

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
NO	0	Pounds	O - Other Approaches

5.2 Stack or Point Air Emissions

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
NO	0	Pounds	O - Other Approaches

5.3 Discharges to Receiving Streams or Water Bodies

STREAM/WATER BODY NAME	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	% FROM STORMWATER
NA				
NA				
NA				
NA				
NA				
NA				

5.4 Underground Injection On Site 87-95

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.4.1 Underground Injection Onsite to Class I Wells.

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
NO			

5.4.2 Underground Injection Onsite to Class II-V Wells.

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
NO			

5.5 Disposal to Land Onsite

5.5.1 On Site Landfill

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.5.2 Land Treatment/Application Farming

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.5.3 Surface Impoundment

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.5.4 Other Disposal

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

Section 6. Transfers of the Toxic Chemical in Wastes to Off-Site Locations

6.1 Discharges to Publicly Owned Treatment Works (POTWs)

6.1.A Total Quantity Transfered to POTWs and Basis of Estimate

6.1.A.	TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
1	NO DATA		NO DATA

6.1.B POTW Locations

6.1.B.	POTW NAME	ADDRESS	CITY	STATE	COUNTY	ZIP CODE
1	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA

6.2 Transfers to other Off-Site Locations

RCRA Number: UTD991301748 Parent Company Controlled: YES
Name: USPCI/GRAYBACK MOUNTAIN Address: 3 MILES E. 7 MILES N. EXIT 41, I80
City: CLIVE State: UT
County: TOOELE Zip Code:
Country Code (Non - US): Province:

TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	WASTE MANAGEMENT TYPE
1 - 499	Pounds	O - Other Approaches	M72 - Landfill/Disposal Surface Impoundment

RCRA Number: TXD055141378 Parent Company Controlled: NO
Name: ROLLINS ENVIRONMENTAL SERVICES Address: 2027 BATTLEGROUND RD.
City: DEER PARK State: TX
County: HARRIS Zip Code: 77536
Country Code (Non - US): Province:

TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	WASTE MANAGEMENT TYPE
444000	Pounds	M - Data Monitoring Or Measurements	M50 - Incineration/Thermal Treatment

RCRA Number: ARD069748192 Parent Company Controlled: NO
Name: ENSCO Address: 47TH. AVE. & SMITH
City: EL DORADO State: AR
County: UNION Zip Code: 71730
Country Code (Non - US): Province:

TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	WASTE MANAGEMENT TYPE
314000	Pounds	M - Data Monitoring Or Measurements	M50 - Incineration/Thermal Treatment

RCRA Number: MOD981506611 Parent Company Controlled: NO
Name: TIPTON ENVIRONMENTAL TECH., INC. Address: 1 MILE EAST HWY. 50
City: TIPTON State: MO
County: MONITEAU Zip Code: 65081
Country Code (Non - US): Province:

TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	WASTE MANAGEMENT TYPE
		M - Data Monitoring Or	M50 - Incineration/Thermal

444000	Pounds	Measurements	Treatment

RCRA Number: KSD980964993 Parent Company Controlled: NO
Name: APTUS Address: HWY. 169 NORTH
City: COFFEYVILLE State: KS
County: MONTGOMERY Zip Code: 67337
Country Code (Non - US): Province:

TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	WASTE MANAGEMENT TYPE
34650	Pounds	M - Data Monitoring Or Measurements	M50 - Incineration/Thermal Treatment

RCRA Number: GAD980839187 Parent Company Controlled: YES
Name: PPM INC. Address: 1875 FORGE ST.
City: TUCKER State: GA
County: DE KALB Zip Code: 30084
Country Code (Non - US): Province:

TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	WASTE MANAGEMENT TYPE
20000	Pounds	M - Data Monitoring Or Measurements	M72 - Landfill/Disposal Surface Impoundment

RCRA Number: MOD06927754 Parent Company Controlled: YES
Name: PPM INC. Address: 1628 WEST 9TH. ST.
City: KANSAS CITY State: MO
County: JACKSON Zip Code: 64101
Country Code (Non - US): Province:

TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	WASTE MANAGEMENT TYPE
6000	Pounds	M - Data Monitoring Or Measurements	M72 - Landfill/Disposal Surface Impoundment

RCRA Number: MOD06927754 Parent Company Controlled: YES
Name: PPM INC. Address: 1628 WEST 9TH. ST.
City: KANSAS CITY State: MO
County: JACKSON Zip Code: 64101
Country Code (Non - US): Province:

TOTAL TRANSFERS	UNIT OF		WASTE MANAGEMENT

(per year)	MEASURE	BASIS OF ESTIMATE	TYPE
2000	Pounds	M - Data Monitoring Or Measurements	M50 - Incineration/Thermal Treatment

Section 7A. On-Site Waste Treatment Methods and Efficiency

7A.1a. Waste Stream:

7A.1b.	WASTE TREATMENT METHOD(S) SEQUENCE
1	NA

7A.1c. Range of Influent Concentration:

7A.1d. Waste Treatment Efficiency Estimate:

7A.1e. Based on Operating Data?:

Section 7B. On-Site Energy Recovery Processes

ON SITE ENERGY RECOVERY PROCESSES
NO DATA

Section 7C. On-Site Recycling Processes

ON SITE RECYCLING PROCESSES
NO DATA

Section 8. **Source Reduction and Recycling Activities**

SECTION	TYPE OF QUANTITY	UNITS	PRIOR YEAR	CURRENT REPORTING YEAR	FOLLOWING YEAR	SECOND FOLLOWING YEAR
8.1	Quantity Released					
8.2	Quantity Used for Energy Recovery Onsite					
8.3	Quantity Used for Energy Recovery Offsite					
8.4	Quantity Recycled Onsite					
8.5	Quantity Recycled Offsite					

8.6	Quantity Treated Onsite					
8.7	Quantity Treated Offsite					

8.8 One-Time Event Release:

8.9 Production Ratio:

8.10 Source Reduction Activities

SOURCE REDUCTION ACTIVITIES	METHOD 1	METHOD 2	METHOD 3
NO DATA	NO DATA	NO DATA	NO DATA

8.11 Additional Data Indicator: NO

EPA United States Environmental Protection Agency

Envirofacts Warehouse | Toxics Release Inventory | Report Error
EZ Query | Batch Reports | Form R Reports NEW
Overview | Law EXIT EPA | Customized Query | State Reports | Query | Model | Feedback | EF Home

TRI FORM R REPORTS

PART I. FACILITY IDENTIFICATION INFORMATION *(FORM R)*

DOCUMENT CONTROL NUMBER: 1389035551252

more info Facility Registry System ID: 110002096286

Section 1. Reporting Year

Reporting Year: 1989

Section 2. Trade Secret Information

2.1 Trade Secret: NO

2.2 Sanitized Copy: Unsanitized

Section 3. Certification

CERTIFYING OFFICIAL'S NAME	CERTIFYING OFFICIAL'S TITLE	CERTIFYING OFFICIAL'S SIGNATURE	DATE SIGNED
CHARLES B. CHILTON	MANAGER	Original	22-JUN-90

Section 4. Facility Identification

TRI Facility ID: 19101GNRLL3198C

4.1 Facility Name and Address.

Facility Information

NAME	STREET	CITY	COUNTY	STATE	ZIP CODE
GE CO. RE-ENTRY SYS. DEPARTMENT	3198 CHESTNUT ST.	PHILADELPHIA	PHILADELPHIA	PA	19101

Mailing Information

NAME	STREET	CITY	COUNTY	STATE	ZIP CODE
GE CO. RE-ENTRY SYS. DEPARTMENT	3198 CHESTNUT ST.	PHILADELPHIA		PA	19101

PROVINCE	COUNTRY (NON - US)
NO DATA	NO DATA

1.2 Facility Classification

ENTIRE FACILITY	PARTIAL FACILITY	FEDERAL FACILITY	GOCO FACILITY
NO	NO	NO	No Data

1.3 Technical Contact

NAME	PHONE	PHONE EXT.	EMAIL
CHARLES B. CHILTON	2153544570		

1.4 Public Contact

NAME	PHONE
KRIS MCLAUGHLIN	2158232697

1.5 SIC Codes

SIC CODE	SIC CODE DESCRIPTION
3769	GUIDED MISSILE AND SPACE VEHICLE PARTS AND AUXILIARY EQUIPMENT, NOT ELSEWHERE CLASSIFIED

1.6 Location

LATITUDE	LONGITUDE
039-57-11	075-11-06

1.7 Dun & Bradstreet Numbers

DUNS NUMBER
001680719

1.8 RCRA ID Numbers

RCRA ID NUMBER
PAD002316305

4.9 NPDES Permit Numbers

NPDES PERMIT NUMBER
NO DATA

4.10 Underground Injection Well Code (UIC) ID Number

UIC ID NUMBER
NO DATA

5 Parent Company Information

Parent Company Name: GE CO.

Parent Company DUNS Number: 001367960

PART II. CHEMICAL - SPECIFIC INFORMATION

DOCUMENT CONTROL NUMBER: 1389035551252

Section 1. Toxic Chemical Identity

1.1 CAS Number: 001336363

1.2 Toxic Chemical or Chemical Category Name: POLYCHLORINATED BIPHENYLS

1.3 Generic Chemical Name: NA

1.4 Distribution of Each Member of the Dioxin and Dioxin like Compounds Category

NA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
NO																	

Section 2. Mixture Component Identity

2.1 Supplier Provided Generic Chemical Name: NA

Section 3. Activities and Uses of the Toxic Chemical

3.1 Manufacture the Toxic Chemical:

Produce: NO Import: NO On-Site Use/Processing: NO
Sale/Distribution: NO Byproduct: NO Impurity: NO

3.2 Process the Toxic Chemical:
Reactant: NO Formulation Component: NO Article Component: NO Repackaging: NO Impurity: NO

3.3 Otherwise Use the Toxic Chemical:
Chemical Processing Aid: NO Manufacturing Aid: NO Ancillary or Other Use: YES

Section 4. Maximum Amount of the Toxic Chemical Onsite During the Calendar Year

Maximum Chemical Amount:

Section 5. Quantity of the Toxic Chemical Entering each Environmental Medium Onsite

5.1 Fugitive or Non-Point Air Emissions

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.2 Stack or Point Air Emissions

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.3 Discharges to Receiving Streams or Water Bodies

STREAM/WATER BODY NAME	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	% FROM STORMWATER
NA				
NA				
NA				

5.4 Underground Injection On Site 87-95

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.4.1 Underground Injection Onsite to Class I Wells.

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
NO			

5.4.2 Underground Injection Onsite to Class II-V Wells.

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
NO			

5.5 Disposal to Land Onsite

5.5.1 On Site Landfill

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.5.2 Land Treatment/Application Farming

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.5.3 Surface Impoundment

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

5.5.4 Other Disposal

NA	TOTAL RELEASE (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
YES			

Section 6. Transfers of the Toxic Chemical in Wastes to Off-Site Locations

6.1 Discharges to Publicly Owned Treatment Works (POTWs)

6.1.A Total Quantity Transfered to POTWs and Basis of Estimate

6.1.A.	TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE
1	NO DATA		NO DATA

6.1.B POTW Locations

6.1.B.	POTW NAME	ADDRESS	CITY	STATE	COUNTY	ZIP CODE
1	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA	NO DATA

6.2 Transfers to other Off-Site Locations

RCRA Number: PAD043583848 Parent Company Controlled: YES
Name: GE CO. Address: 1040 EAST ERIE AVE.
City: PHILADELPHIA State: PA
County: PHILADELPHIA Zip Code: 19124
Country Code (Non - US): Province:

TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	WASTE MANAGEMENT TYPE
1 - 499	Pounds	O - Other Approaches	M10 - Storage Only

RCRA Number: Parent Company Controlled:
Name: NA Address:
City: State:
County: Zip Code:
Country Code (Non - US): Province:

TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	WASTE MANAGEMENT TYPE
NO DATA		NO DATA	NO DATA

RCRA Number: Parent Company Controlled:
Name: NA Address:
City: State:
County: Zip Code:
Country Code (Non - US): Province:

TOTAL TRANSFERS (per year)	UNIT OF MEASURE	BASIS OF ESTIMATE	WASTE MANAGEMENT TYPE
NO DATA		NO DATA	NO DATA

Section 7A. On-Site Waste Treatment Methods and Efficiency

7A.1a. Waste Stream:

7A.1b.	WASTE TREATMENT METHOD(S) SEQUENCE
1	NA

7A.1c. Range of Influent Concentration:

7A.1d. Waste Treatment Efficiency Estimate:

7A.1e. Based on Operating Data?:

Section 7B. On-Site Energy Recovery Processes

ON SITE ENERGY RECOVERY PROCESSES
NO DATA

Section 7C. On-Site Recycling Processes

ON SITE RECYCLING PROCESSES
NO DATA

Section 8. Source Reduction and Recycling Activities

SECTION	TYPE OF QUANTITY	UNITS	PRIOR YEAR	CURRENT REPORTING YEAR	FOLLOWING YEAR	SECOND FOLLOWING YEAR
8.1	Quantity Released					
8.2	Quantity Used for Energy Recovery Onsite					
8.3	Quantity Used for Energy Recovery Offsite					
8.4	Quantity Recycled Onsite					
8.5	Quantity Recycled Offsite					
8.6	Quantity Treated Onsite					
8.7	Quantity Treated Offsite					

8.8 One-Time Event Release:

8.9 Production Ratio:

8.10 Source Reduction Activities

SOURCE REDUCTION ACTIVITIES	METHOD 1	METHOD 2	METHOD 3
NO DATA	NO DATA	NO DATA	NO DATA

8.11 Additional Data Indicator: NO

PMP
Northeast Plant
Strategy for Identifying Unknown Sources
(Trackdown)
Item 6

As discussed in the Item 3.c., description and map or schematic of the collection system, the influent to the Northeast Plant consists of the following major collectors:

1. Frankford Creek High Level
2. Frankford Creek Low Level
3. Somerset Low Level
4. Delaware Low Level Collector

In addition to these collectors and as further described in item 3.e, the Northeast Plant contains on its site sludge impoundment basins whose runoff is directed into the plant for treatment. There are two runoff connections into the plant:

1. South Lagoons Runoff
2. North Lagoons Runoff

Due the nature of the influent connections to the plant which do not provide reasonable, continuous access to all collectors on the plant site, the NPDES permit which governs the operation of the plant, allows for the representation of influent quality to be determined from samples taken at the following three locations:

1. Primary Settling Tanks Influent Set 1 North
2. Primary Settling Tanks Influent Set 1 South
3. Primary Settling Tanks Influent Set 2 at Pit B

The plant effluent is represented by a single composite sample:

1. Plant Effluent

In addition to the above sample locations and due to the size of their individual sewersheds, the following sites will also be sampled in order to trackdown PCB within the sheds:

1. Delaware Low Level Collector at Comly and Milnor Streets
2. Delaware Low Level Collector at Princeton Street, East of State Road
3. Delaware Low Level Collector at Grant Ave., West of State Road
4. Frankford Creek High Level at Romona Street

All of the above locations will be sampled and analyzed for PCBs and suspended solids. This plan encompasses the Northeast Plant Phase 1 Trackdown study.

A diagram, entitled *"Northeast Water Pollution Control Plant, PCB Trackdown Program, Phase 1",* depicting the interceptors, lagoon runoff sewers and the planned sampling locations is attached to this section.

A description of the proposed sampling and analytical methods planned for the Phase 1 project are identified in the following package entitled "*Sampling and Analysis Plan for Polychlorinated Biphenly Congener Trackdown, Phase 1, Northeast Water Pollution Control Plant"*.

It is PWD's expectations that we will conduct the Phase 1 sampling effort in 2007. Any further investigations, i.e. Phase 2, will be dependent upon the results of the Phase 1 program.

PWD's objective in conducting this trackdown program is to identify significant sources of PCBs in the sewer shed and to implement reasonable cost effective measures to mitigate the source. Since we are at the initial stage in the investigation, it is unclear as to what sources may be uncovered and, therefore, what might the nature of each source. Clearly, the nature of a source is relevant in considering what legal and physical options are available to PWD in achieving our goal. However, PWD will consult with PaDEP and other regulators in making this determination.

SAMPLING AND ANALYSIS PLAN FOR POLYCHLORINATED BIPHENYL CONGENER TRACKDOWN PHASE 1 NORTHEAST WATER POLLUTION CONTROL PLANT

Revised September 30, 2005

PHILADELPHIA WATER DEPARTMENT

Project Manager: **Bruce Aptowicz** ______________________________

TABLE OF CONTENTS

1 INTRODUCTION

The Pennsylvania Department of Environmental Protection requires, as a component of a PCB Pollutant Minimization Plan (PCB PMP) that large POTWs discharging to the Delaware River engage in a sewershed PCB trackdown study to locate significant PCB sources. To that end, a PCB trackdown committee has been formed to carry out this objective. This Sampling and Analysis Plan addresses the Phase 1 activities of the trackdown for PWD's Northeast Water Pollution Control Plant (NEWPCP) sewershed.

All samples will be submitted to the contract lab for Method 8082 PCB congener analysis and for total suspended solids using method 160.2. An attempt will be made to estimate the flow at each sampling point to calculate mass loadings at those sampling locations.

Since the direction of this program is dependent upon preceding results, we will conduct this effort in phases, with the details of each phase dependent upon the results of the prior phase. The first phase will consist of wet weather samplings. Wet Weather sampling has been selected for the first phase because dry weather samplings at the PWD's POTW effluents demonstrated very low amounts of PCBs present.

Regarding the analytical methodology, we will be using DRBC's analytical protocol described on their web site.

2 PROJECT MANAGEMENT

The project management structure is indicated in Table 1.

Table 1. Roles and Responsibilities of Key Project Personnel

Key individual	Title	Phone	Responsibility
Bruce Aptowicz	Deputy Director Operations Division	215- 685-6205	Provide overall project coordination
Keith Houck	Assistant Manager, Industrial Waste Unit	215-685-4910	Verify the proper collection of wastewater samples, verify proper post sampling activities
Earl Peterkin	Manager, Trace Organics Lab Bureau of Laboratory Services	215-685-1439	Oversee cleaning of all equipment, sample receipt, preservation, proper storage and shipping of all samples to the contract laboratory. Review field logs
William McKeon	Manager, Wastewater Treatment Plants	215-685-6258	Oversee all sampling from within the wastewater plants. Interpret significance of plant sample results
Chris Crockett	Manager, Office of Watersheds	215-685-6334	Oversee all input regarding collector system flow analysis. Interpret data from collection system samples.
Drew Mihocko	Manager, Collection System	215-685-6203	Provide input regarding physical details of the collection system.

3 SAMPLING ACTIVITIES

3.1 SAMPLING LOCATIONS

3.1.1 PRIMARY LOCATIONS

Four locations in the Upper Delaware Low Level Interceptor, two locations in the Frankford High Level Interceptor, one location in the Frankford Low Level Interceptor and one location in the Somerset Low Level Interceptor will be sampled. Six locations within the NEWPCP will be sampled. Table 2 lists these locations.

3.2 DRY WEATHER SAMPLING (RESERVED)

3.3 WET WEATHER SAMPLING

3.3.1 SCHEME

A sample run start will be confined to a qualifying rain event that only occurs as a frontal system. A qualifying rain event is one which equals or exceeds 0.1 inch and whose duration is at least one hour and where there has bee no preceding rainfall within 72 hours of 0.01 inches or greater.

Sampling shall begin at the locations described in Table 2 immediately upon the above criteria being achieved. Two grab samples shall be taken 20 minutes apart at each location to catch the rising hydrograph that is occurring in the sewer. Before samplings are composited and submitted for analysis, there shall be a determination of the rising hydrograph at the NEWPCP influent made and adjusted for the travel time for each location. This confirmation assures that the samples taken at each of the14 locations occur on a rising hydrograph of the storm event. Sampling will start at the top of the system so as to follow the same sewerage down the collector as it picks up additional flows from the trunked sewers. The two grabs from the interceptor (and the plant influent) locations will be combined in equal proportions with one another at the PWD's Bureau of Laboratory Services (BLS) at Hunting Park and Castor Avenues, Philadelphia.

3.3.2 SAMPLING DETAIL

- The PWD industrial waste unit (IWU) will conduct sampling. All sampling procedures will be conducted in accordance with the protocols detailed in this section.
- Dedicated, precleaned equipment will be used for each sampling location. Each sample container will consist of a food grade pint mason jar that has undergone an ultra cleaning at our central laboratory. The samplings will be transferred immediately to I-chem ultraclean bottle. No mason jars will be reused.
- Personnel handling the samples will wear a new pair of disposable powder-free surgical gloves with each sample collected.
- Sewage will be retrieved from the interceptors at manholes using nylon twine affixed to a new, precleaned one-pint mason jar. For those interceptor samples, a dedicated precleaned mason jar will be lowered

by nylon twine from the top of the manhole to the top of the sewage flow several times to retrieve sufficient volume to fill one liter ultraclean I-chem bottle. The filled I-chem bottle will be stored in a cooler, which will contain ice.

- A second one liter ultraclean I-chem bottle will be filled 20 minutes after the collection of the first sample, using the same sampling technique.
- A separate sample for total suspended solids (TSS) will be collected at each location sampled. Each sample will consist of a one-liter sample at the locations listed above.
- The PWD Bureau of Laboratory Services (BLS) will provide all clean glassware, store samples and undertake shipment when a contract laboratory purchase order is in place. BLS will conduct analyses for TSS.
- The contract laboratory will undertake all analyses except TSS. They will supply deionized water, ice coolers and shipping to and from BLS. This water shall be used for all blanks. One liter blank will be collected at each sample location from the rinseates of the mason jar used to retrieve that sample. One of the blanks will be sent on to the contract laboratory. All other blanks will be stored at BLS and their disposition will be dependent on the results of all samples.
- All samples will be transported to the central lab under ice. For each location, BLS will combine the two grab samples. The two grab samples will be combined by gently shaking/swirling the contents of each, and then immediately pour the contents of each into a laboratory prepared sample container. The combined sample will be identified as the respective manhole/plant sample.

Table 2. Location, timing and types of samples to be taken

Sampling location I.D.	Location	Approximate time of sample*	Type	Ratio of combining samples
1	Delaware Low Level at Grant Avenue west of State Road	tbd*	2 grab samples	1 to 1
2	Delaware Low Level at Princeton Street east of State Road	tbd*	2 grab samples	1 to 1
3	Delaware Low Level at Comly and Milnor Streets	tbd*	2 grab samples	1 to 1
4	Delaware Low Level at monitoring well north of Junction Chamber A	tbd*	2 grab samples	1 to 1
5	Frankford High Level IFO 926 Ramona Street	tbd*	2 grab samples	1 to 1
6	Frankford High Level at NEWPCP front gate	tbd*	2 grab samples	1 to 1
7	Frankford Low Level at Luzerne and Richmond Streets	tbd*	2 grab samples	1 to 1
8	Somerset Low Level at NEWPCP south gate (Balfour Street)	tbd*	2 grab samples	1 to 1
9	NEWPCP PST Influent Set 1 North	tbd*	8-hour composite (every 20 minutes)	automatic composite
10	NEWPCP Influent Set 1 South	tbd*	8-hour composite (every 20 minutes)	automatic composite
11	NEWPCP Influent Set 2 at Pit B	tbd*	8-hour composite (every 20 minutes)	automatic composite
12	NEWPCP Effluent	tbd*	8-hour composite (every 20 minutes)	automatic composite
13	NEWPCP South Lagoons Runoff	tbd*	1 grab sample	N/A
14	NEWPCP North Lagoons Runoff	tbd*	1 grab sample	N/A

* To be determined

3.4 EQUIPMENT AND MATERIALS

- 60 unused food grade two part metal top one pint mason jar
- 2 large volume glass jugs
- 18 liter I-CHEM series 300 amber bottles
- Disposable surgical gloves
- glass funnels (wide mouth for narrow mouth 1 liter bottle)
- Ice
- 30 gallon polyethylene bags
- Nylon twine spool
- Ice coolers and shipping (to be provided by contract lab)
- hexane
- methanol
- 3 isco composite samplers w Teflon lined tubing
- deionized water from contract lab
- non-phosphate detergent

3.5 EQUIPMENT CLEANING

Trace level PCB detection limits needed for this program warrant clean sampling procedures to minimize contamination during sample collection. Dedicated equipment will be used whenever possible. Field sampling equipment, if reused, will be cleaned as follows:

- non-phosphate detergent wash
- tap water rinse
- distilled/deionized water rinse
- hexane rinse (pesticide quality or better)
- air dry
- distilled/deionized water rinse.

3.6 QC REQUIREMENTS

3.6.1 BLANKS

One equipment blank that consists of the rinseate from the mason jar supply will be collected and submitted for analysis with the investigative samples.

Deionized water supplied by the contract laboratory will be used as a field equipment rinseate blank.

3.6.2 SAMPLE CUSTODY AND DOCUMENT CONTROL

3.6.2.1 FIELD LOG BOOK

In the field, the sampler will record the following information in the field log book (bound) for each sample collected:

- sample matrix
- name of sampler
- sample source
- time and date
- pertinent data
- analysis to be conducted
- sampling method
- appearance of each sample (i.e., color)
- preservation added
- number of sample bottles collected
- pertinent weather data
- precipitation and hydrographic flow data for rain events
- any other significant observations.

Each field logbook page will be signed by the sampler. BLS will review field logbooks for completeness.

3.6.2.2 SAMPLE LABELS

A unique sample numbering system will be used to identify each collected sample. See table 2.0. This system will provide a tracking number to allow retrieval and cross-referencing of sample information. Samples will be described/labeled as:
NEWPCP Collector-DRBC/EPA PCB TRACKDOWN AND MANHOLE LOCATION
Monitoring-date and time: Example for NEWPCP sample. NE-PCB-trackdown-wet Weather- May X, 2006 1300-A,B,C………………..
The time is that of the second of the two grabs at the location.

3.6.2.3 CHAIN-OF-CUSTODY FORMS

PWD-BLS laboratory services/Laboratory request form # 79-771 (chain of custody form) will be completed for all samples collected during the program. Additionally, chain of custody from the contract laboratory will be used to document sample handling from BLS to the contract laboratory. See Attachment for sample chain of custody form used by PWD.

4 SAMPLE ANALYSIS

4.1 SAMPLE PREPARATION BY BUREAU OF LABORATORY SERVICES (BLS)

The two grabs will be combined 50/50 by volume as follows: gently mix/swirl the contents of each 1liter I-chem jar to insure the sample is homogenized.

Using dedicated pre-cleaned glass funnels transfer the appropriate sample from the 1-liter I-chem bottles to the appropriate 1-liter, I-Chem series 300 amber glass bottle as follows
:

1- 1 liter each of sewage at locations 1 through 8

1-1 liter of field/equipment rinseate blank,
1-1 liter of reagent blank (to be stored indefinitely)

Samples will be stored between 0 and 4^{o} C.

Samples will be logged into LIMS and assigned LIMS numbers.

4.2 ANALYTICAL METHODS

All samples will be analyzed by the contract lab using EPA Method 8082– Polychlorinated Biphenyls by Gas Chromatography. Additionally, all samples will be analyzed for Total Suspended Solids using EPA Method 160.2.

5 DATA ANALYSIS

The PCB monitoring data may provide us with a valuable tool in targeting potential sources within the Northeast WPCP drainage district. The PCB source contribution from each of the drainage areas feeding the interceptor between monitoring points will be determined by examining the data
This evaluation will enable us to identify any potential large influx of PCBs. Also the results of the PCB monitoring will be graphically represented by percentage of homolog group found at each monitoring location as well as by congener type. This interpretation hopefully will assist us in trying to fingerprint any mass produced PCB source. In addition, a mass balance analysis of solids and PCBs will be performed on a system wide basis. This will involve using estimated flows and solids concentration data from the sewers leading to Northeast.

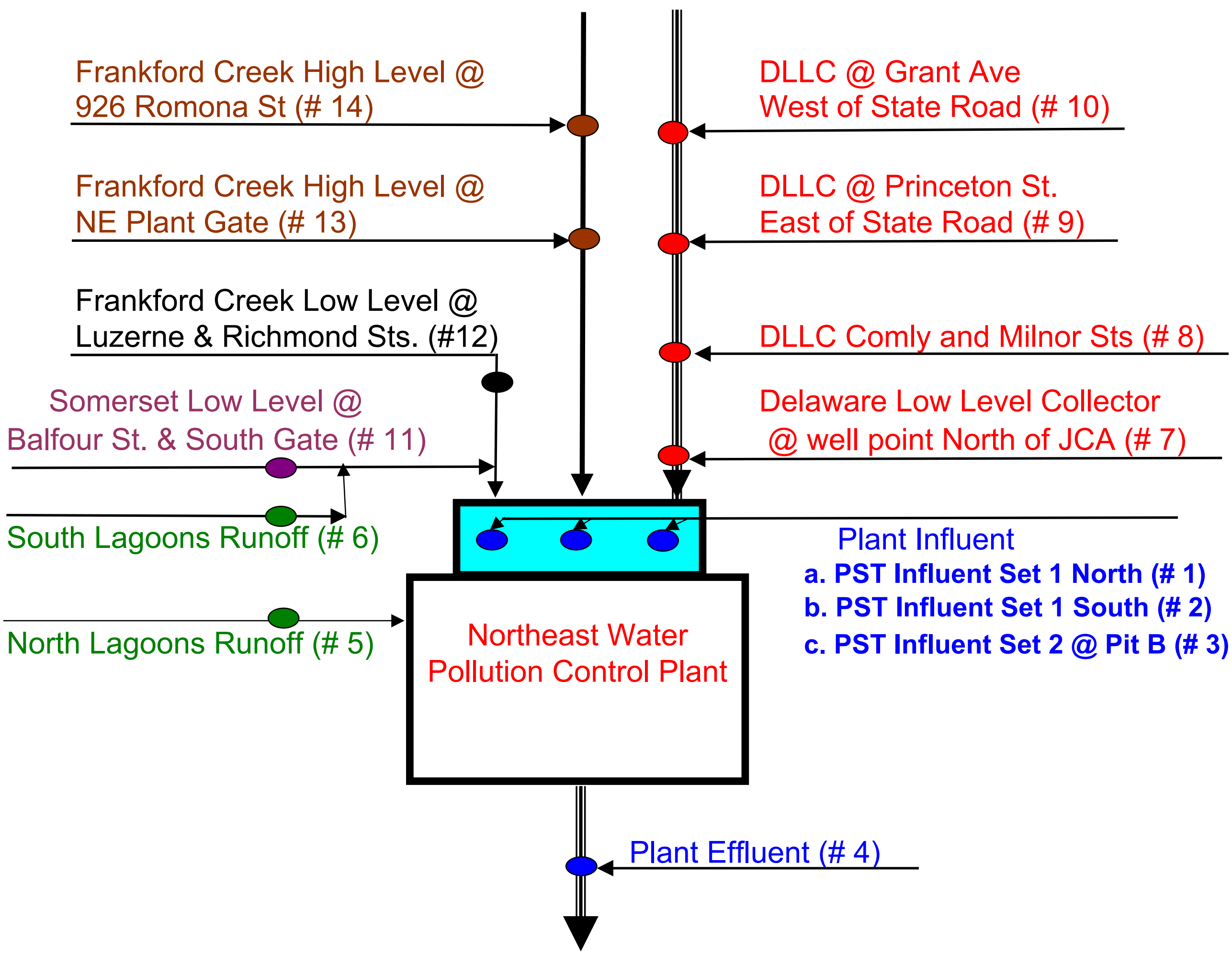
TSS data will be used to characterize the sample as representative of wet weather influenced sewage and to perform a mass solids (TSS) balance on in-sewer loadings as compared to influent loadings as measured at the plant influent.

APPENDIXES

Map of sampling sites for Northeast Water Pollution Control Plant sewershed

Sample BLS chain of custody form

Northeast Water Pollution Control Plant
PCB Trackdown Program
Phase 1



PMP
Northeast Plant
Previous Minimization Activities
Item 7

As described in Section 4. Known Sources, the water treatment coagulant used at the Baxter Water Treatment Plant is produced by the DuPont Company. This product contains PCBs, most of which are captured by the water treatment processes and discharged into the Northeast Plant sewer shed. The Dupont Company reports the following activities to reduce the PCB concentrations in their ferric chloride.

In the spring of 2001 DuPont analyzed the ferric chloride by-product and found approximately 1.49 ppb of PCBs in the ferric chloride by-product. DuPont promptly launched a program to determine how PCBs are incidentally manufactured in the TIO2 process. The objective of the program is the virtual elimination of PCBs as technology becomes available with a focus on source reduction versus end of pipe treatment. The DuPont technical team developed several short terms process modification to reduce incidental manufacturing of PCBs and 15 long term options that could possibly reduce PCB generation by 90% from the 2001 levels.

The short term reduction effort was quickly implemented in 2002. The effort consisted of a change in raw material use (oil used to keep ore dust down), additional process controls, and installation of settling tanks. These actions reduced PCBs generation by approximately a 60%.

In order to obtain information regarding previous, ongoing or planned pollutant minimization activities, PWD wrote to a number of agencies who may have knowledge of such programs in the PWD sewer sheds as explained in this PMP report under Section 5. Northeast Plant, Potential Sources. The following activities were reported to us from those agencies.

The USEPA has an ongoing PCB minimization effort occurring at the Metal Bank Superfund Site located at 7301 Milnor Street, Philadelphia. PWD was contacted by the USEPA in regards to the receipt of the proposed discharge of treated wastewater from the site. After consultation and agreement with PaDEP, DRBC and USEPA, PWD agreed that it would issue a discharge permit into the Northeast sewer shed with a PCB discharge limit of 0.11 gm/day. It is expected that following the completion of this multi-year PCB mitigation project, the resulting inflow of PCBs from the site and into the Delaware River will have significantly diminished. It was the Federal and State regulatory position that the short term intake of additional, but limited PCBs into PWD's sewers would result in a far greater, long term benefit to the environment.

The following document represents the commitment PWD has made towards this cleanup process. It is a letter from PWD to USEPA offering a proposed discharge permit for the site treatment project. This agreement, by PWD, to accept the treated site discharge has been incorporated in the agreement in the United States District Court for the Eastern District of Pennsylvania by all parties.

The Philadelphia Department of Public Heath provided PWD with several locations of historical PCB spill sites within the boundaries of the City of Philadelphia. These are listed in the following spreadsheet entitled *"PMP- NE PCB Sites – Health Dept"*. Many of these sites date back in time several decades and were quite small in nature, however they continue to be listed as PCB sites by the Health Dept. PWD's Industrial Waste Unit's inspectors will attempt to investigate the current environmental status of each of these sites over the first two years of this PMP. Sites which are believed to represent no further threat to the environment will be eliminated from the listing. Sites which continue to represent a threat will be characterized in future annuals reports together with any plans to further minimize the sources.

The PaDEP reports that they have a number of sites located within the Northeast sewer shed which are ACT 2 PCB Sites and should be reported in the PMP as possible sites for which previous minimization activities have occurred. A meeting, on September 5, 2005 was held between PWD and state officials, in response to PWD's letter, to discuss this inventory which is currently located on a rather large PaDEP Southeast Region database. The outcome of the meeting was that PWD would forward a set of possible descriptors for each site. PaDEP would use the descriptors to produce a listing of Act 2 sites. It was recognized that considerable effort on the part of PaDEP would be required to produce the listing and that the time required to complete the task might go beyond the window of time which we have to incorporate the results into our PMP. That is the current situation, PWD will incorporate the complete list of sites into our first annual report. Attached is a copy of the email entitled *"PMP – Identification of Known Sources, by Bruce Aptowicz"* which lists PWD's criteria.

It was agreed by all parties that this 5 year PMP would not require a site visit by PWD personnel as other PCB sources have higher priorities. However, should the trackdown effort result in the detection of a significant unknown source in a specific part of the Northeast sewer shed, we look examine PaDEP's ACT 2 listing for any nearby sites and inspect those sites as the potential sources of the unknown loading.

C I T Y O F P H I L A D E L P H I
A

Bernard Brunwasser
NT
Water Commissioner

W A T E R D E P A R T M E

1101 Market Street, 5th floor
Philadelphia, Pa 19107

November 4, 2004

Linda Dietz
Remedial Project Manager
U.S. EPA Region III
1650 Arch Street
Philadelphia, PA

Via Fax:

Re: Permitted Discharges from the Metal Bank Site

Dear Linda:

Attached please find a proposed permit from the City of Philadelphia Water Department for the discharges from the Metal Bank Site. The City is pleased that the site remediation contractor will be able to comply with permit limits that should minimize the impact of pollutants to the City's facilities and to the environment. Provided these limits are met, the Water Department does not believe there will be a measurable impact on the Delaware Low Level Intercepting Sewer or on the Northeast Water Pollution Control Plant. There may, however, be an impact on the Dry Weather Overflow (DWO) sewer pipe.

The permit requires that the discharge be made into the DWO rather than at a point that could result in a contaminated discharge from a combined sewer overflow. As an additional precaution, discharges are prohibited during wet weather.

We know that the DWO currently has sediment deposits. These sediments may contain PCBs. Because certain capital improvements are necessary for cleaning this sewer, the City will not be able to remove the sediment before the planned discharge. Therefore, prior to the commencement of the Metal Bank discharges, the Water Department will sample the sediment and test it for PCBs. If the sediment exceeds 50 Parts Per Million (PPM), the contractor will not be responsible for costs of removal and disposal of the sediment. If the sediment is less than 50 PPM prior to commencement, and remains below that level at the completion of the project, the contractor will not be responsible for costs of removal and disposal. However, if the sediment is below 50 PPM prior to commencement of discharges and exceeds that level at the completion of the project, the contractor will be responsible for costs of sediment removal and disposal.

Please review the proposed permit with the contractor. If you any questions, please do not hesitate to call me.

Very truly yours.

Bruce S. Aptowicz
Deputy Director of Operations
Philadelphia Water Department

Cc: Jennifer Fields, DEP
David A. Katz, Deputy Water Commissioner
Darlene Heep, Philadelphia Law Department
Patrick O' Neill, Philadelphia Law Department
J. Barry Davis, Philadelphia Law Department
Thomas Healey, Philadelphia Water Department
Thomas Fikslin, Delaware River Basin Commission

Attachment

PHILADELPHIA WATER DEPARTMENT

WASTEWATER DISCHARGE PERMIT

PERMITTEE:

MAILIING ADDRESS:

is hereby authorized to discharge wastewater from to the City of Philadelphia sanitary sewer system in accordance with the City of Philadelphia Water Department Regulations (PWDR), any applicable federal, state or local law or regulation and the terms and conditions set forth herein. All discharges authorized herein shall be consistent with the terms and conditions of this Permit. The discharge of any pollutant identified in this Permit more frequently than or at a level in excess of that authorized, as well as failure to fulfill any other term or condition of this Permit, shall constitute a violation of this Permit.

This Permit shall become effective on and shall expire at midnight on
.

By: ___________________________
Thomas F. Healey
Manager, Industrial Waste Unit
Philadelphia Water Department

Permit Conditions

- Monitoring will be required for metals and PCBs. Sampling and analysis for metals will be required weekly. This frequency may be reduced if approved in writing by PWD. Sampling and analysis for PCBs and dioxin (2,3,7,8-TCDD) will be required daily for the first two weeks of discharge, then every three days, if this reduction is approved in writing by PWD. Samples shall be composite samples, with aliquots taken once per hour during a discharge day, using an automatic sampling machine with a single sample container. PCB and dioxin results must be available on a three-day turnaround basis. Analytical methods shall be as follows:

  Metals - Refer to 40 CFR 136

  PCBs - Method 8082

Dioxin - Method 613

- Discharge limits for metals will be those found in the Philadelphia Water Department Regulations (PWDR); they are listed below. Discharge limit for PCB will be 0.11 grams per day (0.11 g/day). Discharge limit for dioxin will be 6.0 milligrams per day (6.0 mg/day).

Metal	Daily Maximum (mg/L)	Monthly Average (mg/L)
Arsenic	0.01	0.005
Cadmium	0.2	0.1
Copper	4.5	2.7
Lead	0.69	0.43
Mercury	0.01	0.005
Nickel	4.1	2.6
Silver	0.43	0.24
Chromium (total)	7.0	4.0
Zinc	4.2	2.6
Selenium	0.2	0.1

- Initial analytical results for metals, PCBs and dioxin must be submitted before any discharge is made. Notice must be given at least twenty-four hours before the initial discharge begins. Initial results and initial discharge notice must be made by email to

  Evan Schofield evan.schofield@phila.gov

  Keith Houck keith.houck@phila.gov

  Thomas Healey thomas.healey@phila.gov

- All analytical data must be submitted, as soon as they become available, by email to all addresses indicated above. This reporting frequency may be reduced if approved in writing by PWD.
- Each January and July during the course of the operation, the permittee shall submit to PWD, in writing, a report including all flow and analytical data and a general statement as to the status of the operation with respect to compliance with this Permit. Each such report shall cover the preceding six months of the operation. The CEO of the permittee or his designee must sign each such report.
- Flow (gpd) data shall be submitted weekly by email to all addresses indicated above. This reporting frequency may be reduced if approved in writing by PWD. A wastewater charge of $14.36 per thousand cubic feet ($14.36/Mcf), subject to change, shall be assessed at the end of the project.
- PWD has the option of stopping any discharge in the event of an exceedance.

- All discharges must be made into the dry weather overflow (DWO) pipe (return line) of CSO outfall D-02 at a location to be specified by PWD.
- Discharge is to occur during dry weather only.
- A permit application fee of five hundred dollars ($500.00), as required by the PWDR, must be submitted before the Discharge Permit will become effective. The permit will be in effect for a period of no more than five years.
- The document titled “Construction Water Management”, submitted by AMEC and dated March 6, 2001, will be attached to the Discharge Permit as Exhibit A.
- Prior to the start of the permittee’s operation, PWD will take a representative sample of the sediment in the DWO. If the total PCB concentration is found to be greater than 50 mg/L by PWD’s analysis, PWD will be responsible for the cleaning and disposal of sediment at the conclusion of the permittee’s operation. If the total PCB concentration is found to be less than 50 mg/L by PWD’s analysis, then PWD shall inspect the DWO pipe for sediment at the conclusion of the permittee’s operation. If sediment is present, then a representative sample of the sediment will be taken by PWD and a portion of the sample (split sample) shall be made available to the permittee. If the total PCB concentration is found to be greater than 50 mg/L by PWD’s analysis, PWD will notify the permittee in writing to remove and dispose of all sediment within 60 days of such notice. Disposal must be made at a facility permitted for such material.

PMP - NE PCB Sites - Health Dept

WPCP	Location	Date	Amount	Comments
NE	Cottman Ave & Delaware River	1980		PCB dump/ 3 hr clean-up
NE	3100 E. Ontario	10/16/80		PCB spill/ 1/2 hr clean-up
NE	Knights Rd. Shopping Center	3/15/83	3 55-gal drums	
NE	3500 Block Palethorpe	05/24/79	11.6 - 18.9ppm PCB	Spill from transformer
NE	Palethorpe & Tioga	05/25/79		PCB contaminated soil
NE	JF Joyce Co. - 2710 LeFevre St.	07/30/85	> 50 ppm	Leaking transformer
NE	2465 Wheatsheaf Lane	07/15/?		PCB transformer on fire in junkyard
NE	Wayne Junction - Windrim & Germantown Ave.	03/27/84		PCB spill
NE	SEPTA - Roberts Ave Railyard	10/27/88	< 10 gal	Potential hazards of PCB getting to Schuylkill River via storm drain system
NE	5900 Devon Place	06/20/91		PCB contaminated oil leak

Bruce Aptowicz

09/06/2005 01:18 PM

To: jefields@state.pa.us
cc: jnewbold@state.pa.us
Subject: PMP - Identification of Known Sources

Jennifer:

It was productive for us to meet with Bob, Jim and you, yesterday, as we create the PCB - PMP program for PWD. As we discussed, PaDEP will review your database of ACT 2 PCB sites and provide me with an electronic spreadsheet according to the following conditions:

The inventory of PCB sites will include all known sites within the boundaries of the City of Philadelphia

The inventory of PCB sites will also include all known sites within the boundaries of the townships which have combined sewer systems. It was our expectation that PCBs leaving a contaminated site would be caused by storm runoff and therefore be transported by the storm system, not the sanitary system. Therefore, PCBs discharging from a site in a suburban township which has separate systems would be the responsibility of the suburban township, not PWD. Unfortunately, we are not positive as which of our suburban township customers have combined sewers. It is our best understanding that none of the townships listed below have combined sewer systems. If PaDEP has information to the contrary, then please include the Act 2 sites located in those townships.

Jim suggested that very large sources of PCBs in any of our suburban customers should also be included since a release from such a site might also reach the sanitary sewers. The following list represents all of PWD's suburban township customers:

Northeast Water Pollution Control Plant

City of Philadelphia:

Zip Code	County	Township
18940	Bucks	Northampton & Newtown Township & Newtown Borough
18954	Bucks	Northampton
18966	Bucks	Southampton
19001	Montgomery	Abington
19006	Montgomery	Lower Southampton
19007	Bucks	Bristol Township
19020	Bucks	Bensalem
19046	Montgomery	Jenkintown
19047	Bucks	Hulmeville Borough & Langhorne Borough
19053	Bucks	Lower Southampton
19056	Bucks	Middleton Township
19054	Bucks	Levittown
19075	Montgomery	Oreland
19090	Montgomery	Willow Grove
19067	Bucks	Lower Makefield

Southeast Water Pollution Control Plant

City of Philadelphia:

Zip Code	County	Township
19038	Montgomery	Glenside
19095	Montgomery	Wyncote

Southwest Water Pollution Control Plant
City of Philadelphia:

Zip Code	County	Township
19038	Montgomery	Glenside
19008	Delaware	Broomall
19018	Delaware	Clifton Hts.
19023	Delaware	Darby
19026	Delaware	Drexel Hill
19029	Delaware	Essington
19032	Delaware	Folcroft
19033	Delaware	Folsom
19036	Delaware	Glenolden
19041	Delaware	Haverford
19043	Delaware	Holmes
19050	Delaware	Lansdowne
19057	Delaware	Wayne
19066	Montgomery	Lower Merion
19070	Delaware	Morton
19073	Delaware	Newtown Sq.
19074	Delaware	Norwood
19076	Delaware	Prospect Park
19078	Delaware	Ridley Park
19079	Delaware	Sharon Hill
19082	Delaware	Upper Darby
19083	Delaware	Upper Darby
19085	Delaware	Villanova
19087	Delaware	Wayne
19004	Montgomery	Bala Cynwyd
19010	Delaware	Bryn Mawr
19017	Delaware	Chester Heights
19035	Montgomery	Gladwyne
19096	Montgomery	Wynnewood
19444	Montgomery	Lafayette Hill

4. If information that is available to you in the database permits you to believe that the site was essentiall all cleaned to background levels, do not include that site.
5. We all concluded that the proper place within the PMP submission to list these sites was Section 7: *Previous, Ongoing or Planned Minimization Activities Voluntarily or Required by Other Regulatory Programs.*That section requests that the discharger provide the following information with each site listing. Please determine if your database can provide me with information:
    - the level of pollutant reduction attained
    - the level of pollutant reduction targeted
    - measures completed
    - measures underway
    - the schedule for planned activities
6. Additionally, I would suggest that the following information be provided for each site, if available via your database
    - Name of site, if any,
    - Company's name, if any

Street
Township
County
Zip Code
GIS coordinates
Whether the site met site specific standards or state health standards

7. PWD would then add the following information to characterize each site:
   Name of POTW which might be affected by site
   (For PCB sites located in suburban townships which discharge into the PWD collection system)
   Name of entity under whose contract with PWD permits wastewater in the vicinity of the site to discharge wastewater into PWD's collection system
   Location or name of downstream connection to the PWD's collection system
   (For PCB sites located within the City of Philadelphia's collection system)
   Name of the trunk sewer which transports wastes in the vicinity of the site
   Name of the intercepting sewer which transports the wastes in the vicinity of the site
   Name of stormwater outfall which transports the stormwater in the vicinity of the site
8. Additionally, we all concluded that this submission of the 5 year PMP would not require a site visit by PWD personnel as other PCB sources, and specially, the potential sources, have higher priorities.

As I mentioned yesterday, if you are able to gather the requested information and transmit it to me in about a week or two, I should be able to incorporate it into our submission. If your effort takes more time, I will simply reference this task in the PMP submission and incorporate the information into the PMP when it arrives.

Thanks.

Bruce

PMP
Northeast Plant
Recommendations for Action Under Other Regulatory Programs
Item 8

At this point in the PMP process, PWD does not envision the need for other regulatory authorities to take further actions in the mitigation of the currently listed known sources beyond the continued reduction of PCB concentrations in ambient sources waters.

However, should the trackdown effort result in the identification of a PCB source which is not in violation of the Department's Pretreatment Regulations, it is expected that PWD will request a meeting with the appropriate regulatory agencies to determine a proper course of action.

With respect to potential sources, we have identified two instances in Section 5 – Potential Sources in which the involvement of other regulatory agencies is recommended.

PWD will request a meeting with the DRBC, PaDEP and USEPA to discuss regulatory assistance towards requiring the electric service provider, to any facility which operates a PCB transformer, to notify PWD whenever one the referenced facilities requests that their high tension electrical power be shut down for an indeterminate period. If such an arrangement can be accomplished, upon notification, PWD will visit the facility and inquire as to the facility's plans for the transformer and provide information regarding the proper disposal of PCB equipment.

Secondly, upon identifying a facility, containing PCB equipment, which is closed or not secured, PWD will request a meeting with the DRBC, PaDEP and USEPA to discuss regulatory assistance towards minimizing the potential of PCBs from that equipment becoming released into the environment.

PMP
Northeast Plant
Pollutant Minimization Measures
Item 9

1. On-Site Known or Probable Sources

As reported in Section 3 of this report, the Northeast Plant has one probable on-site source of PCBs – the Northeast Plant Lagoons. Included in that section is some evidence to suggest that these lagoons are likely not a source of PCBs into the plant. However, as part of the Northeast Plant trackdown program, PWD will sample and analyze for PCBs in order to quantify their impact upon the plant. Should we determine that the lagoons represent a known source, we will consider employing appropriate filtering measures to the runoff – such as hay bales – to reduce the conveyed load of solids and PCBs into the plant

2. Collection System Known Sources

As described in Section 4. Known Sources, two known sources of PCBs were reported at this time. PaDEP has preliminarily identified additional ACT 2 sites – under past or current mitigation actions for PCBs - that may be the source of PCBs into the environment, but requires additional time to develop an appropriate spreadsheet to characterize each site. PWD will incorporate the PaDEP's list of ACT 2 sites into this PMP in the first annual report. However, should an outcome of the trackdown program result in the identification of an ACT 2 site as being the source of a significant release of PCBs into the sewer shed, PWD will request a meeting of all appropriate regulatory parties to determine a future course of action.

The first reported known source affecting the Northeast sewer shed is the transmission of PCBs from the Delaware River into sewer via treatment processes of the Baxter Water Treatment Plant. The Delaware River has been listed by the State of Pennsylvania as impaired due the presence of PCBs. As a result of this listing, state and federal agencies are working towards the development of a plan which will, upon implementation, result in a reduction in its ambient PCB concentration. PWD recognizes that this effort will, in all likelihood, take decades to demonstrate significant results. During the intervening time, the Baxter Plant, under direction from both the PaDEP and the USEPA, will continue to maximize the removal of solids from its drinking water supply - recognizing that such removal effectiveness also increases the capture of PCBs and their discharge into the sewer. PWD's economic analysis also indicates that the sewering of the Baxter Plant's settling basin waste solids – thereby utilizing the existing Northeast Plant's infrastructure to convey, separate, thicken, dewater and ultimately, dispose of the water plant's commingled solids – continues to remain the only economically feasible option.

The second known source of PCBs in the collection system is the water treatment coagulant used at the Baxter Water Treatment Plant which is produced by the DuPont Company. This product contains PCBs, most of which are captured by the water treatment processes and discharged into the Northeast Plant sewer shed. The Dupont Company reports the following future activities to reduce the PCB concentrations in their ferric chloride.

Since 2002, DuPont completed its evaluation of the long term options to reduce PCB at the source and is committed to implement a $15+million project in 2007. The project will consist of modifications to the industrial process. DuPont anticipates this project will reduce PCB generation by approximately 90% from the 2001 PCB levels in ferric chloride.

3. Potential Sources

PWD believes that the release of potential sources of PCBs into the environment represents a significant threat to the consistent reduction of PCB concentrations in the nearby rivers and streams. Indeed, in September of 1994, PWD was the victim of an illegal discharge of approximately 1000 pounds of PCBs into the Southeast sewer shed. The consequences of the discharge was overwhelming to our biosolids recycling program and undoubtedly resulted in significant quantities of PCBs being conveyed into the Delaware River.

However, PWD recognizes that it is the policy of this country not to require the removal of PCB containing devices (potential sources) when they used and maintained in a responsible manner.

Therefore, PWD believes that the most effective, but reasonable, manner to prevent a release of a stored quantity of PCBs from being illegally released into the environment is to take existing, but limited, federal programs of identification of PCB potential sources to a higher level.

Section 5 - Potential Sources of this plan identifies a plan to visit all current owners of PCB equipment and collect and record forty (40) descriptors for each source. The following tasks are proposed identify and control potential sources:

1. PWD will make a reasonable effort to obtain the requested information from the owners of the equipment. All gathered information will be incorporated into the referenced spreadsheet.
2. Inspectors from the Industrial Waste Unit will visit all listed sites either within the City of Philadelphia or sites located in the sewer sheds of those suburban townships that wholesale discharge sewerage into PWD's collection system for which PWD manages their pretreatment permit.
3. All such listed sites will be visited during this five year plan
4. PWD will attempt to enlist either the suburban community's wastewater utility or its fire code enforcement organization to visit the remaining suburban township sites and provide PWD with the requested information.
5. On the occasion of a visit to a site, PWD will disseminate information to the site contact individual regarding their obligations for proper disposal of the PCB equipment. We will request that the site contact individual notify PWD of any change in status of the PCB equipment.
6. If the site containing the PCB equipment has an industrial waste pretreatment permit with PWD, we will, on the occasion of their next permit renewal, insert language into the pretreatment permit which obligated the permittee to notify PWD if the status changes of the PCB equipment and to follow proper procedures when disposing of the equipment.
7. PWD will request a meeting with the DRBC, PaDEP and USEPA to discuss regulatory assistance towards requiring the electric service provider, to any facility which operates a PCB transformer, to notify PWD whenever one the referenced facilities requests that their high tension electrical power be shut down for an indeterminate period. If such an arrangement can be accomplished, upon notification, PWD will visit the facility and inquire as to the facility's plans for the transformer and provide information regarding the proper disposal of PCB equipment.

8. Upon identifying a facility, containing PCB equipment, which is closed or not secured, PWD will request a meeting with the DRBC, PaDEP and USEPA to discuss regulatory assistance towards minimizing the potential of PCBs from that equipment becoming released into the environment.

PMP
Northeast Plant
Source Prioritization
Item 10

Identified potential sources of PCBs have been prioritized in accordance with their decreasing weights of contained PCBs. Data used to compare PCB weights was limited, as only the USEPA and Philadelphia Water Department records contained information regarding the weight of PCBs contained within the devices. The files provided in Item 5 Potential Sources display the prioritized sites.

PWD will follow this prioritization in the scheduling of site inspections unless geographical convenience or scheduled inspections for the purpose of pretreatment inspections allows us to efficiently inspect sites in addition to those at the top of the list.

Two known PCB sites have been identified in Section 4 of this report. PWD will prioritize PCBs contained in ferric chloride used in the water treatment process.

PMP - ALL PLANTS   Key Dates   Item # 11

Tasks	Qtr 1-Yr 1	Qtr 2-Yr 1	Qtr 3-Yr 1	Qtr 4-Yr 1	Qtr 1-Yr 21	Qtr 2-Yr 2	Qtr 3-Yr 2	Qtr 4-Yr 2	Qtr 1-Yr 3	Qtr 2-Yr 3	Qtr 3-Yr 3	Qtr 4-Yr 3	Qtr 1-Yr 4	Qtr 2-Yr 4	Qtr 3-Yr 4	Qtr 4-Yr 4	Qtr 1-Yr 5	Qtr 2-Yr 5	Qtr 3-Yr 5	Qtr 4-Yr 5
Trackdown (# 6)																				
Trackdown -Southeast Plant																				
Review of Final Plans for Phase 2																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 3, as needed																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 4, as needed																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Trackdown - Northeast Plant																				
Review of Final Plans for Phase 1																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 2, as needed																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 3, as needed																				
Sampling and Laboratory Analysis																				
Trackdown - Southwest Plant																				
Review of Final Plans for Phase 1																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 2, as needed																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Previous Minimization Activitiess (# 7)																				
Review PaDEP's Act 2 Sites and assign to POTW																				
Incorporate PaDEP's List of ACT 2 Sites Into PWD's PMP																				
Number of inspections of 31 PCB sites identified by Phila. Health Dept.			10				10				11									
Remove a site from the list if it does not represent a threat																				
Identify activities to mitigate potential threat from remaining sites																				
Implement above activities																				
Pollutant Minimization Measures (# 9)																				
Northeast Plant - determine PCB Loading from lagoons																				
Reduce PCB loading from Lagoons, as necessary																				
Southwest Plant - determine PCB Loading from lagoons																				
Reduce PCB loading from Lagoons, as necessary																				
Reduce PCB Concentration in FeCl3 by 90% from 2001 Levels																				
Reduce PCB Concentration in Schuylkill and Delaware Rivers (by others)																				
Number of Inspections of 377 City-wide Potential Sources	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	2
Discuss w/ Suburban Townships their inspection of Pot. Sources																				
Suburban Township Inspections and data transfer																				
Revise Pretreatment Permits if they own a Potential Source																				
Meet w/ regulators to discuss receipt of info from Electric Comp.																				
Plant Effluent PCB Analysis																				
Conduct Plant Effluent Sampling (Method 1668a) Every 2 Years																				
Reports																				
Submit an Annual Report of PMP Activities																				

PMP
Northeast Plant
Measuring, Demonstrating and Reporting Progress
Item 12

12.1 Sampling and Analytical Approaches

PWD intends to utilize several different approaches to demonstrate progress towards achieving PCB minimization resulting from the implementation of our PMP.

As required by the PMP, we will sample the effluent of the plant once every two years and will analyze the sample for PCBs using Method 1668A. Reductions in the total PCB concentration over time may be an indicator program success. However, as the DRBC has correctly pointed out in their document entitled "*Recommended Outline for Pollutant Minimization Plans for Polychlorinated Biphenyls in the Delaware Estuary, Municipal Waste Water Treatment Plants and Publicly Owned Treatment Works",* analytical uncertainties may mask effluent reductions. Furthermore, wet weather samples will be collected and their PCB concentrations used in the analysis. However, the data indicates that there is far greater variability in the PCB concentrations of wet weather samples versus dry weather samples. Although there can be a number of causes of this variability, it is likely that the characteristics of each storm event (rainfall intensity, duration, etc) are significant factors. Since future wet weather sampling will cover a range of types of storm events (as long as each meets the requirements of a qualifying storm event), it is likely that the resulting PCB concentrations will contain significant variability due solely to the nature of each rain event.

Therefore, alternative approaches will be included in our annual reports to demonstrate progress.

As provided in the list of PCB potential sources, Item 5, there may be as many 167 sites in the Northeast Plant sewer shed housing PCB contained devices. Additionally, a number of these sites are reported to hold more than one PCB device. At this stage in the program, PWD is uncertain of the current existence of all of the reported devices, but we know that they were reported by the authorities to have existed in the not distant past and there is no reported knowledge on the part of those agencies that they have been removed. PWD will visit each site during the term of this plan and will report the number of devices that have been removed. If the institutional knowledge can provide us with the weight of the removed PCBs, we will report that value also.

Furthermore, PWD has stated concerns over the potential release of PCBs from vulnerable devices – i.e. those located at sites which are closed or abandoned or devices which have been deenergized or moved into storage. We have recommended that, upon identification of such devices, the regulators and ourselves discuss and implement procedures to minimize the risk of these PCBs from being released into the environment. At such, we will separately report the removal of any vulnerable devices.

PWD has reported two known sources. Both sources are discharged into the sewer shed from the Baxter Water Treatment Plant. We will report any reduction in PCB concentrations in the waste streams from the water plant by both measuring the PCBs in the ferric chloride product as well as, using available DRBC ambient data, PCB reductions in the plant's source (Delaware River) water.

PWD has identified a number of sites from the Philadelphia Dept. of Public Health which, we believe, have undergone some form of prior remediation. PWD will inspect each site to either remove it as a potential liability for future PCB release or to recommend activities to reduce the potential risk. We will report the number of sites removed from the list or sites where further remedial action has been recommended or completed.

PWD's objective in conducting its trackdown program is to identify significant sources of PCBs discharged into our sewer shed and then, in cooperation with our regulators, determine and implement procedures to minimize or eliminate those discharges. PWD will report each reduction of PCB load into the shed.

However, as reported in *Item 7, Previous Minimization Activities*, the Northeast Plant is expecting to receive an increased PCB loading, up to 0.11 gms per day, from the Metal Bank Superfund site. However, the acceptance of this load was at the request of the EPA and, after significant discussion with the State and DRBC, was supported by all regulatory parties. Their recommendation to accept this new load was based upon the facts that the discharge into our sewer would occur for only several years, but would permit extensive cleanup of the site with significant environmental benefits to the Delaware River. PWD will report the PCB loading from this temporary discharge into our sewer together with the reported status of the Metal Bank site clean up effort. An estimate of the reduction of PCBs into the environment from the remediation project at Metal Bank will be included.

12.2 Estimated Load

An estimate of the annual baseline load from the Northeast Plant has been determined by calculating the average wet and dry weather PCB concentrations in the plant effluent and then determining the flow for a typical year.

PWD recommends using the typical year flows for future year comparisons and calculations. By doing so, we remove, from the analysis, the variability in annual PCB loads caused by the variation in annual rainfall. Secondly, it is clear that the Northeast Plant will discharge a greater PCB annual loading if it increases its capture of stormwater and thereby increases its flows during wet weather. However, by accomplishing this goal, the environment will receive an overall benefit since the volume of untreated CSO discharge will be reduced. Of course, PWD has been directed, via its NPDES permit, to implement plans to minimize CSO discharge and is well on its way towards accomplishing this long term requirement. By using a typical year plant flow for the annual PMP analysis, we can properly focus our attention on progress towards reducing PCB concentrations in the plant effluent.

The following chart entitled *"Northeast Plant, Baseline PCB Plant Effluent Concentration (pg/l)"* provides our methodology for determining the baseline PCB concentration. PWD uses the PCB data collected in 2001 as the basis for its baseline concentration since that was the time frame in which PWD began to focus attention on reducing PCBs affecting its sewer shed. However, the analytical procedures employed to analyze that data set focused on only 85 congeners while more recent data (2005) required data from 209 congeners. In order to make the 2001 data reflect all 209 congeners, a procedure was employed to estimate the concentrations of the unanalyzed congeners in the 2001 data set by developing a ratio between the total concentration in the 85 congeners to the total concentration of the 209 congeners in the 2005 data set. That ratio was then applied to the 2001 data and an estimate of the concentration from 209 congeners was derived. It is estimated that the average baseline PCB concentration during wet weather is 23,028 pg/l while the average dry weather concentration is 10,426 pg/l.

In order to estimate plant flow for a typical year, PWD examined the annual rainfall patterns for the past 103 years and determined that the year 2000 exhibited close to the average annual rainfall while also providing relevant plant flow data, which were also near long term averages. The plant flow data was examined to identify flows consistent with rainfall events. The attached graph entitled *"NE WPCP Average Daily Flows – 2000"* identifies wet weather days. The average flow for wet weather days and dry weather days were then calculated together with the number of days in each category. Thus, in a typical year, the Northeast Plant experiences 141 wet weather days and 224 dry weather days, while the average plant flow in wet weather is 215 MGD and is 177 MGD in dry weather.

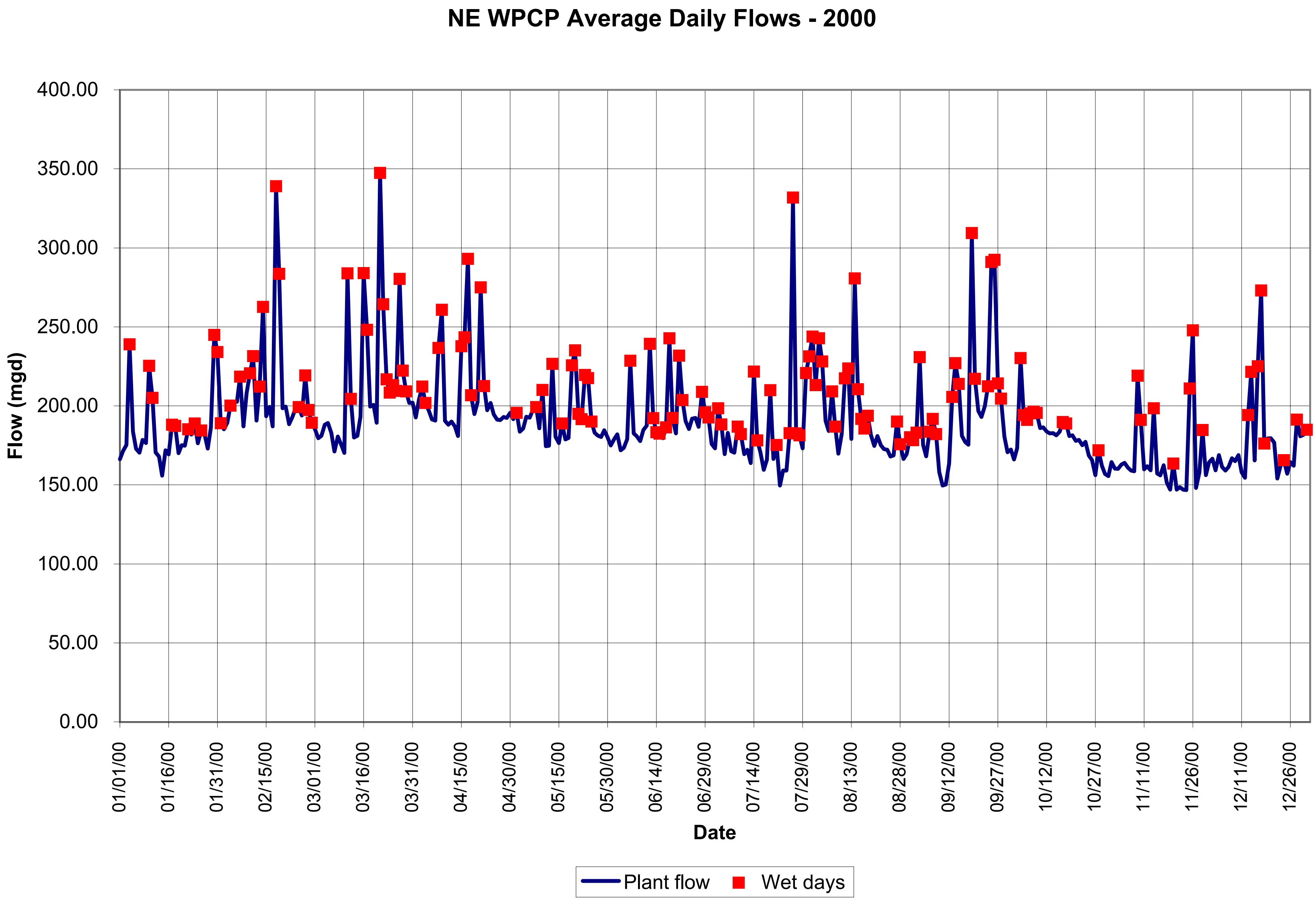
The attached chart entitled *"Northeast Plant, Baseline PCB Plant Effluent Loading (gm/yr)"* displays this data and calculates the baseline annual loading to be **4,201 gm/year**.

12.3 Anticipated Reductions to Baseline Load

Currently, PWD has committed to a reduction in the PCB concentration in the ferric chloride product utilized in its Baxter Water Treatment Plant and which is then discharged into the sewer. We expect to experience a 90 percent reduction in concentration by the end of the third year of the program. Beyond that known source, PWD is uncertain as to the expected success of its ability to identify and, subsequently, minimize other sources and therefore cannot, with any degree of confidence, anticipate further reductions to baseline load. PWD is committed, however, to making every reasonable effort to achieve success of this program and is hopeful that its labors will result in significant load reductions.

12.4 Continuing Assessment

PWD will report progress towards PCB minimization in an annual report starting one year after the commencement of this PMP. Commencement of the PMP will start within 60 days of the receipt of a determination of completeness from the DRBC.



NE WPCP Average Daily Flows - 2000
Flow (mgd)
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
01/01/00
01/16/00
01/31/00
02/15/00
03/01/00
03/16/00
03/31/00
04/15/00
04/30/00
05/15/00
05/30/00
06/14/00
06/29/00
07/14/00
07/29/00
08/13/00
08/28/00
09/12/00
09/27/00
10/12/00
10/27/00
11/11/00
11/26/00
12/11/00
12/26/00
Date
Plant flow
Wet days

Measuring, Demonstrating and Reporting Progress
Item # 12
Northeast Plant

Baseline PCB Plant Effluent Concentration (pg/l)

			Wet Weather				Dry Weather			
Line	**Year Samples Taken**	**Data**	**Sample # 1**	**Sample # 2**	**Sample # 3**	**Average**	**Sample # 1**	**Sample # 2**	**Sample # 3**	**Average**
1	**2005**	**Total of all 209 congener concentrations with positive values plus 1/2 detection level for all congeners with non-detections**	**6,002**	**17,641**	**9,781**	**11,141**	**3,259**	**4,924**	**5,811**	**4,665**
2	**2005**	**Using only the 85 (2001) congeners, total concentrations with positive values plus 1/2 detection level for all congeners with non-detections**	3361	10148	5628	**6,379**	1847	2860	3203	**2,637**
3		**ratio of Line 1 to Line 2**	1.79	1.74	1.74	**1.75**	1.76	1.72	1.81	**1.77**
4	**2001**	**Total of 85 congener concentrations with positive values plus 1/2 detection level for all congeners with non-detections**	14023	11721	13808	**13,184**	5365	7476	4838	**5,893**
5	**2001**	**Estimate of total concentration assuming analysis of 209 congeners (Line 3 multiplied by Line 4)**	25,043	20,376	23,998	**23,028**	9,467	12,870	8,778	**10,426**

All reported PCB concentrations **include** 'J' values, and 1/2 the detection limit for those cogeners reported as non-detect ('U')
In 2001, only 85 congeners were analyzed, while 209 were analyzed for in 2005

Item # 12
Northeast Plant

Baseline PCB Plant Effluent Loading (gm/yr)

		Wet Weather		Dry Weather		Total
Baseline Flows (MGD)		215		177		
Baseline Flow Days per Year		141		224		
Baseline PCB Concentration (pg/l)		23,028		10,426		
Baseline PCB Loading (gm/year)		2,639		1,563		**4,201**

PMP
Southeast Plant
Facility Description
Item 3

3.a. Facility Name and Address

Southeast Water Pollution Control Plant
25 Pattison Avenue
Philadelphia, PA 19148-5121

PaDEP Site ID #: 451994
NPDES Permit No. PA 0026671

3.b. Facility Description and Map

The SEWPCP provides full secondary treatment of wastewater for a design flow of 112 million gallons per day (MGD) from an approximately 20 square mile area of the city.

The SEWPCP treats incoming wastewater using five basic unit processes: 1) influent pumping, 2) preliminary treatment, 3) primary treatment, 4) secondary treatment, 5) effluent pumping and disinfection. Processes used for solids handling are located at the Southwest Water Pollution Control Plant (SWWPCP). The Primary and Secondary sludge from the SEWPCP is pumped via a five mile force main to the SWWPCP for thickening and digestion.

The purpose of the influent pumping process is to lift wastewater to the operating level of the plant. The wastewater is lifted by six influent pumps from a low-level interceptor. There are two large bar racks which collect trash and large debris before it can reach the influent pumps.

The purpose of preliminary treatment is to remove smaller objects, debris, grit and other inert material from wastewater to prevent clogging or machinery breakdown due to blockage or abrasion. The preliminary treatment process consists of catenary bar screens and grit channels. The six catenary bar screens remove objects larger than 1 inch in diameter from the wastewater using bar screens and a mechanically operated rake. The six grit channels remove grit and other inert material from the wastewater. These materials are mixed and transported to the SWWPCP for eventual landfill disposal.

The purpose of primary treatment is to remove readily settleable solids and floatables that will separate from the wastewater under quiescent flow conditions. The process is augmented by the use of flocculation channels. Flocculation promotes formation of larger floc particles and the separation of floatables, while providing oxygen to reduce septic conditions. The thickened sludge is sent to the digesters while the floatables are sent to the SWWPCP for disposal.

The purpose of secondary treatment is to remove colloidal and soluble Biochemical Oxygen Demand from the wastewater using biomass and air. In the aeration tanks, dissolved organic compounds and fine solids are metabolized by a concentrated mass of microorganisms called activated sludge. The biomass is separated from the wastewater in the final settling tanks, where quiescent flow conditions allow the activated sludge to settle to the bottom of the tank. The thickened solids collected at the bottom of the tanks while excess sludge is pumped to the SWWPCP for thickening and the remainder returned to the head of the Aeration Tanks.

The purpose of the effluent pumping and disinfection is to pump the plant effluent to the Delaware River under high tide or high flow conditions and to disinfect the effluent before its discharge into the Delaware River. All plant effluent is disinfected using an injected solution of Sodium Hypochlorite. After approximately a thirty-minute travel through the outfall conduit, the wastewater is discharged into the Delaware River.

Please find the following attached maps and diagrams:

1. PMP Plant Process Diagrams –SE
2. PMP Facility Plan Drawing – SE
3. PMP Stormwater Drainage Plan - SE

3.c. Description and Maps of Collection System

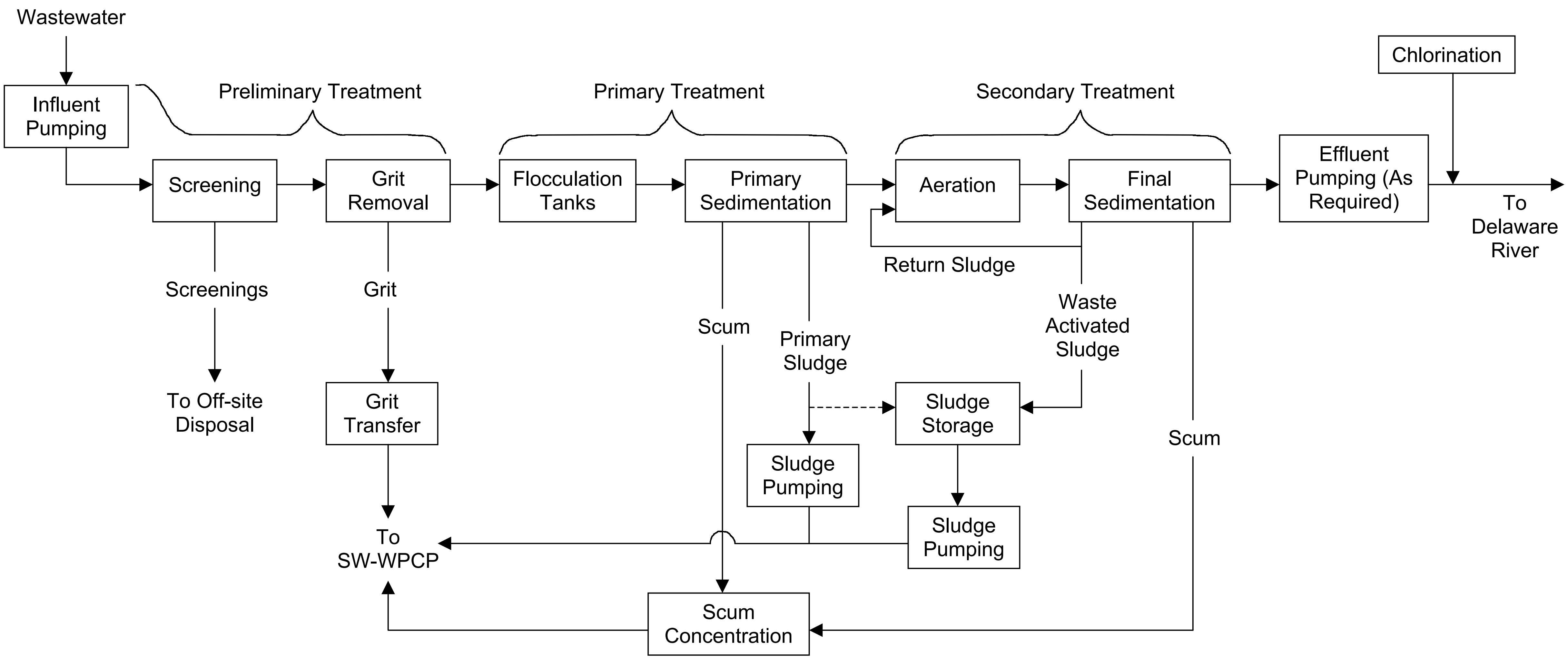
The PWD service area is divided into three drainage districts: Northeast, Southeast, and Southwest. Each of these drainage districts conveys flow to the respective WPCP of the same name. These three drainage basins are hydraulically independent except during conditions of high flow, when cross connections in the trunk sewer system allow conveyance of some flow between the Northeast and Southeast drainage districts. The service areas are itemized in Table 1 by collection system type.

Table 1 Wastewater Service Areas by Drainage District and Collection System Type

	SE (ac)	SW (ac)	NE (ac)	Total (ac)	%
Combined	8,475	12,741	19,934	41,150	19%
Separate	31	9,732	15,737	25,500	12%
Suburban Sanitary	300	76,600	70,800	147,700	69%
			Total	**214,350**	

Each drainage district contains a network of branch sewers, trunk sewers, combined sewer interceptors, separate sanitary interceptors, and storm relief sewers as shown on Figure 1. Branch sewers collect wastewater from catch basins and lateral connections from drainage areas. The branch sewers convey flow to the trunk sewers, which are larger arterial sewers that convey wastewater to regulating chambers. Combined sewer interceptors convey flow from regulating chambers and separate sanitary interceptors to the WPCPs. Storm relief sewers convey flow from storm relief diversion chambers to the receiving waters during extreme high flow conditions. This network of sewers has been subdivided into 17 interceptor systems and 10 storm relief sewer systems. Table 2 identifies each of the interceptor systems. Table 3 identifies the storm relief sewers systems. Table 4 identifies the major separate sanitary sewer interceptors that are tributary to combined sewer interceptors. Table 5 identifies contributing communities and their associated interceptor systems.

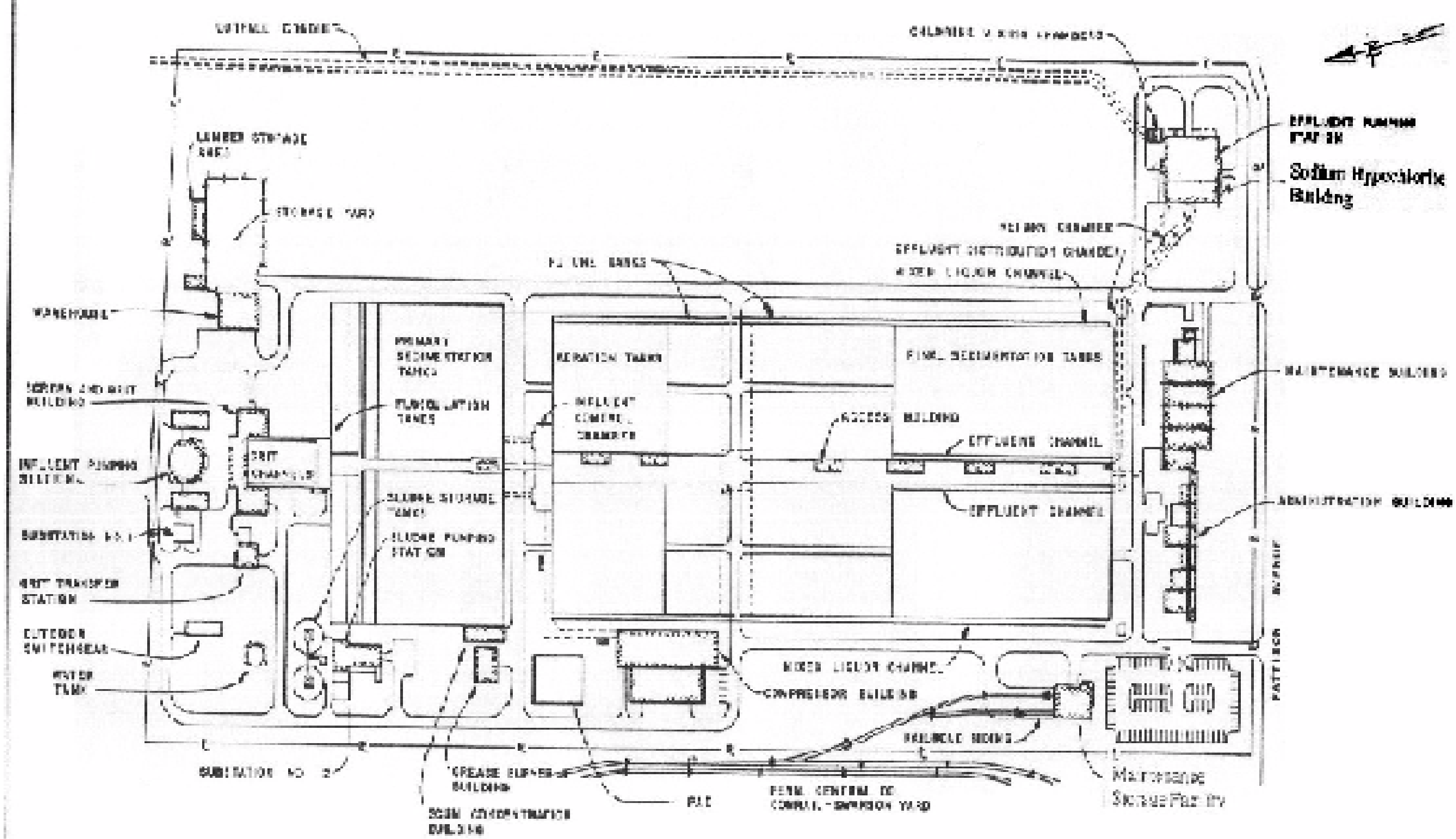
Figure 2-2-1



Process Plan Diagram – Wastewater Treatment Processes

Southeast Water Pollution Control Plant
Operation and Maintenance Manual

Philadelphia Water Department

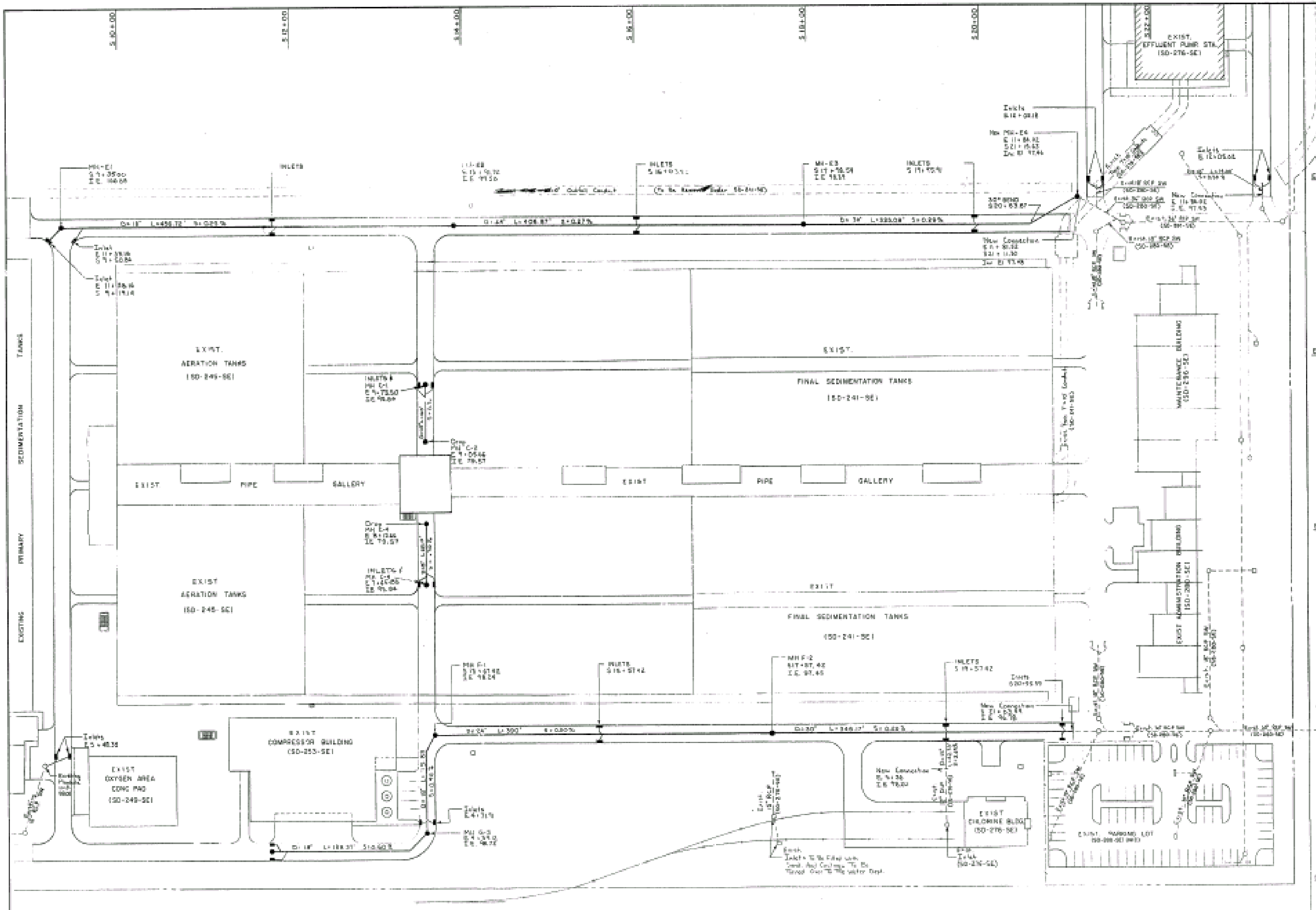


FACILITY PLAN

GREELEY AND HANSEN ENGINEERS

CITY OF PHILADELPHIA WATER DEPARTMENT
SOUTHEAST WATER POLLUTION CONTROL PLANT
OPERATION AND MAINTENANCE MANUAL

Revised 1/11/2005



CITY OF PHILADELPHIA
WATER DEPARTMENT

APPROVED

CHIEF, DESIGN BRANCH, ENGINEERING DIVISION

SEALS

WATER POLLUTION CONTROL PROJECT
SOUTHEAST
WATER POLLUTION CONTROL PLANT
GRADING, PAVING, DRAINAGE, LANDSCAPING & YARD PIPING (PHASE 2)

SCALE 1" = 40'

STORMWATER DRAINAGE
GENERAL PLAN

DRAWN BY	CHECKED BY	SUPERVISOR	DATE
Bockmishaft	Lawson	Arnold Friedman	May 1984

DRAWING NO. 3-G-3052
SHEET NO. 2 of 13
WORK NUMBER SD-284-SE

27-2-605

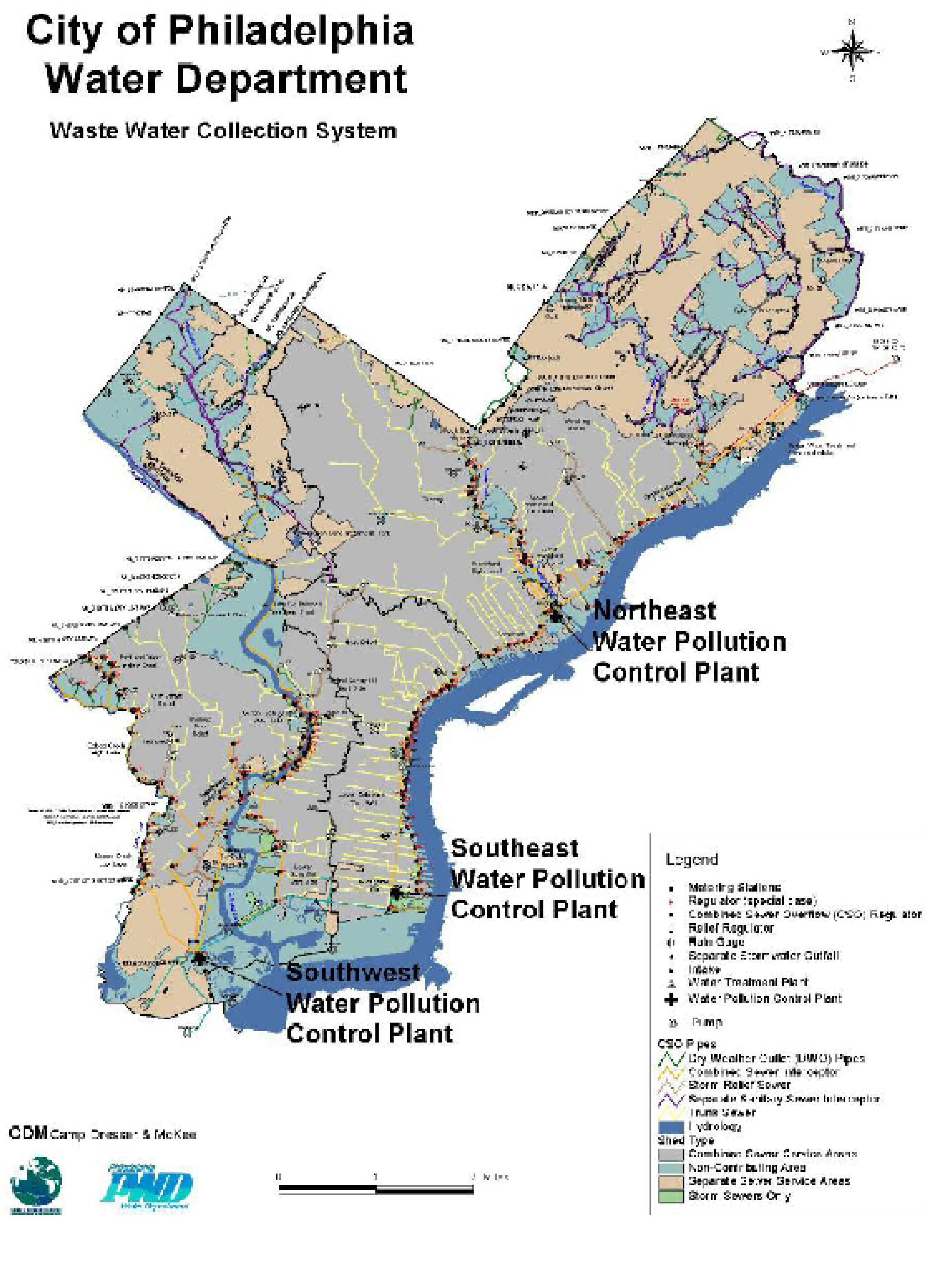


Figure 1 - PWD wastewater collection System

Table 2 Combined Sewer Interceptor Systems in the PWD Service Areas

Combined Sewer Interceptor	Abbreviation	Drainage District
Lower Delaware Low Level	LDLL	Southeast
Oregon Avenue	O	Southeast

Table 3 Storm Relief Systems in the PWD Service Areas

Storm Relief System	Abbreviation	Drainage District
Oregon Ave. Relief Sewer	FR_O	Southeast

Table 4 Separate Sanitary Interceptors Tributary to Combined Interceptors

Separate Sanitary Interceptor	Abbreviation	Receiving Interceptor	Drainage District
Wissahickon High Level	S-WHL	LDLL	Southeast
Cresheim Valley Bridge	S-CVB	LDLL	Southeast
Monoshone Branch	S-MON	LDLL	Southeast

Table 5 Summary of Contributing Communities to the PWD Collection System

Municipality/Authority	Drainage District	Intercepting System
Township of Springfield, Montgomery County *	SE/SW	LDLL/CSES

Source: "Act 537 Plan Volume 1"; BCM, May 1993. * Flows are split between the SE and SW districts.

A brief description of the collection system for this drainage district is as follows.

Southeast Drainage District

Figure 3 shows the collection system for the Southeast drainage district. This figure depicts the combined sewer interceptors and the major separate sewer interceptors, as well as, the location of the CSO regulators, storm relief chambers, and major hydraulic control points. Regulators and relief chambers are described in Section 1.1.4; major hydraulic control points are described in Section 1.1.5. The only suburban community served by the Southeast WPCP is Springfield Township.

The combined sewer interceptors in the Southeast drainage district include the Lower Delaware Low Level (LDLL) and Oregon Avenue (O). The Oregon Avenue Interceptor combines with the LDLL upstream from the Southeast WPCP pumping station, which lifts the wastewater from both interceptors into the preliminary treatment building.

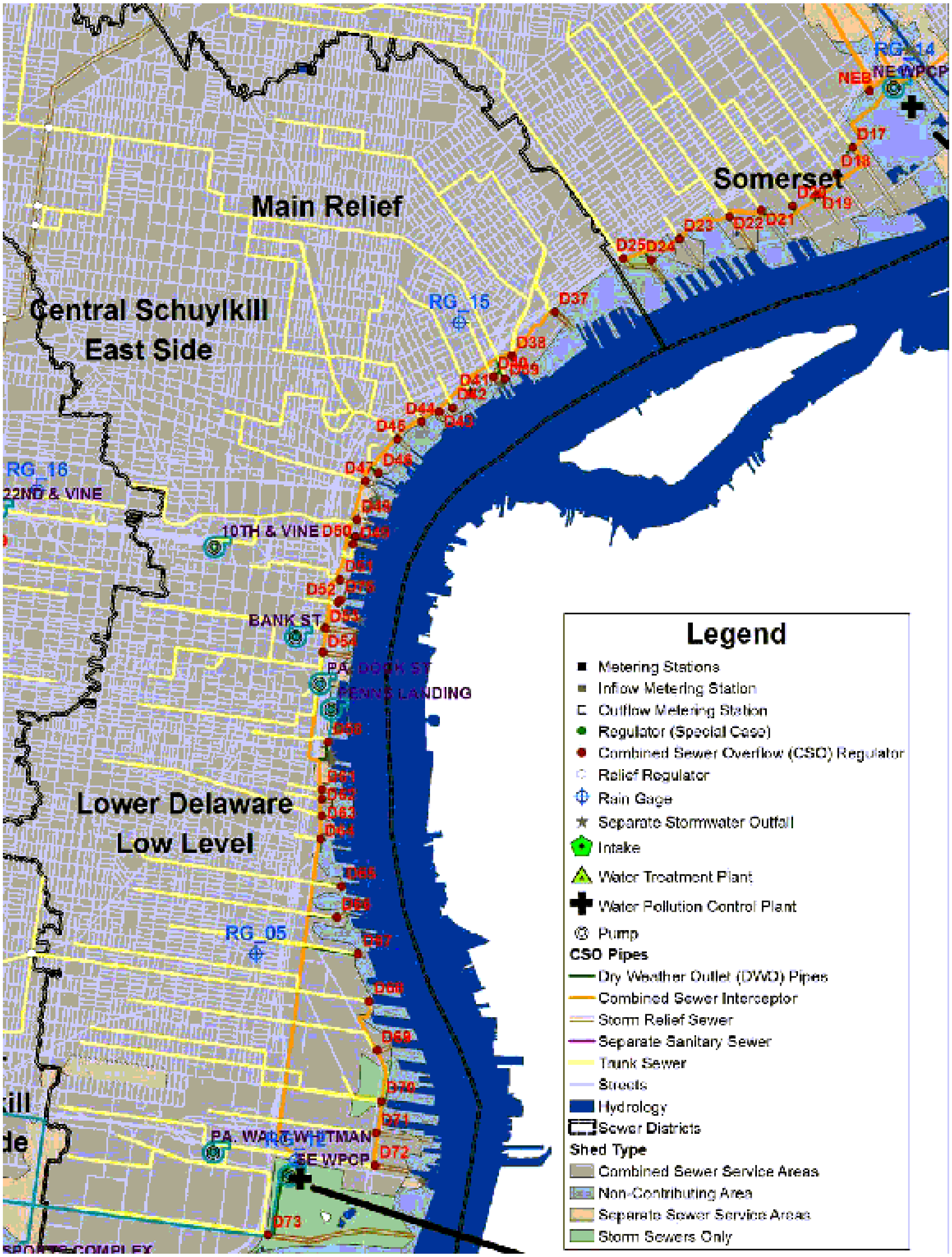
<u>Lower Delaware Low Level:</u> The LDLL interceptor begins in central Philadelphia at the intersection of Dyott St. and Delaware Avenue. The LDLL heads south along the Delaware River and combines with the Oregon Avenue interceptor at Oregon Avenue and Swanson Street. Separate sanitary wastewater flows from the Wissahickon High Level, Monoshone and Cresheim Valley interceptors, including flow from areas outside the City, are collected by the LDLL. Table 1-11 lists the combined sewer regulators on the LDLL.

Oregon Avenue: The Oregon Avenue interceptor runs on Delaware Avenue from Snyder Avenue to Packer Avenue, with a portion between Jackson St. and Snyder Avenue on River St. Wastewater flows to the intersection of Oregon and Delaware Avenues where it heads west along Oregon Avenue to Swanson Street and feeds into the LDLL. Table 1-11 lists the combined sewer regulators on the Oregon Ave. Interceptor.
Table 7 lists ranges of interceptor sewer diameters in the Southeast Drainage district by interceptor system.

Table 7 Interceptor Sewer Systems in the Southeast Drainage District

Interceptor System	Length (miles)	Size Range (ft)
Lower Delaware Low Level	5.0	3 - 11
Oregon Avenue	1.5	2.5 – 4

Figure 3 SE WPCP Interceptor System



3.d. Description of Wastes Accepted from Outside Collection System

The Southeast Plant receives no wastes from outside its collection system.

3.e. Map and Description of Point and Non-Point Source Releases From Facility

There are no known sources of PCBs at the Southeast Plant

3.f. Facility State and Federal Permit Numbers

PaDEP Site ID #: 451992
NPDES Permit No. PA 0026662

3.g. Name of Receiving Stream Including River Mile

The discharge of the Southeast Plant is received by the Delaware River at mile point 96.7

3.f. List of all known industrial users of the collection System and permit numbers

SEWPCP - Known Industrial Users of Collection System

List of Industrial Dischargers in the Southeast Sewershed

FACILITY NAME	STREET ADDRESS	CITY	STATE	ZIP	PRETREATMENT PERMIT NO.
Trio Silversmiths Inc.	729 Sansom St.	Philadelphia	PA	19106	TRIO00011029FP
Murray Green & Son	740 Sanson St., Suite 402	Philadelphia	PA	19106	MURR02001109ND
Phillip Tierstein Polishers	740 Sansom St., Room 306	Philadelphia	PA	19106	PHIL02001107ND
Stephen L. Blum	733 Sansom St., 2nd Floor	Philadelphia	PA	19106	STEP00021108ND
AppTec Laboratory Services	Phila. Naval Business Center - 5001 S. Broad St.	Philadelphia	PA	19112	TEMP
A &R Transport	8 E. Oregon Avenue	Philadelphia	PA	19148	ART00011146WS
V&S Philadelphia Galvanizing LLC	2520 E. Hagert St.	Philadelphia	PA	19125	CATT00010819WS
Wade Technology, Inc.	445 N. 11th St.	Philadelphia	PA	19123	WADE00010864FP
Jaws, Inc.	2148 E. Tucker St.	Philadelphia	PA	19125	JAWS00010829WS
Simons Brothers	2424-38 Sergeant Street	Philadelphia	PA	19125	SIMO00011114WS
Department of the Treasury, U.S. Mint	5TH & Arch Streets	Philadelphia	PA	19106	USTR00010913WS
Ashland Chemical Company	2801 Christopher Columbus Blvd.	Philadelphia	PA	19148	ASHL00010470BD
Inolex Chemical Company	Jackson & Swnason Streets	Philadelphia	PA	19148	INOL00010298WS
Cantol Specialty Chemicals	2211 N. American Street	Philadelphia	PA	19133	CANT00011105OM
PECO Oregon Shop	2610 S. Christopher Columbus Blvd.	Philadelphia	PA	19148	PECO00011148MS
Naval Foundry & Propeller	1701 Kitty Hawk Ave.	Philadelphia	PA	19122	NAVA00011147MS
George L. Wells Meat Co.	982 N. Delaware Avenue	Philadelphia	PA	19123	not permitted
Philadelphia Poultry Inc.	346 N. Front St.	Philadelphia	PA	19106	not permitted
Charles Jacquin's	2633 Trenton Avenue	Philadelphia	PA	19125	not permitted
Metropolitan Bakery	1036 Marlborough St.	Philadelphia	PA	19125	not permitted
Dubin Paper Company	1910 S. Delaware Ave.	Philadelphia	PA	19148	not permitted
Cooper's Cooperage	320 Brown St.	Philadelphia	PA	19123	COOP00020851OM
Kohler Freda LLC	1334 S. Front Street	Philadelphia	PA	19147	GVFR00010019OM
Leatex	2722 N. Hancock St.	Philadelphia	PA	19133	LEAT00011039OM
National Chemical Laboratories	401 N. 10th St.	Philadelphia	PA	19123	NATI00050995OM
Yee Tung	10 Queen St.	Philadelphia	PA	19147	YEET00011031OM
Cambria Container, LLC	2900 N. 18th Street	Philadelphia	PA	19132	CAMB00011130MS

PMP
Southeast Plant
Known Sources
Item 4

Two known sources of PCBs entering the Southeast Plant sewer shed are the intake of Schuylkill River water and the addition of ferric chloride as a treatment coagulant into the Queen Lane Water Treatment Plant and the resultant discharge of most of the plant's process wastes into the sewer. The remaining wastes are stored onsite in the plant's raw water basin which is periodically dredged. The wastes produced from the dredging operation are not sewered.

The intake of Schuylkill River water into the plant occurs at a location which is significantly influenced by the Wissahickon Creek. Two ambient water samples were taken above the tidal dam and analyzed for PCBs in March, 2002 and October, 2002. The results were 1.636 and 1.857 ng/l, respectfully, for and average concentration of 1.75 ng/l. We do not have PCB data to represent the Wissahickon Creek and assume its concentration of PCBs is similar to that of the Schuylkill River. An average intake flow of 78 MGD into the plant results in an intake of PCBs of 428 mg/day. Based upon an approximate solids balance, we estimate 99 percent of the influent loading is captured within the treatment processes. Ten percent of that captured loading immediately settles in the raw water basin. Therefore, we estimate that approximately 89 percent, or 381 mg/day, of the Schuylkill River loading influent to the Queen Lane Plant is discharged into the Southeast Plant sewer shed.

The second source is discharge of spent ferric chloride, which contains PCBs in the delivered product, from the Queen Lane Plant into the sewer. The Queen Lane Plant uses ferric chloride as a water treatment chemical to coagulate and flocculate fine particle solids from the river water. PWD currently purchases ferric chloride from Kemiron. In 2001 PWD was informed by Eaglebrook (now Kemiron) that low levels of polychlorinated biphenyls were detected in the ferric chloride. The source of the ferric chloride is from the DuPont Edge Moor plant that produces ferric chloride as a by-product. The DuPont Company has analyzed their ferric chloride product for PCBs and estimates that the current concentration is 0.00055 mg/l. Based on the average dosage of ferric chloride and the average plant flow, the average contribution of PCBs to the plant is 17.44 mg/day. However, as described above, we estimate that the plant captures approximately 99 percent of the solids produced as a result of the chemical addition and all is discharged into the sewer. Therefore, we estimate that approximately 99 percent, or 17.27 mg/day, of the PCBs from the ferric chloride source is discharged into the Southeast Plant sewer shed.

The DuPont Company has already undertaken measures to reduce the concentration of PCBs in the ferric chloride produced from their Edge Moor Plant and has committed to further reductions. Their previous actions will be presented in *Section 7. Previous Minimization Activities* of this report. Their future plans will be presented in *Section 9. Pollutant Minimization Measures*.

PMP
Southeast Plant
Potential Sources
Item 5

Identification of potential sources of PCB focused first on those sources which stored PCBs in equipment. In addition to PWD's inventory of PCB containing equipment, we requested identification of such equipment from the following agencies:

1. Philadelphia Fire Department
2. Philadelphia Department of Public Health
3. USEPA (including the Mega Rule's database)
4. PaDEP
5. DRBC
6. Partnership for the Delaware Estuary
7. PECO

The following pages of the spreadsheet entitled *"List of Potential Sources, Item 5, Southeast Plant"* contain a complete listing of equipment containing PCBs resulting from the above request. PWD believes that considerable information concerning each source should be gathered and maintained in order to both understand the characteristics of the particular source as well as identify the owner who is responsible for its proper operation and ultimate disposal. PWD intends to gather the following information regarding each potential source:

1. Name of POTW in whose drainage shed the equipment is located
2. PWD identification #
3. Name of agency referring PCB source to PWD
4. Date of last inspection of equipment by PWD or its agent
5. Name of inspector
6. Name of company which owns equipment
7. Street address of facility where source is located
8. Township address of facility where source is located
9. Zip Code address of facility where source is located
10. GIS coordinates of facility where source is located
11. County address of facility where source is located
12. Name of site or complex where source is located
13. Name of building where source is located
14. Name of contact at site who maintains PCB equipment
15. Phone number of contact at site who maintains PCB equipment
16. Name of company official responsible for management of PCB equipment
17. Title of company official responsible for management of PCB equipment
18. Street address of company official responsible for management of PCB equipment

19. Township address of company official responsible for management of PCB equipment
20. State address of company official responsible for management of PCB equipment
21. Zip Code address of company official responsible for management of PCB equipment

    (For PCB sources located in suburban townships which discharge into the PWD collection system)
22. Name of suburban utility under contract w/PWD
23. Location or name of connection to PWD System

    For PCB sources located within Philadelphia
24. Name of Trunk Sewer connected to site
25. Name of Intercepting Sewer connected to site
26. Is the site in a combined or separate sewer district?
27. Name of agency responsible for management of pretreatment permit
28. Identification of pretreatment permit number
29. Type of PCB source/equipment
30. Number of identical PCB sources at location
31. Type of Aroclor contained in equipment
32. Total PCB concentration
33. Fluid volume (gal)
32. PCB mass (lbs)
33. PCB mass (kg)
    Status of PCB equipment
34. In use
35. Out of service
36. Disconnected
    Status of building housing PCB equipment
37. Operating
38. Closed
39. Abandoned/not secure
40. Comments including any past spills from source, or company plans regarding future of source, etc

The electronic copy of this spreadsheet contains columns to allow recording of the above information. All information currently available regarding each source has been incorporated into the spreadsheet. For ease of printing, only some of the columns have been identified in the printed version of this PMP.

Please see attached spreadsheet PCB Devices

PMP
Southeast Plant
Strategy for Identifying Unknown Sources
(Trackdown)
Item 6

Prior Trackdown Studies

In 2001/2002, PWD developed and conducted an initial trackdown of PCBs in the Southeast Plant sewershed. The plan called for the sampling of all sewers entering the plant as well as a number of samples taken at strategic locations in the sewershed. The project and its results placed on a Powerpoint presentation called *"Philadelphia's Experiences with the Pollutant Minimization Plan Requirements"* and is attached to this section.

Additionally, the total PCB concentration values together with the estimated sewer flows for each location at the time of sampling can be found on the following chart entitled *"PMP, Trackdown, Southeast Plant, Phase 1, Data Results"*.

A description of the sampling and analytical methods used for the Phase 1 project are identified in the following package entitled "*Sampling and Analysis Plan for Polychlorinated Biphenly Congener Trackdown, Phase 1, Southeast Water Pollution Control Plant"*.

Philadelphia's Experiences with the Pollutant Minimization Plan Requirements

By
Bruce S. Aptowicz P.E.
Deputy Director of Operations
Philadelphia Water Department

PWD's Experiences and Plans Regarding Sewershed Trackdown

- In 2001, each plant effluent was sampled for PCBs - 3 times in dry and 3 times in wet weather
  - results from the 9 dry weather samples were 1 congener just above detection in 1 sample
  - results* from wet weather samples averaged
    - 6,313 picrograms per liter for Northeast Plant
    - 10,773 picrograms per liter for Southeast Plant
    - 3,023 picrograms per liter for Southwest Plant

* non-detected congeners were computed as zero

Sewershed Trackdown
(cont'd)

- In 2005, each plant effluent is being sampled for PCBs - 3 times in dry and 3 times in wet weather
- number of congeners reported increased and detection level decreased
- Available results to date are as follows

Total Average PCBs

(in pg/l)

(Incomplete data set)

	2001 Dry	2001 Wet	2005 Dry	2005 Wet
Northeast	-	6,313	3,037	11,000
Southeast	-	10,773	2,024	13,500
Southwest	-	3,023	3,205	7,918

Sewershed Trackdown
(cont'd)

- In 2001/2002, PWD, as well as CCMUA, supported by the USEPA, PaDEP and DRBC, developed and conducted an initial trackdown of a sewershed
- Methodology:
  - Southeast Plant was selected due to highest wet weather PCB levels and simpler influent configuration
  - All sampling in wet weather (3/4 inch of rain event)

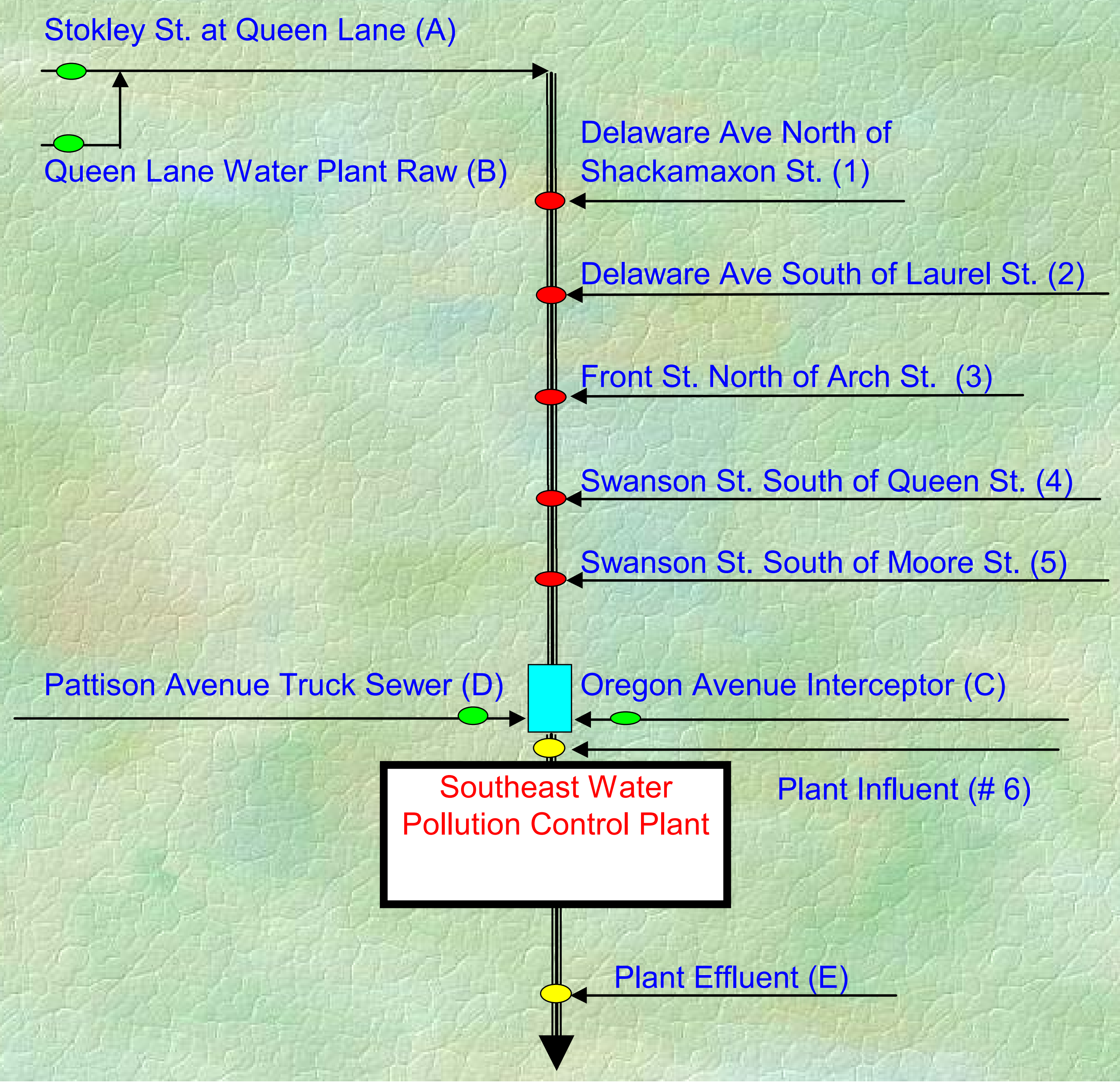
Sewershed Trackdown
(cont'd)

- Samples taken at various locations in interceptor since numerous individual trunk sewer sampling was deemed too costly
- All sewer samples consisted of a composite of 2 grab samples taken 20 minutes apart
- Initial sample taken at head of interceptor and at one hour post storm start

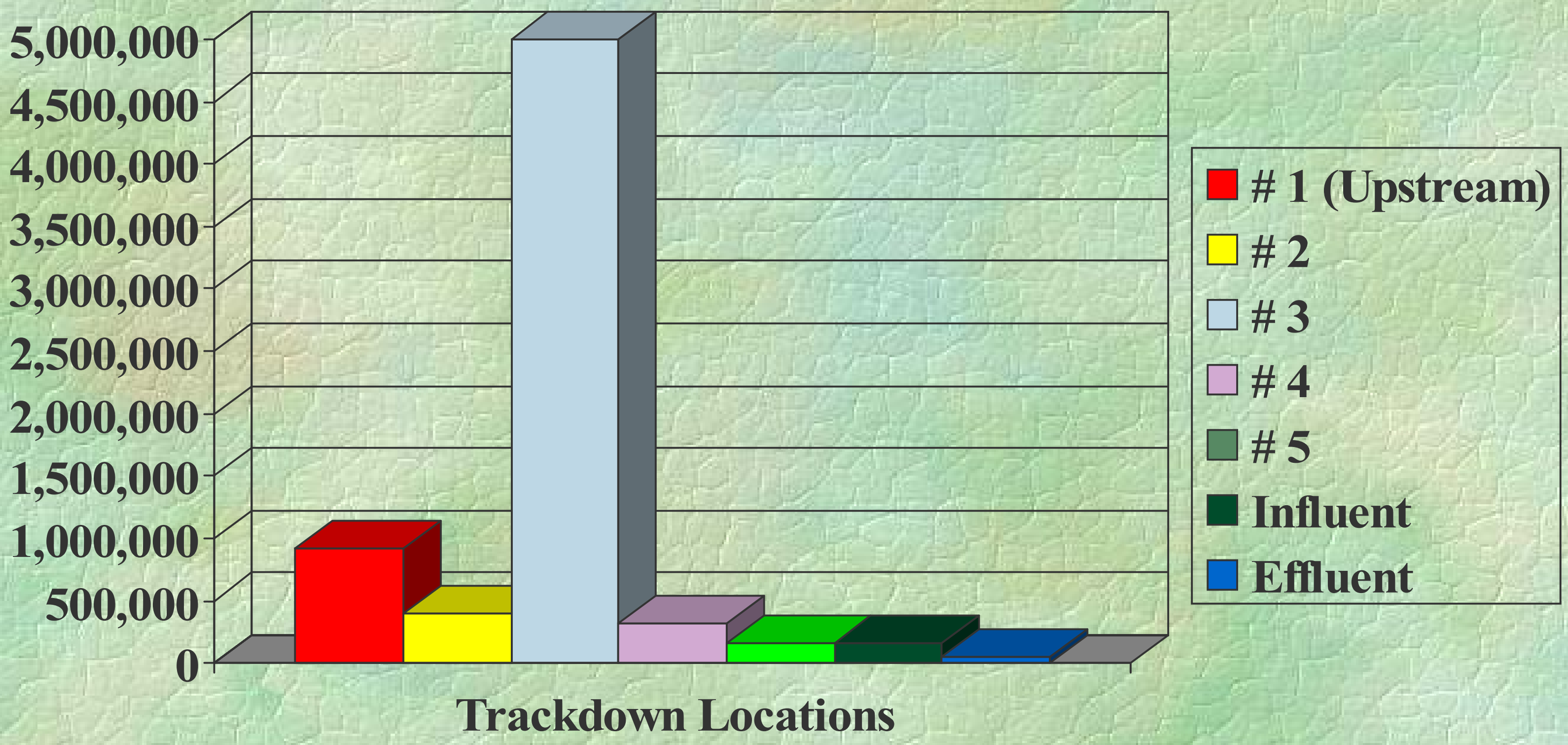
Sewershed Trackdown
(cont'd)

- Interceptor time of travel was estimated and downstream samples taken accordingly
- Plant influent sample was an ISCO 30 minute composite, starting at estimated time of arrival at plant and for eight hours
- Plant effluent sample was similar to influent sample but with a two hour delay
- IWU employed 3 crews of two persons to conduct sampling

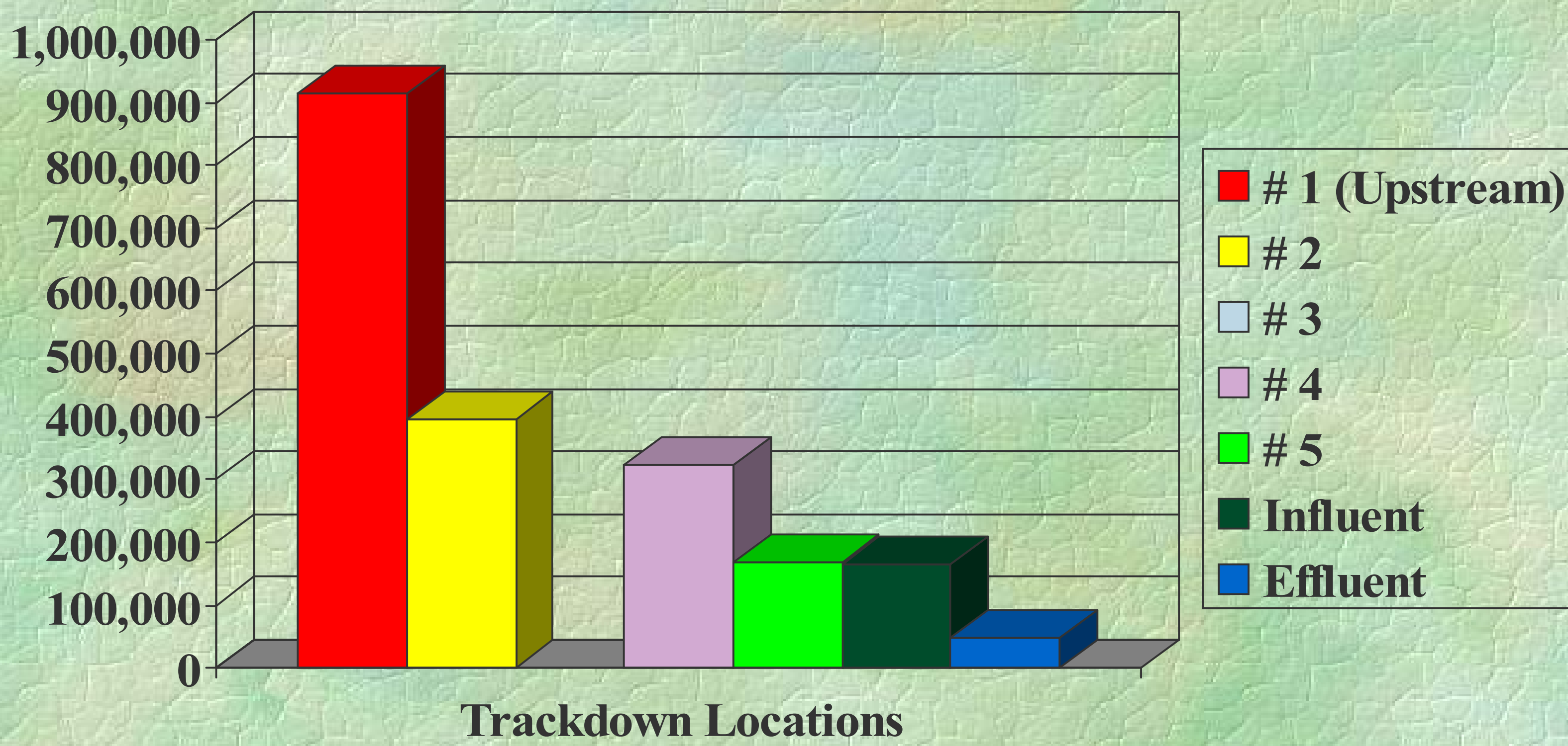
Stickley St. at Queen Lane
Queen Lane Filter Plant
Lower Delaware Interceptor at Delaware Ave. North of Shackamaxon St.
Lower Delaware Interceptor at Delaware Ave. South of Laurel St.
Lower Delaware Interceptor at Front St. North of Arch St.
Lower Delaware Interceptor at Swanson St. South of Queen St.
Oregon Avenue Interceptor
SEWPCP Influent
SEWPCP Effluent
Pattison Ave Trunk Sewer
SWMM5 Output (Links and Nodes) with Track Down Sampling Locations
SWMM5 Output
Junction
Outfall
Storage
SWMM5 Output
Link
Track Down Sampling Site
Sewershed Type
Combined Sewer Area
Separate Sewer Area
Storm Sewer Only
Non-Contributing Area
Hydrologic Feature
March 2004
CDM


Stokley St. at Queen Lane (A)
Queen Lane Water Plant Raw (B)
Delaware Ave North of Shackamaxon St. (1)
Delaware Ave South of Laurel St. (2)
Front St. North of Arch St. (3)
Swanson St. South of Queen St. (4)
Swanson St. South of Moore St. (5)
Pattison Avenue Truck Sewer (D)
Oregon Avenue Interceptor (C)
Southeast Water Pollution Control Plant
Plant Influent (# 6)
Plant Effluent (E)

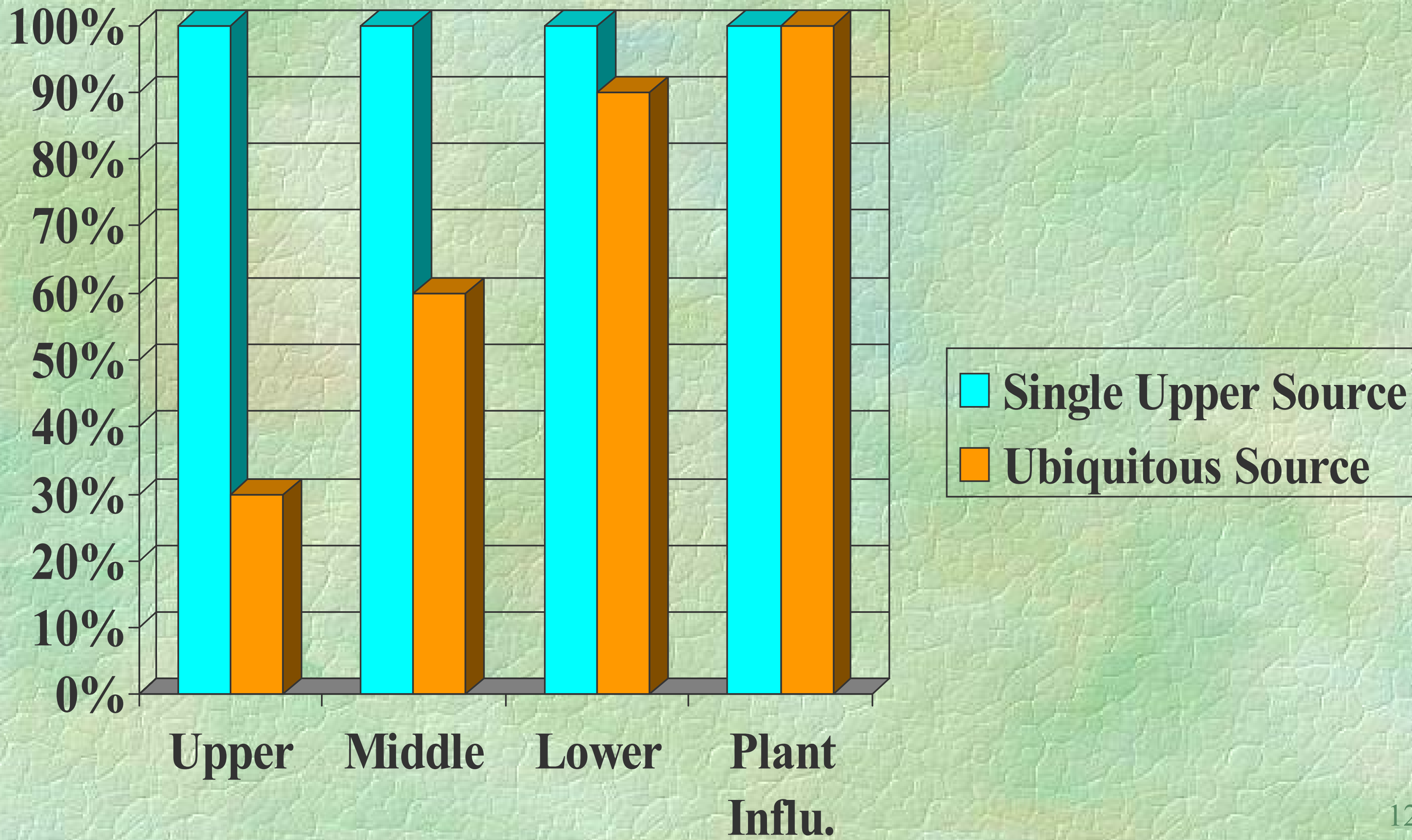
PCB Concentrations in samples in pg/l



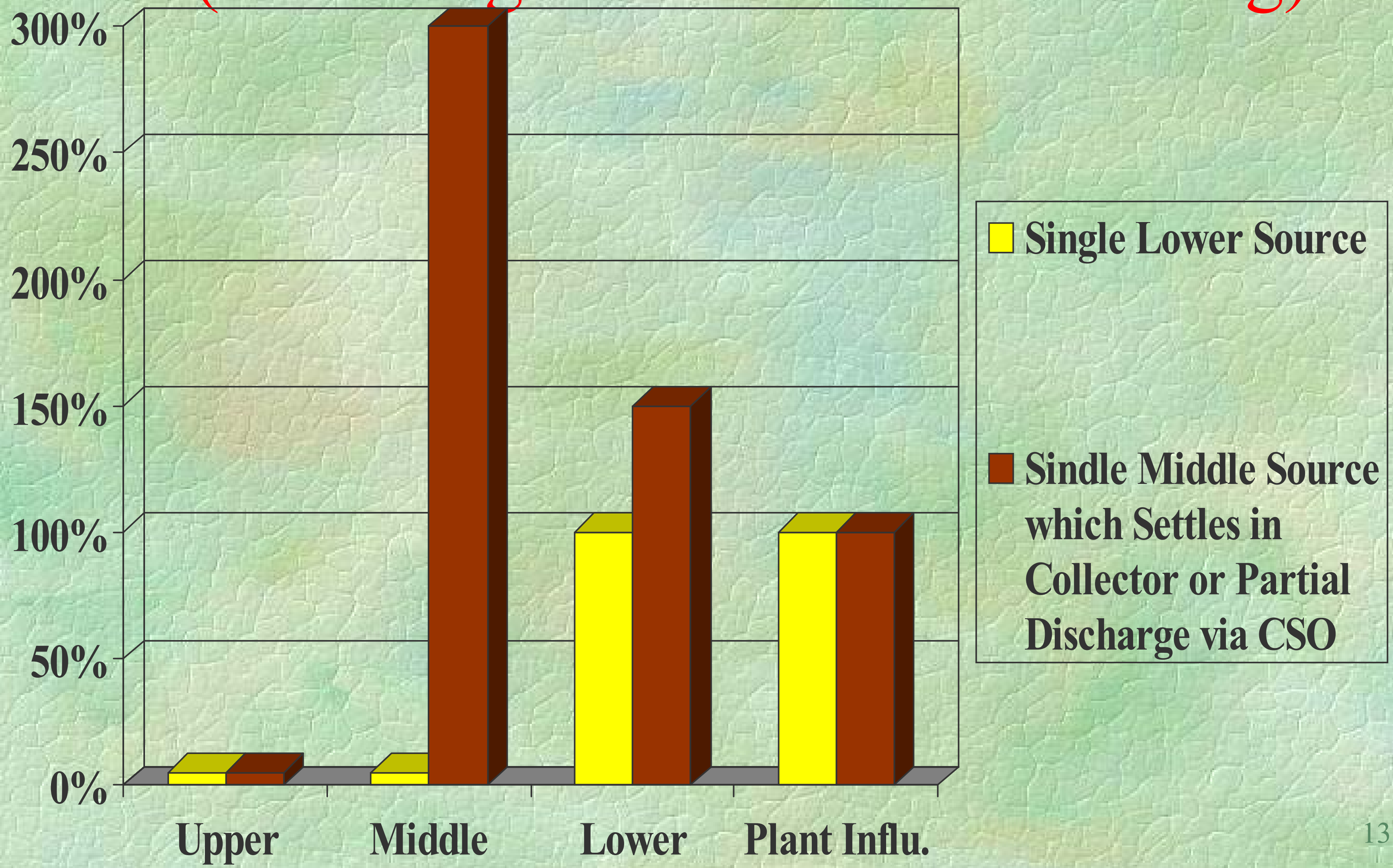
PCB Concentrations in samples in pg/l without # 3



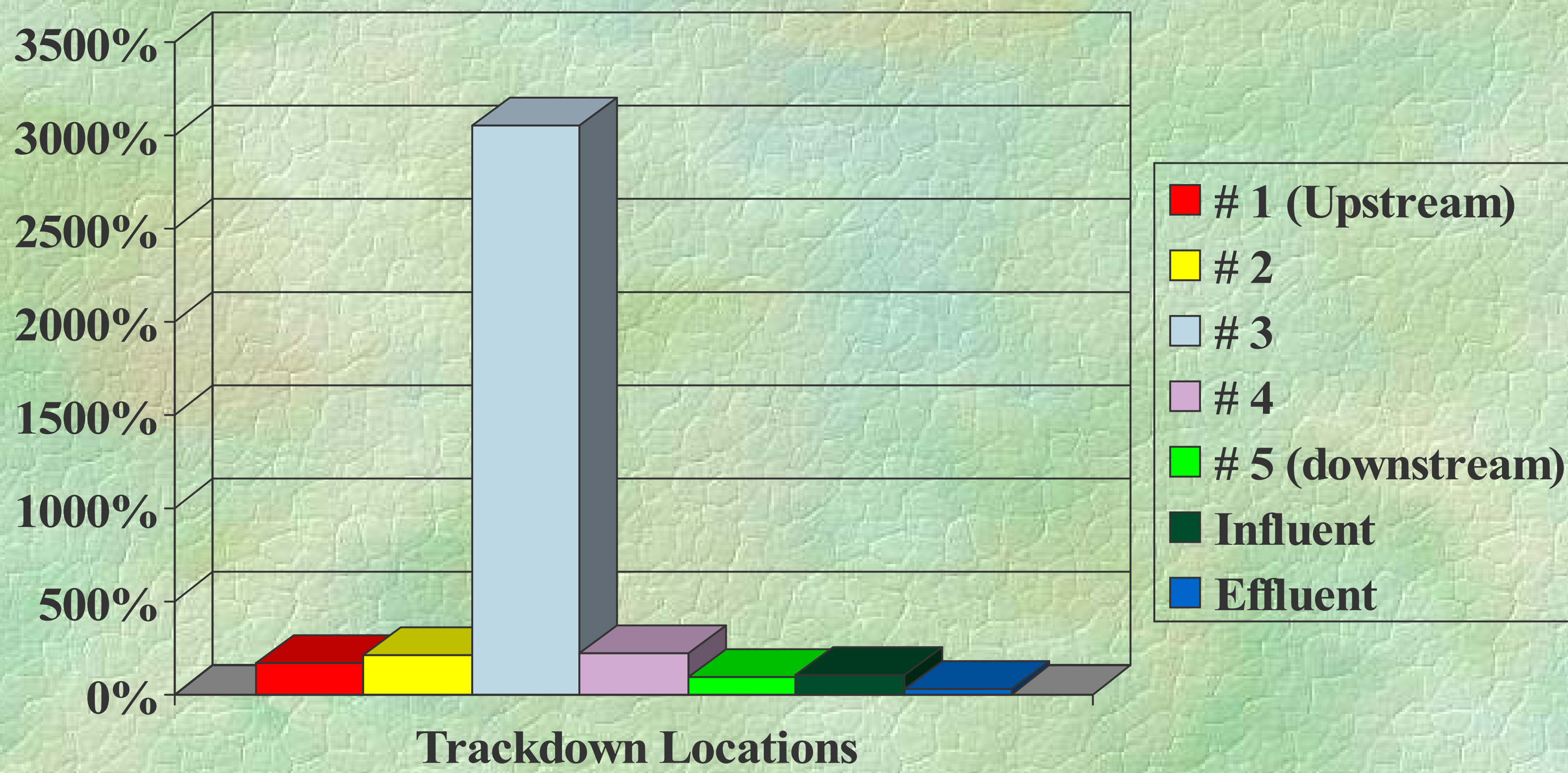
Theoretical Graphs for Various Loadings (Percentage of Plant Influ. Loading)



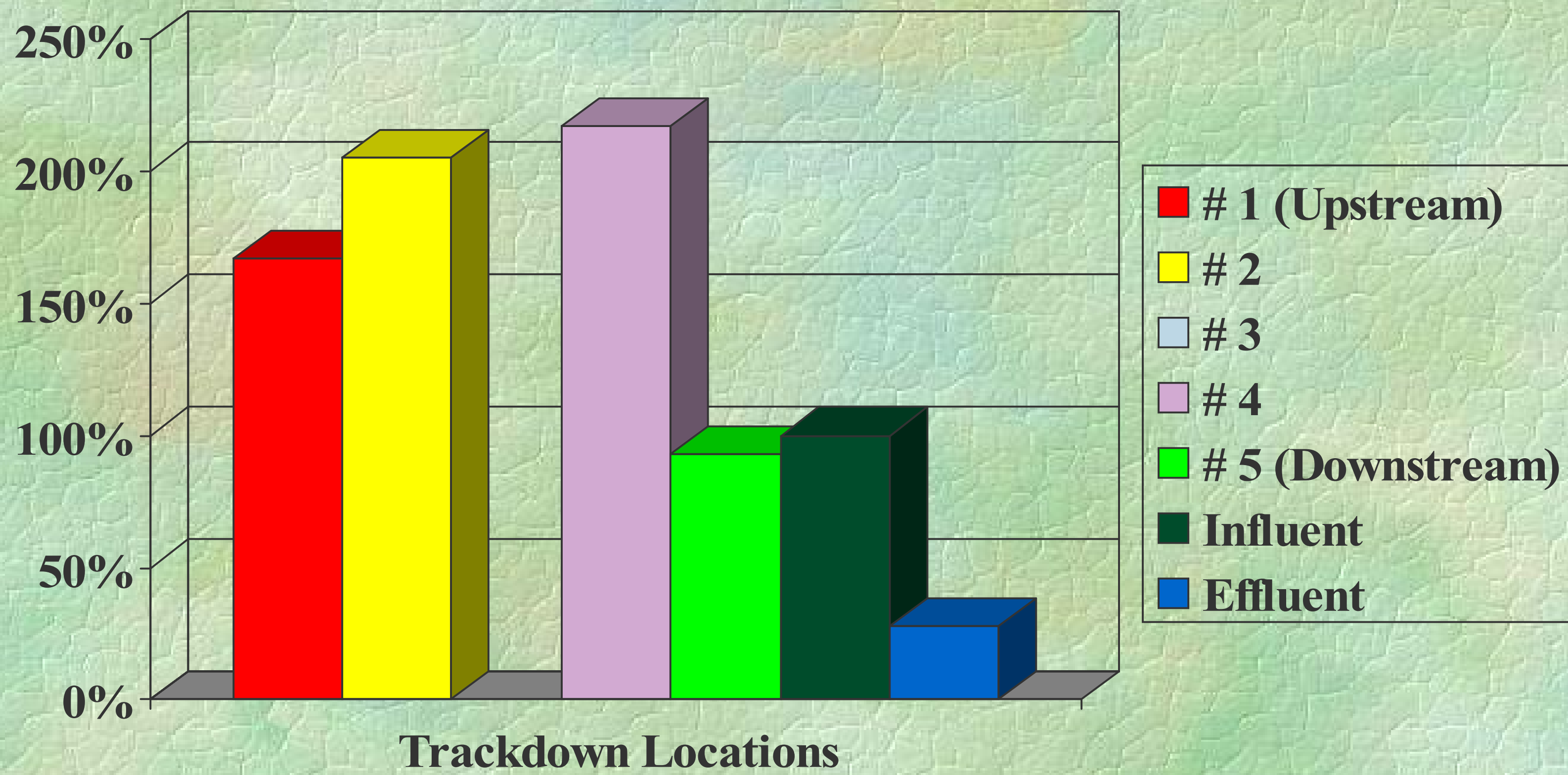
Theoretical Graphs for Various Loadings (Percentage of Plant Influ. Loading)



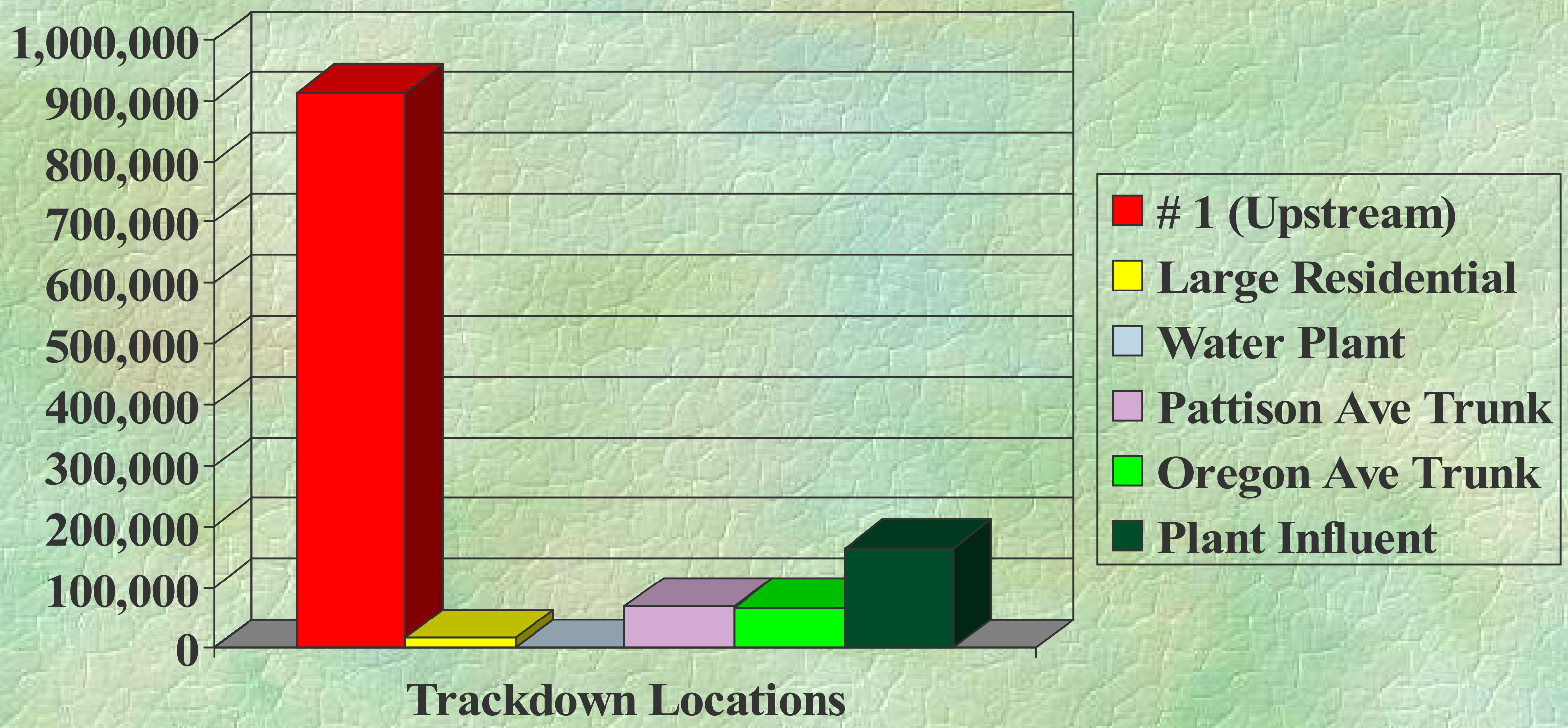
PCB Loadings in Shed as a % age of Plant Influent Load



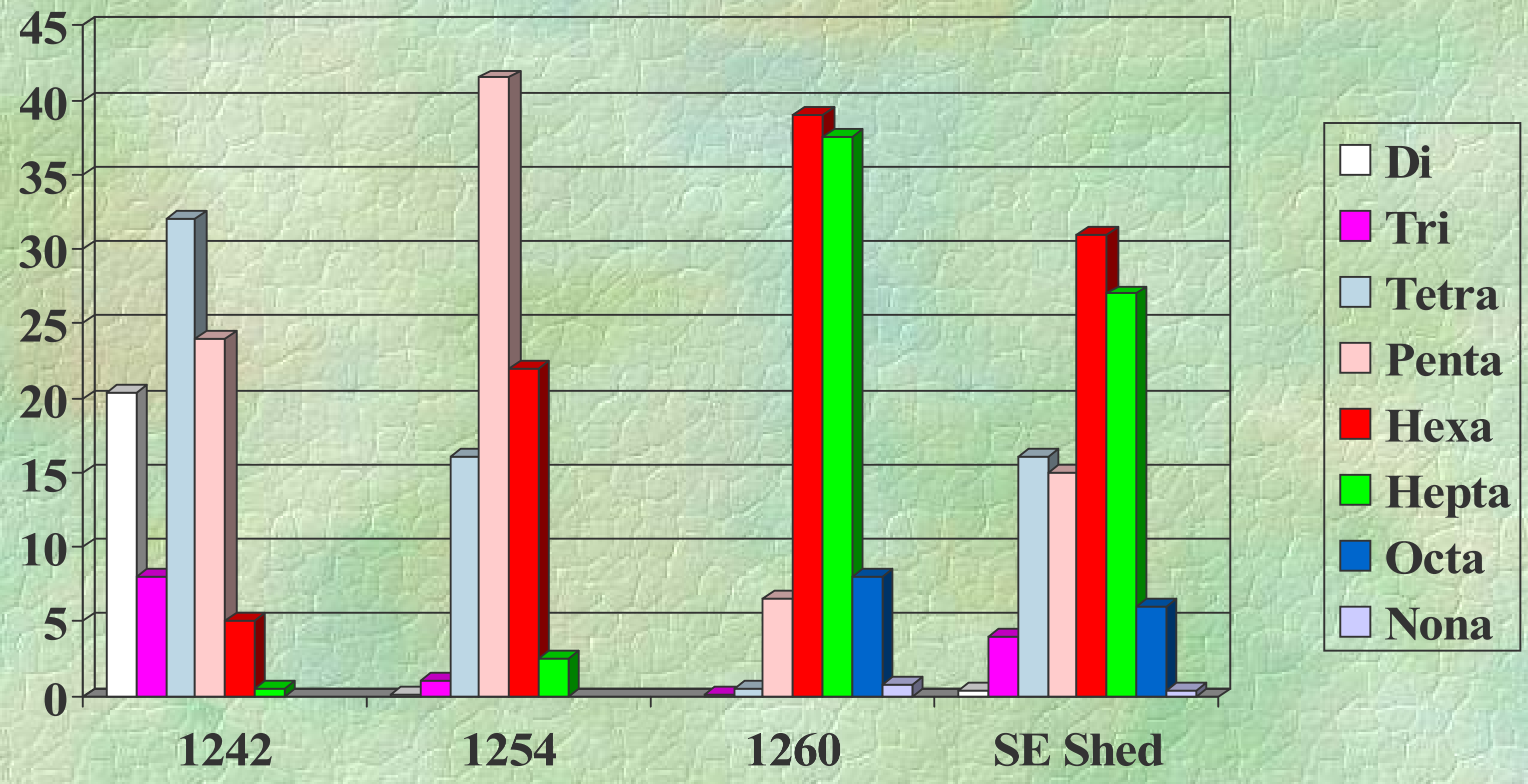
PCB Loadings in Shed as a % age of Plant Infl. Load w/o # 3



PCB Concentrations (pg/l) at other locations within Sewershed



Aroclor Comparison
% for each Homolog



Sewershed Trackdown
(cont'd)

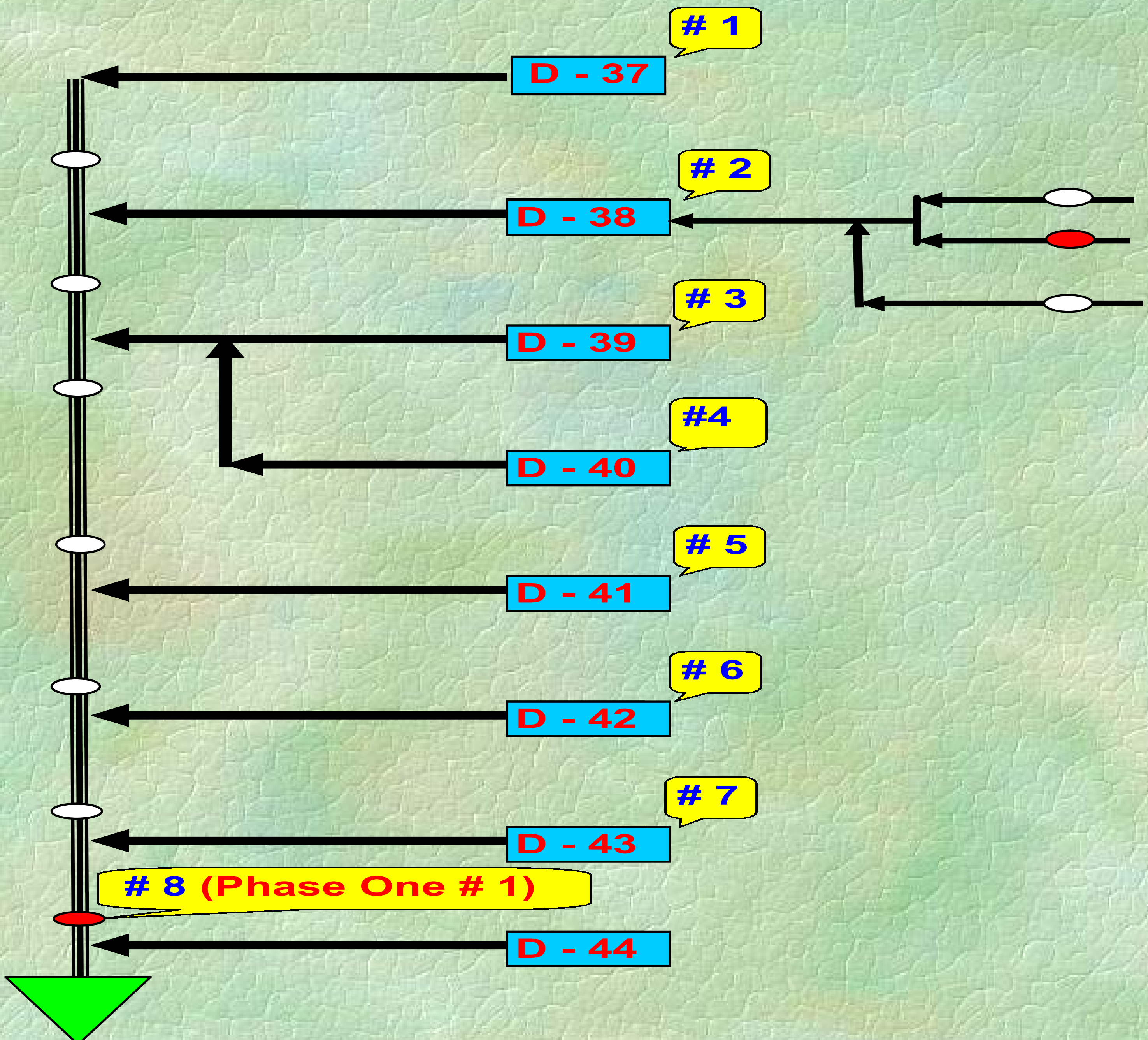
- Observations/Comments
  - Schuylkill River (at average flow) is not a significant PCB contributor to shed via water plant
  - Two minor interceptors located near Southeast Plant are not significant PCB contributors
  - Large residential/retail shed is not a significant PCB contributor

Sewershed Trackdown
(cont'd)

- Over 150 percent of plant influent PCB load appears to originate from source(s) affecting sample location # 1 - a distance of five miles from Southeast Plant
- The 1994 illegal discharge was upstream of sample location # 1
- Aroclor type at sample location # 1 is similar to 1994 discharge

Sewershed Trackdown
(cont'd)

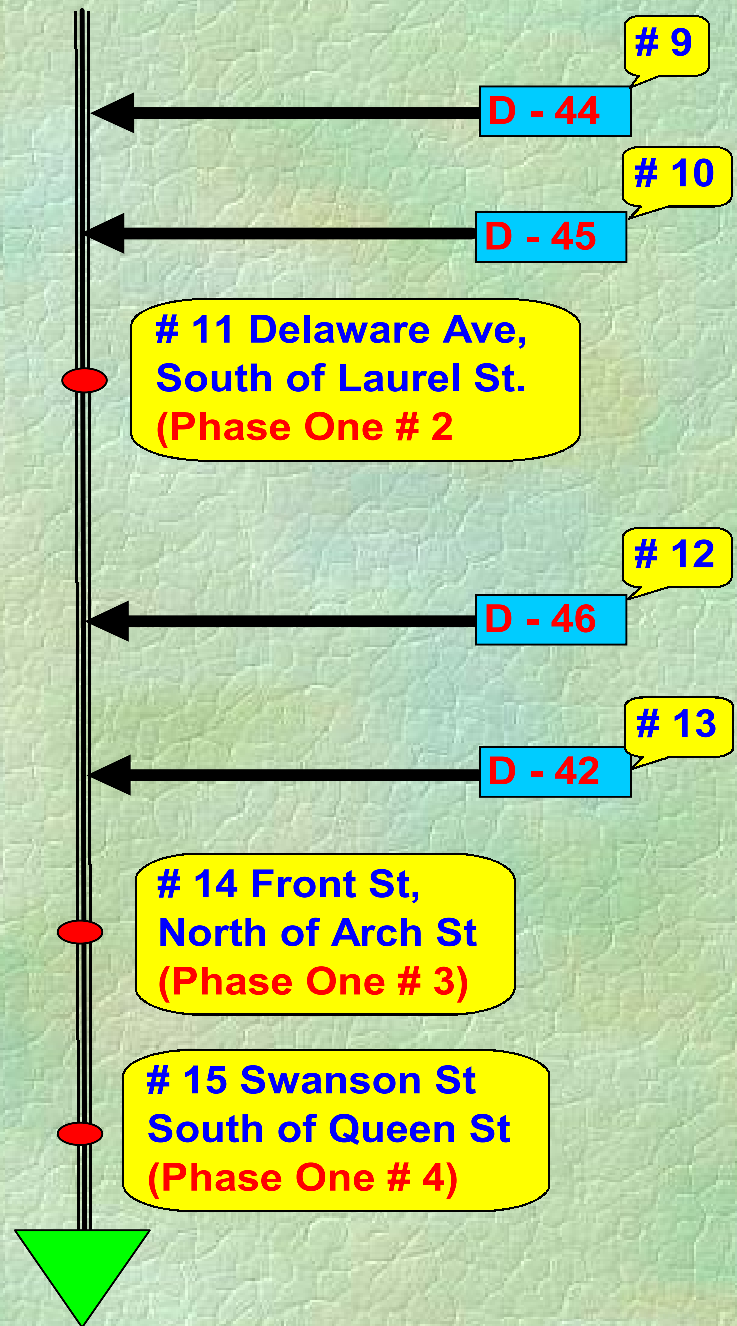
- Initial upstream sampling site (# 1) needs further study (Phase 2)
  - Determine if PCB source is from 1 or more trunk sewers contributing flow ahead of site # 1 or from the sediment in the intercepting sewer
  - Sample during a storm event
  - Use analytical method 8082



1
D - 37
2
D - 38
3
D - 39
#4
D - 40
5
D - 41
6
D - 42
7
D - 43
8 (Phase One # 1)
D - 44

Sewershed Trackdown
(cont'd)

- High PCB concentration near Arch Street nears further study (Phase 2)
  - Conc. increases 5 fold from upstream sample
  - But then immediately decreases 6 fold in next downstream sample
  - Sample may be an aberration or may be due to some resuspension/resettling of sewer sediment phenomena or ??
  - Ultimate importance of site as a significant contributor to plant influent loading is not certain
  - Resample during a storm event using analytical method 8082



9
D - 44
10
D - 45
11 Delaware Ave,
South of Laurel St.
(Phase One # 2
12
D - 46
13
D - 42
14 Front St,
North of Arch St
(Phase One # 3)
15 Swanson St
South of Queen St
(Phase One # 4)

Analytical Methods

	1668a	8082
Sensitivity (per congener)	10 to 100 pg/l	100 to 1000 pg/l
Accuracy	+/- 25 %	+/- 50 %
Contamination	Often below Background levels	Often above Background levels
Cost per sample (approx.)	$ 1500	$ 300

Sewershed Trackdown
(cont'd)

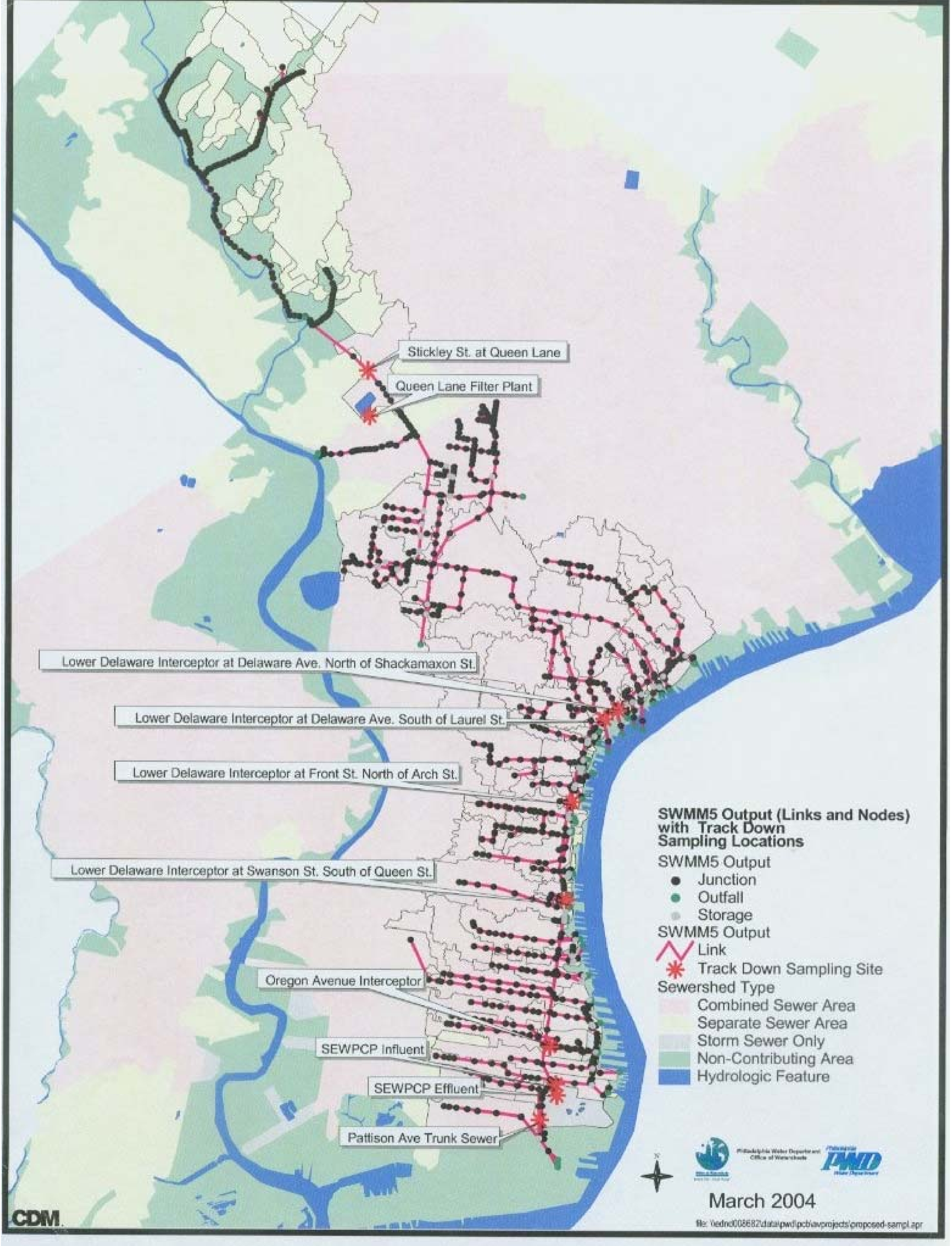
- Sources identified via sewer trackdown
  - Assign GIS coordinates
  - IWU to visit sites and attempt to obtain information regarding source of PCBs
  - Identify potential minimization strategies
  - Confer with regulatory agencies regarding future strategy

Sewershed Trackdown
(cont'd)

- Known spills and contaminated sites
  - Develop list from requested agencies
  - Assign GIS coordinates
  - Populate a database with available information
  - IWU to visit sites and determine if there is any reason to expect that site may be an significant source
  - If so, consider taking samples of runoff or soil and analyze for PCBs
  - Confer with regulatory agencies regarding future strategy

PMP
Trackdown
Southeast Plant
Phase 1
Data Results

Location	Tot PCB Concentration (pg/l)	Estimated Flow at Time of Sampling (MGD)
Stokley Street above Queen Lane Plant	16,914	
Queen Lane Plant Discharge	1,418	
Delaware Avenue North of Shackamaxon Street	913,510	72
Delaware Avenue South of Laurel Street	395,270	205
Front Street North of Arch Street	5,018,911	240
Swanson Street South of Queen Street	323,000	265
Swanson Street South of Moore	167,405	220
SEWPCF Influent	165,252	240
SEWPCF Effluent	47,611	240
Oregon Ave. Interceptor	66,935	
Pattison Ave. Trunk Sewer	68,517	


Stickley St. at Queen Lane
Queen Lane Filter Plant
Lower Delaware Interceptor at Delaware Ave. North of Shackamaxon St.
Lower Delaware Interceptor at Delaware Ave. South of Laurel St.
Lower Delaware Interceptor at Front St. North of Arch St.
Lower Delaware Interceptor at Swanson St. South of Queen St.
Oregon Avenue Interceptor
SEWPCP Influent
SEWPCP Effluent
Pattison Ave Trunk Sewer
SWMM5 Output (Links and Nodes) with Track Down Sampling Locations
SWMM5 Output
Junction
Outfall
Storage
SWMM5 Output
Link
Track Down Sampling Site
Sewershed Type
Combined Sewer Area
Separate Sewer Area
Storm Sewer Only
Non-Contributing Area
Hydrologic Feature
N
Philadelphia Water Department
Office of Watersheds
PWD
March 2004
CDM

SAMPLING AND ANALYSIS PLAN FOR POLYCHLORINATED BIPHENYL CONGENER TRACKDOWN PHASE 1 SOUTHEAST WATER POLLUTION CONTROL PLANT

Revised August 8, 2002

PHILADELPHIA WATER DEPARTMENT

Project Manager: Bruce Aptowicz ______________________________

Quality Assurance Officer: Thomas Healey

____

Date of Request:

Date of Project Duration:

TABLE OF CONTENTS

BLS sample chain of custody form

1 INTRODUCTION

The Delaware River Basin Commission and the Environmental Protection Agency requested that large POTWs discharging to the Delaware River participate in a sewershed PCB trackdown study to find significant sources of 141 congeners in the PCB family. To that end, a PCB trackdown committee has been formed to carry out this objective. For Philadelphia Water Department's (PWD) part, we have selected our Southeast Water Pollution Control Plant (SEWPCP) sewershed and sampling points within two major interceptors so as to narrow future trunk sewer investigative work. All samples will be submitted to the contract lab for 1668a PCB congener analysis and for total suspended solids using method 160.2. While results will be expressed on a concentration basis, an attempt will be made to derive an estimate of the flow at each sampling point to calculate mass loadings at those sampling locations.

Since the direction of this program is dependent upon preceding results, we will conduct this effort in phases, with the details of each phase dependent upon the results of the prior phase. The first phase will consist of wet weather samplings using grab sample techniques. Wet Weather sampling has been selected for the first phase because dry weather samplings at the PWD's POTW effluents has demonstrated no measurable amounts of PCBs present. Current biosolids data, together with plant effluent data, leads us to conclude that the bulk of the spilled PCBs have been flushed out (or physically removed by contract) of the sewer system. Therefore, loadings into the plant during dry weather are insufficient to result in detectable concentrations in the effluent. Since it is reasonable to assume that wet weather samples will contain the dry weather loading, the potential to track down the dry weather loading from wet weather samples exists. After reviewing the wet weather data, if having dry weather samples would be important to the cause, they can be done as part of phase 2.

Details regarding the analytical methodology are provided in the document titled "Quality Assurance Project Plan, Polychlorinated Biphenyl Congener Characterization" which was prepared for the Coalition of Industrial and Municipal Dischargers. A copy of this plan is located in the Philadelphia Water Department's Industrial Waste Unit offices, which are at 1101 Market Street, 4th Floor, Philadelphia, PA 19107.

2 PROJECT MANAGEMENT

The project management structure is indicated in Table 1.

Table 1. Roles and Responsibilities of Key Project Individuals

Key individual	Title	Phone	Responsibility
Bruce Aptowicz Philadelphia Water Dept.	Deputy Director Operations Division	215- 685-6205	Provide overall pro- ject coordination
Thomas Healey Philadelphia Water Dept.	Manager, Industrial Waste Unit Operations Division	215-685-6233	Verify the proper collection of wastewater samples, verify proper post sampling activities
Earl Peterkin Philadelphia Water Dept.	Manager, Trace Organics Lab Bureau of Laboratory Services	215-685-1439	Oversees cleaning of all equipment, sample receipt, preservation, proper storage and shipping of all samples to the contract laboratory. Reviews field logs
Dennis Blair Philadelphia Water Dept	Manager, Planning and Engineering Unit Engineering Division	215-685-6139	Oversee all data interpretation, estimate mass loadings from point to point,provide estimates of flow at each location

3 SAMPLING ACTIVITIES

3.1 SAMPLING LOCATIONS

3.1.1 PRIMARY LOCATIONS

Six locations in the Lower Delaware Low Level Interceptor will be sampled. Two other locations: the Oregon Avenue interceptor (which contains several discrete trunk sewer systems) and the Pattison Avenue trunk sewer system will be sampled in a similar fashion to the six main interceptor locations. The combined locations represent 100% of the flow being received at SEWPCP. Table 2 contains these locations

3.1.2 SECONDARY LOCATIONS

Other sampling locations will include sewage passing the Stokley St and Queen Lane intersection. Also, a sample of Schuylkill River solids entering the chemical treatment process at PWD's Queen Lane Filter Plant while operating under high turbid river conditions. High turbid conditions are defined as when the turbidity at the raw water basin effluent exceeds 8 ntus.

A SEWPCP influent and effluent composite type sample will be collected

3.2 DRY WEATHER SAMPLING (RESERVED)

3.3 WET WEATHER SAMPLING

3.3.1 SCHEME

A sample run start will be confined to a qualifying rain event that only occurs as a frontal system. A qualifying rain event is one which equal or exceeds .1 inch and whose duration is at least one hour and where there has bee no preceding rainfall within 72 hours of .01 inches or greater.

Sampling shall begin at the locations described in Table 2 immediately upon the above criteria being achieved. Two grab samples shall be taken 20 minutes apart at each location to catch the rising hydrograph that is occurring in the sewer. Before samplings are composited and submitted for analysis, there shall be a determination of the rising hydrograph at the SEWPCP influent made and adjusted for the travel time for each location. This confirmation assures that the grabs taken at each of the 6 locations occur on a rising hydrograph of the storm event. Sampling will start at the top of the system so as to follow the same sewerage down the collector as it picks up additional flows from the trunked sewers. The two grabs from the interceptor (and the plant influent) locations will be combined in equal proportions with one another at the PWD's Bureau of Laboratory Services (BLS) at Hunting Park and Castor Avenue, Philadelphia

3.3.2 SAMPLING DETAIL

- The PWD industrial waste unit (IWU) will conduct sampling. All sampling procedures will be conducted in accordance with the protocols detailed in this section.
- Dedicated, precleaned equipment will be used for each sampling location. Each sample container will consist of a food grade pint mason jar that has undergone an ultra cleaning at our central laboratory. The samplings will be transferred immediately to I-chem ultraclean bottle. No mason jars will be reused.
- Personnel handling the samples will wear a new pair of disposable powder-free surgical gloves with each sample collected.
- Sewage will be retrieved from the interceptors at manholes using nylon twine affixed to a new, precleaned one-pint mason jar. For those interceptor samples, a dedicated precleaned mason jar will be lowered by nylon twine from the top of the manhole to the top of the sewage flow several times to retrieve sufficient volume to fill one liter ultraclean I-chem bottle. The filled I-chem bottle will be stored in a cooler, which will contain ice.
- The Mason jar samples will be poured off into one liter I-chem bottles provided by the central laboratory and composited at the central laboratory.
- A separate sample for total suspended solids (TSS) will be collected at each location sampled. Each sample will consist of a one-liter sample at the locations listed above.
- The influent, effluent and Queen Lane Filter Plant raw water basin effluent samples will consist of two one liter samples so as to perform both total PCB congener analysis and a suspended solids analysis.
- The PWD Bureau of Laboratory Services (BLS) will provide all clean glassware, store samples and undertake shipment

when a contract laboratory purchase order is in place. BLS will conduct analyses for TSS.

- The contract laboratory will undertake all analyses except TSS. They will supply deionized water, ice coolers and shipping to and from BLS. This water shall be used for all blanks. One liter blank will be collected at each sample location from the rinseates of the mason jar used to retrieve that sample. One of the blanks will be sent on to the contract laboratory. All other blanks will be stored at BLS and their disposition will be dependent on the results of all samples.
- All samples will be transported to the central lab under ice. For each location, BLS will combine the two grab samples. The two grab samples will be combined by gently shaking/swirling the contents of each, and then immediately pour the contents of each into a laboratory prepared sample container. The combined sample will be identified as the respective manhole/plant sample.

Table 2. Location, type and frequency of samples to be taken

Sampling location I.D.	Location	Approximate time of sample	Type	Ratio of combining sample
1	Delaware Ave. north of Shackamaxon St.	One hour after start of storm and second sample 20 minutes later	grab	1 to 1
2	Delaware Ave. south of Laurel St.	Loc. 1 plus 30 minutes and second sample 20 minutes later	grab	1 to 1
3	Front St. north of Arch St.	Loc. 2 plus 30 minutes and second sample 20 minutes later	grab	1 to 1

4	**Swanson St. south of Queen St.**	**Loc. 3 plus 30 minutes and second sample 20 minutes later**	**grab**	**1 to 1**
5	**Swanson St. south of Moore**	**Loc. 4 plus 30 minutes and second sample 20 minutes later**	**grab**	**1 to 1**
6	**SEWPCP Influent**	**Loc. 5 plus 30 minutes and every 30 minutes thereafter**	**8 hour composite every 30 minutes**	
A	**Stokley At. (at Queen Lane)**	**At the onset of a significant rain**	**grab**	**One grab**
B	**Queen Lane Filter Plant raw water basin effluent (QLFP)**	**during high turbidity(>,= 8 ntus)**	**8 hour composite every 30 minutes**	
C	**Oregon Ave. Interceptor on Oregon Ave. east of Swanson St.**	**Simultaneous to Loc. 5 and second sample 20 minutes later**	**grab**	**1 to 1**
D	**Pattison Ave. trunk sewer return line along the plant fenceline**	**Simultaneous to Loc. 5 and second sample 20 minutes later**	**grab**	**1 to 1**
E	**SEWPCP Effluent**	Location 6 plus 2 hours and every 30 minutes thereafter	**8 hour composite every 30 minutes**	

3.4 EQUIPMENT AND MATERIALS

- 60 unused food grade two part metal top one pint mason jar
- 2 large volume glass jugs
- 18 liter I-CHEM series 300 amber bottles
- Disposable surgical gloves
- glass funnels (wide mouth for narrow mouth 1 liter bottle)
- Ice
- 30 gallon polyethylene bags
- Nylon twine spool
- Ice coolers and shipping (to be provided by contract lab)
- hexane
- methanol
- 3 isco composite samplers w Teflon lined tubing
- deionized water from contract lab
- non-phosphate detergent

3.5 EQUIPMENT CLEANING

Trace level PCB detection limits needed for this program warrant clean sampling procedures to minimize contamination during sample collection. Dedicated equipment will be used whenever possible. Field sampling equipment, if reused, will be cleaned as follows:

- non-phosphate detergent wash
- tap water rinse
- distilled/deionized water rinse
- hexane rinse (pesticide quality or better)
- air dry
- distilled/deionized water rinse.

3.6 QC REQUIREMENTS

3.6.1 BLANKS

One equipment blank that consists of the rinseate from the mason jar supply will be collected and submitted for analysis with the investigative samples.

Deionized water supplied by the contract laboratory will be used as a field equipment rinseate blank**.**

3.6.2 SAMPLE CUSTODY AND DOCUMENT CONTROL

3.6.2.1 FIELD LOG BOOK

In the field, the sampler will record the following information in the field log book (bound) for each sample collected:

- sample matrix
- name of sampler
- sample source
- time and date
- pertinent data
- analysis to be conducted
- sampling method
- appearance of each sample (i.e., color)
- preservation added
- number of sample bottles collected
- pertinent weather data
- precipitation and hydrographic flow data for rain events
- any other significant observations.

Each field logbook page will be signed by the sampler. BLS will review field logbooks for completeness.

3.6.2.2 SAMPLE LABELS

A unique sample numbering system will be used to identify each collected sample. See table 2.0. This system will provide a tracking number to allow retrieval and cross-referencing of sample information. Samples will be described/labeled as:

SEWPCP Collector-DRBC/EPA PCB TRACKDOWN AND MANHOLE LOCATION
Monitoring-date and time: Example for SEWPCP sample. SE-PCB-trackdown-wet Weather- May X, 2002 1300-A,B,C………………..
The time is that of the second of the two grabs at the location.

3.6.2.3 CHAIN-OF-CUSTODY FORMS

PWD-BLS laboratory services/Laboratory request form # 79-771 (chain of custody form) will be completed for all samples collected during the program. Additionally, chain of custody from the contract laboratory will be used to document sample handling from BLS to the contract laboratory. See Attachment for sample chain of custody form used by PWD.

4 SAMPLE ANALYSIS

4.1 SAMPLE PREPARATION BY BUREAU OF LABORATORY SERVICES (BLS)

The two grabs will be combined 50/50 by volume as follows: gently mix/swirl the contents of each 1liter I-chem jar to insure the sample is homogenized except for the larger volume SEWPCP influent, effluent and QL raw water basin composite samples.

Using dedicated pre-cleaned glass funnels transfer the appropriate sample from the 1-liter I-chem bottles to the appropriate 1-liter, I-Chem series 300 amber glass bottle as follows
:

1- 1 liter each of sewage at locations C,D, 1,2,3,4, and 5

2-1liter plant <u>effluent sample(location E)</u>

2-1 liter plant <u>influent sample(location 6)</u>

2-1 liter raw water basin sample (location B)

1-1 liter of field/equipment rinseate blank,
1-1 liter of <u>reagent blank</u>(to be stored indefinitely)

Samples will be stored between 0 and 4^{o} C.

Samples will be logged into LIMS and assigned LIMS numbers.

4.2 ANALYTICAL METHODS

All samples collected will be sent to a contract lab chosen by the DRBC.

All samples will be analyzed by the contract lab using the more sensitive DRAFT EPA Method 1668a – Chlorinated Biphenyl Congeners in Water, Soil, Sediment and Tissue by High Resolution Gas Chromatography/High Resolution Mass Spectrometry. Additionally, all samples will be analyzed for Total Suspended Solids using EPA Method 160.2.

5 DATA ANALYSIS

The PCB monitoring data may provide us with a valuable tool in targeting potential sources within the Southeast WPCP drainage district. The PCB source contribution from each of the drainage areas feeding the interceptor between monitoring points will be determined by examining the data

This evaluation will enable us to identify any potential large influx of PCBs. Also the results of the PCB monitoring will be graphically represented by percentage of homolog group found at each monitoring location as well as by congener type. This interpretation hopefully will assist us in trying to fingerprint any mass produced PCB source. In addition, a mass balance analysis of solids and PCBs will be performed on a system wide basis. This will involve using estimated flows and solids concentration data from the sewers leading to Southeast.

TSS data will be used to characterize the sample as representative of wet weather influenced sewage and to perform a mass solids (TSS) balance on in-sewer loadings as compared to influent loadings as measured at the plant influent.

APPENDIXES

Map of sampling sites for Southeast Water Pollution Plant sewershed.

Sample BLS chain of custody form

Proposed Trackdown Studies

As discussed in the referenced PowerPoint presentation, a Phase 2 trackdown study is recommended to attempt determine the cause of elevated levels of PCBs at two locations sampled in Phase 1.

The first location is called the Lower Delaware Interceptor at Delaware Ave, North of Shackamaxon Street. The results from the PCB analysis at this location was deemed significant since the total PCB loading at this location was about 150% of the plant's influent loading. However, the sample location was about five miles upstream from the plant. There are seven trunk sewers which enter the Lower Delaware Interceptor above the Delaware Ave North of Shackamaxon Street sampling location. In Phase 2, the plan calls for the sampling of each trunk sewer, as each passes through a combined overflow chamber. Additionally, we intend to resample the original sampling location in the interceptor itself. A diagram, entitled *"Southeast Water Pollution Control Plant, PCB Trackdown Program, Phase 2.a",* depicting the interceptor, trunk sewers and the planned sampling locations is attached to this section

The second location is called Lower Delaware Interceptor at Front Street, North of Arch Street. The results from the PCB analysis at this location was deemed significant since the total PCB concentration at this location was about ten times higher than the total PCB concentration at the nearest upstream sampling location at Delaware Ave., South of Laurel St. There are two trunk sewers which enter the Lower Delaware Interceptor between the original sampling points at Delaware Ave., South of Laurel St. and Front Street, North of Arch Street. In Phase 2, the plan calls for the sampling of each trunk sewer, as each passes through a combined overflow chamber. Additionally, we intend to resample the two original sampling locations in the interceptor itself as well as the next downstream Phase 1 sampling location at Swanson Street, South of Queen St. In order to complete the sampling of all trunk sewers in the area, we will also sample the remaining two unsampled trunk sewers upstream of Delaware Ave., South of Laurel St. It was noted, as an outcome of the Phase 1 review, that the total PCB concentration in the interceptor dropped back to below upstream concentrations once the sewerage passed the Arch Street location, so the overall impact on the environment of the dramatic concentration increase is unclear. However, we believe that the conditions merit further investigation. A diagram, entitled *"Southeast Water Pollution Control Plant, PCB Trackdown Program, Phase 2.b",* depicting the interceptor, trunk sewers and the planned sampling locations is attached to this section.

A description of the proposed sampling and analytical methods planned for the Phase 2 project are identified in the following package entitled “*Sampling and Analysis Plan for Polychlorinated Biphenly Congener Trackdown, Phase 2, Southeast Water Pollution Control Plant”*.

It is PWD’s expectations that, assuming approval of the PMP before the Spring of 2006, we will conduct the Phase 2 sampling effort in 2006. Any further investigations, i.e. Phase 3, will be dependent upon the results of the Phase 2 program.

PWD’s objective in conducting this trackdown program is to identify significant sources of PCBs in the sewer shed and to implement reasonable cost effective measures to mitigate the source. Since we are at the initial stage in the investigation, it is unclear as to what sources may be uncovered and, therefore, what might the nature of each source. Clearly, the nature of a source is relevant in considering what legal and physical options are available to PWD in achieving our goal. However, PWD will consult with PaDEP and other regulators in making this determination.

SAMPLING AND ANALYSIS PLAN FOR POLYCHLORINATED BIPHENYL CONGENER TRACKDOWN PHASE 2 SOUTHEAST WATER POLLUTION CONTROL PLANT

Revised September 30, 2005

PHILADELPHIA WATER DEPARTMENT

Project Manager: **Bruce Aptowicz** ______________________________

TABLE OF CONTENTS

1 INTRODUCTION

The Pennsylvania Department of Environmental Protection requires, as a component of a PCB Pollutant Minimization Plan (PCB PMP) that large POTWs discharging to the Delaware River engage in a sewershed PCB trackdown study to find significant sources of 209 congeners in the PCB family. To that end, a PCB trackdown committee has been formed to carry out this objective. This Sampling and Analysis Plan addresses the Phase 2 activities of the trackdown for PWD's Southeast Water Pollution Control Plant (SEWPCP) sewershed.

All samples will be submitted to the contract lab for Method 8082 PCB congener analysis and for total suspended solids using method 160.2. An attempt will be made to estimate the flow at each sampling point to calculate mass loadings at those sampling locations.

Phase 1 of this trackdown consisted of wet weather samplings using grab sample techniques. Wet Weather sampling was selected for the first phase because dry weather samplings at the PWD's POTW effluents had demonstrated very low amounts of PCBs present. Current biosolids data, together with plant effluent data, leads us to conclude that the bulk of the spilled PCBs have been flushed out (or physically removed by contract) of the sewer system. Therefore, loadings into the plant during dry weather are insufficient to result in detectable concentrations in the effluent. Since it is reasonable to assume that wet weather samples will contain the dry weather loading, the potential to track down the dry weather loading from wet weather samples exists. Phase 2 sampling will also consist of wet weather sampling using grab sample techniques.

Phase 2 will attempt to determine the cause of elevated levels of PCBs at two locations sampled in Phase 1. The first location is called the Lower Delaware Low Level Interceptor at Delaware Avenue north of Shackamaxon Street. The results from the PCB analysis at this location were deemed significant since the total PCB loading at this location was about 150% of the plant's influent loading. However, the sample location was about five miles upstream from the plant. The second location is called Lower Delaware Interceptor at Front Street North of Arch Street. The results from the PCB analysis at this location were deemed significant since the total PCB concentration at this location was about ten times higher than the total PCB concentration at the nearest upstream sampling location.

Regarding the analytical methodology, we will be using DRBC's analytical protocol described on their web site.

2 PROJECT MANAGEMENT

The project management structure is indicated in Table 1.

Table 1. Roles and Responsibilities of Key Project Personnel

Key individual	Title	Phone	Responsibility
Bruce Aptowicz	Deputy Director Operations Division	215- 685-6205	Provide overall project coordination
Keith Houck	Assistant Manager, Industrial Waste Unit	215-685-4910	Verify the proper collection of wastewater samples, verify proper post sampling activities
Earl Peterkin	Manager, Trace Organics Lab Bureau of Laboratory Services	215-685-1439	Oversee cleaning of all equipment, sample receipt, preservation, proper storage and shipping of all samples to the contract laboratory. Review field logs
William McKeon	Manager, Wastewater Treatment Plants	215-685-6258	Oversee all sampling from within the wastewater plants. Interpret significance of plant sample results
Chris Crockett	Manager, Office of Watersheds	215-685-6334	Oversee all input regarding collector system flow analysis. Interpret data from collection system samples.
Drew Mihocko	Manager, Collection System	215-685-6203	Provide input regarding physical details of the collection system.

3 SAMPLING ACTIVITIES

3.1 SAMPLING LOCATIONS

3.1.1 PRIMARY LOCATIONS

Fifteen locations in the Lower Delaware Low Level Interceptor will be sampled. Table 2 lists these locations.

3.2 DRY WEATHER SAMPLING (RESERVED)

3.3 WET WEATHER SAMPLING

3.3.1 SCHEME

A sample run start will be confined to a qualifying rain event that only occurs as a frontal system. A qualifying rain event is one which equal or exceeds 0.1 inch and whose duration is at least one hour and where there has been no preceding rainfall within 72 hours of 0.01 inches or greater.

Before sampling occurs, there shall be an estimate of the travel time for each location. By attempting to collect the downstream samples according to their estimated time of travel, we will increase the likelihood that the grabs taken at each of the 15 locations occur on a rising hydrograph of the storm event.

Sampling shall begin at the locations described in Table 2 immediately upon the above criteria being achieved. Two grab samples shall be taken 20 minutes apart at each location to catch the rising hydrograph that is occurring in the sewer. Sampling will start at the top of the system so as to follow the same sewerage down the collector as it picks up additional flows from the trunked sewers. The two grabs from the interceptor (and the plant influent) locations will be combined in equal proportions with one another at the PWD's Bureau of Laboratory Services (BLS) at Hunting Park and Castor Avenues, Philadelphia.

3.3.2 SAMPLING DETAIL

- The PWD industrial waste unit (IWU) will conduct sampling. All sampling procedures will be conducted in accordance with the protocols detailed in this section.
- Dedicated, precleaned equipment will be used for each sampling location. Each sample container will consist of a food grade pint mason jar that has undergone an ultra cleaning at our central laboratory. The samplings will be transferred immediately to I-chem ultraclean bottle. No mason jars will be reused.
- Personnel handling the samples will wear a new pair of disposable powder-free surgical gloves with each sample collected.
- Sewage will be retrieved from the interceptors at manholes using nylon twine affixed to a new, precleaned one-pint mason jar. For those interceptor samples, a dedicated precleaned mason jar will be lowered by nylon twine from the top of the manhole to the top of the sewage flow several times to retrieve sufficient volume to fill one liter ultraclean I-chem bottle. The filled I-chem bottle will be stored in a cooler, which will contain ice.
- A second one liter ultraclean I-chem bottle will be filled 20 minutes after the collection of the first sample, using the same sampling technique. The filled I-chem bottle will be stored in a cooler, which will contain ice.
- A separate sample for total suspended solids (TSS) will be collected at each location sampled. Each sample will consist of a one-liter sample at the locations listed above.

- The PWD Bureau of Laboratory Services (BLS) will provide all clean glassware, store samples and undertake shipment when a contract laboratory purchase order is in place. BLS will conduct analyses for TSS.
- The contract laboratory will undertake all analyses except TSS. They will supply deionized water, ice coolers and shipping to and from BLS. This water shall be used for all blanks. One liter blank will be collected at each sample location from the rinseates of the mason jar used to retrieve that sample. One of the blanks will be sent on to the contract laboratory. All other blanks will be stored at BLS and their disposition will be dependent on the results of all samples.
- All samples will be transported to the central lab under ice. For each location, BLS will combine the two grab samples. The two grab samples will be combined by gently shaking/swirling the contents of each, and then immediately pour the contents of each into a laboratory prepared sample container. The combined sample will be identified as the respective manhole/plant sample.

Table 2. Location, timing and types of samples to be taken

Sampling location I.D.	Location	Approximate time of sample*	Type	Ratio of combining samples
1	Dry Weather Overflow Pipe in the Combined Sewer Overflow Chamber at D-37	tbd*	2 grab samples	1 to 1
2	Dry Weather Overflow Pipe in the Combined Sewer Overflow Chamber at D-38	tbd	2 grab samples	1 to 1
3	Dry Weather Overflow Pipe in the Combined Sewer Overflow Chamber at D-39	tbd	2 grab samples	1 to 1
4	Dry Weather Overflow Pipe in the Combined Sewer Overflow Chamber at D-40	tbd	2 grab samples	1 to 1
5	Dry Weather Overflow Pipe in the Combined Sewer Overflow Chamber at D-41	tbd	2 grab samples	1 to 1
6	Dry Weather Overflow Pipe in the Combined Sewer Overflow Chamber at D-42	tbd	2 grab samples	1 to 1
7	Dry Weather Overflow Pipe in the Combined Sewer Overflow Chamber at D-43	tbd	2 grab samples	1 to 1
8	Lower Delaware Low Level Interceptor at Delaware Ave. north of Shackamaxon St.	tbd	2 grab samples	1 to 1
9	Dry Weather Overflow Pipe in the Combined Sewer Overflow Chamber at D-44	tbd	2 grab samples	1 to 1
10	Dry Weather Overflow Pipe in the Combined Sewer Overflow Chamber at D-45	tbd	2 grab samples	1 to 1
11	Lower Delaware Low Level Interceptor at Delaware Ave. south of Laurel St.	tbd	2 grab	1 to 1
12	Dry Weather Overflow Pipe in the Combined Sewer Overflow Chamber at D-46	tbd	2 grab samples	1 to 1
13	Dry Weather Overflow Pipe in the Combined Sewer Overflow Chamber at D-47	tbd	2 grab samples	1 to 1
14	Lower Delaware Low Level Interceptor at Front St. north of Arch St.	tbd	2 grab samples	1 to 1
15	Lower Delaware Low Level Interceptor at Swanson St. south of Queen St.	tbd	2 grab samples	1 to 1

* To be determined

3.4 EQUIPMENT AND MATERIALS

- 60 unused food grade two part metal top one pint mason jar
- 2 large volume glass jugs
- 18 liter I-CHEM series 300 amber bottles
- Disposable surgical gloves
- glass funnels (wide mouth for narrow mouth 1 liter bottle)
- Ice
- 30 gallon polyethylene bags
- Nylon twine spool
- Ice coolers and shipping (to be provided by contract lab)
- hexane
- methanol
- 3 isco composite samplers w Teflon lined tubing
- deionized water from contract lab
- non-phosphate detergent

3.5 EQUIPMENT CLEANING

Trace level PCB detection limits needed for this program warrant clean sampling procedures to minimize contamination during sample collection. Dedicated equipment will be used whenever possible. Field sampling equipment, if reused, will be cleaned as follows:

- non-phosphate detergent wash
- tap water rinse
- distilled/deionized water rinse
- hexane rinse (pesticide quality or better)
- air dry
- distilled/deionized water rinse.

3.6 QC REQUIREMENTS

3.6.1 BLANKS

One equipment blank that consists of the rinseate from the mason jar supply will be collected and submitted for analysis with the investigative samples.

Deionized water supplied by the contract laboratory will be used as a field equipment rinseate blank**.**

3.6.2 SAMPLE CUSTODY AND DOCUMENT CONTROL

3.6.2.1 FIELD LOG BOOK

In the field, the sampler will record the following information in the field log book (bound) for each sample collected:

- sample matrix
- name of sampler
- sample source
- time and date
- pertinent data
- analysis to be conducted
- sampling method
- appearance of each sample (i.e., color)
- preservation added
- number of sample bottles collected
- pertinent weather data
- precipitation and hydrographic flow data for rain events
- any other significant observations.

Each field logbook page will be signed by the sampler. BLS will review field logbooks for completeness.

3.6.2.2 SAMPLE LABELS

A unique sample numbering system will be used to identify each collected sample. See table 2.0. This system will provide a tracking number to allow retrieval and cross-referencing of sample information. Samples will be described/labeled as:

SEWPCP PHASE 2 Collector-DRBC/EPA PCB TRACKDOWN AND MANHOLE LOCATION

Monitoring-date and time: Example for SEWPCP sample. SE-PCB-trackdown-wet Weather- May X, 2006 1300-A,B,C………………..

The time is that of the second of the two grabs at the location.

3.6.2.3 CHAIN-OF-CUSTODY FORMS

PWD-BLS laboratory services/Laboratory request form # 79-771 (chain of custody form) will be completed for all samples collected during the program. Additionally, chain of custody from the contract laboratory will be used to document sample handling from BLS to the contract laboratory. See Attachment for sample chain of custody form used by PWD.

4 SAMPLE ANALYSIS

4.1 SAMPLE PREPARATION BY BUREAU OF LABORATORY SERVICES (BLS)

The two grabs will be combined 50/50 by volume as follows: gently mix/swirl the contents of each 1liter I-chem jar to insure the sample is homogenized.

Using dedicated pre-cleaned glass funnels transfer the appropriate sample from the 1-liter I-chem bottles to the appropriate 1-liter, I-Chem series 300 amber glass bottle as follows:

1- 1 liter each of sewage at locations 1 to 15
1-1 liter of field/equipment rinseate blank,
1-1 liter of reagent blank (to be stored indefinitely)

Samples will be stored between 0 and 4^{o} C.

Samples will be logged into LIMS and assigned LIMS numbers.

4.2 ANALYTICAL METHODS

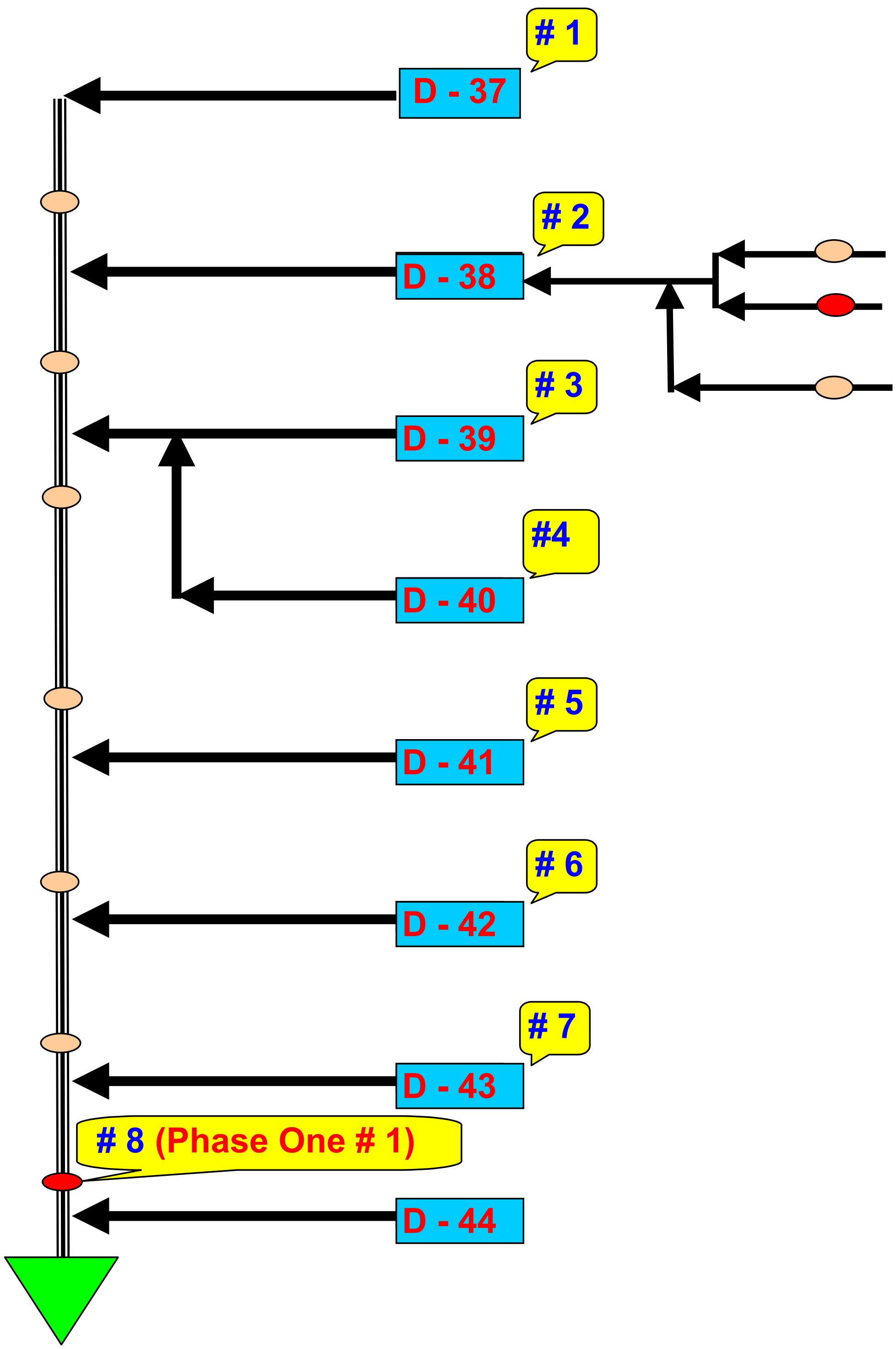
All samples will be analyzed by the contract lab using EPA Method 8082 – Polychlorinated Biphenyls by Gas Chromatography. Additionally, all samples will be analyzed for Total Suspended Solids using EPA Method 160.2.

5 DATA ANALYSIS

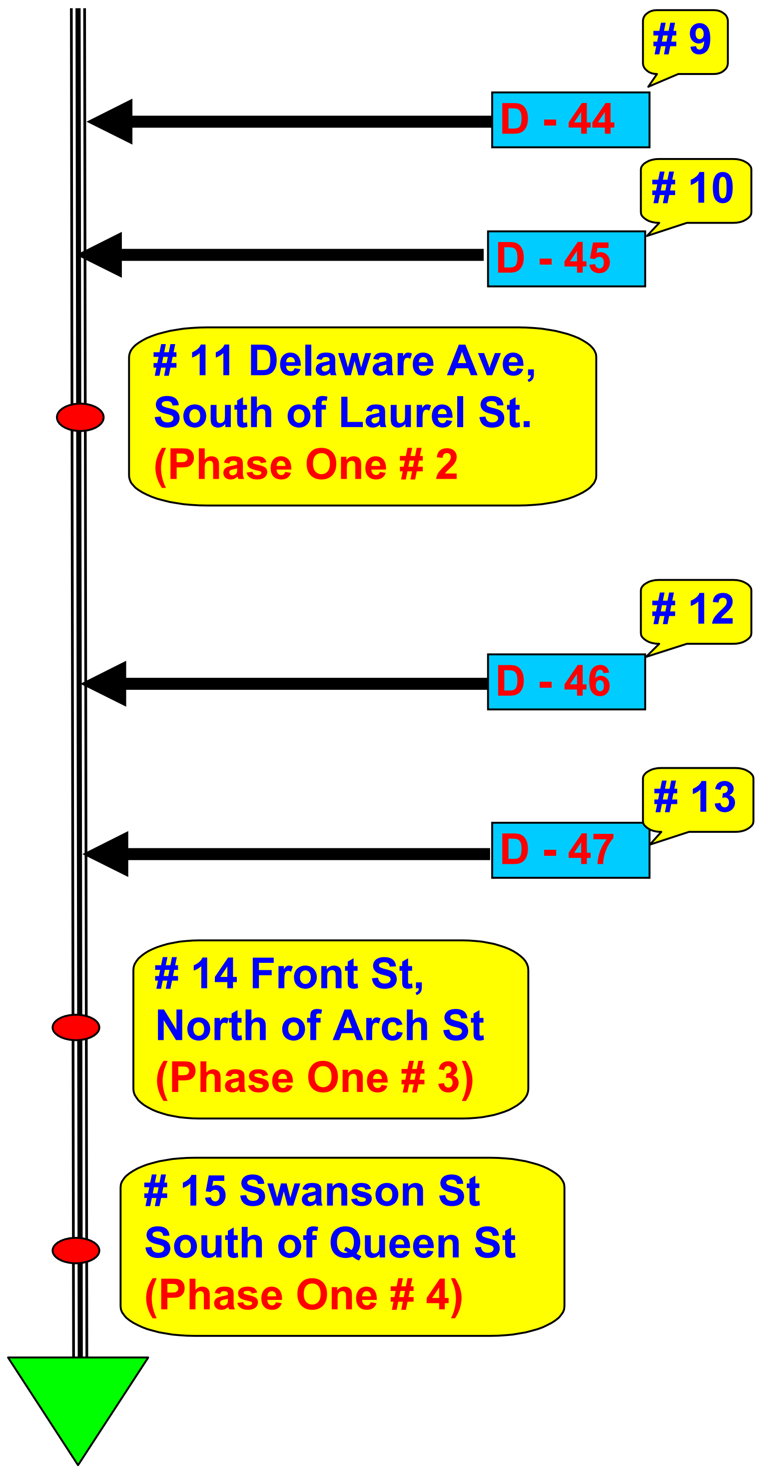
This evaluation will enable us to identify any potential large influx of PCBs. Also the results of the PCB monitoring will be graphically represented by percentage of homolog group found at each monitoring location as well as by congener type. This interpretation should assist us in trying to locate and identify PCB sources.

TSS data will be used to characterize the sample as representative of wet weather influenced sewage and to perform a mass solids (TSS) balance on in-sewer loadings as compared to influent loadings as measured at the plant influent.

PCB Trackdown Program
Phase 2.a



Southeast Water Pollution Control Plant
PCB Trackdown Program
Phase 2.b



PMP

Southeast Plant
Previous Minimization Activities
Item 7

As described in Section 4. Known Sources, the water treatment coagulant used at the Queen Lane Water Treatment Plant is produced by the DuPont Company. This product contains PCBs, most of which are captured by the water treatment processes and discharged into the Southeast Plant sewer shed. The Dupont Company reports the following activities to reduce the PCB concentrations in their ferric chloride.

In the spring of 2001 DuPont analyzed the ferric chloride by-product and found approximately 1.49 ppb of PCBs in the ferric chloride by-product. DuPont promptly launched a program to determine how PCBs are incidentally manufactured in the TIO2 process. The objective of the program is the virtual elimination of PCBs as technology becomes available with a focus on source reduction versus end of pipe treatment. The DuPont technical team developed several short terms process modification to reduce incidental manufacturing of PCBs and 15 long term options that could possibly reduce PCB generation by 90% from the 2001 levels.

The short term reduction effort was quickly implemented in 2002. The effort consisted of a change in raw material use (oil used to keep ore dust down), additional process controls, and installation of settling tanks. These actions reduced PCBs generation by approximately a 60%.

In order to obtain information regarding previous, ongoing or planned pollutant minimization activities, PWD wrote to a number of agencies who may have knowledge of such programs in the PWD sewer sheds as explained in this PMP report under Section 5. Northeast Plant, Potential Sources. The following activities were reported to us from those agencies.

The Philadelphia Department of Public Heath provided PWD with several locations of historical PCB spill sites within the boundaries of the City of Philadelphia. These are listed in the following spreadsheet entitled *"PMP- SE PCB Sites – Health Dept"*. Many of these sites date back in time several decades and were quite small in nature, however they continue to be listed as PCB sites by the Health Dept. PWD's Industrial Waste Unit's inspectors will attempt to investigate the current environmental status of each of these sites over the first two years of this PMP. Sites which are believed to represent no further threat to the environment will be eliminated from the listing. Sites which continue to represent a threat will be characterized in future annuals reports together with any plans to further minimize the sources.

The PaDEP reports that they have a number of sites located within the Southeast sewer shed which are ACT 2 PCB Sites and should be reported in the PMP as possible sites for which previous minimization activities have occurred. A meeting, on September 5, 2005 was held between PWD and state officials, in response to PWD's letter, to discuss this inventory which is currently located on a rather large PaDEP Southeast Region database. The outcome of the meeting was that PWD would forward a set of possible descriptors for each site. PaDEP would use the descriptors to produce a listing of

Act 2 sites. It was recognized that considerable effort on the part of PaDEP would be required to produce the listing and that the time required to complete the task might go beyond the window of time which we have to incorporate the results into our PMP. That is the current situation, PWD will incorporate the complete list of sites into our first annual report. Attached is a copy of the email entitled *"PMP – Identification of Known Sources, by Bruce Aptowicz"* which lists PWD's criteria.

It was agreed by all parties that this 5 year PMP would not require a site visit by PWD personnel as other PCB sources have higher priorities. However, should the trackdown effort result in the detection of a significant unknown source in a specific part of the Southeast sewer shed, we look examine PaDEP's ACT 2 listing for any nearby sites and inspect those sites as the potential sources of the unknown loading.

PMP - SE PCB Sites - Health Dept

WPCP	Location	Date	Amount	Comments
SE	9th & Columbia	1980		6 hr clean-up
SE	200 S.Broad Street	06/19/87	~1 gal	Transformaer leak at Bellvue
SE	3650 S. Galloway	05/22/86	65 ppm	Transformer oil in manhole
SE	Pier 14 - Powerhouse Transformer	03/06/84		PCB spill
SE	Hancock paper CO.- 434 Brown Street	06/07/84		PCBs stored, liquid discharged from building to street
SE	Jackfrost Sugar Refinery - 1037 N. Delaware Ave.	09/09/85		Leaked PCB transformer

Bruce Aptowicz

09/06/2005 01:18 PM

To: jefields@state.pa.us
cc: jnewbold@state.pa.us
Subject: PMP - Identification of Known Sources

Jennifer:

It was productive for us to meet with Bob, Jim and you, yesterday, as we create the PCB - PMP program for PWD. As we discussed, PaDEP will review your database of ACT 2 PCB sites and provide me with an electronic spreadsheet according to the following conditions:

The inventory of PCB sites will include all known sites within the boundaries of the City of Philadelphia

The inventory of PCB sites will also include all known sites within the boundaries of the townships which have combined sewer systems. It was our expectation that PCBs leaving a contaminated site would be caused by storm runoff and therefore be transported by the storm system, not the sanitary system. Therefore, PCBs discharging from a site in a suburban township which has separate systems would be the responsibility of the suburban township, not PWD. Unfortunately, we are not positive as which of our suburban township customers have combined sewers. It is our best understanding that none of the townships listed below have combined sewer systems. If PaDEP has information to the contrary, then please include the Act 2 sites located in those townships.

Jim suggested that very large sources of PCBs in any of our suburban customers should also be included since a release from such a site might also reach the sanitary sewers. The following list represents all of PWD's suburban township customers:

Northeast Water Pollution Control Plant

City of Philadelphia:

Zip Code	County	Township
18940	Bucks	Northampton & Newtown Township & Newtown Borough
18954	Bucks	Northampton
18966	Bucks	Southampton
19001	Montgomery	Abington
19006	Montgomery	Lower Southampton
19007	Bucks	Bristol Township
19020	Bucks	Bensalem
19046	Montgomery	Jenkintown
19047	Bucks	Hulmeville Borough & Langhorne Borough
19053	Bucks	Lower Southampton
19056	Bucks	Middleton Township
19054	Bucks	Levittown
19075	Montgomery	Oreland
19090	Montgomery	Willow Grove
19067	Bucks	Lower Makefield

Southeast Water Pollution Control Plant

City of Philadelphia:

Zip Code	County	Township
19038	Montgomery	Glenside
19095	Montgomery	Wyncote

Southwest Water Pollution Control Plant

City of Philadelphia:

Zip Code	County	Township
19038	Montgomery	Glenside
19008	Delaware	Broomall
19018	Delaware	Clifton Hts.
19023	Delaware	Darby
19026	Delaware	Drexel Hill
19029	Delaware	Essington
19032	Delaware	Folcroft
19033	Delaware	Folsom
19036	Delaware	Glenolden
19041	Delaware	Haverford
19043	Delaware	Holmes
19050	Delaware	Lansdowne
19057	Delaware	Wayne
19066	Montgomery	Lower Merion
19070	Delaware	Morton
19073	Delaware	Newtown Sq.
19074	Delaware	Norwood
19076	Delaware	Prospect Park
19078	Delaware	Ridley Park
19079	Delaware	Sharon Hill
19082	Delaware	Upper Darby
19083	Delaware	Upper Darby
19085	Delaware	Villanova
19087	Delaware	Wayne
19004	Montgomery	Bala Cynwyd
19010	Delaware	Bryn Mawr
19017	Delaware	Chester Heights
19035	Montgomery	Gladwyne
19096	Montgomery	Wynnewood
19444	Montgomery	Lafayette Hill

4. If information that is available to you in the database permits you to believe that the site was essentiall all cleaned to background levels, do not include that site.
5. We all concluded that the proper place within the PMP submission to list these sites was Section 7: *Previous, Ongoing or Planned Minimization Activities Voluntarily or Required by Other Regulatory Programs.*That section requests that the discharger provide the following information with each site listing. Please determine if your database can provide me with information:

    the level of pollutant reduction attained
    the level of pollutant reduction targeted
    measures completed
    measures underway
    the schedule for planned activities

6. Additionally, I would suggest that the following information be provided for each site, if available via your database

    Name of site, if any,
    Company’s name, if any

Street
Township
County
Zip Code
GIS coordinates
Whether the site met site specific standards or state health standards

7. PWD would then add the following information to characterize each site:
   Name of POTW which might be affected by site

   (For PCB sites located in suburban townships which discharge into the PWD collection system)
   Name of entity under whose contract with PWD permits wastewater in the vicinity of the site to discharge wastewater into PWD's collection system
   Location or name of downstream connection to the PWD's collection system

   (For PCB sites located within the City of Philadelphia's collection system)
   Name of the trunk sewer which transports wastes in the vicinity of the site
   Name of the intercepting sewer which transports the wastes in the vicinity of the site
   Name of stormwater outfall which transports the stormwater in the vicinity of the site

8. Additionally, we all concluded that this submission of the 5 year PMP would not require a site visit by PWD personnel as other PCB sources, and specially, the potential sources, have higher priorities.

As I mentioned yesterday, if you are able to gather the requested information and transmit it to me in about a week or two, I should be able to incorporate it into our submission. If your effort takes more time, I will simply reference this task in the PMP submission and incorporate the information into the PMP when it arrives.

Thanks.

Bruce

PMP
Southeast Plant
Recommendations for Action Under Other Regulatory Programs
Item 8

At this point in the PMP process, PWD does not envision the need for other regulatory authorities to take further actions in the mitigation of the currently listed known sources beyond the continued reduction of PCB concentrations in ambient sources waters.

However, should the trackdown effort result in the identification of a PCB source which is not in violation of the Department's Pretreatment Regulations, it is expected that PWD will request a meeting with the appropriate regulatory agencies to determine a proper course of action.

With respect to potential sources, we have identified two instances in Section 5 – Potential Sources in which the involvement of other regulatory agencies is recommended.

PWD will request a meeting with the DRBC, PaDEP and USEPA to discuss regulatory assistance towards requiring the electric service provider, to any facility which operates a PCB transformer, to notify PWD whenever one the referenced facilities requests that their high tension electrical power be shut down for an indeterminate period. If such an arrangement can be accomplished, upon notification, PWD will visit the facility and inquire as to the facility's plans for the transformer and provide information regarding the proper disposal of PCB equipment.

Secondly, upon identifying a facility, containing PCB equipment, which is closed or not secured, PWD will request a meeting with the DRBC, PaDEP and USEPA to discuss regulatory assistance towards minimizing the potential of PCBs from that equipment becoming released into the environment.

PMP
Southeast Plant
Pollutant Minimization Measures
Item 9

1. On-Site Known or Probable Sources

As reported in Section 3 of this report, the Southeast Plant has no known or probable on-site sources of PCBs.

2. Collection System Known Sources

As described in Section 4. Known Sources, two known sources of PCBs were reported at this time. PaDEP has preliminarily identified additional ACT 2 sites – under past or current mitigation actions for PCBs - that may be the source of PCBs into the environment, but requires additional time to develop an appropriate spreadsheet to characterize each site. PWD will incorporate the PaDEP's list of ACT 2 sites into this PMP in the first annual report. However, should an outcome of the trackdown program result in the identification of an ACT 2 site as being the source of a significant release of PCBs into the sewer shed, PWD will request a meeting of all appropriate regulatory parties to determine a future course of action.

The first reported known source affecting the Southeast sewer shed is the transmission of PCBs from the Schuylkill River into sewer via treatment processes of the Queen Lane Water Treatment Plant. The Schuylkill River has been listed by the State of Pennsylvania as impaired due the presence of PCBs. As a result of this listing, state and federal agencies are working towards the development of a plan which will, upon implementation, result in a reduction in its ambient PCB concentration. PWD recognizes that this effort will, in all likelihood, take decades to demonstrate significant results. During the intervening time, the Queen Lane Plant, under direction from both the PaDEP and the USEPA, will continue to maximize the removal of solids from its drinking water supply - recognizing that such removal effectiveness also increases the capture of PCBs and their discharge into the sewer. PWD's economic analysis also indicates that the sewering of the Queen Lane Plant's waste solids – thereby utilizing the existing Southeast Plant's infrastructure to convey, separate, thicken, dewater and ultimately, dispose of the water plant's commingled solids – continues to remain the only economically feasible option.

The second known source of PCBs in the collection system is the water treatment coagulant used at the Queen Lane Water Treatment Plant which is produced by the DuPont Company. This product contains PCBs, most of which are captured by the water treatment processes and discharged into the Southeast Plant sewer shed. The Dupont Company reports the following future activities to reduce the PCB concentrations in their ferric chloride.

Since 2002, DuPont completed its evaluation of the long term options to reduce PCB at the source and is committed to implement a $15+million project in 2007. The project will consist of modifications to the industrial process. DuPont anticipates this project will reduce PCB generation by approximately 90% from the 2001 PCB levels in ferric chloride.

3. Potential Sources

PWD believes that the release of potential sources of PCBs into the environment represents a significant threat to the consistent reduction of PCB concentrations in the nearby rivers and streams. Indeed, in September of 1994, PWD was the victim of an illegal discharge of approximately 1000 pounds of PCBs into the Southeast sewer shed. The consequences of the discharge was overwhelming to our biosolids recycling program and undoubtedly resulted in significant quantities of PCBs being conveyed into the Delaware River.

However, PWD recognizes that it is the policy of this country not to require the removal of PCB containing devices (potential sources) when they used and maintained in a responsible manner.

Therefore, PWD believes that the most effective, but reasonable, manner to prevent a release of a stored quantity of PCBs from being illegally released into the environment is to take existing, but limited, federal programs of identification of PCB potential sources to a higher level.

Section 5 - Potential Sources of this plan identifies a plan to visit all current owners of PCB equipment and collect and record forty (40) descriptors for each source. The following tasks are proposed identify and control potential sources:

1. PWD will make a reasonable effort to obtain the requested information from the owners of the equipment. All gathered information will be incorporated into the referenced spreadsheet.
2. Inspectors from the Industrial Waste Unit will visit all listed sites either within the City of Philadelphia or sites located in the sewer sheds of those suburban townships that wholesale discharge sewerage into PWD's collection system for which PWD manages their pretreatment permit.
3. All such listed sites will be visited during this five year plan
4. PWD will attempt to enlist either the suburban community's wastewater utility or its fire code enforcement organization to visit the remaining suburban township sites and provide PWD with the requested information.
5. On the occasion of a visit to a site, PWD will disseminate information to the site contact individual regarding their obligations for proper disposal of the PCB equipment. We will request that the site contact individual notify PWD of any change in status of the PCB equipment.
6. If the site containing the PCB equipment has an industrial waste pretreatment permit with PWD, we will, on the occasion of their next permit renewal, insert language into the pretreatment permit which obligated the permittee to notify PWD if the status changes of the PCB equipment and to follow proper procedures when disposing of the equipment.
7. PWD will request a meeting with the DRBC, PaDEP and USEPA to discuss regulatory assistance towards requiring the electric service provider, to any facility which operates a PCB transformer, to notify PWD whenever one the referenced facilities requests that their high tension electrical power be

shut down for an indeterminate period. If such an arrangement can be accomplished, upon notification, PWD will visit the facility and inquire as to the facility's plans for the transformer and provide information regarding the proper disposal of PCB equipment.

8. Upon identifying a facility, containing PCB equipment, which is closed or not secured, PWD will request a meeting with the DRBC, PaDEP and USEPA to discuss regulatory assistance towards minimizing the potential of PCBs from that equipment becoming released into the environment.

PMP
Southeast Plant
Source Prioritization
Item 10

Identified potential sources of PCBs have been prioritized in accordance with their decreasing weights of contained PCBs. Data used to compare PCB weights was limited, as only the USEPA and Philadelphia Water Department records contained information regarding the weight of PCBs contained within the devices. The files provided in Item 5 Potential Sources display the prioritized sites.

PWD will follow this prioritization in the scheduling of site inspections unless geographical convenience or scheduled inspections for the purpose of pretreatment inspections allows us to efficiently inspect sites in addition to those at the top of the list.

Two known PCB sites have been identified in Section 4 of this report. PWD will prioritize PCBs contained in ferric chloride used in the water treatment process.

PMP - ALL PLANTS   Key Dates   Item # 11

Tasks	Qtr 1-Yr 1	Qtr 2-Yr 1	Qtr 3-Yr 1	Qtr 4-Yr 1	Qtr 1-Yr 21	Qtr 2-Yr 2	Qtr 3-Yr 2	Qtr 4-Yr 2	Qtr 1-Yr 3	Qtr 2-Yr 3	Qtr 3-Yr 3	Qtr 4-Yr 3	Qtr 1-Yr 4	Qtr 2-Yr 4	Qtr 3-Yr 4	Qtr 4-Yr 4	Qtr 1-Yr 5	Qtr 2-Yr 5	Qtr 3-Yr 5	Qtr 4-Yr 5
Trackdown (# 6)																				
Trackdown -Southeast Plant																				
Review of Final Plans for Phase 2																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 3, as needed																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 4, as needed																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Trackdown - Northeast Plant																				
Review of Final Plans for Phase 1																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 2, as needed																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 3, as needed																				
Sampling and Laboratory Analysis																				
Trackdown - Southwest Plant																				
Review of Final Plans for Phase 1																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 2, as needed																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Previous Minimization Activitiess (# 7)																				
Review PaDEP's Act 2 Sites and assign to POTW																				
Incorporate PaDEP's List of ACT 2 Sites Into PWD's PMP																				
Number of inspections of 31 PCB sites identified by Phila. Health Dept.			10				10				11									
Remove a site from the list if it does not represent a threat																				
Identify activities to mitigate potential threat from remaining sites																				
Implement above activities																				
Pollutant Minimization Measures (# 9)																				
Northeast Plant - determine PCB Loading from lagoons																				
Reduce PCB loading from Lagoons, as necessary																				
Southwest Plant - determine PCB Loading from lagoons																				
Reduce PCB loading from Lagoons, as necessary																				
Reduce PCB Concentration in FeCl3 by 90% from 2001 Levels																				
Reduce PCB Concentration in Schuylkill and Delaware Rivers (by others)																				
Number of Inspections of 377 City-wide Potential Sources	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	2
Discuss w/ Suburban Townships their inspection of Pot. Sources																				
Suburban Township Inspections and data transfer																				
Revise Pretreatment Permits if they own a Potential Source																				
Meet w/ regulators to discuss receipt of info from Electric Comp.																				
Plant Effluent PCB Analysis																				
Conduct Plant Effluent Sampling (Method 1668a) Every 2 Years																				
Reports																				
Submit an Annual Report of PMP Activities																				

PMP
Southeast Plant
Measuring, Demonstrating and Reporting Progress
Item 12

12.1 Sampling and Analytical Approaches

PWD intends to utilize several different approaches to demonstrate progress towards achieving PCB minimization resulting from the implementation of our PMP.

As required by the PMP, we will sample the effluent of the plant once every two years and will analyze the sample for PCBs using Method 1668A. Reductions in the total PCB concentration over time may be an indicator program success. However, as the DRBC has correctly pointed out in their document entitled "*Recommended Outline for Pollutant Minimization Plans for Polychlorinated Biphenyls in the Delaware Estuary, Municipal Waste Water Treatment Plants and Publicly Owned Treatment Works",* analytical uncertainties may mask effluent reductions. Furthermore, wet weather samples will be collected and their PCB concentrations used in the analysis. However, the data indicates that there is far greater variability in the PCB concentrations of wet weather samples versus dry weather samples. Although there can be a number of causes of this variability, it is likely that the characteristics of each storm event (rainfall intensity, duration, etc) are significant factors. Since future wet weather sampling will cover a range of types of storm events (as long as each meets the requirements of a qualifying storm event), it is likely that the resulting PCB concentrations will contain significant variability due solely to the nature of each rain event.

Therefore, alternative approaches will be included in our annual reports to demonstrate progress.

As provided in the list of PCB potential sources, Item 5, there may be as many 73 sites in the Southeast Plant sewer shed housing PCB contained devices. Additionally, a number of these sites are reported to hold more than one PCB device. At this stage in the program, PWD is uncertain of the current existence of all of the reported devices, but we know that they were reported by the authorities to have existed in the not distant past and there is no reported knowledge on the part of those agencies that they have been removed. PWD will visit each site during the term of this plan and will report the number of devices that have been removed. If the institutional knowledge can provide us with the weight of the removed PCBs, we will report that value also.

Furthermore, PWD has stated concerns over the potential release of PCBs from vulnerable devices – i.e. those located at sites which are closed or abandoned or devices which have been deenergized or moved into storage. We have recommended that, upon identification of such devices, the regulators and ourselves discuss and implement procedures to minimize the risk of these PCBs from being released into the environment. At such, we will separately report the removal of any vulnerable devices.

PWD has reported two known sources. Both sources are discharged into the sewer shed from the Queen Lane Water Treatment Plant. We will report any reduction in PCB concentrations in the waste streams from the water plant by both measuring the PCBs in the ferric chloride product as well as, using available DRBC ambient data, PCB reductions in the plant's source (Schuylkill River) water.

PWD has identified a number of sites from the Philadelphia Dept. of Public Health which, we believe, have undergone some form of prior remediation. PWD will inspect each site to either remove it as a potential liability for future PCB release or to recommend activities to reduce the potential risk. We will report the number of sites removed from the list or sites where further remedial action has been recommended or completed.

PWD's objective in conducting its trackdown program is to identify significant sources of PCBs discharged into our sewer shed and then, in cooperation with our regulators, determine and implement procedures to minimize or eliminate those discharges. PWD will report each reduction of PCB load into the shed.

12.2 Estimated Load

An estimate of the annual baseline load from the Southeast Plant has been determined by calculating the average wet and dry weather PCB concentrations in the plant effluent and then determining the flow for a typical year.

PWD recommends using the typical year flows for future year comparisons and calculations. By doing so, we remove, from the analysis, the variability in annual PCB loads caused by the variation in annual rainfall. Secondly, it is clear that the Southeast Plant will discharge a greater PCB annual loading if it increases its capture of stormwater and thereby increases its flows during wet weather. However, by accomplishing this goal, the environment will receive an overall benefit since the volume of untreated CSO discharge will be reduced. Of course, PWD has been directed, via its NPDES permit, to implement plans to minimize CSO discharge and is well on its way towards accomplishing this long term requirement. By using a typical year plant flow for the annual PMP analysis, we can properly focus our attention on progress towards reducing PCB concentrations in the plant effluent.

The following chart entitled *"Southeast Plant, Baseline PCB Plant Effluent Concentration (pg/l)"* provides our methodology for determining the baseline PCB concentration. PWD uses the PCB data collected in 2001 as the basis for its baseline concentration since that was the time frame in which PWD began to focus attention on reducing PCBs affecting its sewer shed. However, the analytical procedures employed to analyze that data set focused on only 85 congeners while more recent data (2005) required data from 209 congeners. In order to make the 2001 data reflect all 209 congeners, a procedure was employed to estimate the concentrations of the unanalyzed congeners in the 2001 data set by developing a ratio between the total concentration in the 85 congeners to the total concentration of the 209 congeners in the 2005 data set. That ratio was then applied to the 2001 data and an estimate of the concentration from 209 congeners was derived. It is estimated that the average baseline PCB concentration during wet weather is 32,442 pg/l while the average dry weather concentration is 12,653 pg/l.

In order to estimate plant flow for a typical year, PWD examined the annual rainfall patterns for the past 103 years and determined that the year 2000 exhibited close to the average annual rainfall while also providing relevant plant flow data, which were also near long term averages. The plant flow data was examined to identify flows consistent with rainfall events. The attached graph entitled *"SE WPCP Average Daily Flows – 2000"* identifies wet weather days. The average flow for wet weather days and dry weather days were then calculated together with the number of days in each category. Thus, in a typical year, the Southeast Plant experiences 142 wet weather days and 223 dry weather days, while the average plant flow in wet weather is 107 MGD and is 84 MGD in dry weather.

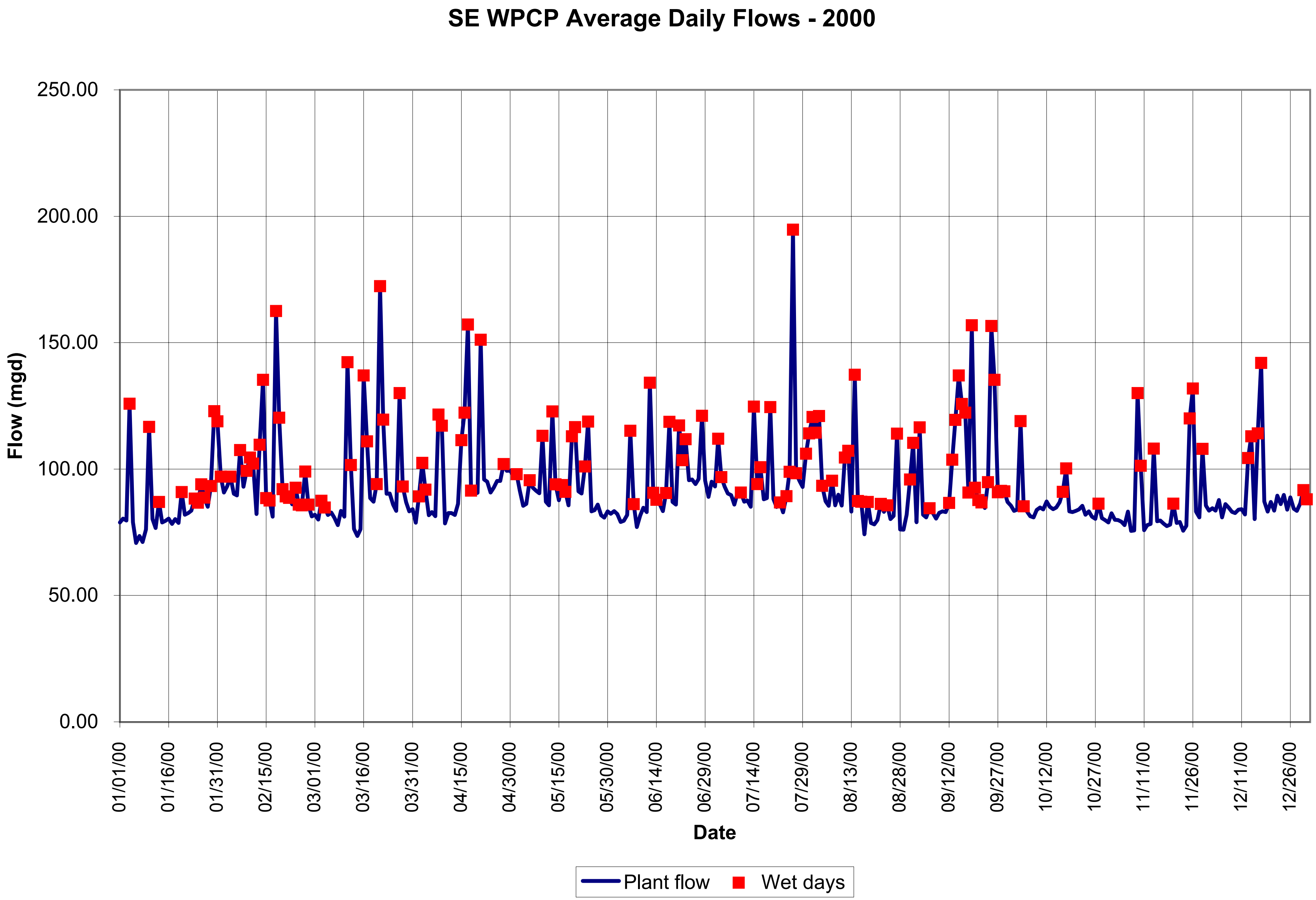
The attached chart entitled *"Southeast Plant, Baseline PCB Plant Effluent Loading (gm/yr)"* displays this data and calculates the baseline annual loading to be 2,758 gm/year.

12.3 Anticipated Reductions to Baseline Load

Currently, PWD has committed to a reduction in the PCB concentration in the ferric chloride product utilized in its Queen Lane Water Treatment Plant and which is then discharged into the sewer. We expect to experience a 90 percent reduction in concentration by the end of the third year of the program. Beyond that known source, PWD is uncertain as to the expected success of its ability to identify and, subsequently, minimize other sources and therefore cannot, with any degree of confidence, anticipate further reductions to baseline load. PWD is committed, however, to making every reasonable effort to achieve success of this program and is hopeful that its labors will result in significant load reductions.

12.4 Continuing Assessment

PWD will report progress towards PCB minimization in an annual report starting one year after the commencement of this PMP. Commencement of the PMP will start within 60 days of the receipt of a determination of completeness from the DRBC.


SE WPCP Average Daily Flows - 2000
Flow (mgd)
250.00
200.00
150.00
100.00
50.00
0.00
01/01/00
01/16/00
01/31/00
02/15/00
03/01/00
03/16/00
03/31/00
04/15/00
04/30/00
05/15/00
05/30/00
06/14/00
06/29/00
07/14/00
07/29/00
08/13/00
08/28/00
09/12/00
09/27/00
10/12/00
10/27/00
11/11/00
11/26/00
12/11/00
12/26/00
Date
Plant flow
Wet days

Measuring, Demonstrating and Reporting Progress
Item # 12
Southeast Plant

Baseline PCB Plant Effluent Concentration (pg/l)

			Wet Weather				Dry Weather			
Line	**Year Samples Taken**	**Data**	**Sample # 1**	**Sample # 2**	**Sample # 3**	**Average**	**Sample # 1**	**Sample # 2**	**Sample # 3**	**Average**
1	**2005**	**Total of all 209 congener concentrations with positive values plus 1/2 detection level for all congeners with non-detections**	**18,357**	**8,733**		**13,545**	**2,125**	**1,857**	**2,457**	**2,147**
2	**2005**	**Using only the 85 (2001) congeners, total concentrations with positive values plus 1/2 detection level for all congeners with non-detections**	11,026	4,877		**7,952**	871	741	1,047	**887**
3		**ratio of Line 1 to Line 2**	1.66	1.79		**1.70**	2.44	2.51	2.35	**2.42**
4	**2001**	**Total of 85 congener concentrations with positive values plus 1/2 detection level for all congeners with non-detections**	14,960	20,095	22,081	**19,045**	3,801	7,041	4,834	**5,225**
5	**2001**	**Estimate of total concentration assuming analysis of 209 congeners (Line 3 multiplied by Line 4)**	24,907	35,980	-	**32,442**	9,278	17,638	11,340	**12,653**

All reported PCB concentrations **include** 'J' values, and 1/2 the detection limit for those cogeners reported as non-detect ('U')
In 2001, only 85 congeners were analyzed, while 209 were analyzed for in 2005

Measuring, Demonstrating and Reporting Progress
Item # 12
Southeast Plant

Baseline PCB Plant Effluent Loading (gm/yr)

		Wet Weather		Dry Weather		Total
Baseline Flows (MGD)		107		84		
Baseline Flow Days per Year		142		223		
Baseline PCB Concentration (pg/l)		32,442		12,653		
Baseline PCB Loading (gm/year)		1,863		896		**2,759**

PMP
Southwest Plant
Facility Description
Item 3

3.a. Facility Name and Address

Southwest Water Pollution Control Plant
8200 Enterprise Avenue
Philadelphia, PA 19153-3813

PaDEP Site ID #: 451994
NPDES Permit No. PA 0026671

3.b. Facility Description and Map

The SWWPCP provides full secondary treatment of wastewater for a design flow of 200 million gallons per day (MGD). SWWPCP also provides thickening and digestion of sludge for both the SWWPCP and Southeast Water Pollution Control Plant (SEWPCP). Digested sludge is then sent to BRC for dewatering and composting operations.

The SWWPCP treats incoming wastewater using five basic unit processes: 1) influent pumping, 2) preliminary treatment, 3) primary treatment, 4) secondary treatment, 5)effluent pumping and disinfection. Additional processes are used for solids handling. These processes included sludge thickening and digestion.

The purpose of the influent pumping process is to lift wastewater to the operating level of the plant. The wastewater is lifted by three two-stage screw pumps from a low level interceptor. Influent pumps are required for approximately 10 % of the incoming wastewater. High-level interceptor delivers the rest of the wastewater, from both Philadelphia and Delaware Counties by gravity.

The purpose of preliminary treatment is to remove large objects, rags, debris, grit and other inert material from wastewater to prevent clogging or machinery breakdown due to blockage and overloading. The preliminary treatment process consists of catenary bar screens and grit basins. The six catenary bar screens remove large objects, rags and debris from the wastewater using bar screens and a mechanically operated rake. The four grit basins remove grit and other inert material from the wastewater. These materials are mixed and stored on the grit pad located next to the north digesters for eventual landfill disposal. Disposal at a landfill is handled through contract services.

The purpose of primary treatment is to remove readily settleable solids and floatables that will separate from the wastewater under quiescent flow conditions. The process is augmented by the use of flocculation channels. Flocculation promotes formation of larger floc particles and the separation of floatables, while providing oxygen to reduce septicity. The thickened sludge is sent to the digesters while the floatables are disposed of through contract services.

The purpose of secondary treatment is to remove colloidal and soluble pollutants (termed as biochemical oxygen demand) from the wastewater using biomass and pure oxygen. In the aeration tanks, dissolved organic compounds and fine solids are metabolized by a concentrated mass of microorganisms called activated

sludge. The biomass is separated from the wastewater in the final settling tanks, where quiescent flow conditions allow the activated sludge to settle to the bottom of the tank. The thickened solids collected at the bottom of the tanks are either wasted to Dissolved Air Flotation Thickeners or returned to the head of the Aeration Tanks.
The purpose of the effluent pumping and disinfection is to pump the plant effluent to the Delaware River under high tide or high flow conditions and to disinfect the effluent before its discharge into the Delaware River. All plant effluent is disinfected using an injected solution of Sodium Hypochlorite (10% chlorine, wt.). After approximately a thirty-minute travel through the outfall conduit, the wastewater is discharged into the Delaware River (See Figure 2).

The purpose of solids handling is to remove and digest waste activated and primary sludge from the plant. The digested product is pumped to the Biosolids Recycling Center (BRC) for further processing. The solids handling process includes the Dissolved Air Flotation system and the digesters. Waste activated sludge from the Final Tanks and from SEWPCP is thickened at the Dissolved Air Floatation Tanks. This thickened sludge is mixed with both SWWPCP and SEWPCP primary sludge and then fed to the digesters. Twelve anaerobic digesters partially decompose organic matter to sludge gas that is used as fuel in boilers located in the Sludge Thickener Building, Maintenance Building and in electric generators located in an on-site cogeneration facility.

Please find the following attached maps and diagrams:

1. PMP Plant Process Diagrams –SW
2. PMP Facility Plan Drawing – SW
3. PMP Stormwater Drainage Plan - SW

3.c. Description and Maps of Collection System

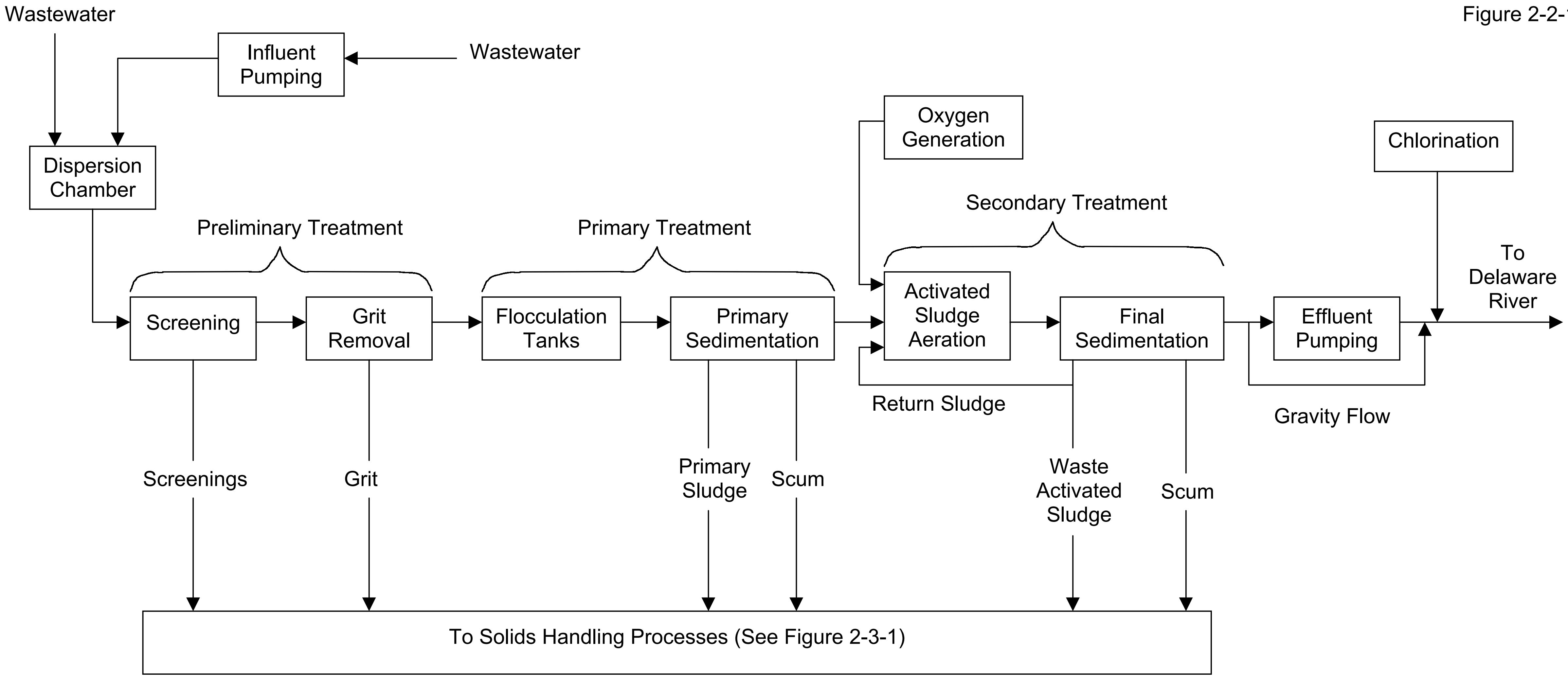
The PWD service area is divided into three drainage districts: Northeast, Southeast, and Southwest. Each of these drainage districts conveys flow to the respective WPCP of the same name. These three drainage basins are hydraulically independent except during conditions of high flow, when cross connections in the trunk sewer system allow conveyance of some flow between the Northeast and Southeast drainage districts. The service areas are itemized in Table 1 by collection system type.

Table 1 Wastewater Service Areas by Drainage District and Collection System Type

	SE (ac)	SW (ac)	NE (ac)	Total (ac)	%
Combined	8,475	12,741	19,934	41,150	19%
Separate	31	9,732	15,737	25,500	12%
Suburban Sanitary	300	76,600	70,800	147,700	69%
			Total	**214,350**	

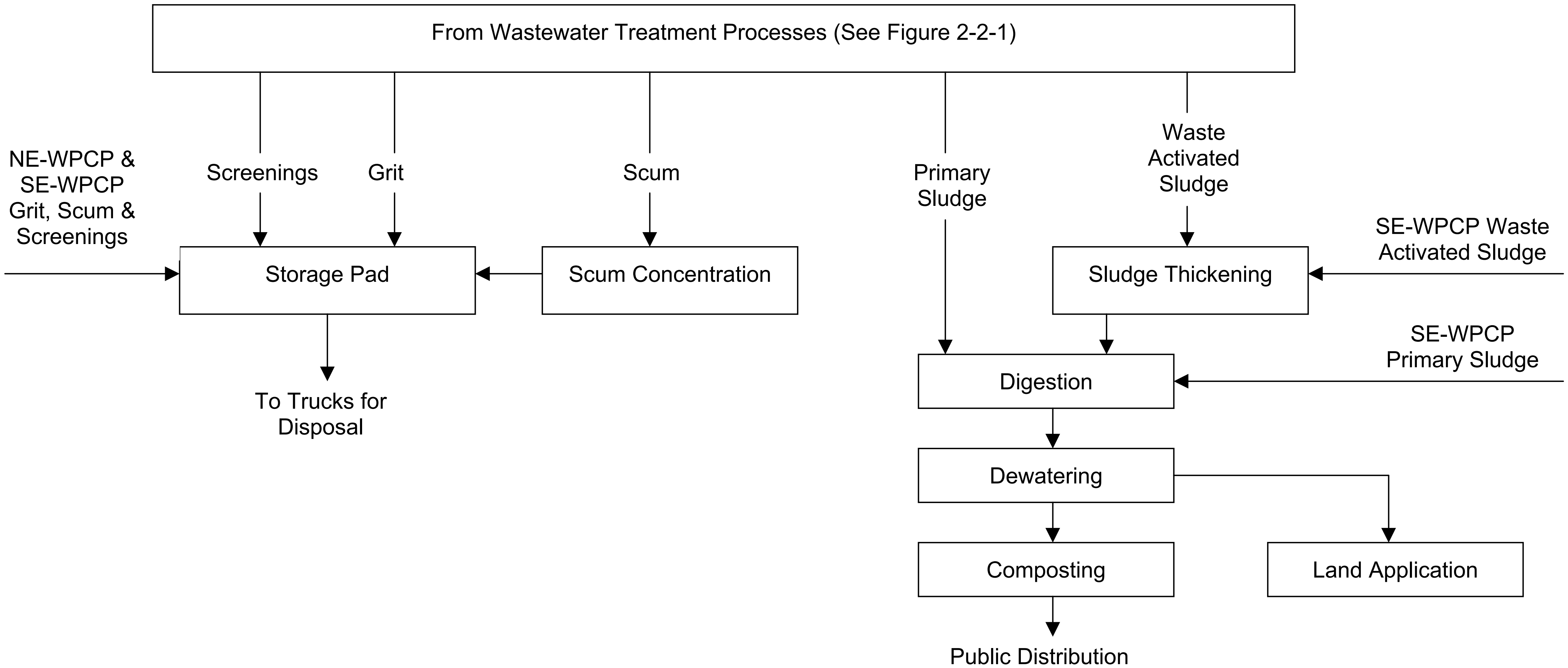
Each drainage district contains a network of branch sewers, trunk sewers, combined sewer interceptors, separate sanitary interceptors, and storm relief sewers as shown on Figure 1. Branch sewers collect wastewater from catch basins and lateral connections from drainage areas. The branch sewers convey flow to the trunk sewers, which are larger arterial sewers that convey wastewater to regulating chambers. Combined sewer interceptors convey flow from regulating chambers and separate sanitary interceptors to the WPCPs. Storm relief sewers convey flow from storm relief diversion chambers to the receiving waters during extreme high flow conditions. This network of sewers has been subdivided into 17 interceptor systems and 10 storm relief sewer systems. Table 2 identifies each of the interceptor systems. Table 3 identifies the storm relief sewers systems. Table 4 identifies the major separate sanitary sewer interceptors that are tributary to combined sewer interceptors. Table 5 identifies contributing communities and their associated interceptor systems.

Figure 2-2-1



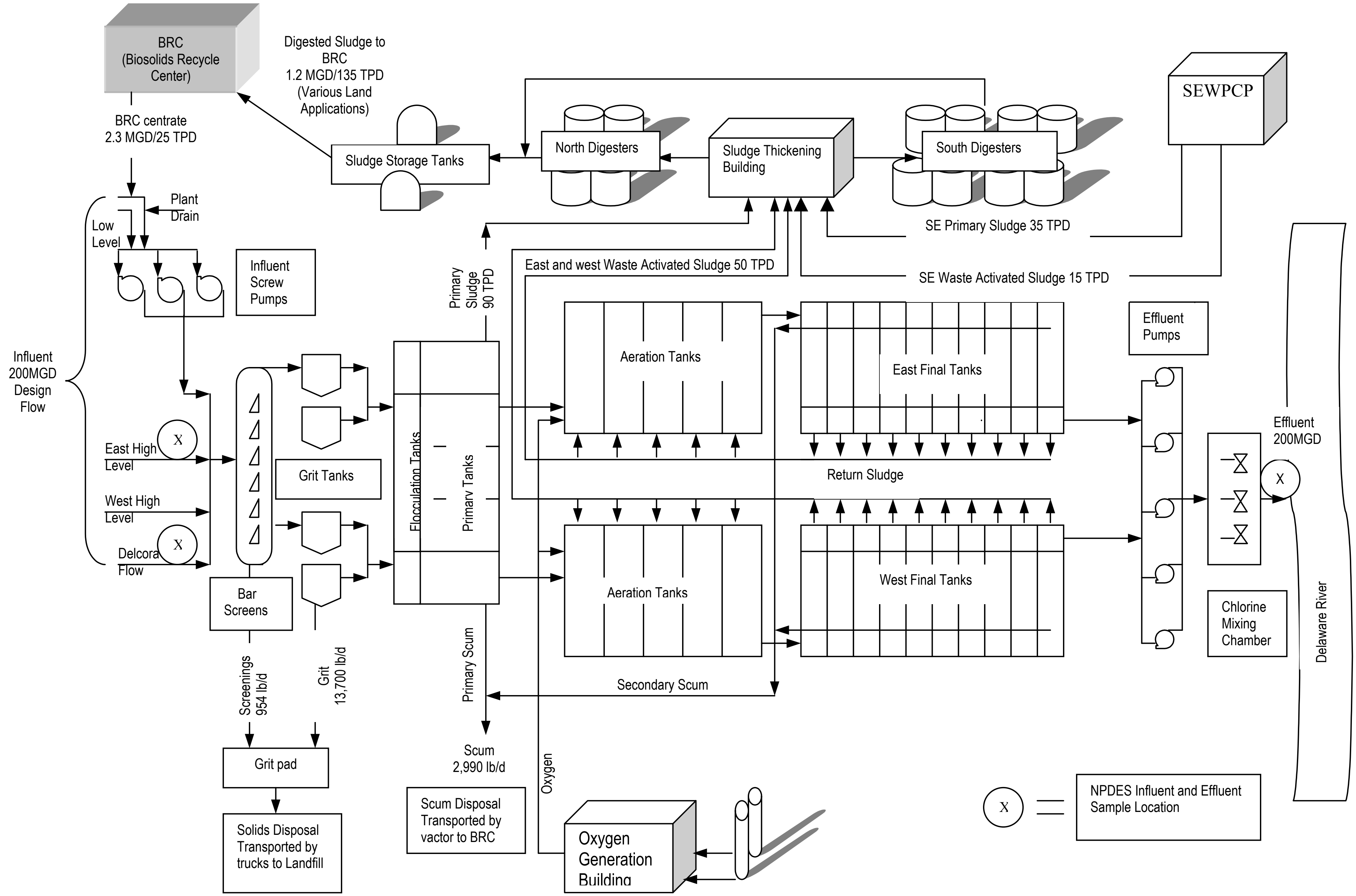
Process Plan Diagram – Wastewater Treatment Processes

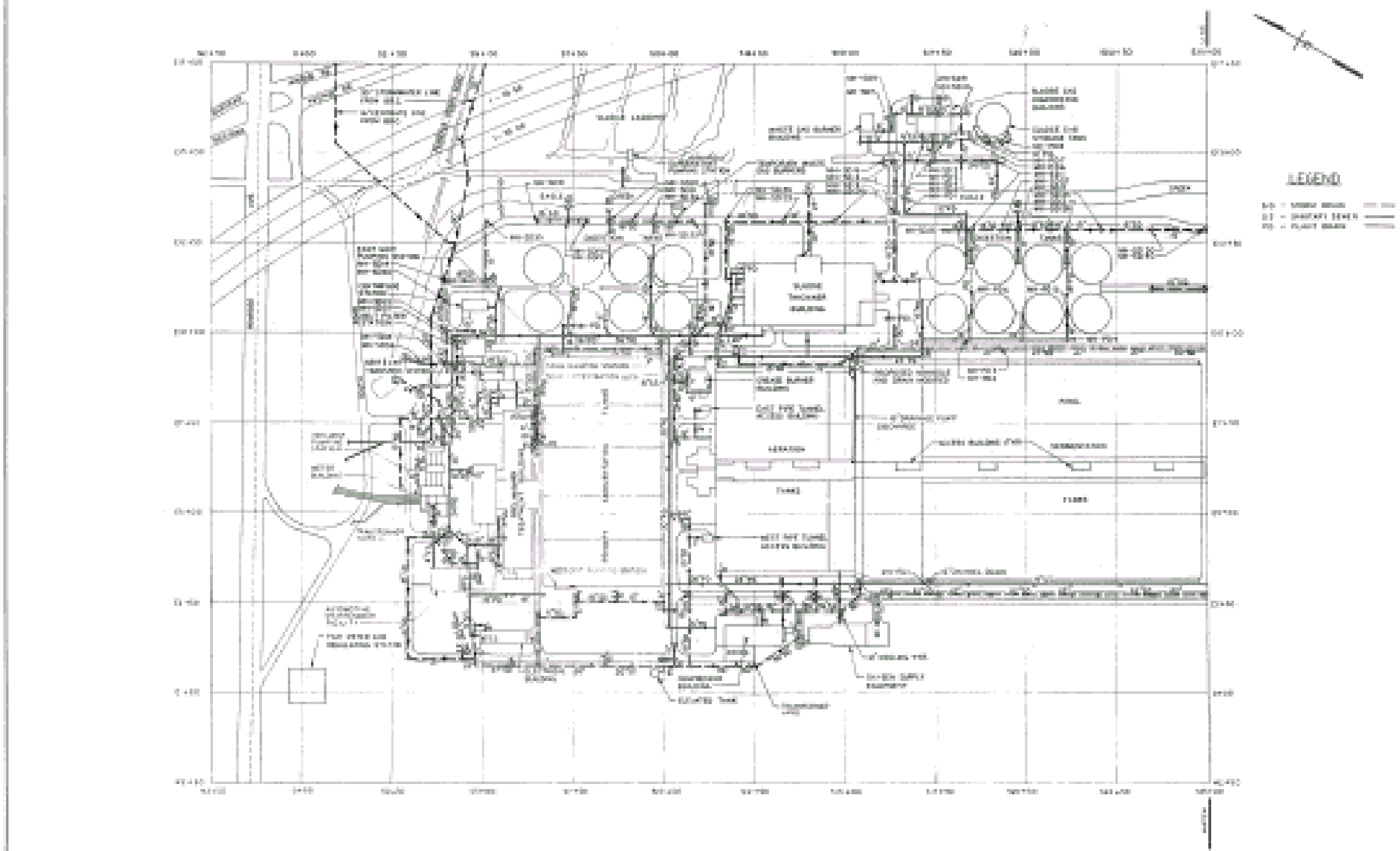
Figure 2-3-1



Process Plan Diagram – Sludge and Other Solids Treatment Processes

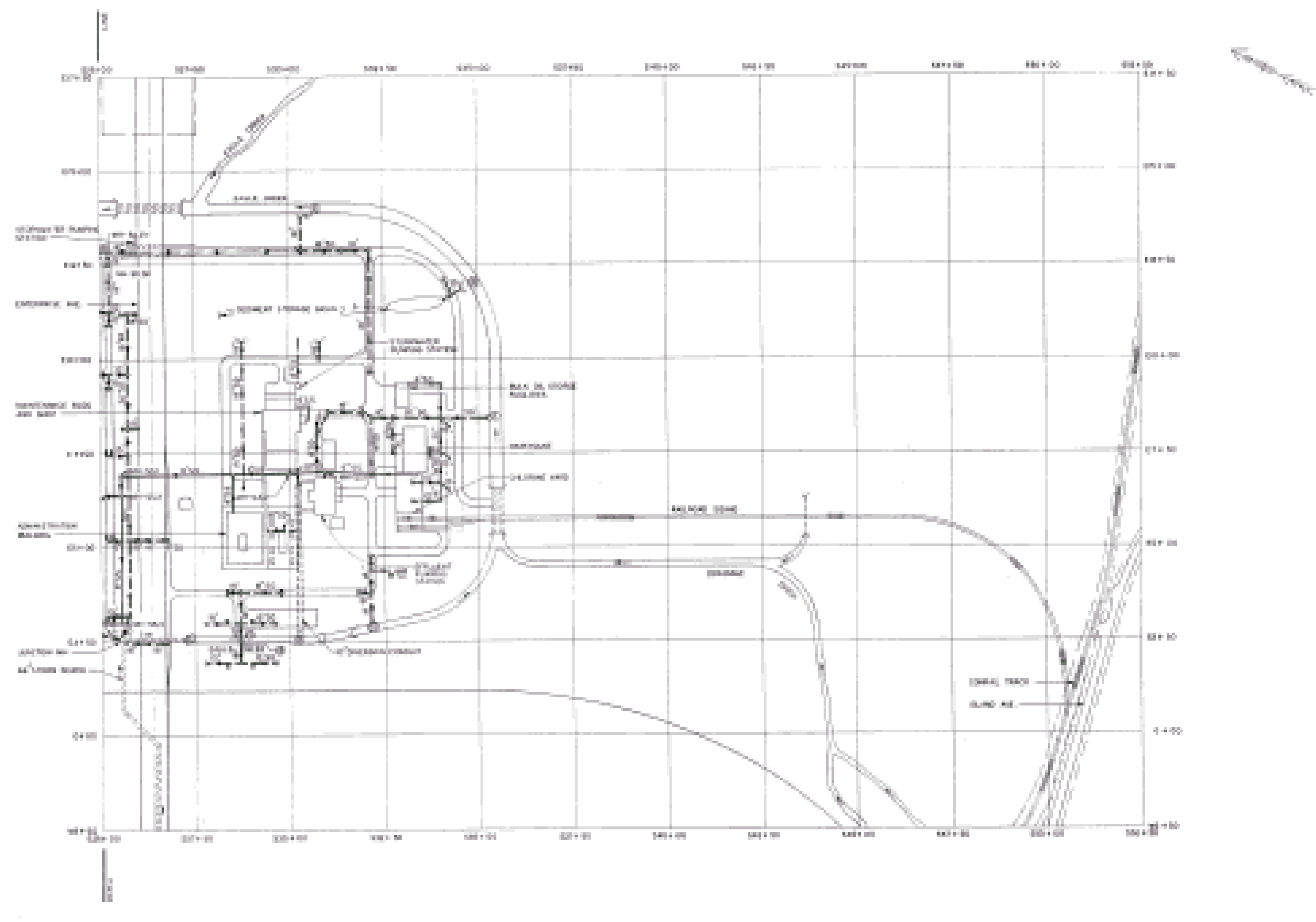
SOUTHWEST WPCP
OUTFALL NUMBER 001
SCHEMATIC OF WASTEWATER TREATMENT





CITY OF PHILADELPHIA WATER DEPARTMENT			WATER POLLUTION CONTROL PROJECT SOUTHWEST WATER POLLUTION CONTROL PLANT	1" = 100'-0"	STORMWATER, SANITARY & PLANT DRAINAGE PIPING ALSO CENTRATE & STORMWATER PIPING FROM B.B.C.

ATTACHMENT 2 33-Z-308



CITY OF PHILADELPHIA WATER DEPARTMENT			WATER POLLUTION CONTROL PROJECT SOUTHWEST WATER POLLUTION CONTROL PLANT	1" = 100'-0"	STORMWATER SANITARY & PLANT DRAINAGE PIPING SLED CENTRATE & STORMWATER PIPING FROM B.R.C.

ATTACHMENT 2.

33-2-707

PMP - SW Plant
Plant Stormwater Discharge IDs

Outfall Number (PA DEP #)	Outfall Number (Site #)	Total Area Drained (sq. feet)
85	1	104,000
86	2	268,000
87	3	22,500
88	4	120,000
89	5	61,500
90	6	201,000
91	7	200,000
92	8	288,000
93	9	205,000
94	10	385,000
95	11	185,000
96	12	95,500
97	13	63,000
98	14	56,000
99	15	56,000
100	16	1,100,000
101	17	95,000
102	18	5,000

See site map: Stormwater, Sanitary &
Plant Drainage Piping (Work #73027) (2 sheets)

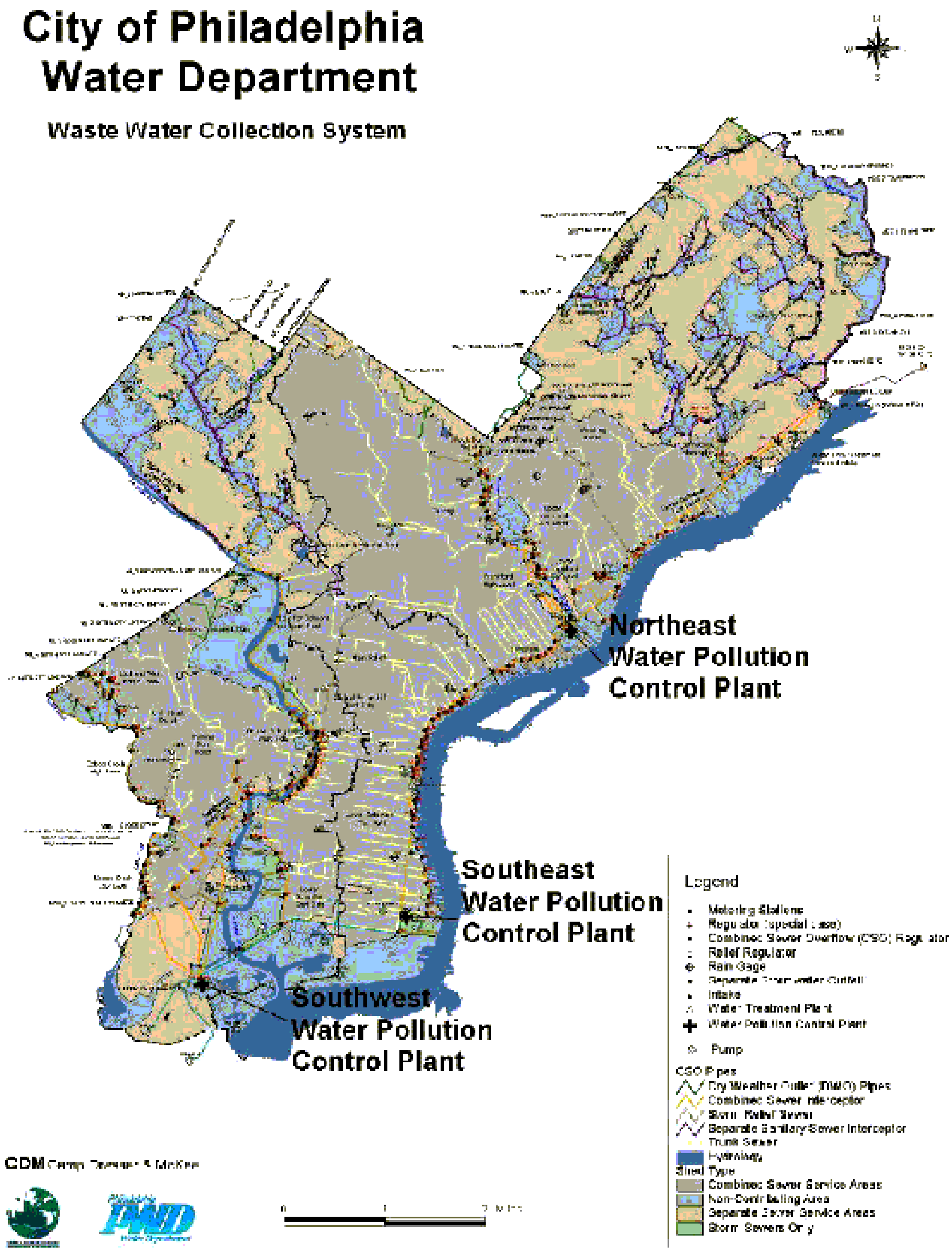


Figure 1 - PWD wastewater collection System

Table 2 Combined Sewer Interceptor Systems in the PWD Service Areas

Combined Sewer Interceptor	Abbreviation	Drainage District
Central Schuylkill East Side	CSES	Southwest
Central Schuylkill West Side	CSWS	Southwest
Cobbs Creek High Level	CCHL	Southwest
Cobbs Creek Low Level	CCLL	Southwest
Lower Schuylkill East Side	LSES	Southwest
Lower Schuylkill West Side	LSWS	Southwest
Southwest Main Gravity	SWMG	Southwest

Table 3 Storm Relief Systems in the PWD Service Areas

Storm Relief System	Abbreviation	Drainage District
32nd St. Relief Sewer	FR_32	Southwest
Arch St. Relief Sewer	FR_A	Southwest
Main Relief Sewer	FR_M	Southwest
Main Street Relief Sewer	FR_MS	Southwest
Thomas Run Relief Sewer	FR_TR	Southwest

Table 4 Separate Sanitary Interceptors Tributary to Combined Interceptors

Separate Sanitary Interceptor	Abbreviation	Receiving Interceptor	Drainage District
Upper Schuylkill Low Level	S-USLL	CSES	Southwest
Wissahickon Low Level	S-WLL	CSES	Southwest

Table 5 Summary of Contributing Communities to the PWD Collection System

Municipality/Authority	Drainage District	Intercepting System
Township of Springfield, Montgomery County *	SE/SW	LDLL/CSES
Delaware County Regional Water Quality Control Authority (DELCORA)	SW	SE WPCP
Township of Lower Merion	SW	SWMG
Upper Darby Township	SW	CCHL

Source: "Act 537 Plan Volume 1"; BCM, May 1993. * Flows are split between the SE and SW districts.

A brief description of the collection system for this drainage district is as follows.

Southwest Drainage District

Figure 1-5 shows the collection system for the Southwest drainage district. This figure depicts the combined sewer interceptors and the major separate sewer interceptors, as well as, the location of the CSO regulators, storm relief chambers, and major hydraulic control points. Regulators and relief chambers are described in Section 1.1.4; major hydraulic control points are described in Section 1.1.5.

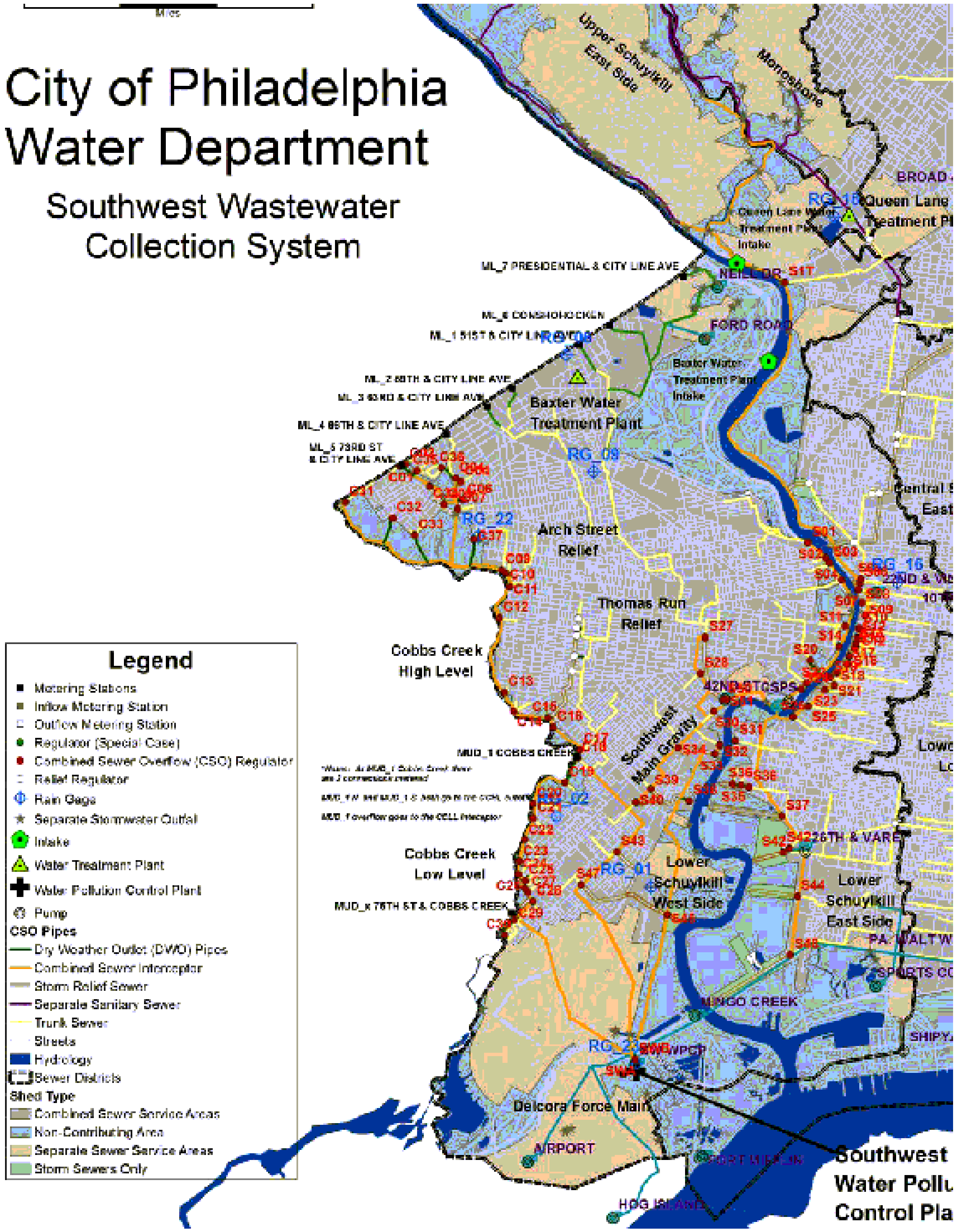
The combined sewer interceptors in the Southwest drainage district include the Central Schuylkill East Side (CSES), Central Schuylkill West Side (CSWS), Lower Schuylkill East Side (LSES), Southwest Main Gravity (SWMG), Cobbs Creek High Level (CCHL), and Cobbs Creek Low Level (CCLL). The CSES, CSWS, and LSWS interceptors are all tributary to the Central Schuylkill Pumping Station, which pumps to the upstream end of the SWMG. The CCHL is also tributary to the SWMG, which conveys flow by gravity to the Southwest treatment plant. The CCLL and LSWS interceptors combine upstream from the Southwest WPCP pumping station, which lifts the wastewater from these interceptors into the preliminary treatment building to be combined with the flow from SWMG and the DELCORA force main. The Southwest Drainage District collects separate sanitary wastewater flows from the Wissahickon Low Level and Upper Schuylkill interceptors, including large areas outside the City. The suburban communities served by the Southwest WPCP are:

- DELCORA
- Lower Merion Township.
- Springfield Township.
- Upper Darby Township.

Cobbs Creek High Level: The CCHL interceptor begins in the westernmost sections of Philadelphia along Cobbs and Indian Creeks. Several small interceptors consolidate to form the main interceptor that runs parallel to Cobbs Creek. This interceptor, which once continued south along Cobbs Creek, heads east in the Cobbs Creek High Level Cutoff sewer along 60th Street until it combines with the SWMG interceptor.

Southwest Main Gravity: The SWMG interceptor begins at the force main from the Central Schuylkill Pumping Station and continues south to the Southwest WPCP. A tributary interceptor, which conveys flow from the Mill Creek drainage basin, enters the main SWMG interceptor at 47th Street and Grays Ferry Avenue. Wastewater from the DWOs of regulators S_50 and S_51 are pumped to the SWMG interceptor by the 42nd Street pumping station. The CCHL interceptor combines with the SWMG at 60th Street and Grays Avenue. Near the intersection of 70th Street and Dicks Avenue, the SWMG interceptor enters a dispersion chamber and becomes a triple barrel parallel sewer, which conveys the wastewater directly into the Southwest WPCP without additional inflows. There are gates on each of the three pipes at this dispersion chamber and currently the middle barrel is closed.

Figure 4 SW WPCP Interceptor System



3.d. Description of Wastes Accepted from Outside Collection System

The Southwest Plant receives wastes from outside its collection system from two (2) sources – septage and Tinicum Township Sludge. A description of each is as follows:

Septage

Trucked septage wastes are permitted to discharge their contents at the Southwest Plant under permit. Approximately 0.5 MG per year is received at SWWPCP.
Only sanitary sewage wastes may be discharged to the plant. This includes sanitary sewage wastes from septic tanks, septic holding tanks and chemical toilets. Commercial or industrial waste, other than sanitary sewage waste, may not be discharged.

It is prohibited to discharge wastes with any of the following characteristics:

- pH lower than 6 or higher than 9
- Containing in excess of 100 mg/L of non-polar fat, oil and grease, or any substances which may solidify or become viscous in the temperature range of 32 to 140 degrees Fahrenheit
- Containing gasoline, benzene, naphtha, fuel oil or other flammable or explosive liquids, solids or gases
- Containing any sludges, liquids or other substances originating from public or private water or wastewater treatment plants
- Containing any material considered to be a RCRA hazardous waste
- Having a temperature higher than 104 degrees Fahrenheit
- Containing any ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, paunch, manure or any other solids or viscous substances capable of causing obstructions or other interferences with the proper operation of the wastewater treatment plant

Tinicum Township POTW Sludge

Tinicum Township, under contact with PWD, periodically delivers thickened sludge from their POTW to the Southwest Plant. Approximately 0.34-million gallons at a dry weight of 52 tons per year are discharged to the Southwest Plant's mixing chamber # 2. This mixing chamber is the feed source to the twelve anaerobic digesters operated at the Southwest Plant. Combined flows to the mixing chamber also include primary and thickened, waste activated sludges from both the Southwest and Southeast plants. The Southeast and Southwest waste activated sludges combine in mixing chamber #1 prior to thickening via Dissolved Air Flotation Tanks.

The volume of sludge received from Tinicum Township comprises less than 0.1% of the total sludge volume handled at the Southwest Plant on an annual basis. The daily contribution is less than 1.0%. The water department's Industrial Waste Unit does require annual sludge analyses of the Tinicum

Township sludge. Among the list of required parameters are Aroclors 1221, 1017, 1232, 1242, 1248, 1254, 1260.

The analytical results from the 2004 and 2005 annual samples of the Tinicum sludge samples are as follows:

Tinicum Township POTW Sludge

Year	Aroclor 1221 ug/kg-dry	Aroclor 1017 ug/kg-dry	Aroclor 1232 ug/kg-dry	Aroclor 1242 ug/kg-dry	Aroclor 1248 ug/kg-dry	Aroclor 1254 ug/kg-dry	Aroclor 1260 ug/kg-dry
2004	<360	<360	<360	<360	<360	<360	<360
2005	<1000	<1000	<1000	<1000	<1000	<1000	<1000

3.e. Map and Description of Point and Non-Point Source Releases From Facility

As described below, the Southwest Plant contains sludge impoundments which, as indicated in the chart entitled *"Southwest October 2001 Sludge Samples",* has PCBs contained in some samples of the sludge. Although we believe that it is unlikely that the limited runoff from these impoundments which is directed into the headworks of the Southwest Plant represents a significant PCB contribution to the facility's overall load, we have included below a description of the impoundments together with available PCB information. As part of the Southwest Plant trackdown study, we intend to sample the impoundment runoff and analyze for PCBs.

Philadelphia Water Department Southwest WPCP Sludge Impoundment

The Philadelphia Water Department owns sludge impoundments at the Southwest Water Pollution Control Plant (8200 Enterprise Ave). These impoundments were used to store treated sludge during the 1950's and 60's, and have been inactive since. There are seven impoundments that are unlined, except for the natural clay layer beneath, which covers about 80 acres (see attached maps). The sludge is between 8-10 feet deep and totals approximately 1,100,000 cubic yards. In preparation for closing this site under the PA Recycling and Environmental Remediation Standards Act (Act 2), a Site Characterization Study was performed, and a Remedial Investigation/Baseline Risk Assessment Report is currently being generated. These reports are prepared by our consultant RETTEW Associates, and their findings are summarized below.

A groundwater well network comprised of 16 wells was developed around the perimeter of the impoundments with four rounds of quarterly sampling analyzed for a wide range of parameters. Analytical method 8082 (arochlor) was used for PCB testing with a detection limit of 0.5 ppb. The results are presented in the attached table. All of the samples analyzed were below the detection limit.

Three sludge samples were collected from three different depths within each impoundment. A similar arochlor method was employed for analyzing these samples, with varying detection limits based upon the moisture content of the sample. Numerous samples had measurable values above the detection limit for PCB 1248, 1254, and 1260. Results ranged from 2000 – 70,000 ug/kg. Attached is a table which details these results.

The nature and composition of the sludge explains why measurable quantities of PCBs were not found in the groundwater. The sludge is composed of organic waste solids that have very high carbon content and a very low permeability. Combine this with the fact that PCB compounds have an affinity for solids, (eg 1260 migrates in the sludge 2,500,000 times slower than water) explains the groundwater results.

When the surface water elevation in Lagoon B rises to specified levels, the water is pumped into a retention basin on the Biosolids Recycling Center property. This basin drains into the headworks of the Southwest WPCP for treatment. The configuration of the remaining impoundments allows for internal drainage so that no overflows occur from this area.

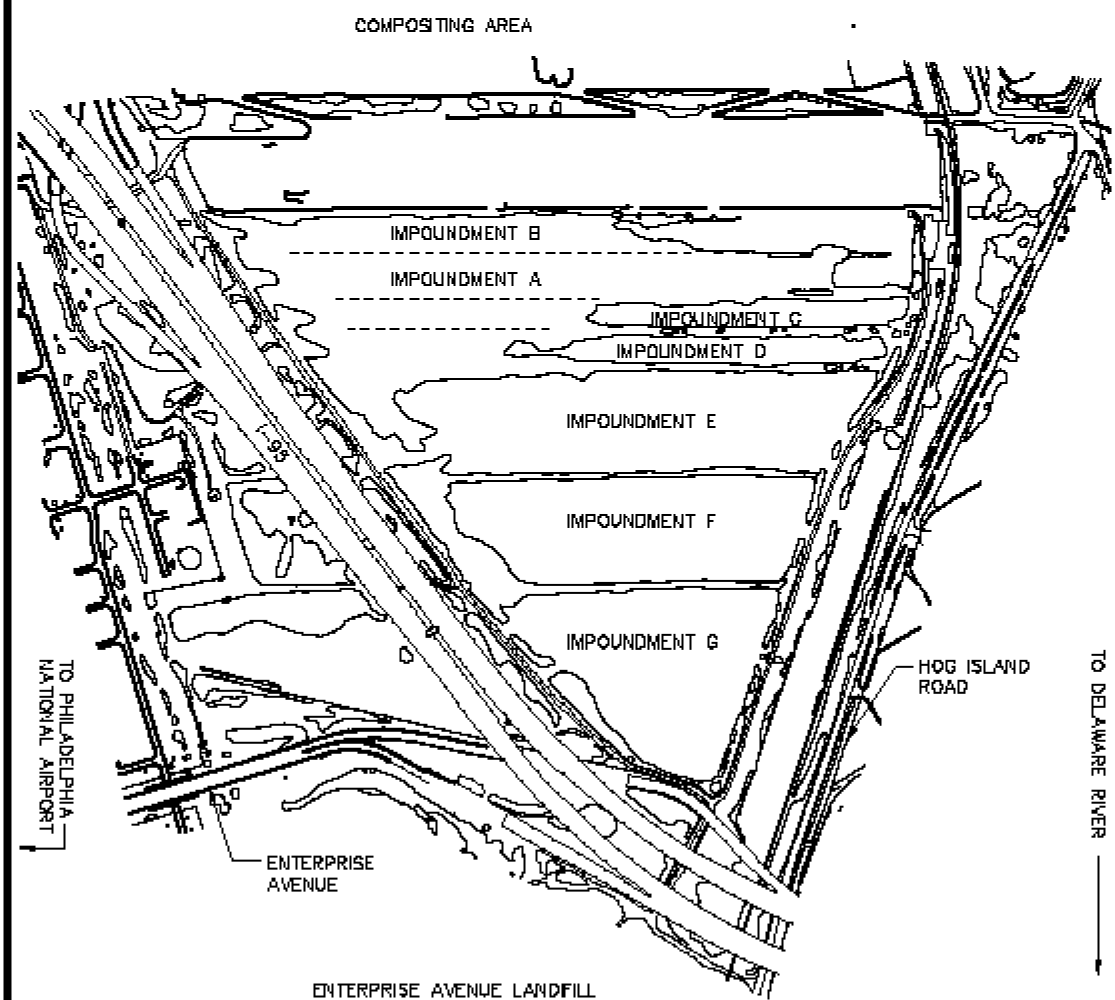


FIGURE 2

SCALE: 1"=500'

PWD - SWWPCP CLOSURE PLAN

PROJECT NO: 981597-01

SITE MAP

RETTEW ASSOCIATES, INC.

H:\98\98159701\CADD\SWWPCP\FINAL REPORT FIGURES\98159701-FIGURES 2-4-6-7.DWG

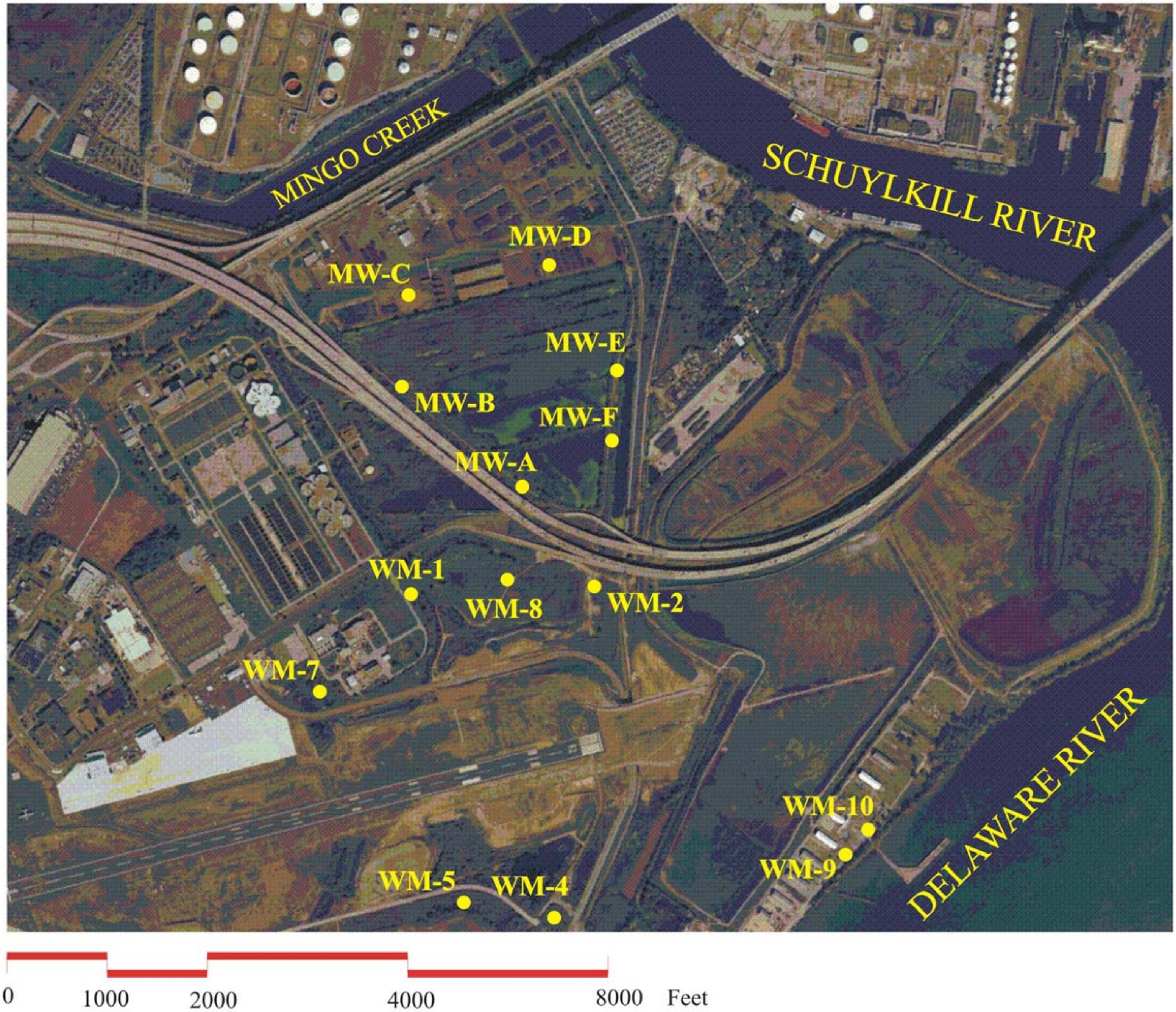


FIGURE 5

LEGEND

WM-4 Monitor Well

PWD - SWWPCP CLOSURE PLAN

PROJECT NO: 981597-01

Location of Regional Monitor Well Network

RETTEW ASSOCIATES INC.

SOUTHWEST GROUNDWATER SAMPLES

Location:			SW MW-AS		SW MW-AD		SW MW-BS		SW MW-BD		SW MW-CS		SW MW-CD		SW MW-DS		SW MW-DD		SW MW-ES		SW MW-ED		SW MW-FS		SW MW-FD		SW MW-1D		SW MW-1M		SW MW-2D		SW MW-2M
Sample type:			grab		grab		grab		grab		grab		grab		grab		grab		grab		grab		grab		grab		grab		grab		grab		grab
Jul-01																																	
PCB-1016	ug/L	<	0.49	<	0.48	<	0.48	<	0.47	<	0.49	<	0.47	<	0.47	<	0.47	<	0.49	<	0.49	<	0.47	<	0.49	<	0.47	<	0.48	<	0.49	<	0.47
PCB-1221	ug/L	<	0.49	<	0.48	<	0.48	<	0.47	<	0.49	<	0.47	<	0.47	<	0.47	<	0.49	<	0.49	<	0.47	<	0.49	<	0.94	<	1	<	1	<	0.94
PCB-1232	ug/L	<	0.49	<	0.48	<	0.48	<	0.47	<	0.49	<	0.47	<	0.47	<	0.47	<	0.49	<	0.49	<	0.47	<	0.49	<	0.47	<	0.48	<	0.49	<	0.47
PCB-1242	ug/L	<	0.49	<	0.48	<	0.48	<	0.47	<	0.49	<	0.47	<	0.47	<	0.47	<	0.49	<	0.49	<	0.47	<	0.49	<	0.47	<	0.48	<	0.49	<	0.47
PCB-1248	ug/L	<	0.49	<	0.48	<	0.48	<	0.47	<	0.49	<	0.47	<	0.47	<	0.47	<	0.49	<	0.49	<	0.47	<	0.49	<	0.47	<	0.48	<	0.49	<	0.47
PCB-1254	ug/L	<	0.49	<	0.48	<	0.48	<	0.47	<	0.49	<	0.47	<	0.47	<	0.47	<	0.49	<	0.49	<	0.47	<	0.49	<	0.47	<	0.48	<	0.49	<	0.47
PCB-1260	ug/L	<	0.49	<	0.48	<	0.48	<	0.47	<	0.49	<	0.47	<	0.47	<	0.47	<	0.49	<	0.49	<	0.47	<	0.49	<	0.47	<	0.48	<	0.49	<	0.47
Oct-01																																	
PCB-1016	ug/L	<	0.47	<	0.5	<	0.48	<	0.47	<	0.47	<	9.5	<	0.47	<	0.47	<	0.48	<	0.49	<	0.48	<	0.48	<	0.47	<	0.48	<	0.49	<	0.51
PCB-1221	ug/L	<	0.95	<	1	<	1	<	0.94	<	0.95	<	19	<	0.95	<	0.95	<	1	<	1	<	1	<	1	<	0.95	<	1	<	1	<	1
PCB-1232	ug/L	<	0.47	<	0.5	<	0.48	<	0.47	<	0.47	<	9.5	<	0.47	<	0.47	<	0.48	<	0.49	<	0.48	<	0.48	<	0.47	<	0.48	<	0.49	<	0.51
PCB-1242	ug/L	<	0.47	<	0.5	<	0.48	<	0.47	<	0.47	<	9.5	<	0.47	<	0.47	<	0.48	<	0.49	<	0.48	<	0.48	<	0.47	<	0.48	<	0.49	<	0.51
PCB-1248	ug/L	<	0.47	<	0.5	<	0.48	<	0.47	<	0.47	<	9.5	<	0.47	<	0.47	<	0.48	<	0.49	<	0.48	<	0.48	<	0.47	<	0.48	<	0.49	<	0.51
PCB-1254	ug/L	<	0.47	<	0.5	<	0.48	<	0.47	<	0.47	<	9.5	<	0.47	<	0.47	<	0.48	<	0.49	<	0.48	<	0.48	<	0.47	<	0.48	<	0.49	<	0.51
PCB-1260	ug/L	<	0.47	<	0.5	<	0.48	<	0.47	<	0.47	<	9.5	<	0.47	<	0.47	<	0.48	<	0.49	<	0.48	<	0.48	<	0.47	<	0.48	<	0.49	<	0.51
Jan-02																																	
PCB-1016	ug/L	<	0.47	<	0.48	<	0.47	<	0.47	<	0.47	<	0.5	<	0.48	<	0.47	<	0.5	<	0.47	<	0.48	<	0.48	<	0.47	<	0.47	<	0.5	<	0.47
PCB-1221	ug/L	<	0.94	<	1	<	0.95	<	0.94	<	0.95	<	1	<	1	<	0.94	<	1	<	0.94	<	1	<	1	<	0.95	<	0.95	<	1	<	0.95
PCB-1232	ug/L	<	0.47	<	0.48	<	0.47	<	0.47	<	0.47	<	0.5	<	0.48	<	0.47	<	0.5	<	0.47	<	0.48	<	0.48	<	0.47	<	0.47	<	0.5	<	0.47
PCB-1242	ug/L	<	0.47	<	0.48	<	0.47	<	0.47	<	0.47	<	0.5	<	0.48	<	0.47	<	0.5	<	0.47	<	0.48	<	0.48	<	0.47	<	0.47	<	0.5	<	0.47
PCB-1248	ug/L	<	0.47	<	0.48	<	0.47	<	0.47	<	0.47	<	0.5	<	0.48	<	0.47	<	0.5	<	0.47	<	0.48	<	0.48	<	0.47	<	0.47	<	0.5	<	0.47
PCB-1254	ug/L	<	0.47	<	0.48	<	0.47	<	0.47	<	0.47	<	0.5	<	0.48	<	0.47	<	0.5	<	0.47	<	0.48	<	0.48	<	0.47	<	0.47	<	0.5	<	0.47
PCB-1260	ug/L	<	0.47	<	0.48	<	0.47	<	0.47	<	0.47	<	0.5	<	0.48	<	0.47	<	0.5	<	0.47	<	0.48	<	0.48	<	0.47	<	0.47	<	0.5	<	0.47
Apr-02																																	
PCB-1016	ug/L	<	0.5	<	0.47	<	0.47	<	0.47	<	0.47	<	0.48	<	0.47	<	0.48	<	0.48	<	0.47	<	0.48	<	0.47	<	0.48	<	0.48	<	0.48	<	0.48
PCB-1221	ug/L	<	1	<	0.95	<	0.95	<	0.95	<	0.95	<	1	<	0.95	<	1	<	1	<	0.95	<	1	<	0.95	<	1	<	1	<	1	<	1
PCB-1232	ug/L	<	0.5	<	0.47	<	0.47	<	0.47	<	0.47	<	0.48	<	0.47	<	0.48	<	0.48	<	0.47	<	0.48	<	0.47	<	0.48	<	0.48	<	0.48	<	0.48
PCB-1242	ug/L	<	0.5	<	0.47	<	0.47	<	0.47	<	0.47	<	0.48	<	0.47	<	0.48	<	0.48	<	0.47	<	0.48	<	0.47	<	0.48	<	0.48	<	0.48	<	0.48
PCB-1248	ug/L	<	0.5	<	0.47	<	0.47	<	0.47	<	0.47	<	0.48	<	0.47	<	0.48	<	0.48	<	0.47	<	0.48	<	0.47	<	0.48	<	0.48	<	0.48	<	0.48
PCB-1254	ug/L	<	0.5	<	0.47	<	0.47	<	0.47	<	0.47	<	0.48	<	0.47	<	0.48	<	0.48	<	0.47	<	0.48	<	0.47	<	0.48	<	0.48	<	0.48	<	0.48

SOUTHWEST OCTOBER 2001 SLUDGE SAMPLES

Location:		SW LAGA1D	SW LAGA1M	SW LAGA1S	SW LAGA2	SW LAGA2M	SW LAGA2S	SW LAGA3D	SW LAGA3M	SW LAGA3S
Sample type:		grab	grab	grab	grab	grab	grab	grab	grab	grab
PCB-1016	ug/kg	< 8000.	< 4800.	< 5600.	< 5200.	< 7100.	< 5700.	< 7200.	< 7400.	< 6000.
PCB-1221	ug/kg	< 8000.	< 4800.	< 5600.	< 5200.	< 7100.	< 5700.	< 7200.	< 7400.	< 6000.
PCB-1232	ug/kg	< 8000.	< 4800.	< 5600.	< 5200.	< 7100.	< 5700.	< 7200.	< 7400.	< 6000.
PCB-1242	ug/kg	< 8000.	< 4800.	< 5600.	< 5200.	< 7100.	< 5700.	< 7200.	< 7400.	< 6000.
PCB-1248	ug/kg	13000.	6900.	7600.	24000.	14000.	10000.	15000.	15000.	9400.
PCB-1254	ug/kg	11000.	< 4800.	< 5600.	14000.	12000.	< 5700.	12000.	12000.	< 6000.
PCB-1260	ug/kg	10000.	14000.	7300.	8700.	9800.	13000.	10000.	12000.	8600.
		SW LAGB1D	SW LAGB1M	SW LAGB1S	SW LAGB2D	SW LAGB2M	SW LAGB2S	SW LAGB3D	SW LAGB3M	SW LAGB3S
PCB-1016	ug/kg	< 660.	< 690.	< 630.	< 740.	< 760.	< 620.	< 550.	< 590.	< 520.
PCB-1221	ug/kg	< 660.	< 690.	< 630.	< 740.	< 760.	< 620.	< 550.	< 590.	< 520.
PCB-1232	ug/kg	< 660.	< 690.	< 630.	< 740.	< 760.	< 620.	< 550.	< 590.	< 520.
PCB-1242	ug/kg	< 660.	< 690.	< 630.	< 740.	< 760.	< 620.	< 550.	< 590.	< 520.
PCB-1248	ug/kg	5500.	5000.	4000.	4500.	1400.	< 620.	5900.	4500.	3300.
PCB-1254	ug/kg	3700.	3700.	2000.	3400.	< 760.	< 620.	3700.	2900.	1900.
PCB-1260	ug/kg	6600.	4100.	2400.	2800.	1400.	< 620.	5800.	4500.	3800.
		SW LAGC1D	SW LAGC1M	SW LAGC1S	SW LAGC2D	SW LAGC2M	SW LAGC2S	SW LAGC3D	SW LAGC3M	SW LAGC3S
PCB-1016	ug/kg	< 6500.	< 6200.	< 6600.	< 5900.	< 6100.	< 6200.	< 7000.	< 7200.	< 5800.
PCB-1221	ug/kg	< 6500.	< 6200.	< 6600.	< 5900.	< 6100.	< 6200.	< 7000.	< 7200.	< 5800.
PCB-1232	ug/kg	< 6500.	< 6200.	< 6600.	< 5900.	< 6100.	< 6200.	< 7000.	< 7200.	< 5800.
PCB-1242	ug/kg	< 6500.	< 6200.	< 6600.	< 5900.	< 6100.	< 6200.	< 7000.	< 7200.	< 5800.
PCB-1248	ug/kg	18000.	< 6200.	15000.	< 5900.	< 6100.	< 6200.	< 7000.	< 7200.	< 5800.
PCB-1254	ug/kg	14000.	< 6200.	11000.	12000.	12000.	16000.	33000.	17000.	< 5800.
PCB-1260	ug/kg	16000.	15000.	14000.	11000.	11000.	14000.	33000.	16000.	9200.
		SW LAGD1D	SW LAGD1M	SW LAGD1S	SW LAGD2D	SW LAGD2M	SW LAGD2S	SW LAGD3D	SW LAGD3M	SW LAGD3S
PCB-1016	ug/kg	< 7200.	< 7400.	< 5400.	< 6500.	< 6600.	< 7700.	< 6000.	< 4900.	< 5600.
PCB-1221	ug/kg	< 7200.	< 7400.	< 5400.	< 6500.	< 6600.	< 7700.	< 6000.	< 4900.	< 5600.
PCB-1232	ug/kg	< 7200.	< 7400.	< 5400.	< 6500.	< 6600.	< 7700.	< 6000.	< 4900.	< 5600.
PCB-1242	ug/kg	< 7200.	< 7400.	< 5400	< 6500.	< 6600.	< 7700.	< 6000.	< 4900.	< 5600.
PCB-1248	ug/kg	< 7200.	< 7400.	< 5400.	< 6500.	< 6600.	< 7700.	< 6000.	< 4900.	16000.
PCB-1254	ug/kg	12000.	11000.	< 5400.	11000.	14000.	< 7700.	10000.	12000.	13000.
PCB-1260	ug/kg	12000.	14000.	17000.	12000.	15000.	17000.	9500.	13000.	21000.
		SW LAGE1D	SW LAGE1M	SW LAGE1S	SW LAGE2D	SW LAGE2M	SW LAGE2S	SW LAGE3D	SW LAGE3M	SW LAGE3S
PCB-1016	ug/kg	< 7500.	< 6200.	< 6100.	< 6300.	< 7600	< 5000.	< 6100.	< 7300.	< 790.
PCB-1221	ug/kg	< 7500.	< 6200.	< 6100.	< 6300.	< 7600	< 5000.	< 6100.	< 7300.	< 790.
PCB-1232	ug/kg	< 7500.	< 6200.	< 6100.	< 6300.	< 7600	< 5000.	< 6100.	< 7300.	< 790.
PCB-1242	ug/kg	< 7500.	< 6200.	< 6100.	< 6300.	< 7600	< 5000.	< 6100.	< 7300.	< 790.
PCB-1248	ug/kg	37000.	13000.	8500.	11000.	21000	22000.	26000.	21000.	2100.
PCB-1254	ug/kg	28000.	< 6200.	< 6100.	< 6300.	< 7600	< 5000.	18000.	< 7300.	< 790.
PCB-1260	ug/kg	18000.	17000.	8600.	15000.	32000	26000.	18000.	21000.	4000.
		SW LAGF1D	SW LAGF1M	SW LAGF1S	SW LAGF2D	SW LAGF2M	SW LAGF2S	SW LAGF3D	SW LAGF3M	SW LAGF3S
PCB-1016	ug/kg	< 7200.	< 7500.	< 7600.	< 6300.	< 7300.	< 5200.	< 7100.	< 7500	< 8400.
PCB-1221	ug/kg	< 7200.	< 7500.	< 7600.	< 6300.	< 7300.	< 5200.	< 7100.	< 7500	< 8400.
PCB-1232	ug/kg	< 7200.	< 7500.	< 7600.	< 6300.	< 7300.	< 5200.	< 7100.	< 7500	< 8400.
PCB-1242	ug/kg	< 7200.	< 7500.	< 7600.	< 6300.	< 7300.	< 5200.	< 7100.	< 7500	< 8400.
PCB-1248	ug/kg	25000.	26000.	15000.	22000.	19000.	16000.	25000.	31000	26000.
PCB-1254	ug/kg	< 7200.	< 7500.	< 7600.	< 6300.	< 7300.	< 5200.	< 7100.	< 7500	< 8400.
PCB-1260	ug/kg	64000.	30000.	25000.	33000.	34000.	26000.	59000.	73000	57000.

3.f. Facility tate and Federal Permit Numbers

PaDEP Site ID #: 451994
NPDES Permit No. PA 0026671

3.g. Name of Receiving Stream Including River Mile

The discharge of the Southwest Plant is received by the Delaware River at mile point 90.7

3.f. All Known Industrial Users of the Collection System and Permit Numbers

List of Industrial Dischargers in the Southwest Sewershed

FACILITY NAME	STREET ADDRESS	CITY	ZIP	STATE	PRETREATMENT PERMIT NO.
La France	8425 Executive Ave.	Philadelphia	19153	PA	LAFR00010843WS
ST Services	3400 S. 67th Street	Philadelphia	19153	PA	MARI00010987WS
Source Interlink	2001 W. Erie Ave.	Philadelphia	19140	PA	YEAG00010886WS
Sun Chemical	3301 Hunting Park Ave.	Philadelphia	19132	PA	SUNC00011138ND
Trigen Philadelphia Thermal Energy Corp.	2600 Christian Street	Philadelphia	19146	PA	PHIL01860929OM
Jefferson Smurfit Corporation	5000 Flat Rock Road	Philadelphia	19127	PA	CONT00020359WS
Penn Fishing Tackle Mfg. Co.	3028 West Hunting Park Avenue	Philadelphia	19132	PA	PENN00130821WS
Starlite Industries, Inc.	1111 Lancaster Avenue	Rosemont	19010	PA	STAR00011053WS
Manayunk Brewing Co.	4120 Main Street	Philadelphia	19127	PA	not permitted
Yard's Brewing Company	2439 Amber Street	Philadelphia	19125	PA	not permitted
Ottens Flavors	7800 Holstein Ave.	Philadelphia	19153	PA	not permitted
Procacci Bros	3655 S.Lawrence St.	Philadelphia	19148	PA	not permitted
Thomas Colace Co	19 E. Oregon Avenue	Philadelphia	19148	PA	not permitted
Amoroso Baking Company	845 S. 55th St.	Philadelphia	19143	PA	not permitted
Vincent Giordano	2600 Washington Ave.	Philadelphia	19146	PA	not permitted
Kissin Fresh Meats	140 E.Rrichmond St.	Philadelphia	19125	PA	not permitted
Exceptional Foods Inc.	210 E. Allen St.	Philadelphia	19125	PA	not permitted
Chemson	7825 Holstein Ave.	Philadelphia	19153	PA	not permitted
Frankford Candy	2101 Washington Ave.	Philadelphia	19146	PA	not permitted
M. Buono	3650 S.Third St.	Philadelphia	19148	PA	not permitted
Richards Apex	4204 Main St.	Philadelphia	19127	PA	RICH00010497OM
Philadelphia Gas Works - Passyunk	3100 Passyunk Ave.	Philadelphia	19145	PA	PHIL00070948
Marshall Laboratories (DUPONT)	3500 Grays Ferry Ave.	Philadelphia	19146	PA	EIDU00030950
Coyne Textile Services	4825 Brown St.	Philadelphia	19139	PA	COYN00010963
A. C. Kissling Co	161 E. Allen Street	Philadelphia	19125	PA	ACKI00011049OM
Gate Gourmet	8350 Executive Avenue	Philadelphia	19153	PA	DOBB00011082OM
LSG Sky Chefs	8401 Escort Avenue	Philadelphia	19153	PA	LSG00011081OM
G.J. Littlewood & Son, Inc.	4044 Main St.	Philadelphia	19127	PA	LITT00011052OM
Tasty Baking Co.	2801 W. Hunting Park Ave.	Philadelphia	19129	PA	TAST00010145OM
Sun Co. Schuylkill River Tank Farm	70th St. & Essington Ave.	Philadelphia	19145	PA	SUNC00031027OM
Mrs. Resslers	8400 Executive Ave	Philadelphia	19153	PA	MRSR00021121OM
City of Philadelphia Dept. of Commerce	Deicing Facility	Philadelphia	19153	PA	PHIL02911122TD

United Parcel Service	1 Hog Island Rd.	Tinicum	19153	PA	UNIT00121123TD
Precious Metals Plating., Inc.	21 South Chester Pike	Glenolden	19036	PA	205-M19
Multiflex Plating Company	109 Willows Avenue	Collingdale	19023	PA	2DC03-01
Bullen Chemical Company	1640 Delmar Drive	Folcroft	19032	PA	2DC-07-02
Hydrol Chemical	520 Commerce Drive	Yeadon	19050	PA	2DC-13-01
Keystone Silversmiths	100 Mill Street Suite #3	Clifton Heights	19018	PA	2DC-02-01
Kozmer Technologies, Ltd	20 Roberts Avenue	Collingdale	19023	PA	2DC-03-02
Penn Panel & Box Company	100 Willows Avenue	Collingdale	19023	PA	2DC 03-03
Sun Co. Darby Creek Tank Farm	Calcon Hook and Hook Roads	Darby	19023	PA	2DC-06-01
Lyondell Chemical Company	3801 West Chester Pike	Newtown	19073	PA	202-D30

Facilities in shaded area are DELCORA facilities.

PMP
Southwest Plant
Known Sources
Item 4

Two known sources of PCBs entering the Southwest Plant sewer shed are the intake of Schuylkill River water and the addition of ferric chloride as a treatment coagulant into the Belmont Water Treatment Plant and the resultant discharge of most of the plant's process wastes into the sewer. The remaining wastes are stored onsite in the plant's raw water basin which is periodically dredged. The wastes produced from the dredging operation are not sewered.

The intake of Schuylkill River water into the plant is best represented two ambient water samples were taken above the tidal dam and analyzed for PCBs in March, 2002 and October, 2002. The results were 1.636 and 1.857 ng/l, respectfully, for and average concentration of 1.75 ng/l. An average intake flow of 52 MGD into the plant results in an intake of PCBs of 344 mg/day. Based upon an approximate solids balance, we estimate 99 percent of the influent loading is captured within the treatment processes. Ten percent of that captured loading immediately settles in the raw water basin. Therefore, we estimate that approximately 89 percent, or 306 mg/day, of the Schuylkill River loading influent to the Belmont Plant is discharged into the Southwest Plant sewer shed.

The second source is discharge of spent ferric chloride, which contains PCBs in the delivered product, from the Belmont Plant into the sewer. The Belmont Plant uses ferric chloride as a water treatment chemical to coagulate and flocculate fine particle solids from the river water. PWD currently purchases ferric chloride from Kemiron. In 2001 PWD was informed by Eaglebrook (now Kemiron) that low levels of polychlorinated biphenyls were detected in the ferric chloride. The source of the ferric chloride is from the DuPont Edge Moor plant that produces ferric chloride as a by-product. The DuPont Company has analyzed their ferric chloride product for PCBs and estimates that the current concentration is 0.00055 mg/l. Based on the average dosage of ferric chloride and the average plant flow, the average contribution of PCBs to the plant is 10.68 mg/day. However, as described above, we estimate that the plant captures approximately 99 percent of the solids produced as a result of the chemical addition and all is discharged into the sewer. Therefore, we estimate that approximately 99 percent, or 10.6 mg/day, of the PCBs from the ferric chloride source is discharged into the Southwest Plant sewer shed.

The DuPont Company has already undertaken measures to reduce the concentration of PCBs in the ferric chloride produced from their Edge Moor Plant and has committed to further reductions. Their previous actions will be presented in *Section 7. Previous Minimization Activities* of this report. Their future plans will be presented in *Section 9. Pollutant Minimization Measures*.

PMP
Southwest Plant
Potential Sources
Item 5

Identification of potential sources of PCB focused first on those sources which stored PCBs in equipment. In addition to PWD's inventory of PCB containing equipment, we requested identification of such equipment from the following agencies:

1. Philadelphia Fire Department
2. Philadelphia Department of Public Health
3. USEPA (including the Mega Rule's database)
4. PaDEP
5. DRBC
6. Partnership for the Delaware Estuary
7. PECO

The following pages of the spreadsheet entitled *"List of Potential Sources, Item 5, Southwest Plant"* contain a complete listing of equipment containing PCBs resulting from the above request. PWD believes that considerable information concerning each source should be gathered and maintained in order to both understand the characteristics of the particular source as well as identify the owner who is responsible for its proper operation and ultimate disposal. PWD intends to gather the following information regarding each potential source:

1. Name of POTW in whose drainage shed the equipment is located
2. PWD identification #
3. Name of agency referring PCB source to PWD
4. Date of last inspection of equipment by PWD or its agent
5. Name of inspector
6. Name of company which owns equipment
7. Street address of facility where source is located
8. Township address of facility where source is located
9. Zip Code address of facility where source is located
10. GIS coordinates of facility where source is located
11. County address of facility where source is located
12. Name of site or complex where source is located
13. Name of building where source is located
14. Name of contact at site who maintains PCB equipment
15. Phone number of contact at site who maintains PCB equipment
16. Name of company official responsible for management of PCB equipment
17. Title of company official responsible for management of PCB equipment

18. Street address of company official responsible for management of PCB equipment
19. Township address of company official responsible for management of PCB equipment
20. State address of company official responsible for management of PCB equipment
21. Zip Code address of company official responsible for management of PCB equipment

(For PCB sources located in suburban townships which discharge into the PWD collection system)

22. Name of suburban utility under contract w/PWD
23. Location or name of connection to PWD System

For PCB sources located within Philadelphia

24. Name of Trunk Sewer connected to site
25. Name of Intercepting Sewer connected to site
26. Is the site in a combined or separate sewer district?
27. Name of agency responsible for management of pretreatment permit
28. Identification of pretreatment permit number
29. Type of PCB source/equipment
30. Number of identical PCB sources at location
31. Type of Aroclor contained in equipment
32. Total PCB concentration
33. Fluid volume (gal)
32. PCB mass (lbs)
33. PCB mass (kg)

Status of PCB equipment

34. In use
35. Out of service
36. Disconnected

Status of building housing PCB equipment

37. Operating
38. Closed
39. Abandoned/not secure
40. Comments including any past spills from source, or company plans regarding future of source, etc

The electronic copy of this spreadsheet contains columns to allow recording of the above information. All information currently available regarding each source has been incorporated into the spreadsheet. For ease of printing, only some of the columns have been identified in the printed version of this PMP.

Please see attached spreadsheet PCB Devices

PMP
Southwest Plant
Strategy for Identifying Unknown Sources
(Trackdown)
Item 6

As discussed in the Item 3.c., description and map or schematic of the collection system, the influent to the Southwest Plant consists of the following major collectors:

1. Southwest Main Gravity
2. Delcora Force Main
3. Southwest Low Level

Sampling of the Delcora Force Main will occur at the same location as directed by the NPDES permit which governs the operation of the plant.

NPDES sampling to represent the Southwest Main Gravity occurs near the confluence of that stream and the plant's pumped influent stream. There is some degree of uncertainly regarding the potential influence of the pumped influent at this sample location. Therefore, a new, single sample location has been chosen to represent the Southwest Main Gravity – near one the three influent main's flow metering station. The design of the chamber which causes the diversion of the Southwest Main Gravity flow into two or more of three gravity mains supplying the plant insures that all mains are representative of the flow. The proposed sampling location near the metering device is sufficiently distant form the connection with the pumping flow so that the sample will be representative of only the Southwest Main Gravity. If this new sample location proves to be successful, PWD will consider adopting it for future NPDES sampling.

Due the nature of the Southwest Low Level influent connection to the plant which does not provide reasonable, continuous access to an independent sample, the NPDES permit allows for the representation of influent quality to be determined by the sample from the Southwest Main Gravity. However, since the PCB trackdown effort is a special sampling program, PWD will make an effort to collect a sample which represents that stream. Towards that goal, PWD has been attempting to locate access manholes as near to the plant as possible. To date, we have not met with success and may be forced to sample up-stream in the collector. This may require us to take samples at several locations to insure that no influent stream is unrepresented by a sample. PWD will continue to evaluate the best sampling protocol to represent the Southwest Low Level and will define the locations prior to the start of sampling.

In addition to these collectors and as further described in item 3.e, the Northeast Plant contains on its site sludge impoundment basins whose runoff is directed into the plant for treatment. There is one runoff connection into the plant:

1. Lagoons Runoff

Additionally, all PWD biosolids produced from its three (3) wastewater treatment plants are directed to BRC for processing. All waste streams from BRC are directed to Southwest Plant for treatment. These waste streams include centrate from the dewatering process, liquid removed from the biosolids as part of the composting process and site runoff. There is one BRC discharge connection into the plant:

1. BRC Discharge

Furthermore, it is recognized that the waste activated sludge from the Southeast Plant is pumped directed into the Southwest Plant for thickening and digestion. The underflow from the dissolved air floatable (DAF) process is directed into the process stream of the Southwest Plant. As such, this represents a potential source of PCBs outside of the Southwest Plant collection system and should be sampled. However, the waste activated sludge from both the Southeast and Southwest Plants are commingled prior to entering the DAF process. A sample will be taken from the commingled process underflow. The results of the PCB analysis will compared to other plant influent sources and is expected to confirm that this source is significant.

1. Southeast/Southwest Commingled DAF Underflow

The plant effluent is represented by a single composite sample:

1. Plant Effluent

In addition to the above sample locations and due to the size of the Southwest Main Gravity sewer shed, the following sites will also be sampled in order to trackdown PCB within the sheds:

1. Southwest Main Gravity at Central Schuykill West Side
2. Southwest Main Gravity at Central Schuykill Pumping Station

All of the above locations will be sampled and analyzed for PCBs and suspended solids. This plan encompasses the Southwest Plant Phase 1 Trackdown study.

A diagram, entitled *"Southwest Water Pollution Control Plant, PCB Trackdown Program, Phase 1",* depicting the interceptors, lagoon runoff sewers and the planned sampling locations is attached to this section.

A description of the proposed sampling and analytical methods planned for the Phase 1 project are identified in the following package entitled "*Sampling and Analysis Plan for Polychlorinated Biphenly Congener Trackdown, Phase 1, Southwest Water Pollution Control Plant".*

It is PWD’s expectations that we will conduct the Phase 1 sampling effort in 2008. Any further investigations, i.e. Phase 2, will be dependent upon the results of the Phase 1 program.

PWD’s objective in conducting this trackdown program is to identify significant sources of PCBs in the sewer shed and to implement reasonable cost effective measures to mitigate the source. Since we are at the initial stage in the investigation, it is unclear as to what sources may be uncovered and, therefore, what might the nature of each source. Clearly, the nature of a source is relevant in considering what legal and physical options are available to PWD in achieving our goal. However, PWD will consult with PaDEP and other regulators in making this determination.

SAMPLING AND ANALYSIS PLAN FOR POLYCHLORINATED BIPHENYL CONGENER TRACKDOWN
PHASE 1
SOUTHWEST WATER POLLUTION CONTROL PLANT

Revised September 30, 2005

PHILADELPHIA WATER DEPARTMENT

Project Manager: **Bruce Aptowicz** ____________________________

TABLE OF CONTENTS

1 INTRODUCTION

The Pennsylvania Department of Environmental Protection requires, as a component of a PCB Pollutant Minimization Plan (PCB PMP) that large POTWs discharging to the Delaware River engage in a sewershed PCB trackdown study to locate significant PCB sources. To that end, a PCB trackdown committee has been formed to carry out this objective. This Sampling and Analysis Plan addresses the Phase 1 activities of the trackdown for PWD's Southwest Water Pollution Control Plant (SWWPCP) sewershed.

All samples will be submitted to the contract lab for Method 8082 PCB congener analysis and for total suspended solids using method 160.2. An attempt will be made to estimate the flow at each sampling point to calculate mass loadings at those sampling locations.

Since the direction of this program is dependent upon preceding results, we will conduct this effort in phases, with the details of each phase dependent upon the results of the prior phase. The first phase will consist of wet weather samplings. Wet Weather sampling has been selected for the first phase because dry weather samplings at the PWD's POTW effluents demonstrated very low amounts of PCBs present.

Regarding the analytical methodology, we will be using DRBC's analytical protocol described on their web site.

2 PROJECT MANAGEMENT

The project management structure is indicated in Table 1.

Table 1. Roles and Responsibilities of Key Project Personnel

Key individual	Title	Phone	Responsibility
Bruce Aptowicz	Deputy Director Operations Division	215- 685-6205	Provide overall project coordination
Keith Houck	Assistant Manager, Industrial Waste Unit	215-685-4910	Verify the proper collection of wastewater samples, verify proper post sampling activities
Earl Peterkin	Manager, Trace Organics Lab Bureau of Laboratory Services	215-685-1439	Oversee cleaning of all equipment, sample receipt, preservation, proper storage and shipping of all samples to the contract laboratory. Review field logs
William McKeon	Manager, Wastewater Treatment Plants	215-685-6258	Oversee all sampling from within the wastewater plants. Interpret significance of plant sample results
Chris Crockett	Manager, Office of Watersheds	215-685-6334	Oversee all input regarding collector system flow analysis. Interpret data from collection system samples.
Drew Mihocko	Manager, Collection System	215-685-6203	Provide input regarding physical details of the collection system.

3 SAMPLING ACTIVITIES

3.1 SAMPLING LOCATIONS

3.1.1 PRIMARY LOCATIONS

Two locations in the Southwest Low Level system, three locations in the Southwest Main Gravity system, one location in the DELCORA Force Main, one location in the Biosolids Recycling Center (BRC) centrate line and one location in the sludge lagoons runoff will be sampled. Two locations within in the SWWPCP will be sampled. Table 2 lists these locations.

3.2 DRY WEATHER SAMPLING (RESERVED)

3.3 WET WEATHER SAMPLING

3.3.1 SCHEME

A sample run start will be confined to a qualifying rain event that only occurs as a frontal system. A qualifying rain event is one which equals or exceeds 0.1 inch and whose duration is at least one hour and where there has bee no preceding rainfall within 72 hours of 0.01 inches or greater.

Sampling shall begin at the locations described in Table 2 immediately upon the above criteria being achieved. Two grab samples shall be taken 20 minutes apart at each location to catch the rising hydrograph that is occurring in the sewer. Before samplings are composited and submitted for analysis, there shall be a determination of the rising hydrograph at the SWWPCP influent made and adjusted for the travel time for each location. This confirmation assures that the samples taken at each of the 10 locations occur on a rising hydrograph of the storm event. Sampling will start at the top of the system so as to follow the same sewerage down the collector as it picks up additional flows from the trunked sewers. The two grabs from the interceptor (and the plant influent) locations will be combined in equal proportions with one another at the PWD's Bureau of Laboratory Services (BLS) at Hunting Park and Castor Avenues, Philadelphia.

3.3.2 SAMPLING DETAIL

- The PWD industrial waste unit (IWU) will conduct sampling. All sampling procedures will be conducted in accordance with the protocols detailed in this section.
- Dedicated, precleaned equipment will be used for each sampling location. Each sample container will consist of a food grade pint mason jar that has undergone an ultra cleaning at our central laboratory. The samplings will be transferred immediately to I-chem ultraclean bottle. No mason jars will be reused.
- Personnel handling the samples will wear a new pair of disposable powder-free surgical gloves with each sample collected.
- Sewage will be retrieved from the interceptors at manholes using nylon twine affixed to a new, precleaned one-pint mason jar. For those interceptor samples, a dedicated precleaned mason jar will be lowered

by nylon twine from the top of the manhole to the top of the sewage flow several times to retrieve sufficient volume to fill one liter ultraclean I-chem bottle. The filled I-chem bottle will be stored in a cooler, which will contain ice.

- A second one liter ultraclean I-chem bottle will be filled 20 minutes after the collection of the first sample, using the same sampling technique.
- A separate sample for total suspended solids (TSS) will be collected at each location sampled. Each sample will consist of a one-liter sample at the locations listed above.
- The PWD Bureau of Laboratory Services (BLS) will provide all clean glassware, store samples and undertake shipment when a contract laboratory purchase order is in place. BLS will conduct analyses for TSS.
- The contract laboratory will undertake all analyses except TSS. They will supply deionized water, ice coolers and shipping to and from BLS. This water shall be used for all blanks. One liter blank will be collected at each sample location from the rinseates of the mason jar used to retrieve that sample. One of the blanks will be sent on to the contract laboratory. All other blanks will be stored at BLS and their disposition will be dependent on the results of all samples.
- All samples will be transported to the central lab under ice. For each location, BLS will combine the two grab samples. The two grab samples will be combined by gently shaking/swirling the contents of each, and then immediately pour the contents of each into a laboratory prepared sample container. The combined sample will be identified as the respective manhole/plant sample.

Table 2. Location, timing and types of samples to be taken

Sampling location I.D.	Location	Approximate time of sample*	Type	Ratio of combining samples
1	Southwest Low Level @ Lower Schuylkill West Side	tbd*	2 grab samples	1 to 1
2	Southwest Low Level at 80th St. and Bartram Ave.	tbd*	2 grab samples	1 to 1
3	Southwest Main Gravity at Schuylkill West Side	tbd*	2 grab samples	1 to 1
4	Southwest Main Gravity at Central Schuylkill Pumping Station	tbd*	2 grab samples	1 to 1
5	Southwest Main Gravity at 69th St. and Buist Ave.	tbd*	2 grab samples	1 to 1
6	Delcora Force Main	tbd*	8-hour composite (every 20 minutes)	automatic composite
7	BRC Centrate Line	tbd*	8-hour composite (every 20 minutes)	automatic composite
8	SWWPCP Lagoon Runoff	tbd*	1 grab sample	N/A
9	SWWPCP DAF Underflow (SEWPCP WAS)	tbd*	1 grab sample	1 grab sample
10	SWWPCP Effluent	tbd*	8-hour composite (every 20 minutes)	automatic composite

* To be determined

3.4 EQUIPMENT AND MATERIALS

- 60 unused food grade two part metal top one pint mason jar
- 2 large volume glass jugs
- 18 liter I-CHEM series 300 amber bottles
- Disposable surgical gloves
- glass funnels (wide mouth for narrow mouth 1 liter bottle)
- Ice
- 30 gallon polyethylene bags
- Nylon twine spool
- Ice coolers and shipping (to be provided by contract lab)
- hexane
- methanol
- 3 isco composite samplers w Teflon lined tubing
- deionized water from contract lab
- non-phosphate detergent

3.5 EQUIPMENT CLEANING

Trace level PCB detection limits needed for this program warrant clean sampling procedures to minimize contamination during sample collection. Dedicated equipment will be used whenever possible. Field sampling equipment, if reused, will be cleaned as follows:

- non-phosphate detergent wash
- tap water rinse
- distilled/deionized water rinse
- hexane rinse (pesticide quality or better)
- air dry
- distilled/deionized water rinse.

3.6 QC REQUIREMENTS

3.6.1 BLANKS

One equipment blank that consists of the rinseate from the mason jar supply will be collected and submitted for analysis with the investigative samples.

Deionized water supplied by the contract laboratory will be used as a field equipment rinseate blank.

3.6.2 SAMPLE CUSTODY AND DOCUMENT CONTROL

3.6.2.1 FIELD LOG BOOK

In the field, the sampler will record the following information in the field log book (bound) for each sample collected:

- sample matrix
- name of sampler
- sample source
- time and date
- pertinent data
- analysis to be conducted
- sampling method
- appearance of each sample (i.e., color)
- preservation added
- number of sample bottles collected
- pertinent weather data
- precipitation and hydrographic flow data for rain events
- any other significant observations.

Each field logbook page will be signed by the sampler. BLS will review field logbooks for completeness.

3.6.2.2 SAMPLE LABELS

A unique sample numbering system will be used to identify each collected sample. See table 2.0. This system will provide a tracking number to allow retrieval and cross-referencing of sample information. Samples will be described/labeled as:
SWWPCP Collector-DRBC/EPA PCB TRACKDOWN AND MANHOLE LOCATION
Monitoring-date and time: Example for SWWPCP sample. SW-PCB-trackdown-wet Weather- May X, 2006 1300-A,B,C………………..
The time is that of the second of the two grabs at the location.

3.6.2.3 CHAIN-OF-CUSTODY FORMS

PWD-BLS laboratory services/Laboratory request form # 79-771 (chain of custody form) will be completed for all samples collected during the program. Additionally, chain of custody from the contract laboratory will be used to document sample handling from BLS to the contract laboratory. See Attachment for sample chain of custody form used by PWD.

4 SAMPLE ANALYSIS

4.1 SAMPLE PREPARATION BY BUREAU OF LABORATORY SERVICES (BLS)

The two grabs will be combined 50/50 by volume as follows: gently mix/swirl the contents of each 1liter I-chem jar to insure the sample is homogenized except for the larger volume SEWPCP influent, effluent and QL raw water basin composite samples.

Using dedicated pre-cleaned glass funnels transfer the appropriate sample from the 1-liter I-chem bottles to the appropriate 1-liter, I-Chem series 300 amber glass bottle as follows
:

1- 1 liter each of sewage at locations 1 through 5 and 9

1-1 liter of field/equipment rinseate blank,
1-1 liter of <u>reagent blank</u>(to be stored indefinitely)

Samples will be stored between 0 and 4^{o} C.

Samples will be logged into LIMS and assigned LIMS numbers.

4.2 ANALYTICAL METHODS

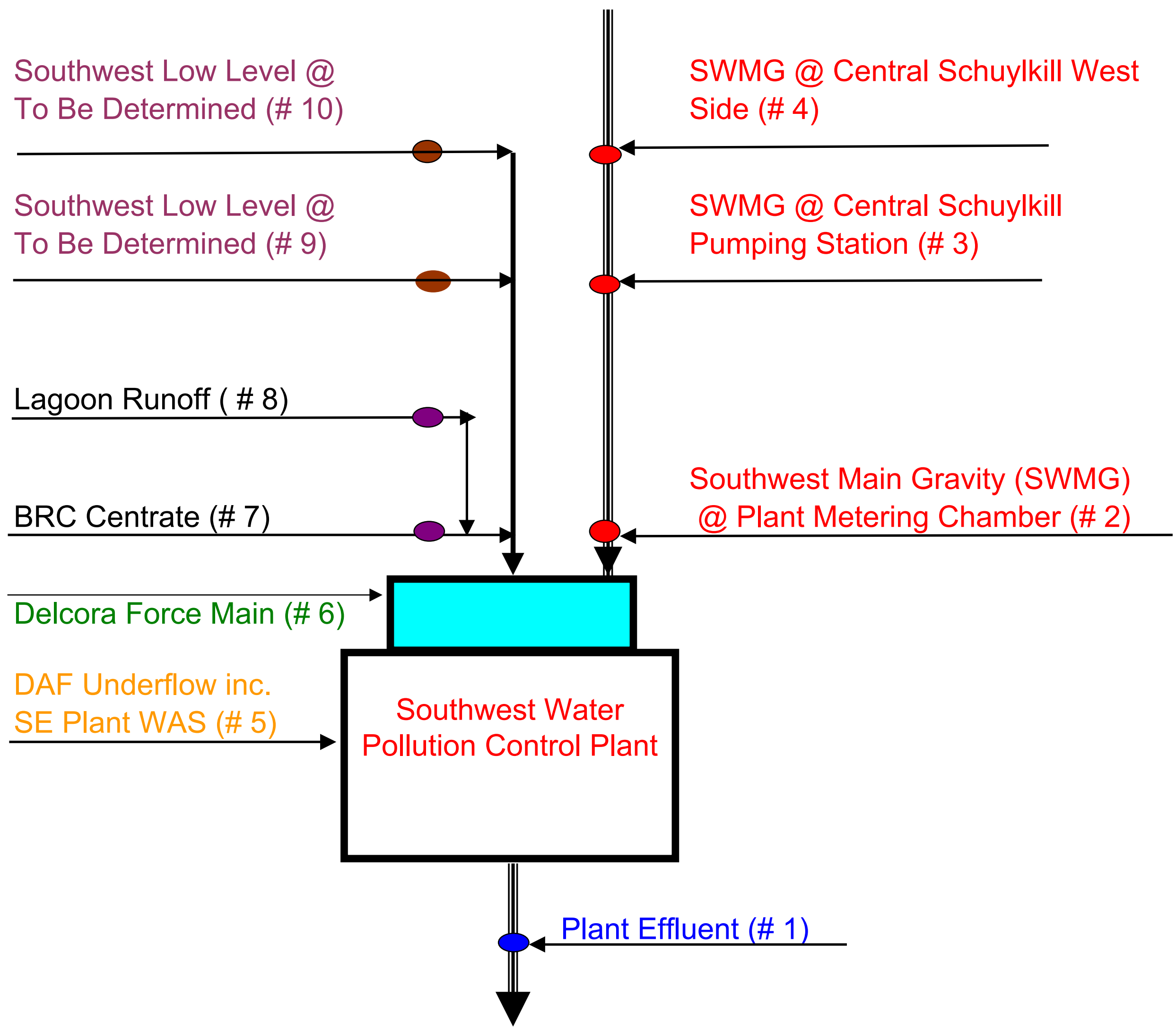
All samples will be analyzed by the contract lab using EPA Method 8082– Polychlorinated Biphenyls by Gas Chromatography. Additionally, all samples will be analyzed for Total Suspended Solids using EPA Method 160.2.

5 DATA ANALYSIS

The PCB monitoring data may provide us with a valuable tool in targeting potential sources within the Southwest WPCP drainage district. The PCB source contribution from each of the drainage areas feeding the interceptor between monitoring points will be determined by examining the data
This evaluation will enable us to identify any potential large influx of PCBs. Also the results of the PCB monitoring will be graphically represented by percentage of homolog group found at each monitoring location as well as by congener type. This interpretation hopefully will assist us in trying to fingerprint any mass produced PCB source. In addition, a mass balance analysis of solids and PCBs will be performed on a system wide basis. This will involve using estimated flows and solids concentration data from the sewers leading to Southwest.

TSS data will be used to characterize the sample as representative of wet weather influenced sewage and to perform a mass solids (TSS) balance on in-sewer loadings as compared to influent loadings as measured at the plant influent.

Southwest Water Pollution Control Plant
PCB Trackdown Program
Phase 1



PMP
Southwest Plant
Previous Minimization Activities
Item 7

As described in Section 4. Known Sources, the water treatment coagulant used at the Belmont Water Treatment Plant is produced by the DuPont Company. This product contains PCBs, most of which are captured by the water treatment processes and discharged into the Southwest Plant sewer shed. The Dupont Company reports the following activities to reduce the PCB concentrations in their ferric chloride.

In the spring of 2001 DuPont analyzed the ferric chloride by-product and found approximately 1.49 ppb of PCBs in the ferric chloride by-product. DuPont promptly launched a program to determine how PCBs are incidentally manufactured in the TIO2 process. The objective of the program is the virtual elimination of PCBs as technology becomes available with a focus on source reduction versus end of pipe treatment. The DuPont technical team developed several short terms process modification to reduce incidental manufacturing of PCBs and 15 long term options that could possibly reduce PCB generation by 90% from the 2001 levels.

The short term reduction effort was quickly implemented in 2002. The effort consisted of a change in raw material use (oil used to keep ore dust down), additional process controls, and installation of settling tanks. These actions reduced PCBs generation by approximately a 60%.

In order to obtain information regarding previous, ongoing or planned pollutant minimization activities, PWD wrote to a number of agencies who may have knowledge of such programs in the PWD sewer sheds as explained in this PMP report under Section 5. Northeast Plant, Potential Sources. The following activities were reported to us from those agencies.

In order to obtain information regarding previous, ongoing or planned pollutant minimization activities, PWD wrote to a number of agencies who may have knowledge of such programs in the PWD sewer sheds as explained in this PMP report under Section 5. Northeast Plant, Potential Sources. The following activities were reported to us from those agencies.

The Philadelphia Department of Public Heath provided PWD with several locations of historical PCB spill sites within the boundaries of the City of Philadelphia. These are listed in the following spreadsheet entitled *"PMP- SW PCB Sites – Health Dept"*. Many of these sites date back in time several decades and were quite small in nature, however they continue to be listed as PCB sites by the Health Dept. PWD's Industrial Waste Unit's inspectors will attempt to investigate the current environmental status of each of these sites over the first two years of this PMP. Sites which are believed to represent no further threat to the environment will be eliminated from the listing. Sites which continue to represent a threat will be characterized in future annuals reports together with any plans to further minimize the sources.

The PaDEP reports that they have a number of sites located within the Southwest sewer shed which are ACT 2 PCB Sites and should be reported in the PMP as possible sites for which previous minimization activities have occurred. A meeting, on September 5, 2005 was held between PWD and state officials, in response to PWD's letter, to discuss this inventory which is currently located on a rather large PaDEP Southeast Region database. The outcome of the meeting was that PWD would forward a set of possible descriptors for each site. PaDEP would use the descriptors to produce a listing of Act 2 sites. It was recognized that considerable effort on the part of PaDEP would be required to produce the listing and that the time required to complete the task might go beyond the window of time which we have to incorporate the results into our PMP. That is the current situation, PWD will incorporate the complete list of sites into our first annual report. Attached is a copy of the email entitled *"PMP – Identification of Known Sources, by Bruce Aptowicz"* which lists PWD's criteria.

It was agreed by all parties that this 5 year PMP would not require a site visit by PWD personnel as other PCB sources have higher priorities. However, should the trackdown effort result in the detection of a significant unknown source in a specific part of the Southwest sewer shed, we look examine PaDEP's ACT 2 listing for any nearby sites and inspect those sites as the potential sources of the unknown loading.

PMP - SW PCB Sites - Health Dept

WPCP	Location		Date	Amount
SW	67th & Linmore		1980	
SW	City Hall Annex		1980	
SW	Roxborough St.		05/22/89	
SW	Dupont Street above Henry Ave.		5/17/89	
SW	Surburban Station		10/1981	8,000 ppm - 279,000ppm
SW	18th & Callowhill		7/31/84	
SW	5101 Grays Ave.		1/21/91	30 gal
SW	16th & Arch Street		01/09/85	
SW	Powelton Railyard		10/27/88	4 small spills between 1984 - 88
	Eastern Electric -	126		
SW	S. 30th St.		09/27/90	
SW	Cargo City Sub Station		02/14/89	1 qt
SW	River Rd. & Delaware		05/07/84	
SW	Zoo Tower Amtrak- 38th & Pengrove		11/30/84	
SW	VA Hospital & Medical Center - University & Woodland Aves.		10/16/90	50 - 100gal (500,000) ppm
SW	Family Court - 1801 Vine St.		03/02/89	

Bruce Aptowicz

09/06/2005 01:18 PM

To: jefields@state.pa.us
cc: jnewbold@state.pa.us
Subject: PMP - Identification of Known Sources

Jennifer:

It was productive for us to meet with Bob, Jim and you, yesterday, as we create the PCB - PMP program for PWD. As we discussed, PaDEP will review your database of ACT 2 PCB sites and provide me with an electronic spreadsheet according to the following conditions:

The inventory of PCB sites will include all known sites within the boundaries of the City of Philadelphia

The inventory of PCB sites will also include all known sites within the boundaries of the townships which have combined sewer systems. It was our expectation that PCBs leaving a contaminated site would be caused by storm runoff and therefore be transported by the storm system, not the sanitary system. Therefore, PCBs discharging from a site in a suburban township which has separate systems would be the responsibility of the suburban township, not PWD. Unfortunately, we are not positive as which of our suburban township customers have combined sewers. It is our best understanding that none of the townships listed below have combined sewer systems. If PaDEP has information to the contrary, then please include the Act 2 sites located in those townships.

Jim suggested that very large sources of PCBs in any of our suburban customers should also be included since a release from such a site might also reach the sanitary sewers. The following list represents all of PWD's suburban township customers:

Northeast Water Pollution Control Plant

City of Philadelphia:

Zip Code	County	Township
18940	Bucks	Northampton & Newtown Township & Newtown Borough
18954	Bucks	Northampton
18966	Bucks	Southampton
19001	Montgomery	Abington
19006	Montgomery	Lower Southampton
19007	Bucks	Bristol Township
19020	Bucks	Bensalem
19046	Montgomery	Jenkintown
19047	Bucks	Hulmeville Borough & Langhorne Borough
19053	Bucks	Lower Southampton
19056	Bucks	Middleton Township
19054	Bucks	Levittown
19075	Montgomery	Oreland
19090	Montgomery	Willow Grove
19067	Bucks	Lower Makefield

Southeast Water Pollution Control Plant

City of Philadelphia:

Zip Code	County	Township
19038	Montgomery	Glenside
19095	Montgomery	Wyncote

Southwest Water Pollution Control Plant

City of Philadelphia:

Zip Code	County	Township
19038	Montgomery	Glenside
19008	Delaware	Broomall
19018	Delaware	Clifton Hts.
19023	Delaware	Darby
19026	Delaware	Drexel Hill
19029	Delaware	Essington
19032	Delaware	Folcroft
19033	Delaware	Folsom
19036	Delaware	Glenolden
19041	Delaware	Haverford
19043	Delaware	Holmes
19050	Delaware	Lansdowne
19057	Delaware	Wayne
19066	Montgomery	Lower Merion
19070	Delaware	Morton
19073	Delaware	Newtown Sq.
19074	Delaware	Norwood
19076	Delaware	Prospect Park
19078	Delaware	Ridley Park
19079	Delaware	Sharon Hill
19082	Delaware	Upper Darby
19083	Delaware	Upper Darby
19085	Delaware	Villanova
19087	Delaware	Wayne
19004	Montgomery	Bala Cynwyd
19010	Delaware	Bryn Mawr
19017	Delaware	Chester Heights
19035	Montgomery	Gladwyne
19096	Montgomery	Wynnewood
19444	Montgomery	Lafayette Hill

4. If information that is available to you in the database permits you to believe that the site was essentiall all cleaned to background levels, do not include that site.
5. We all concluded that the proper place within the PMP submission to list these sites was Section 7: *Previous, Ongoing or Planned Minimization Activities Voluntarily or Required by Other Regulatory Programs.* That section requests that the discharger provide the following information with each site listing. Please determine if your database can provide me with information:
   - the level of pollutant reduction attained
   - the level of pollutant reduction targeted
   - measures completed
   - measures underway
   - the schedule for planned activities
6. Additionally, I would suggest that the following information be provided for each site, if available via your database
   - Name of site, if any,
   - Company's name, if any

Street
Township
County
Zip Code
GIS coordinates
Whether the site met site specific standards or state health standards

7. PWD would then add the following information to characterize each site:
    Name of POTW which might be affected by site
    (For PCB sites located in suburban townships which discharge into the PWD collection system)
    Name of entity under whose contract with PWD permits wastewater in the vicinity of the site to discharge wastewater into PWD's collection system
    Location or name of downstream connection to the PWD's collection system
    (For PCB sites located within the City of Philadelphia's collection system)
    Name of the trunk sewer which transports wastes in the vicinity of the site
    Name of the intercepting sewer which transports the wastes in the vicinity of the site
    Name of stormwater outfall which transports the stormwater in the vicinity of the site
8. Additionally, we all concluded that this submission of the 5 year PMP would not require a site visit by PWD personnel as other PCB sources, and specially, the potential sources, have higher priorities.

As I mentioned yesterday, if you are able to gather the requested information and transmit it to me in about a week or two, I should be able to incorporate it into our submission. If your effort takes more time, I will simply reference this task in the PMP submission and incorporate the information into the PMP when it arrives.

Thanks.

Bruce

PMP
Southwest Plant
Recommendations for Action Under Other Regulatory Programs
Item 8

At this point in the PMP process, PWD does not envision the need for other regulatory authorities to take further actions in the mitigation of the currently listed known sources beyond the continued reduction of PCB concentrations in ambient sources waters.

However, should the trackdown effort result in the identification of a PCB source which is not in violation of the Department's Pretreatment Regulations, it is expected that PWD will request a meeting with the appropriate regulatory agencies to determine a proper course of action.

With respect to potential sources, we have identified two instances in Section 5 – Potential Sources in which the involvement of other regulatory agencies is recommended.

PWD will request a meeting with the DRBC, PaDEP and USEPA to discuss regulatory assistance towards requiring the electric service provider, to any facility which operates a PCB transformer, to notify PWD whenever one the referenced facilities requests that their high tension electrical power be shut down for an indeterminate period. If such an arrangement can be accomplished, upon notification, PWD will visit the facility and inquire as to the facility's plans for the transformer and provide information regarding the proper disposal of PCB equipment.

Secondly, upon identifying a facility, containing PCB equipment, which is closed or not secured, PWD will request a meeting with the DRBC, PaDEP and USEPA to discuss regulatory assistance towards minimizing the potential of PCBs from that equipment becoming released into the environment.

PMP
Southwest Plant
Pollutant Minimization Measures
Item 9

1. On-Site Known or Probable Sources

As reported in Section 3 of this report, the Southwest Plant has one probable on-site source of PCBs – the Southwest Plant Lagoons. Included in that section is some evidence to suggest that these lagoons are likely not a source of PCBs into the plant. However, as part of the Southwest Plant trackdown program, PWD will sample and analyze for PCBs in order to quantify their impact upon the plant. Should we determine that the lagoons represent a known source, we will consider employing appropriate filtering measures to the runoff – such as hay bales – to reduce the conveyed load of solids and PCBs into the plant

2. Collection System Known Sources

As described in Section 4. Known Sources, two known sources of PCBs were reported at this time. PaDEP has preliminarily identified additional ACT 2 sites – under past or current mitigation actions for PCBs - that may be the source of PCBs into the environment, but requires additional time to develop an appropriate spreadsheet to characterize each site. PWD will incorporate the PaDEP's list of ACT 2 sites into this PMP in the first annual report. However, should an outcome of the trackdown program result in the identification of an ACT 2 site as being the source of a significant release of PCBs into the sewer shed, PWD will request a meeting of all appropriate regulatory parties to determine a future course of action.

The first reported known source affecting the Southwest sewer shed is the transmission of PCBs from the Schuylkill River into sewer via treatment processes of the Belmont Water Treatment Plant. The Schuylkill River has been listed by the State of Pennsylvania as impaired due the presence of PCBs. As a result of this listing, state and federal agencies are working towards the development of a plan which will, upon implementation, result in a reduction in its ambient PCB concentration. PWD recognizes that this effort will, in all likelihood, take decades to demonstrate significant results. During the intervening time, the Belmont Plant, under direction from both the PaDEP and the USEPA, will continue to maximize the removal of solids from its drinking water supply - recognizing that such removal effectiveness also increases the capture of PCBs and their discharge into the sewer. PWD's economic analysis also indicates that the sewering of the Belmont Plant's waste solids – thereby utilizing the existing Southwest Plant's infrastructure to convey, separate, thicken, dewater and ultimately, dispose of the water plant's commingled solids – continues to remain the only economically feasible option.

The second known source of PCBs in the collection system is the water treatment coagulant used at the Belmont Water Treatment Plant which is produced by the DuPont Company. This product contains PCBs, most of which are captured by the water treatment processes and discharged into the Southeast Plant sewer shed. The Dupont Company reports the following future activities to reduce the PCB concentrations in their ferric chloride.

Since 2002, DuPont completed its evaluation of the long term options to reduce PCB at the source and is committed to implement a $15+million project in 2007. The project will consist of modifications to the industrial process. DuPont anticipates this project will reduce PCB generation by approximately 90% from the 2001 PCB levels in ferric chloride.

3. Potential Sources

PWD believes that the release of potential sources of PCBs into the environment represents a significant threat to the consistent reduction of PCB concentrations in the nearby rivers and streams. Indeed, in September of 1994, PWD was the victim of an illegal discharge of approximately 1000 pounds of PCBs into the Southeast sewer shed. The consequences of the discharge was overwhelming to our biosolids recycling program and undoubtedly resulted in significant quantities of PCBs being conveyed into the Delaware River.

However, PWD recognizes that it is the policy of this country not to require the removal of PCB containing devices (potential sources) when they used and maintained in a responsible manner.

Therefore, PWD believes that the most effective, but reasonable, manner to prevent a release of a stored quantity of PCBs from being illegally released into the environment is to take existing, but limited, federal programs of identification of PCB potential sources to a higher level.

Section 5 - Potential Sources of this plan identifies a plan to visit all current owners of PCB equipment and collect and record forty (40) descriptors for each source. The following tasks are proposed identify and control potential sources:

1. PWD will make a reasonable effort to obtain the requested information from the owners of the equipment. All gathered information will be incorporated into the referenced spreadsheet.
2. Inspectors from the Industrial Waste Unit will visit all listed sites either within the City of Philadelphia or sites located in the sewer sheds of those suburban townships that wholesale discharge sewerage into PWD's collection system for which PWD manages their pretreatment permit.
3. All such listed sites will be visited during this five year plan
4. PWD will attempt to enlist either the suburban community's wastewater utility or its fire code enforcement organization to visit the remaining suburban township sites and provide PWD with the requested information.

5. On the occasion of a visit to a site, PWD will disseminate information to the site contact individual regarding their obligations for proper disposal of the PCB equipment. We will request that the site contact individual notify PWD of any change in status of the PCB equipment.

6. If the site containing the PCB equipment has an industrial waste pretreatment permit with PWD, we will, on the occasion of their next permit renewal, insert language into the pretreatment permit which obligated the permittee to notify PWD if the status changes of the PCB equipment and to follow proper procedures when disposing of the equipment.

7. PWD will request a meeting with the DRBC, PaDEP and USEPA to discuss regulatory assistance towards requiring the electric service provider, to any facility which operates a PCB transformer, to notify PWD whenever one the referenced facilities requests that their high tension electrical power be shut down for an indeterminate period. If such an arrangement can be accomplished, upon notification, PWD will visit the facility and inquire as to the facility's plans for the transformer and provide information regarding the proper disposal of PCB equipment.

8. Upon identifying a facility, containing PCB equipment, which is closed or not secured, PWD will request a meeting with the DRBC, PaDEP and USEPA to discuss regulatory assistance towards minimizing the potential of PCBs from that equipment becoming released into the environment.

PMP
Southwest Plant
Source Prioritization
Item 10

Identified potential sources of PCBs have been prioritized in accordance with their decreasing weights of contained PCBs. Data used to compare PCB weights was limited, as only the USEPA and Philadelphia Water Department records contained information regarding the weight of PCBs contained within the devices. The files provided in Item 5 Potential Sources display the prioritized sites.

PWD will follow this prioritization in the scheduling of site inspections unless geographical convenience or scheduled inspections for the purpose of pretreatment inspections allows us to efficiently inspect sites in addition to those at the top of the list.

Two known PCB sites have been identified in Section 4 of this report. PWD will prioritize PCBs contained in ferric chloride used in the water treatment process.

PMP - ALL PLANTS   Key Dates   Item # 11

Tasks	Qtr 1-Yr 1	Qtr 2-Yr 1	Qtr 3-Yr 1	Qtr 4-Yr 1	Qtr 1-Yr 21	Qtr 2-Yr 2	Qtr 3-Yr 2	Qtr 4-Yr 2	Qtr 1-Yr 3	Qtr 2-Yr 3	Qtr 3-Yr 3	Qtr 4-Yr 3	Qtr 1-Yr 4	Qtr 2-Yr 4	Qtr 3-Yr 4	Qtr 4-Yr 4	Qtr 1-Yr 5	Qtr 2-Yr 5	Qtr 3-Yr 5	Qtr 4-Yr 5
Trackdown (# 6)																				
Trackdown -Southeast Plant																				
Review of Final Plans for Phase 2																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 3, as needed																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 4, as needed																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Trackdown - Northeast Plant																				
Review of Final Plans for Phase 1																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 2, as needed																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 3, as needed																				
Sampling and Laboratory Analysis																				
Trackdown - Southwest Plant																				
Review of Final Plans for Phase 1																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Development of Phase 2, as needed																				
Sampling and Laboratory Analysis																				
Data Analysis and Further Study Determination																				
Discuss Findings with PaDEP and Others																				
Implement Agreed PCB Mitigation Procedures																				
Previous Minimization Activitiess (# 7)																				
Review PaDEP's Act 2 Sites and assign to POTW																				
Incorporate PaDEP's List of ACT 2 Sites Into PWD's PMP																				
Number of inspections of 31 PCB sites identified by Phila. Health Dept.			10				10				11									
Remove a site from the list if it does not represent a threat																				
Identify activities to mitigate potential threat from remaining sites																				
Implement above activities																				
Pollutant Minimization Measures (# 9)																				
Northeast Plant - determine PCB Loading from lagoons																				
Reduce PCB loading from Lagoons, as necessary																				
Southwest Plant - determine PCB Loading from lagoons																				
Reduce PCB loading from Lagoons, as necessary																				
Reduce PCB Concentration in FeCl3 by 90% from 2001 Levels																				
Reduce PCB Concentration in Schuylkill and Delaware Rivers (by others)																				
Number of Inspections of 377 City-wide Potential Sources	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	2
Discuss w/ Suburban Townships their inspection of Pot. Sources																				
Suburban Township Inspections and data transfer																				
Revise Pretreatment Permits if they own a Potential Source																				
Meet w/ regulators to discuss receipt of info from Electric Comp.																				
Plant Effluent PCB Analysis																				
Conduct Plant Effluent Sampling (Method 1668a) Every 2 Years																				
Reports																				
Submit an Annual Report of PMP Activities																				

PMP
Southwest Plant
Measuring, Demonstrating and Reporting Progress
Item 12

12.1 Sampling and Analytical Approaches

PWD intends to utilize several different approaches to demonstrate progress towards achieving PCB minimization resulting from the implementation of our PMP.

As required by the PMP, we will sample the effluent of the plant once every two years and will analyze the sample for PCBs using Method 1668A. Reductions in the total PCB concentration over time may be an indicator program success. However, as the DRBC has correctly pointed out in their document entitled "*Recommended Outline for Pollutant Minimization Plans for Polychlorinated Biphenyls in the Delaware Estuary, Municipal Waste Water Treatment Plants and Publicly Owned Treatment Works",* analytical uncertainties may mask effluent reductions. Furthermore, wet weather samples will be collected and their PCB concentrations used in the analysis. However, the data indicates that there is far greater variability in the PCB concentrations of wet weather samples versus dry weather samples. Although there can be a number of causes of this variability, it is likely that the characteristics of each storm event (rainfall intensity, duration, etc) are significant factors. Since future wet weather sampling will cover a range of types of storm events (as long as each meets the requirements of a qualifying storm event), it is likely that the resulting PCB concentrations will contain significant variability due solely to the nature of each rain event.

Therefore, alternative approaches will be included in our annual reports to demonstrate progress.

As provided in the list of PCB potential sources, Item 5, there may be as many 157 sites in the Southwest Plant sewer shed housing PCB contained devices. Additionally, a number of these sites are reported to hold more than one PCB device. At this stage in the program, PWD is uncertain of the current existence of all of the reported devices, but we know that they were reported by the authorities to have existed in the not distant past and there is no reported knowledge on the part of those agencies that they have been removed. PWD will visit each site during the term of this plan and will report the number of devices that have been removed. If the institutional knowledge can provide us with the weight of the removed PCBs, we will report that value also.

Furthermore, PWD has stated concerns over the potential release of PCBs from vulnerable devices – i.e. those located at sites which are closed or abandoned or devices which have been deenergized or moved into storage. We have recommended that, upon identification of such devices, the regulators and ourselves discuss and implement procedures to minimize the risk of these PCBs from being released into the environment. At such, we will separately report the removal of any vulnerable devices.

PWD has reported two known sources. Both sources are discharged into the sewer shed from the Belmont Lane Water Treatment Plant. We will report any reduction in PCB concentrations in the waste streams from the water plant by both measuring the PCBs in the ferric chloride product as well as, using available DRBC ambient data, PCB reductions in the plant's source (Schuylkill River) water.

PWD has identified a number of sites from the Philadelphia Dept. of Public Health which, we believe, have undergone some form of prior remediation. PWD will inspect each site to either remove it as a potential liability for future PCB release or to recommend activities to reduce the potential risk. We will report the number of sites removed from the list or sites where further remedial action has been recommended or completed.

PWD's objective in conducting its trackdown program is to identify significant sources of PCBs discharged into our sewer shed and then, in cooperation with our regulators, determine and implement procedures to minimize or eliminate those discharges. PWD will report each reduction of PCB load into the shed.

12.2 Estimated Load

An estimate of the annual baseline load from the Southwest Plant has been determined by calculating the average wet and dry weather PCB concentrations in the plant effluent and then determining the flow for a typical year.

PWD recommends using the typical year flows for future year comparisons and calculations. By doing so, we remove, from the analysis, the variability in annual PCB loads caused by the variation in annual rainfall. Secondly, it is clear that the Southwest Plant will discharge a greater PCB annual loading if it increases its capture of stormwater and thereby increases its flows during wet weather. However, by accomplishing this goal, the environment will receive an overall benefit since the volume of untreated CSO discharge will be reduced. Of course, PWD has been directed, via its NPDES permit, to implement plans to minimize CSO discharge and is well on its way towards accomplishing this long term requirement. By using a typical year plant flow for the annual PMP analysis, we can properly focus our attention on progress towards reducing PCB concentrations in the plant effluent.

The following chart entitled *"Southwest Plant, Baseline PCB Plant Effluent Concentration (pg/l)"* provides our methodology for determining the baseline PCB concentration. PWD uses the PCB data collected in 2001 as the basis for its baseline concentration since that was the time frame in which PWD began to focus attention on reducing PCBs affecting its sewer shed. However, the analytical procedures employed to analyze that data set focused on only 85 congeners while more recent data (2005) required data from 209 congeners. In order to make the 2001 data reflect all 209 congeners, a procedure was employed to estimate the concentrations of the unanalyzed congeners in the 2001 data set by developing a ratio between the total concentration in the 85 congeners to the total concentration of the 209 congeners in the 2005 data set. That ratio was then applied to the 2001 data and an estimate of the concentration from 209 congeners was derived. It is estimated that the average baseline PCB concentration during wet weather is 22,076 pg/l while the average dry weather concentration is 9,929 pg/l.

In order to estimate plant flow for a typical year, PWD examined the annual rainfall patterns for the past 103 years and determined that the year 2000 exhibited close to the average annual rainfall while also providing relevant plant flow data, which were also near long term averages. The plant flow data was examined to identify flows consistent with rainfall events. The attached graph entitled *"SW WPCP Average Daily Flows – 2000"* identifies wet weather days. The average flow for wet weather days and dry weather days were then calculated together with the number of days in each category. Thus, in a typical year, the Southwest Plant experiences 138 wet weather days and 227 dry weather days, while the average plant flow in wet weather is 219 MGD and is 174 MGD in dry weather.

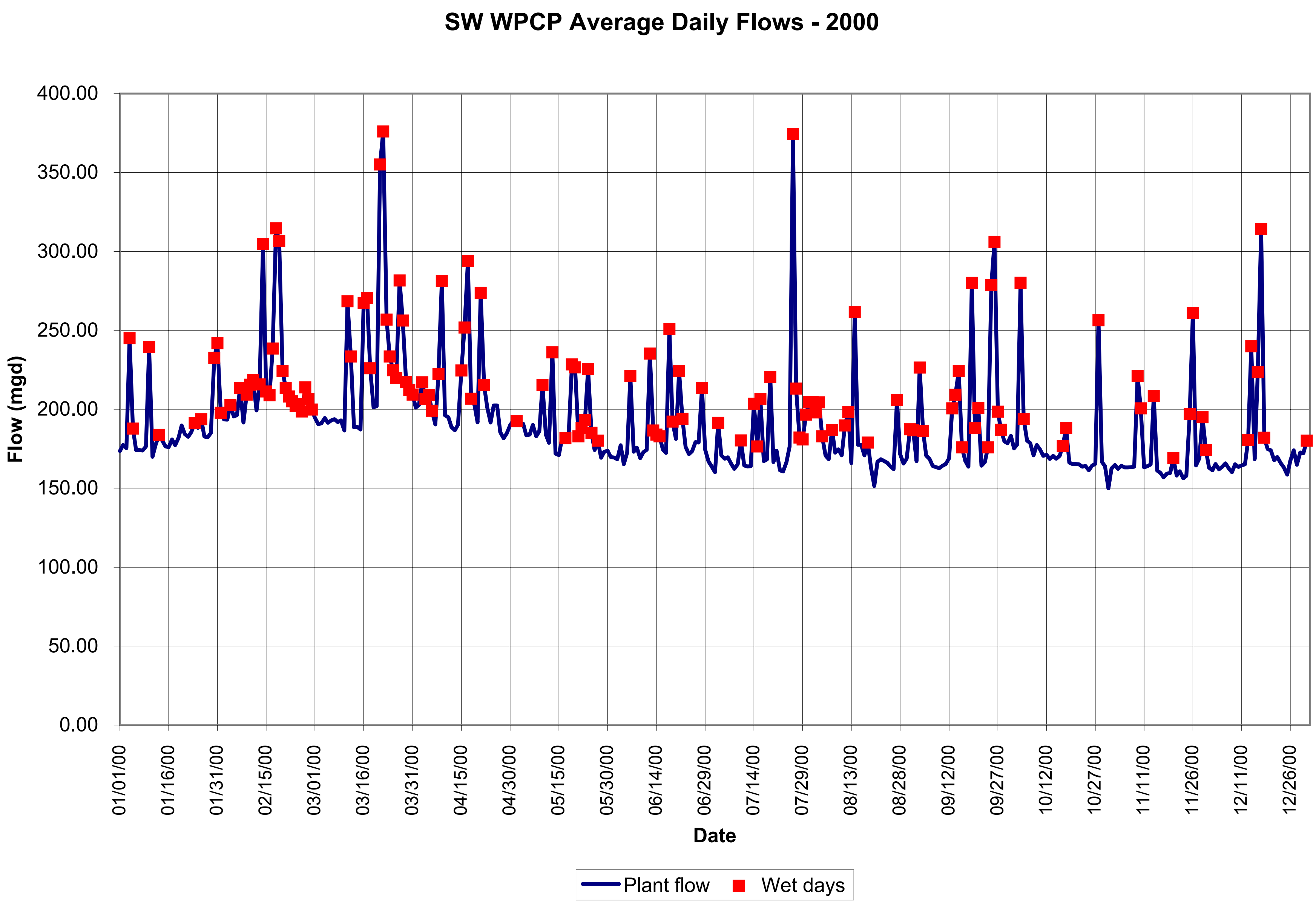
The attached chart entitled *"Southwest Plant, Baseline PCB Plant Effluent Loading (gm/yr)"* displays this data and calculates the baseline annual loading to be 4,004 gm/year.

12.3 Anticipated Reductions to Baseline Load

Currently, PWD has committed to a reduction in the PCB concentration in the ferric chloride product utilized in its Belmont Water Treatment Plant and which is then discharged into the sewer. We expect to experience a 90 percent reduction in concentration by the end of the third year of the program. Beyond that known source, PWD is uncertain as to the expected success of its ability to identify and, subsequently, minimize other sources and therefore cannot, with any degree of confidence, anticipate further reductions to baseline load. PWD is committed, however, to making every reasonable effort to achieve success of this program and is hopeful that its labors will result in significant load reductions.

12.4 Continuing Assessment

PWD will report progress towards PCB minimization in an annual report starting one year after the commencement of this PMP. Commencement of the PMP will start within 60 days of the receipt of a determination of completeness from the DRBC.



SW WPCP Average Daily Flows - 2000
Flow (mgd)
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
01/01/00
01/16/00
01/31/00
02/15/00
03/01/00
03/16/00
03/31/00
04/15/00
04/30/00
05/15/00
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07/14/00
07/29/00
08/13/00
08/28/00
09/12/00
09/27/00
10/12/00
10/27/00
11/11/00
11/26/00
12/11/00
12/26/00
Date
Plant flow
Wet days

Measuring, Demonstrating and Reporting Progress
Item # 12
Southwest Plant

Baseline PCB Plant Effluent Concentration (pg/l)

			Wet Weather				Dry Weather			
Line	**Year Samples Taken**	**Data**	**Sample # 1**	**Sample # 2**	**Sample # 3**	**Average**	**Sample # 1**	**Sample # 2**	**Sample # 3**	**Average**
1	**2005**	**Total of all 209 congener concentrations with positive values plus 1/2 detection level for all congeners with non-detections**	**3,975**	**11,049**	**6,881**	**7,302**	**3,155**	**3,436**	**5,340**	**3,977**
2	**2005**	**Using only the 85 (2001) congeners, total concentrations with positive values plus 1/2 detection level for all congeners with non-detections**	1913	6208	3566	**3,895**	1456	1569	2714	**1,913**
3		**ratio of Line 1 to Line 2**	2.08	1.78		**1.87**	2.17	2.19	1.97	**2.08**
4	**2001**	**Total of 85 congener concentrations with positive values plus 1/2 detection level for all congeners with non-detections**	7419	13805	14109	**11,778**	5673	4693	3960	**4,775**
5	**2001**	**Estimate of total concentration assuming analysis of 209 congeners (Line 3 multiplied by Line 4)**	15,417	24,571	-	**22,076**	12,290	10,281	7,793	**9,929**

All reported PCB concentrations **include** 'J' values, and 1/2 the detection limit for those cogeners reported as non-detect ('U')
In 2001, only 85 congeners were analyzed, while 209 were analyzed for in 2005

Measuring, Demonstrating and Reporting Progress
Item # 12
Southwest Plant

		Wet Weather		Dry Weather		Total
Baseline Flows (MGD)		219		174		
Baseline Flow Days per Year		138		227		
Baseline PCB Concentration (pg/l)		22,076		9,929		
Baseline PCB Loading (gm/year)		2,522		1,482		**4,004**

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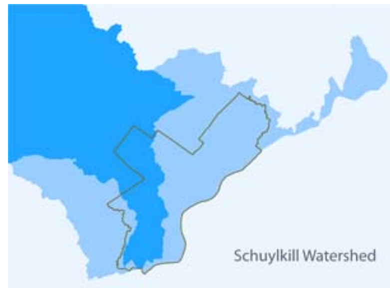
Appendix K
BMP Fact Sheets

Traffic Triangle Retrofit at 47th and Grays Ferry

Stormwater BMP Project Schuylkill Watershed



Contact

Amy Leib
215.685.6035
amy.leib@phila.gov

Partners:

PA Department of Environmental Protection (DEP)
Pennsylvania Horticultural Society (PHS)
Philadelphia Streets Department
University City Green (UCG)
University of Sciences in Philadelphia (USP)

Traffic Triangle Retrofit at 47th and Grays Ferry...

Traffic triangles are often under-utilized parcels within the urban landscape. The grass covered, but un-used traffic triangle at the intersection of 47th and Grays Ferry in West Philadelphia was retrofitted with a bioinfiltration garden to provide a gateway feature for the community and nearby university while managing stormwater from the adjacent streets.
Stormwater from Paschall Street and Grays Ferry Avenue is diverted into the traffic triangle through trench drains, where it can pond and infiltrate into the soil. The gardens are planted with carefully selected trees and shrubs that will tolerate the fluctuating conditions and provide year round interest as a gateway landscape.

Benefits:

- Reduces the flow of storm water into the combined sewer system through on-site infiltration, thus reducing overflows to the river.
- Reduces non-point source pollution from storm water runoff through vegetation and bioretention.
- Reduces nuisance flooding on Paschall Street
- Provides a gateway feature for the West Shore Neighborhood and University of the Sciences.

Clean Water........ Green City
www.phillyriverinfo.org

Allens Lane Arts Center Porous Pavement Demonstration

Stormwater BMP Project – Wissahickon Creek Watershed

Contact:

Joanne Dahme
(215) 685-4944
joanne.dahme@phila.gov

Partners:

- Fairmount Park Commission
- U.S. Environmental Protection Agency

Location:

601 West Allens Lane
Philadelphia, PA 19119

Allens Lane Arts Center Porous Pavement Demonstration

The Fairmount Park Commission has embarked on the complete reconstruction of the basketball court at the Allens Lane Art Center and teamed up with the Office of Watersheds to demonstrate pervious asphalt.

To improve the quality of the courts and reduce the volume of stormwater that flows into the Wissahickon Creek, the basketball courts will be retrofitted with porous asphalt over an infiltration bed. Rain that falls on the basketball courts will pass through the porous surface and be stored in a subsurface stone bed until it can soak into the ground, eventually helping to provide baseflow for the creek.

Benefits:

- The system is designed to capture most of the stormwater that falls on the two basketball courts, thereby reducing the volume and rate of stormwater that flows into Wissahickon Creek
- Rainfall is infiltrated, recharging groundwater and providing needed baseflow for Wissahickon Creek
- No puddles on the court, so players can play immediately after it rains.

PWD's Bureau of Laboratory Services

Stormwater BMP Project Tacony-Frankford Watershed

Contact

Glen Abrams
215.685.6039
glen.abrams@phila.gov

Partners:

Environmental Protection Agency (EPA)

PWD's Bureau of Laboratory Services...

The Habitat Creation and Stormwater Management Demonstration project at the Philadelphia Water Department Bureau of Laboratory Services (BLS) is divided into three sub-projects: 1) Meadow Creation; 2) Stepped Rain Garden; and 3) Porous Pavers and Vegetated Swale. Nearly 1/2 acre of turf was converted to meadow and runoff from about 28,500 square feet of parking area will be managed via vegetation and infiltration by retrofitting the existing facilities.

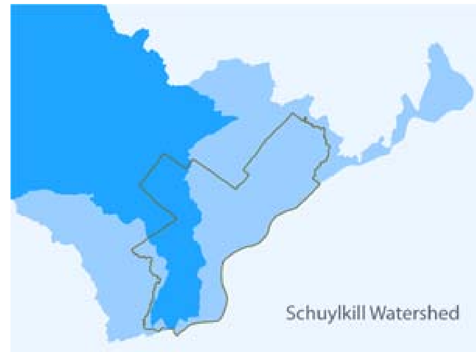
Benefits:

•Provides demonstration of how to retrofit a parking lot to improve stormwater management
•Provides demonstration of constructing bioretention gardens on a slope and in areas with slow infiltration rates
•Illustrates an alternative to the convention lawn, particularly for institutions and corporation

Clark Park Infiltration Bed

Stormwater BMP Project

Mill Creek Watershed



Contact: Ed Grusheski
215.685.6110
Ed.Grusheski@phila.gov

Status: Completed

Partners:

PA Department of Environmental Protection (PADEP)
Philadelphia Capital Program Office

Pennsylvania Department of Conservation & Natural Resources
Philadelphia Department of Recreation

Clark Park Infiltration Bed...

A subsurface infiltration bed beneath a new basketball court at Clark Park will manage stormwater runoff from the basketball court, as well as from an adjacent street and parking lot. The system has been designed to capture about 1.5” of rainfall from the contributing drainage area, but with well-drained soil, it is anticipated that actual stormwater capture will be much greater.

Benefits:

● Infiltration of stormwater runoff will reduce CSO volume in one of Philadelphia's largest combined sewer areas.

● Opportunity to monitor long-term performance of a stormwater management strategy most often selected by private developers.

● Example of integrating management of runoff from the street into a planned capital improvement project on a City facility.

Clean Water........ Green City
www.phillyriverinfo.org

Office of Watersheds

Philadelphia PWD Water Department

Cliveden Park

Stormwater BMP Project

Tacony-Frankford Watershed

Contact: Amy Leib
215.685.6035
amy.leib@phila.gov

Status: Completed

Partners:

Bank of America
Pennsylvania Department of Environmental Protection (PADEP)
Philadelphia Department of Recreation
Friends of Cliveden Park
Pennsylvania Horticultural Society (PHS)

Cliveden Park...

The stormwater demonstration project at Cliveden Park captures runoff from adjacent streets and uses the park's natural topography to detain stormwater before it flows into the combined sewer system. Small upland depressions provide water quality treatment and infiltration of stormwater, and a modified outlet structure allows water to pond in the existing wetland before it is slowly released. The system will provide stormwater volume removal through evapotranspiration and infiltration, and will reduce the flow rate to the combined sewer system during the small, frequent storms that cause the majority of combined sewer overflows. The system meets stormwater management objectives, enhances the existing wetland in the park, and is also provides an amenity for the park community.

Benefits:

•Combined sewer overflows are reduced through infiltration, evapotranspiration, and flow attenuation

•Stormwater filtration and water quality treatment

•Wetland and park enhancement

Clean Water........
Green City
www.phillyriverinfo.org

Riparian Restoration at Courtesy Stables

Restoration Project Wissahickon Creek Watershed

Contact

Phil Duzinski
215-685-4876
Phil.Duzinski@phila.gov

Partners:

Delaware Estuary Grant from the National Fish & Wildlife Fou
Friends of the Wissahickon (FOW)
Natural Resources Conservation Service

Riparian Restoration at Courtesy Stables...

The Courtesy Stables Runoff Treatment Project's aim was to correct a suite of problems contributing to nutrient-laden stormwater that flows from the barnyard through an adjacent wetland and into a tributary of the Wissahickon Creek. Stormwater is rerouted from the barnyard and surrounding area into a grassed waterway/filter strip where nutrients and sediment are removed and a portion of the water infiltrates into the ground before reaching the wetland. Flow from a springhouse was rerouted directly to the wetland, serving as a continuous source of clean water, rather than through the riding ring, where it adsorbs nutrients and creates muddy conditions. Invasive plant species onsite were removed and replaced with Philadelphia-native trees and shrubs and educational signage was erected, linking the nutrient runoff reduction to the improvement of the Delaware Estuary.

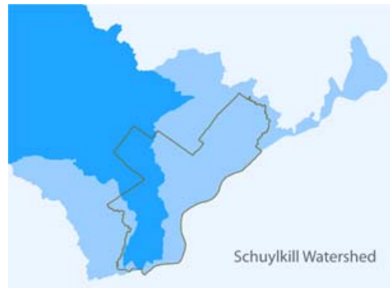
Benefits:

- Eliminate erosion from Courtesy Stables
- Reduced sediment, nutrient, and bacteria loads on the Wissahickon
- Enhanced stormwater infiltration
- Improved surface conditions for equestrian and pedestrian use areas
- Reduce grading and enhance stabilization through planting of native trees and shrubs
- Provide education through signage on linkage between stormwater runoff and downstream water quality

Clean Water........ Green City

Parking Lot in East Falls

Stormwater BMP Project Schuylkill Watershed



Contact

Glen Abrams
215.685.6039
glen.abrams@phila.gov

Partners:

PA Department of Environmental Protection (DEP)

Parking Lot in East Falls...

The City of Philadelphia will be constructing a 50-space parking lot to serve the East Falls commercial district and Kelly Drive recreational trail users. The lot was designed with a bioretention garden to manage all surface runoff. The soil and plants will cleanse the stormwater before it infiltrates into the ground or is discharged into the river.

Benefits:

•Provides highly visible demonstration of bioretention for parking lot runoff management
•Helps manage nonpoint source pollution in priority sourcewater area
•Acts as attractive gateway tEast Falls neighborhood

Riparian Restoration at Fox Chase Farms

Restoration Project Pennypack Watershed

Contact

Kelly Anderson
215-685-6245
Kelly.Anderson@phila.gov

Partners:

Fairmount Park Commission (FPC)
Natural Lands Restoration and Environmental Education Progra
Philadelphia School District (PSD)

Riparian Restoration at Fox Chase Farms...

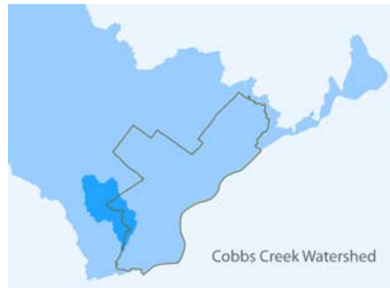
The Fox Chase Farm project involves the application of agricultural BMPs for the reduction of harmful pathogens and nutrients entering the Pennypack Creek from the farm runoff. Prior to project implementation, cows on Fox Chase Farm had free access to the tributary for drinking and cooling off and the surrounding pasture was mowed right to the tributary's edge. This combination resulted in extremely high concentrations of fecal coliform and E. Coli both within the tributary and in the Pennypack Creek downstream of the farm, in both wet and dry weather conditions. This project aims to reduce the impact of farm runoff on the Pennypack watershed through the construction of a cattle crossing over the tributary and the installation of a 1.85 acre riparian buffer along its approximately 430 yard length. In 2002, approximately 400 trees and 700 shrubs were planted on the farm, creating a 15 yard buffer on either side of the tributary for the cost of $13,000. In 2006, water lines were installed to further limit the impact of cows on the stream.

Benefits:

- Reduced concentration of nutrients and harmful pathogens from the farm entering the Pennypack Creek.
- Introduce new native plant species to the site
- Enhance biological habitat in the tributary and the Pennypack
- Create educational demonstration of agricultural best management practices for one of the nation's most reputable agricultural schools.
- Reduce temperature of water entering the Pennypack through the enhanced shading along the tributary

Stream Restoration of Cobbs Creek at Marshall Road

Restoration Project Darby-Cobbs Watershed



Contact

Marc Cammarata
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marc.cammarata@phila.gov

Partners:

Academy of Natural Sciences
ArmyCorps of Engineers
City of Philadelphia
Cobbs Creek Community Environmental Education Center (CCCEEC
Delaware River Basin Commission (DRBC)
Fairmount Park Commission (FPC)
PA Department of Environmental Protection (DEP)
Pennsylvania Environmental Council (PEC)
US Fish and Wildlife Service (USFWS)

Stream Restoration of Cobbs Creek at Marshall Road...

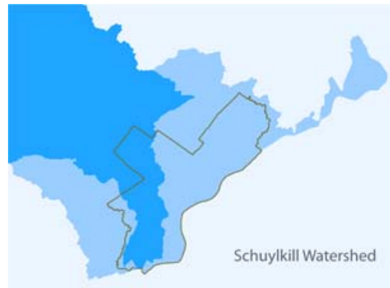
This project will implement a sustainable approach to stream habitat restoration that will mitigate the impacts of urban development and related hydrologic and hydraulic modifications. The Philadelphia Water Department has assembled a project team to develop an approach for the restoration of Cobbs Creek that encompasses the replication of natural hydrologic and ecological cycles, sustainability, enhancement to riparian and in-stream aquatic habitat, improved aesthetics, and significant cost savings over structural solutions. The results of this approach include not just stable stream bank geometry, but also long term ecological stability.

Benefits:

- A stable channel in dynamic equilibrium with it's surrounding watershed
- Stream bank stabilization measures featuring soil bioengineering and natural channel design measures that protect infrastructure and the environment
- A healthy, vegetated riparian zone to add biological diversity to the stream system.
- Enhanced, in-stream aquatic habitat
- Opportunities for the community to learn about stream ecology and morphology
- Increased habitat heterogeneity (pools, riffles, runs)

Porous Basketball Courts at Mill Creek Playground

Stormwater BMP Project Multiple Watersheds



Contact

Amy Leib
215.685.6035
amy.leib@phila.gov

Partners:

Councilwoman Blackwell
Pennsylvania Department of Environmental Protection
Philadelphia Recreation Department

Porous Basketball Courts at Mill Creek Playground...

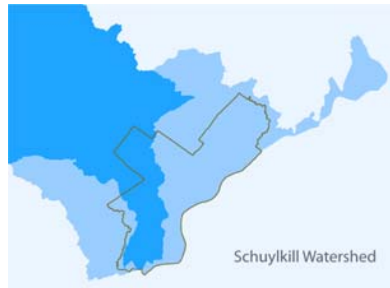
The Mill Creek Playground is heavily used by the community for sports, activities, and meetings. The site includes two basketball courts, play equipment, a recreation center, a baseball field and a swimming pool, which were all built above the streambed of the buried Mill Creek, which is now one of the largest combined sewers in Philadelphia. The basketball courts at the playground were cracked and deteriorating, with low spots that became puddles after storms. To improve the quality of the courts and reduce the volume of stormwater that flows into the combined sewer, the basketball courts were retrofitted with porous asphalt over an infiltration bed.

Benefits:

- 90 percent of the stormwater that falls on the courts infiltrates into the soil
- Opportunity for long-term monitoring and replication at other basketball courts in the City
- Courts dry immediately after rainstorm and create a better playing experience

Mill Creek Urban Farm

Stormwater BMP Project Schuylkill Watershed



Contact

Glen Abrams
215.685.6039
glen.abrams@phila.gov

Partners:

A Little Taste of Everything
Pennsylvania Department of Environmental Protection
Pennsylvania Horticultural Society (PHS)
Philadelphia Water Department
Project NEAT

Mill Creek Urban Farm...

The Mill Creek Urban Farm, on Brown Street between 49th and 50th streets, has revitalized 1.5 acres (11 city lots) of once vacant land. The farm improves consumer access to nutritious food while conserving natural resources and educating the community, local school groups, and the greater Philadelphia community about urban agriculture, stormwater management, and sustainable living.

The farm manages its own runoff as well as runoff from two adjacent streets in a vegetated infiltration swale along the perimeter of the property. A green roof on the farm building manages much of the roof's runoff, with the overflow collected in a cistern for irrigation. Other sustainable practices demonstrated at the farm include graywater reuse for irrigation, a composting toilet that converts waste into fertilizer for fruit trees, and other material and energy conservation practices.

Benefits:

- Combined Sewer Overflow reduction through infiltration and evapotranspiration of stormwater
- Nutritional access and education for the community
- Education about natural resource management and sustainable living
- Waste minimization and resource conservation

Monastery Stables

Stormwater BMP Project Wissahickon Watershed

Contact

Kelly Anderson
215-685-6245
Kelly.Anderson@phila.gov

Partners:

Boarders and Stewards of Monastery (BSM)
Fairmount Park Commission (FPC)
Friends of the Wissahickon (FOW)
Philadelphia Saddle Club (PSC)

Monastery Stables...

PWD is partnering with the FPC to address stormwater and agricultural runoff at this FPC property along the Wissahickon Creek. Lack of proper stormwater management controls, a sloping topography towards the bordering creek, and the intensity of horse activity on the site make Monastery Stables a potentially significant source of contamination to the Wissahickon Watershed. Before implementation, rainfall collected in the paddocks and discharged toward the Wissahickon through several eroded gullies, carrying sediment, nutrients, and harmful pathogens. This project introduced stormwater management controls to increase stormwater infiltration, and direct and treat stormwater runoff, reducing sediment, nutrient, and harmful pathogen loadings on the Wissahickon Creek.

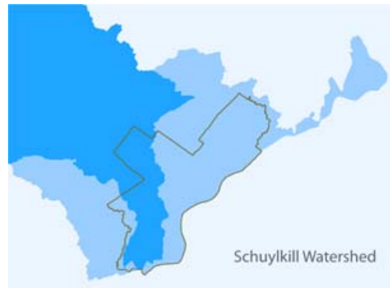
Benefits:

• Reduces concentration of nutrients and harmful pathogens from the farm from entering the Wissahickon Creek.
• Enhances biological habitat in the Wissahickon Creek.
• Contaminated stormwater runoff is managed through subsurface storage tanks and vegetated swales.

Clean Water........ Green City
www.phillyriverinfo.org

Rain Barrels & Tree Program on N. 50th Street in Mill Creek Wat

Education Project Multiple Watersheds



Contact

Joanne Dahme
215.685.4944
joanne.dahme@phila.gov

Rain Barrels & Tree Program on N. 50th Street in Mill Creek Watershed...

This education/implementation project demonstrated small measures homeowners can take to improve stormwater management in their neighborhood. Participating homeowners received rain barrels and street trees for their homes. The rain barrels were connected to their porch roofs and the trees were planted in new or vacant tree pits along the block.

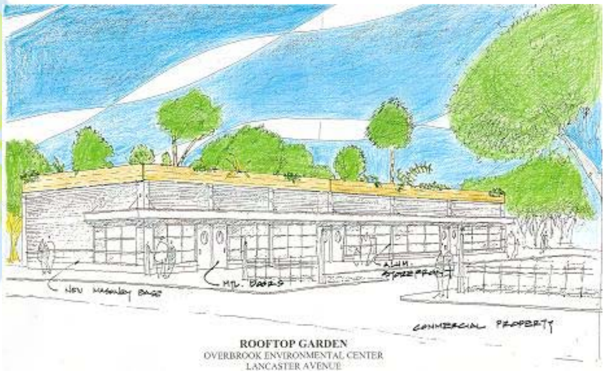
The project also included the re-grading of vacant parcels in the middle of the block to minimize stormwater runoff and create a community green space and gardens.

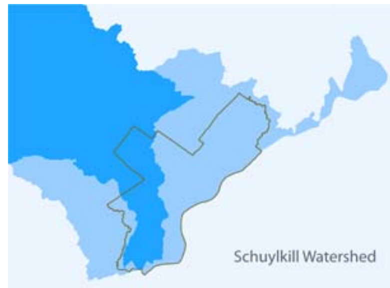
Benefits:

Demonstrate better grading and management techniques for vacant land
Increase tree canopy on rowhouse block
Educate homeowners about stormwater management

Overbrook Environmental Education Center

Stormwater BMP Project Multiple Watersheds





Contact

Laureen Boles
215.685.6268
laureen.boles@phila.gov

Partners:

Overbrook High School (OHS)
PA Department of Labor (DOL)

Overbrook Environmental Education Center...

The Overbrook Environmental Education Center, complete with native plantings, outdoor biology labs, and ‘green’ architecture, is not located on an urban commercial corridor by design. This Center demonstrates an innovative approach to quality of life issues, linking human and environmental conservation rather than viewing them as separate and distinct. The cause and effect of a poor environment affects not only the air we breathe, how we live, and what we drink, but our economy and thereby our quality of life.

Benefits:

• The development of the Overbrook Environmental Education Center is an opportunity to promote economic revitalization through environmental and community improvements.

ES&ED Verree Road Wetland and Parking Lot

Stormwater BMP Project Pennypack Watershed

Contact

Glen Abrams
215.685.6039
glen.abrams@phila.gov

ES&ED Verree Road Wetland and Parking Lot...

A parking lot located in the floodplain of Pennypack Creek was removed to restore a floodplain wetland in the riparian area. The parking lot was reconstructed on the opposite side of the road, outside of the floodplain. The new parking lot is surfaced with pervious gravel paving and has a rain garden that captures any rainfall that runs off the parking lot.

Benefits:

- Expands an existing wetland
- Eliminates direct discharge of polluted runoff from parking lot
- Demonstrates pervious gravel paving technique

Stormwater Treatment Wetland at Saylor Grove

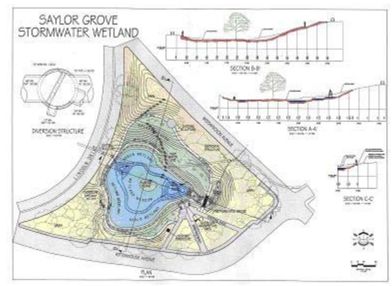
Restoration Project Wissahickon Creek Watershed

Contact

Marc Cammarata
215.685.4948
marc.cammarata@phila.gov

Partners:

Fairmount Park Commission (FPC)
Friends of the Monoshone (FOM)
Friends of the Wissahickon (FOW)
Natural Lands Restoration and Environmental Education Progra
PA Department of Environmental Protection (DEP)
Philadelphia Water Department - OOW
Senior Environmental Corp
Wissahickon Restoration Volunteers (WRV)



Stormwater Treatment Wetland at Saylor Grove...

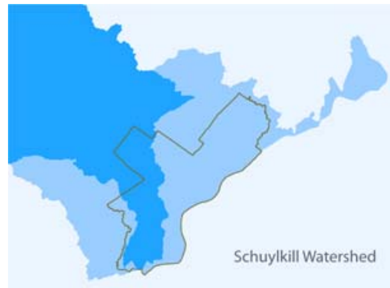
A one-acre stormwater wetland constructed in the fall of 2005 on a parcel of Fairmount Park known as Saylor Grove designed to treat a portion of the 70 million gallons of urban stormwater generated in the storm sewershed per year before it is discharged into the Monoshone Creek. The Monoshone Creek is a tributary of the Wissahickon Creek- a source of drinking water for the City of Philadelphia. 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 BMP Retrofit in the historic Wissahickon Watershed.

Benefits:

- Filter a large portion of the 70 million gallons of stormwater per year which runs off from the shed.
- Remove approximately 13 tons of total suspended solids from the Monoshone
- Increase the total area of wetland habitat in the watershed.
- Improve the aesthetics of the Saylor Grove area.
- Improve the flow variability of storm related flows on the Monoshone Creek.
- Increase the biodiversity of the park area.
- Create two outdoor educational signs about the importance of wetlands and their functions.
- Implement actions items of the Wissahickon River Conservation Plan.

School of the Future Green Roof

Stormwater BMP Project Schuylkill Watershed



Contact

Glen Abrams
215.685.6039
glen.abrams@phila.gov

Partners:

Delaware Valley Green Building Council (DVGBC)
Environmental Protection Agency (EPA)
Microsoft Corporation
StormCenter Communications

School of the Future Green Roof...

In 2003, the School District of Philadelphia announced an ambitious $1.5 billion capital improvement plan that includes construction of several new schools. The Delaware Valley Green Building Council and the Philadelphia Water Department worked with the District to implement environmentally sustainable building practices.

To better manage stormwater runoff, a green roof was installed over the performing arts wing. Green roofs are special roof systems that are designed to grow plants such as sedums and are useful for reducing runoff volumes. Stormwater runoff from the remainder of the school's rooftop is collected in a large holding tank (a cistern) and used to flush the toilets in the building, thus reducing the school's water demand.

Funding for this project was provided, in part, by the U.S. Environmental Protection Agency through a grant to the Philadelphia Water Department.

Benefits:

- Reduced stormwater runoff volumes
- Reduced demand for potable water
- Green roofs also offer other benefits including reducing energy usage for air conditioning, reducing sound reflection and transmission, providing habitat, and extending the service life of the underlying waterproofing system

Springside School

Stormwater BMP Project Wissahickon Creek Watershed

Contact

Amy Leib
215.685.6035
amy.leib@phila.gov

Partners:

Environmental Protection Agency (EPA)
Pennsylvania Horticultural Society (PHS)
Schuylkill Action Network (SAN)
Springside School

Springside School...

The Springside School project will install rain gardens and flow-through planter boxes to manage stormwater runoff from impervious areas at the school. The project design was funded through the Schuylkill Watershed Initiative Grant from the Environmental Protection Agency, and implementation is being undertaken by Springside School.

A rain garden is being created in the parking lot by removing the existing asphalt in an area that previously had a painted circle that directed traffic flow. The soil will be amended and the rain garden will be planted with native vegetation. A portion of the parking lot drains to the rain garden, where it will be able to infiltrate into the soil. As parking lot resurfacing projects are undertaken in the future, more runoff will be directed toward the rain garden. Additional projects to capture roof runoff in rain gardens and flow-through planter boxes are planned for Fall 2007.

Benefits:

- Parking lot rain garden reduces runoff volume through infiltration and evapotranspiration while providing traffic control and parking lot beautification
- Courtyard rain garden and flow-through planter boxes reduce peak rate of runoff, reduce runoff volume, and improve water quality.
- Implementation and monitoring of stormwater practices provide educational opportunities for students at Springside School

Waterview Recreation Center

Stormwater BMP Project

Tacony-Frankford Watershed

Contact: Jessica Brooks
215.685.6038
Jessica.K.Brooks@phila.gov

Status: Completed

Partners:

Pennsylvania Horticultural Society (PHS)

Philadelphia Department of Recreation

Waterview Recreation Center...

The Office of Watersheds is working with the Philadelphia Department of Recreation (PDR) and the Pennsylvania Horticultural Society (PHS) to incorporate stormwater management into Waterview Recreation Center's master plan in ways that can demonstrate effective stormwater management strategies while enhancing recreation programs and improving site aesthetics. The following components are incorporated into the plan:

1. A subsurface infiltration tree trench and new porous concrete sidewalk to provide management of street and sidewalk runoff and provide more tree canopy.
2. Flow through planter boxes adjacent to the main building entrance to manage roof runoff and beautify the entrance.

Benefits:

- Reduce stormwater runoff to Philadelphia's combined sewer system
- Provide neighborhood greening and beautification
- Implement Tookany/Tacony Frankford Integrated Watershed Management Plan

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Office of Watersheds

Philadelphia PWD Water Department

Riparian Restoration at W.B. Saul High School

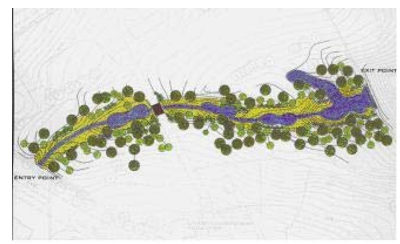
Project Wissahickon Watershed

Contact

Kelly Anderson
215-685-6245
Kelly.Anderson@phila.gov

Partners:

City of Philadelphia
Environmental Protection Agency (EPA)
Philadelphia School District (PSD)



Riparian Restoration at W.B. Saul High School...

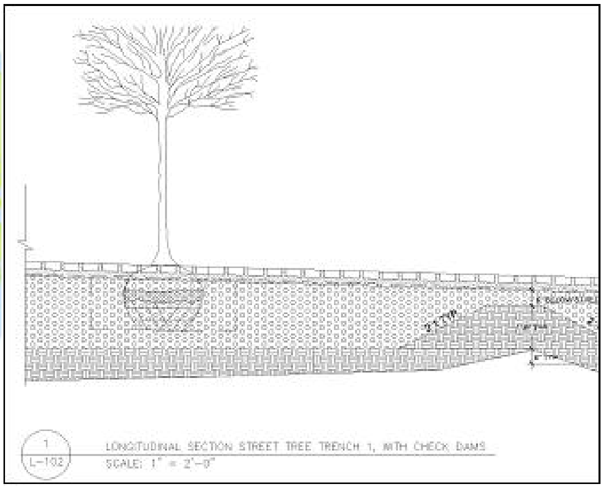
In FY04, PWD utilized a PADEP Growing Greener Technical Assistance Grant to complete a conceptual design to implement stormwater BMPs at this Agricultural High School in the Wissahickon Watershed. PWD is currently conducting wet weather monitoring at the project site prior to project implementation. This will allow for a quantitative assessment of the effectiveness of the BMPs upon completion of the project. The W.B. Saul High School project combines urban stormwater and agricultural BMPs to reduce the harmful impact of the school's runoff on the water quality of the Wissahickon Creek. Prior to discharging into the sewer, which then flows to the Wissahickon, agricultural runoff from the livestock and farming practices, as well as stormwater runoff from the school's roofs and parking lots, will be captured and treated through a series of long pools connected by wetland swales. This project will add a significant educational component to the curriculum of Saul High School, already one of the nation's premier agricultural high schools, by demonstrating proper management of agricultural runoff.

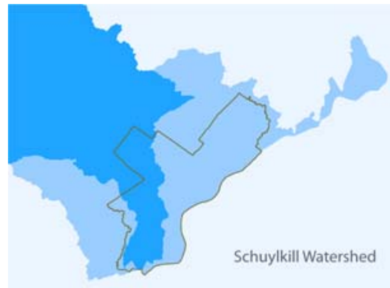
Benefits:

- Prevent nutrients and harmful pathogens caused by farming practices from entering the Wissahickon
- Improve water quality of urban stormwater runoff
- Introduce new native plant species to the site
- Provide educational demonstration of the proper management of stormwater and agricultural runoff
- Create aesthetically pleasing enhancement of the school's landscape

West Mill Creek Infiltration Tree Trench

Stormwater BMP Project Schuylkill Watershed





Contact
Amy Leib
215.685.6035
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Partners:

Pennsylvania Department of Environmental Protection
Pennsylvania Horticultural Society (PHS)
Philadelphia Department of Recreation

West Mill Creek Infiltration Tree Trench...

While most people recognize the shade, beauty, and air cleansing benefits of street trees, many do not realize that trees also reduce the amount of stormwater runoff that enters the City's sewer system. Trees perform this valuable function by intercepting rain on their leaves, branches, and trunks during a storm. They also play an important role in the hydrologic cycle by returning soil moisture to the atmosphere through evapotranspiration.

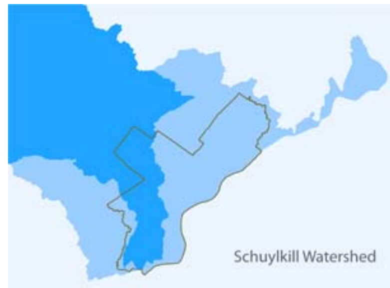
The trees at the intersection of Ogden and Ramsey Streets in West Philadelphia are planted in a way that manages even more runoff from the adjacent streets and wide sidewalks. Instead of being planted in isolated pits, the trees are planted in pockets of soil within in a continuous stone trench. The voids in the stone store stormwater until it can soak into the ground, and the continuous trench provides the tree roots with better access to air and water. Porous pavers replaced the concrete sidewalk over the trench and allow runoff from the sidewalk to flow into trench. Also, new stormwater inlets are designed to convey the street runoff directly into the trench, reducing the volume of runoff to the combined sewer system.

Benefits:

- Reduces stormwater volume, thereby reducing combined sewer overflows from the Mill Creek Sewer.
- Provides healthier conditions for urban street trees
- Adds tree canopy in a dense urban area, thereby reducing urban heat island effect and improving air quality.

Wissahickon Charter School

Education Project Schuylkill Watershed



Contact

Amy Leib
215.685.6035
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Partners:

Pennsylvania Department of Environmental Protection
Wissahickon Charter School (WCS)

Wissahickon Charter School...

Harmony Garden is an outdoor learning lab, recreation area, and stormwater management system at Wissahickon Charter School. Surface and subsurface infiltration basins recharge stormwater runoff from the school parking and give the students at Wissahickon Charter School an opportunity to learn and play in a natural environment at their school.

Benefits:

Baxter Treatment Plant Visitor Parking Lot

Stormwater BMP Project Delaware Watershed

Contact

Amy Leib
215.685.6035
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Baxter Treatment Plant Visitor Parking Lot...

Runoff from the new visitors' parking lot at Baxter Treatment Plant will be managed in a large bioinfiltration area designed to infiltrate most of the stormwater that reaches it. The bioinfiltration area will be planted with a native wildflower mix to maintain needed visibility while enhancing habitat on the plant property.

Benefits:

- Provides infiltration and volume removal of majority of stormwater from new parking lot
- Habitat restoration

Liberty Lands

Stormwater BMP Project Delaware Watershed

Contact

Amy Leib
215.685.6035
amy.leib@phila.gov

Partners:

Northern Liberties Neighborhood Association
Pennsylvania Department of Environmental Protection
Pennsylvania Horticultural Society (PHS)

Liberty Lands...

Office of Watersheds funded the development of a master plan for Liberty Lands in Northern Liberties that provides stormwater management while addressing community objectives for the park. The first portion of the plan to be designed and implemented is a performance stage backed by a vegetated stormwater management area that will be sized to capture runoff from park and surrounding streets. In the initial phase, only runoff from the park and a portion of one adjacent street will be directed to the management area. Runoff from 3rd Street will be intercepted by vegetated curb extended bumpout.

Benefits:

- Reduction of stormwater runoff to the combined sewer system in a neighborhood that suffers from flooding and basement back-ups
- Community amenity and greening
- Provide an example Green Street for Philadelphia

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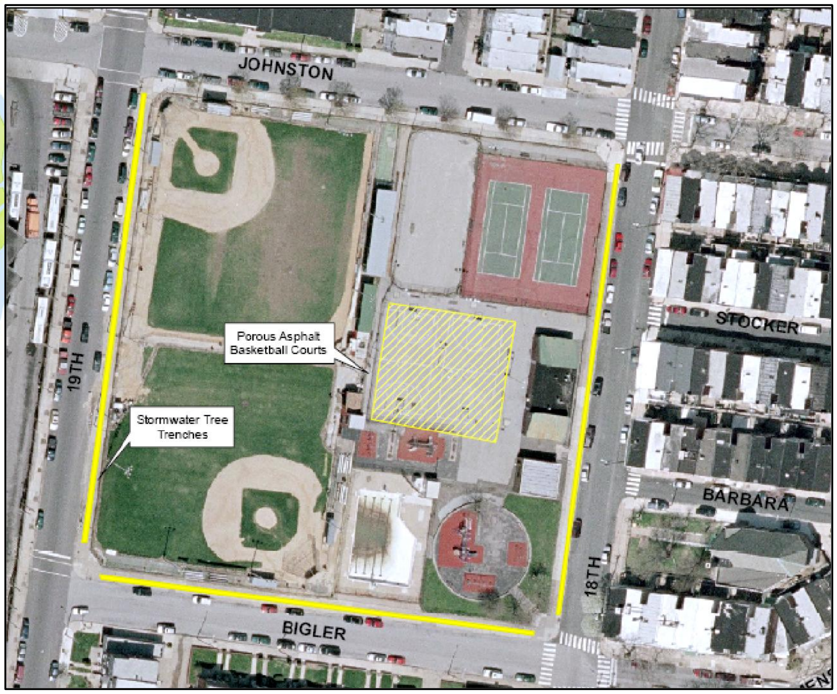
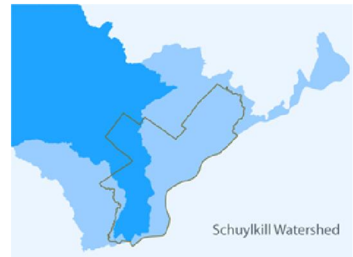
Office of Watersheds

Philadelphia PWD Water Department

Barry Playground Stormwater Management Improvements

Stormwater BMP Project – Schuylkill River Watershed





Contact:

Jessica Brooks
(215) 685-6381
jessica.brooks@phila.gov

Partners:

- Philadelphia Department of Recreation
- PA Department of Environmental Protection
- U.S. Environmental Protection Agency

Location:

Block bounded by 18th, 19th, Johnson, and Bigler Streets
Philadelphia, PA 19145

Barry Playground Stormwater Management Improvements

The Office of Watersheds, along with the Philadelphia Department of Recreation, has identified Barry Playground as a preferred demonstration site for targeted stormwater management improvements. The existing basketball courts are in a state of disrepair and currently drain directly to the overburdened combined sewer system. In addition, three street frontages around the playground are not planted with street trees.

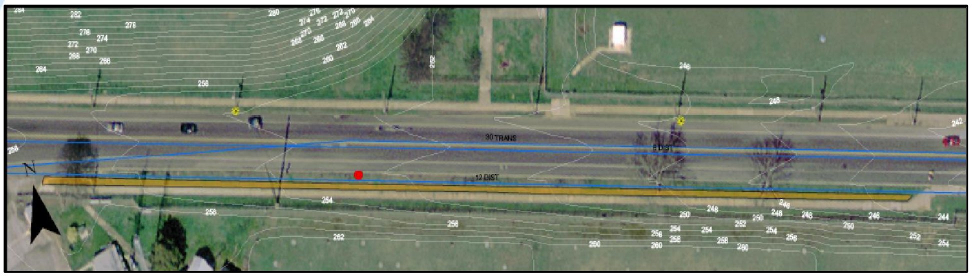
Planned improvements include replacing the existing basketball courts with pervious asphalt, both to assess the effectiveness of utilizing pervious pavements for combined sewer overflow reduction as well as to further the acceptance of this surface for court games. Furthermore, stormwater tree trenches/rain gardens will be installed along the three street frontages without trees to mitigate runoff from the surrounding streets. This effort is an important demonstration in Philadelphia's commitment to streetscape improvements that help manage stormwater runoff and is also an important component in PWD's combined sewer overflow long-term control plan.

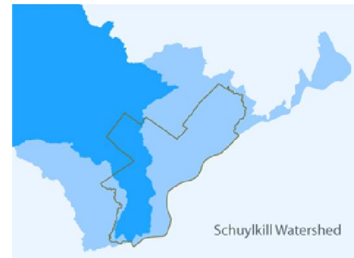
Benefits:

- Directly connect impervious area will be decreased by approximately 11,000 square feet by installing pervious asphalt
- Tree trenches will manage runoff from approximately 20,000 square feet of street and sidewalk area
- Additional landscaping and tree canopy cover provide visual interest, aesthetic appeal and mitigate the urban heat island effect

Belmont Water Treatment Plant Green Streets Project

Stormwater BMP Project – Schuylkill River Watershed





Contact:

Jessica Brooks
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jessica.brooks@phila.gov

Partners:

- PA Department of Environmental Protection
- U.S. Environmental Protection Agency

Location:

Belmont Avenue (2700 block); Ford Road (4100 block)
Philadelphia, PA 19131

Belmont Water Treatment Plant Green Streets Project . . .

Streets and sidewalks comprise about 40 percent of impervious surfaces within the City of Philadelphia. Managing runoff from these areas, all within the public right-of-way, will be an important component of meeting PWD's combined sewer overflow mitigation goals.

PWD intends on piloting "Green Streets", streetscaping projects that mitigate runoff through vegetated practices, to determine their effectiveness at reducing stormwater flows to combined sewer systems. It is also recognized that such practices should realize many other environmental and community benefits.

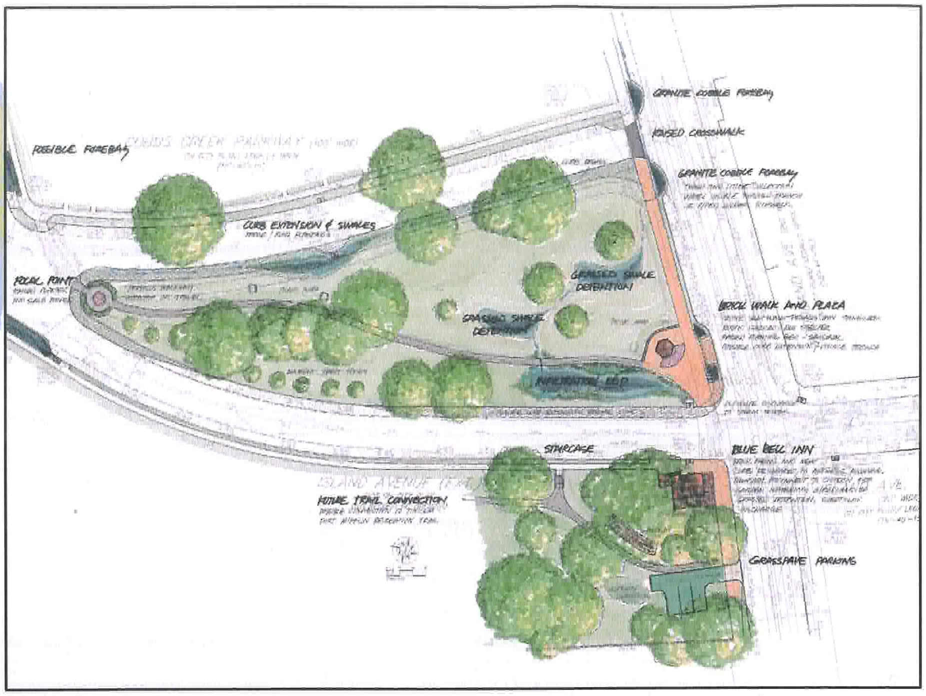
A first phase of the program will target several green street practices along street frontages at PWD facilities. At the Belmont Water Treatment Plant, vegetated curb extensions, tree trenches, and vegetated swales are proposed.

Benefits:

- Mitigates runoff from impervious surfaces within the public right-of-way
- Provides demonstration projects to inform larger-scale, long-term program
- Additional landscaping and tree canopy cover provide visual interest, aesthetic appeal, and mitigate the urban heat island effect

Blue Bell Tavern Triangle

Stormwater BMP Project – Cobbs Creek Watershed



Contact:

Jessica Brooks
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jessica.brooks@phila.gov

Partners:

- Fairmount Park Commission
- Pennsylvania Horticultural Society
- PA Department of Environmental Protection
- U.S. Environmental Protection Agency

Location:

Cobbs Creek Parkway and Woodland Avenue
Philadelphia, PA 19142

Blue Bell Tavern Triangle . . .

The historic Blue Bell Tavern dates to 1776 and was the scene of a Revolutionary War skirmish. General George Washington and many colonial travelers rested and ate at this well-known establishment. The Tavern is now located within Cobbs Creek Park and is maintained by the Fairmount Park Commission.

Across from the Tavern is a large triangle of land that will be designed to manage runoff from the surrounding roadways through a series of curb cuts, swales, and modified storm inlets. Options for creating curb bump-out rain gardens will also be explored as another measure to mitigate runoff and provide traffic calming on Cobbs Creek Parkway.

Benefits:

- Reduce stormwater runoff to Philadelphia's combined sewer system
- Enhance an underutilized green space and create community amenity
- Implement the Cobbs Creek Integrated Watershed Management Plan

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Cathedral Run Stream Restoration

Restoration Project

Wissahickon Creek Watershed

Contact: Erik Haniman
215-685-4877
Erik.Haniman@phila.gov

Status: Concept Design

Partners:

Fairmount Park Commission (FPC)

Philadelphia Water Department - OOW

Cathedral Run Stream Restoration...

Streambank restoration and stabilization of Cathedral Run is part of a larger comprehensive watershed management program. Restoration of the tributary would involve a detailed survey of the streambed and installation of appropriate structures such as rock vanes and channel-spanning, keystone-anchored, step structures to dissipate energy and protect eroding streambank. The macroinvertebrate community in Cathedral Run is severely impaired. Reduced sediment load will increase habitat heterogeneity vital for various macroinvertebrates. Once restoration is complete, a stable, sustainable environment will allow a reintroduced macroinvertebrate community to thrive.

Benefits:

- Increased habitat heterogeneity
- Enhanced aquatic and riparian habitat
- Increased ecological stability
- Improved biological integrity
- Minimize erosion and stabilize stream banks
- Sediment Reduction

Columbus Square Streetscape

Stormwater BMP Project

Delaware Watershed

Contact: Jessica Brooks
215.685.6038
Jessica.K.Brooks@phila.gov

Status: Concept Design

Partners:

Capital Program Office (CPO)

Columbus Square Streetscape...

The Philadelphia Capital Program Office (CPO) is implementing numerous improvements to Columbus Square Park in South Philadelphia, and will be reconstructing the 12th Street sidewalk between Reed and Wharton. The Office of Watersheds is working with CPO to design a series of streetside stormwater planters that will capture runoff from the contributing street and sidewalk areas. A raingarden will be constructed in front of the newly constructed Recreation Center on Wharton Street that will manage runoff from the new building in addition to the streets and sidewalk.

Benefits:

- Reduce stormwater runoff through infiltration and evapotranspiration
- Neighborhood greening and beautification
- Example Green Street that can be replicated throughout Philadelphia

Stream Restoration of Redd Rambler Run

Restoration Project

Pennypack Watershed

Contact: Erik Haniman
215-685-4877
Erik.Haniman@phila.gov

Status: Design

Partners:

Philadelphia Water Department

Stream Restoration of Redd Rambler Run...

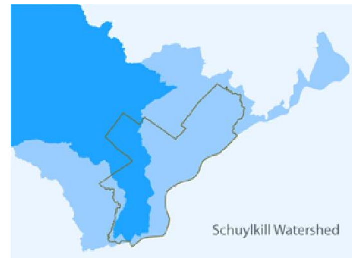
Redd Rambler Run sits within a narrow PWD easement that cuts through approximately 70 backyards in a Philadelphia subdivision. Its problems are typical for an urban stream including channel incision, bank erosion, and blockages to the movement of fish and other aquatic life. The project purpose is to recreate a stable, aesthetically pleasing stream with the potential to nurture habitat. The Redd Rambler Run project entails stream improvements on approximately 2,500 linear feet of stream channel. Urban stream restoration methods are intended to mimic nature and help the stream maintain itself, while improving water quality and reducing damage caused by fast, heavy flows of stormwater runoff.

Benefits:

●Creates a natural channel condition
●Creates a dynamically stable channel utilizing different stabilization techniques and materials
●Aims to improve water quality and aquatic habitat
●Creates a pleasing backyard stream which can be viewed by neighboring houses
●Creates the opportunity for public involvement which can empower the community to develop a stronger sense of stewardship for the creek

Queen Lane Water Treatment Plant Green Streets Project

Stormwater BMP Project – Schuylkill River Watershed



Contact:

Glen Abrams
(215) 685-6039
glen.abrams@phila.gov

Partners:

- PA Department of Environmental Protection
- U.S. Environmental Protection Agency
- East Falls Development Corporation

Location:

Queen Lane (between Fox Street and Henry Avenue)
Philadelphia, PA 19129

Queen Lane Water Treatment Plant Green Streets Project . . .

Streets and sidewalks comprise about 40 percent of impervious surfaces within the City of Philadelphia. Managing runoff from these areas, all within the public right-of-way, will be an important component of meeting PWD's combined sewer overflow mitigation goals.

PWD intends on piloting "Green Streets", streetscaping projects that mitigate runoff through vegetated practices, to determine their effectiveness at reducing stormwater flows to combined sewer systems. It is also recognized that such practices should realize many other environmental and community benefits.

A first phase of the program will target several green street practices along street frontages at PWD facilities. At the Queen Lane Water Treatment Plant, vegetated curb extensions and tree trenches are proposed.

Benefits:

- Mitigates runoff from impervious surfaces within the public right-of-way
- Provides demonstration projects to inform larger-scale, long-term program
- Additional landscaping and tree canopy cover provide visual interest, aesthetic appeal, and mitigate the urban heat island effect

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Stream Restoration on Tacony Creek at Whitaker Avenue

Restoration Project Tacony-Frankford Watershed

Contact

Marc Cammarata
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Partners:

Cheltenham Township (CT)
Cora L. Brooks Foundation
Delaware Estuary Program (DELEP)
Fairmount Park Commission (FPC)
Friends of Tacony Creek Park (FTC)
Natural Lands Restoration and Environmental Education Progra
PA Department of Environmental Protection (DEP)
Pennsylvania Environmental Council (PEC)

Stream Restoration on Tacony Creek at Whitaker Avenue...

This project will implement a sustainable approach to stream habitat restoration that will mitigate the impacts of urban development and related hydrologic and hydraulic modifications. The Philadelphia Water Department has assembled a project team to develop an approach for the restoration of Tacony Creek that encompasses the replication of natural hydrologic and ecological cycles, sustainability, enhancement to riparian and in-stream aquatic habitat, improved aesthetics, and significant cost savings over structural solutions. The results of this approach include not just stable stream bank geometry, but also long term ecological stability.

Benefits:

•Minimization of impacts of non-point source pollution contributed by upstream runoff.
•An integrated restoration of 1700 ft. of stream that improves the physical, chemical, and ecologic metrics of stream health.
•A stable channel in dynamic equilibrium with it's surrounding watershed
•Stream bank stabilization measures featuring soil bioengineering and natural channel design measures that protect infrastructure and the environment in a highly sustainable manner.
•A healthy, vegetated riparian zone to add biological diversity to the stream system.
•Enhanced, In-stream aquatic habitat
•Opportunities for the community to learn about stream ecology

Wises Mill Wetland Creation and Stream Restoration

Restoration Project

Wissahickon Creek Watershed

Contact: Erik Haniman
215-685-4877
Erik.Haniman@phila.gov

Status: Proposed-Short Term

Wises Mill Wetland Creation and Stream Restoration...

Wises Mill Run 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 hindered by urbanization and large storm events. As a result, severe entrenchment occurred in both branches and excessive amounts of sediment has been added to the Wissahickon Creek. This project proposes to reduce flows prior to entering the southern branch by the creation of a stormwater treatment wetland. Secondly, the restoration and stablization of the two branches will be possible by the improvement of the channel and banks to enhance water quality. Overall, sediment and erosion will be reduced, and aquatic and macroinvertebrate life will be improved.

Benefits:

- Increased habitat heterogeneity
- Enhanced aquatic and riparian habitat
- Increased ecological stability
- Improved biological integrity
- Minimize erosion and stablize stream banks
- Sediment reduction
- Creation and enhancement of approximately 1.9 acres of wetland area
- Riparian restoration and stablization
- Storm flow reduction and treatment prior to entering Wises Mill Run