DELAWARE COUNTY ACT 167

STORMWATER MANAGEMENT PLAN

PHASE I – SCOPE OF STUDY

AUGUST 2024

Delaware County Act 167 Stormwater Management Plan

Phase I – Scope of Study

August 2024

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INTRODUCTION

Purpose

This report documents Phase I of Delaware County's efforts to create a countywide Act 167 Stormwater Management Plan. The purpose of a Countywide Act 167 Plan for Delaware County is to fulfill the requirements of the Act of October 4, 1978, 32 P.S., P.L. 864 (Act 167) Section 680.1 et seq., as amended, "The Storm Water Management Act," (PA Act 167) to reduce stormwater runoff and flooding, and to improve water quality in all watersheds of Delaware County.

This report represents a Scope of Study that presents the following results of the County's Phase I work:

- Summary of County watershed characteristics
- Establishment of a Watershed Plan Advisory Committee (WPAC)
- Establishment of a Stakeholder Committee
- Inventory of stormwater issues
- Proposed Phase II scope of work and budget

Stormwater Runoff Problems and Solutions

Stormwater runoff is the excess water resulting from a precipitation event which exceeds the amount that can percolate (infiltrate) or be absorbed into the ground. That water flows over the surface of the ground, collects in channels and conduits, and is carried into receiving watercourses.

The volume and rate of runoff increase as land development occurs because the conversion of natural land cover to impervious surfaces reduces infiltration of stormwater. Development can also degrade stormwater runoff quality and thus introduce more pollution to rivers and streams. Inadequate management of stormwater runoff throughout a watershed greatly increases the cost of public facilities to convey and manage stormwater, and threatens public health and safety in the following ways:

- Increases flood flows and velocities
- Contributes to erosion and sedimentation
- Overtaxes the carrying capacity of existing streams and storm sewers
- Undermines floodplain management and flood reduction efforts in upstream and downstream communities
- Reduces groundwater recharge for water supplies
- Degradation of surface water quality

Stormwater management involves the control of stormwater runoff and is necessary to minimize impacts resulting from development. When properly managed, stormwater can be an important water resource by providing infiltration for water supplies and baseflow of streams, which also protects and maintains surface water quality.

Historically, stormwater control was viewed only on a site-specific basis. Local perspectives and policies regarding stormwater management have changed. Today, it is acknowledged that proper stormwater management can only be accomplished by evaluating the comprehensive effects of stormwater runoff from the entire watershed on its receiving watercourses (i.e., analyzing the impacts of local development in a watershed's headwaters on flooding downstream).

Pennsylvania Storm Water Management Act (Act 167)

Recognizing the adverse effects of excessive stormwater runoff resulting from development, the Pennsylvania General Assembly approved the Storm Water Management Act, P.L. 864, No. 167 (Act 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. The Act provides for grants to be appropriated by the General Assembly and administered by DEP for 75% of the allowable costs for the preparation of a stormwater management plan. It also provides for 75% of administrative, enforcement, and implementation costs incurred by any municipality or county in accordance with Chapter 111 - Stormwater Management Grants and Reimbursement Regulations (adopted by the Environmental Quality Board August 27, 1985).

Act 167 requires that each county must prepare and adopt a watershed stormwater management plan ("Act 167 Plan") for each watershed located in the county as designated by DEP, in consultation with the municipalities located within each watershed, and must periodically review and revise such plans at least every five years. Act 167 plans examine existing and potential stormwater runoff and associated stream flow in a watershed. Plan analysis results in development of standards and criteria for the control and management of stormwater that must be implemented as part of new development and redevelopment. The final product of the Act 167 watershed planning process is a comprehensive watershed plan and model stormwater ordinance developed for the unique physical conditions of that specific watershed. Counties must submit the plans to DEP for approval, and municipalities must enact ordinances or regulations consistent with the plans.

Recent changes in DEP Act 167 policy now provide for Act 167 planning on a countywide basis. Countywide Act 167 plans provide technical standards and criteria for each of a county's watersheds for the management of stormwater runoff from new land development as well as redevelopment. The result is a comprehensive program of stormwater management with reasonable regulation of development and other activities that cause stormwater runoff, to ensure public health, safety, and welfare and the protection of county communities and the environment.

Act 167 Planning for Delaware County

Delaware County is coordinating with its 49 municipalities as well as with key stakeholders to develop a comprehensive, countywide stormwater management program that is consistent with the provisions of Act 167. This will include a model stormwater management ordinance that addresses stormwater issues in critical areas in each of the County's watersheds. Each municipality must adopt ordinances or regulations as necessary to regulate development consistent with the resulting countywide Act 167 plan and model stormwater ordinance.

In addition to complying with Act 167 requirements, Delaware County will strive to develop a stormwater management plan that includes the following:

- Proactive stormwater management solutions for the built environment
- Emphasis on community stormwater engagement and education
- Strategies to streamline future updates to the Countywide Act 167 Stormwater Management Plan

Delaware County has received Phase I funding from DEP and is seeking funding to continue into Phase II, which will result in a Countywide Act 167 Stormwater Management Plan and model ordinance.

Plan Benefits

The Countywide Act 167 Stormwater Management Plan will bring all of Delaware County into compliance with Act 167 requirements. It will provide all of Delaware County's municipalities with consistent stormwater management planning, regulation, and implementation based on accurate and current data. For municipalities that have regulated MS4s, DEP states that compliance with NPDES permits may be achieved by enacting and implementing an ordinance(s) from the current Act 167 Plan.

Phase II of the planning process will generate a significant amount of useful technical information, including detailed stormwater runoff modelling and GIS survey data of stormwater issues, significant obstructions, and existing and proposed facilities from across the County. The municipalities and the County will be able to use these products for other purposes such as local planning, engineering, and emergency management. The County proposes to combine these products into a GIS database for use by municipalities and County agencies.

The plan will survey existing stormwater problems and propose solutions to address them. It will investigate possible funding sources and a list of priorities to implement those solutions. Once implemented, the plan will aid in decreasing costly flood damages by reducing the source and cause of local uncontrolled runoff. The plan will make municipalities and developers more aware of comprehensive planning in stormwater control and will help maintain the water quality of Delaware County's watercourses.

Stormwater Management Planning Approach

Stormwater management requires cooperation between state, county, and local officials. Many of the County's watersheds cross county and, in some cases, state boundaries. Likewise, several stormwater problems extend beyond Delaware County's boundaries. Recognizing the importance of collaborating with its neighbors, Delaware County has engaged Chester County, Montgomery County, and the City of Philadelphia (New Castle County, Delaware is engaged by extension through our collaborative Brandywine Flood Study effort that is currently underway) in the plan update process to ensure that the resulting Countywide Act 167 Plan is consistent with stormwater management planning and regulation throughout the entire region drained by these watersheds.

A Watershed Plan Advisory Committee (WPAC) was formed early in the Phase I process to engage stakeholders in the plan development. The WPAC consists of the municipalities, the Delaware County Planning Department and Delaware County Conservation District, and other interested organizations. WPAC meetings were held during Phase I to introduce the planning process and distribute the WPAC municipal survey. Continued engagement of the WPAC through Phase II will be critical to developing and implementing a successful Countywide Act 167 Plan.

The development process for the Countywide Act 167 Plan is as follows:

Phase I – Scope of Study (SOS)

The Scope of Study (SOS) establishes procedures used to prepare the Plan and include the following:

- Preliminary survey of watershed characteristics and existing stormwater issues
- Review of existing Act 167 Plans and related planning efforts in the County
- Establishment of the WPAC
- Phase II scope and cost estimate

Phase II – Stormwater Management Plan (SMP)

The Stormwater Management Plan (SMP) will consist of technical assessment and development of the model ordinance, and will include the following:

- Detailed survey of stormwater issues and significant obstructions
- Watershed modeling and planning, including assessment of existing and proposed development, stormwater collection systems, alternative runoff control techniques, flood control projects, and designation of areas to be served by stormwater collection and control facilities
- Development of technical standards and criteria for stormwater management
- Conceptual solutions to stormwater identified problems
- Outline of administrative procedures for plan implementation as well as periodic review and update
- Plan and model ordinance review and input from the WPAC
- Public hearing and Plan adoption by Delaware County
- Plan submittal to PADEP for review and approval
- Adoption and implementation of consistent stormwater management ordinances by all 49 municipalities

Previous County Stormwater Management Planning and Related Planning Efforts

The following plans and ordinances will be reviewed for information applicable to the development of the Countywide Act 167 Stormwater Management Plan:

- Sustain Delco: A Sustainability Plan for Delaware County (2023)
- Delaware Countywide Model Stormwater Management Ordinance (2022)
- Delaware County Hazard Mitigation Plan (2022)
- Delaware County 2035 County Comprehensive Plan (2013-2020)
- Delaware County Subdivision and Land Development Ordinance (2016)
- Delaware River Watershed Conservation Plan for the Delaware River Corridor and Naamans, Marcus Hook, and Stoney Creek Watersheds (2014)
- Crum Creek Watershed Act 167 Stormwater Management Plan (2011)
- Greenway Plan for the Darby Creek Watershed (2010)
- Darby Creek Stream Valley Park Master Plan (2009)
- Darby and Cobbs Creeks Act 167 Stormwater Management Plan (2005)
- Chester Creek Watershed Act 167 Stormwater Management Plan (2002)
- Stony Creek/Saw Mill Run Act 167 Stormwater Management Plan (1991)
- Ridley Creek Watershed Act 167 Stormwater Management Plan (1988)

GENERAL COUNTY DESCRIPTION

Delaware County is located in the southeast corner of Pennsylvania, just southwest of the City of Philadelphia. It is bordered to the west, north, and east by Chester, Montgomery, and Philadelphia Counties in Pennsylvania, and to the south by New Castle County in Delaware and by the Delaware River. Across the Delaware River is Gloucester County, New Jersey.

Delaware County encompasses roughly 191 square miles (122,256 acres) with 186 square miles of land and 5 square miles of water. It is the second smallest county in the Philadelphia region after Philadelphia County. With a 2020 population of 576,830, it is the second most densely developed county in the region and is the 5th most populous county in the state. The centrally located Borough of Media serves as the county seat. The City of Chester, located at the confluence of Chester Creek and the Delaware River, is the oldest city in Pennsylvania.

Political Jurisdictions

Delaware County consists of 49 municipalities: 27 boroughs, 21 townships, and one city.

City

Chester

Townships

Aston
Bethel
Chadds Ford
Chester
Concord
Darby
Edgmont
Haverford
Lower Chichester
Marple
Middletown
Nether Providence
Newtown
Radnor
Ridley
Springfield
Thornbury
Tinicum
Upper Chichester
Upper Darby
Upper Providence

Boroughs

Aldan
Brookhaven
Chester Heights
Clifton Heights
Collingdale
Colwyn
Darby
East Lansdowne
Eddystone
Folcroft
Glenolden
Lansdowne
Marcus Hook
Media
Millbourne
Morton
Norwood
Parkside
Prospect Park
Ridley Park
Rose Valley
Rutledge
Sharon Hill
Swarthmore
Trainer
Upland
Yeadon

Transportation

Delaware County features a robust and mature transportation system that has grown significantly over the past century. The County is geographically strategic for all modes of transportation, due to its expansive highway and rail networks, National Highway System connectors, port access, and international airport.

The County is crossed by several major highways. Interstate 476 (the "Blue Route") runs in a north-south direction, following stream corridors in Darby and Crum Creek watersheds before intersecting with Interstate 95 in Ridley

Township. I-95 runs in an east-west direction across the southernmost part of the county and is a major transportation route into and out of the City of Philadelphia. U.S. Routes 30, 13, and 1 and State Routes PA 3 and 291 are likewise significant east-west routes through the Delaware County to and from Philadelphia. U.S. Routes 202 and 322 and State Routes PA 252, 320, 352, 420, and 452 intersect with the County's major east-west highway routes and provide connections to the County's industrial and transportation hubs along the Delaware River. Delaware County is also served by several passenger and freight rail lines that generally run east-west, connecting communities in the eastern and southern two thirds of the County to Philadelphia and other regional & national destinations.

Development Patterns

Development patterns in the County have been strongly influenced by the radial orientation of highway and transit facilities extending west from Philadelphia and north from the Delaware River. Population growth in the County first occurred along these radial paths, later filling in the areas between these pockets of development.

Municipalities in the eastern portion of the County exhibit urban characteristics heavily influenced by their proximity to the City of Philadelphia. Municipalities in the western part of the County are experiencing suburban development but still retain pockets of rural character. Municipalities in the north and center have a suburban or "small town" feel, while municipalities in the south along the Delaware River generally have a more industrial landscape. The County's riverfront has historically been home to several heavy industrial facilities, and there are six maritime ports for industries located along the County's portion of the Delaware River. Significant examples of these riverfront industries include the petroleum refineries in Marcus Hook Borough and Penn Terminals in Eddystone Borough.

Open space generally consists of relatively small parks nestled within the County's urban and suburban landscape, with two major exceptions. Located at the confluence of the Darby Creek and Delaware River, the John Heinz National Wildlife Refuge is a 993-acre island of open space surrounded by urban development, heavy industry, and the Philadelphia International Airport. And Ridley Creek State Park – Delaware County's largest park at 2,539 acres – is a haven of densely wooded open space in a suburbanized area. The County's open space assets provide critical environmental services, including stormwater management and water quality protection.

Water Resources

Delaware County is entirely within the Delaware River watershed. All precipitation that falls within the County eventually feeds into the Delaware River via groundwater or via surface water that drains into the County's major streams. These are: Chester Creek, Ridley Creek, Crum Creek, Naaman's Creek, Marcus Hook Creek, Stoney Creek, Darby Creek, Cobbs Creek (a tributary of Darby Creek), Gulph Creek, and Mill Creek. A map of the County's watersheds can be found in Appendix A.

PA DEP designates nine Act 167 watersheds in the County. Chester, Ridley, Crum, Darby, Cobbs, and Mill Creeks are each a designated Act 167 watershed. Naaman's, Marcus Hook and Stoney Creeks are part of the Delaware River Act 167 watershed. Gulph Creek is part of the Schuylkill River Act 167 watershed. And the ninth Act 167 watershed, Brandywine Creek, consists of various small streams that drain the westernmost part of Delaware County.

These watersheds are critical for Delaware County's water supply, which is collected from surface water in the Crum, Ridley, and Chester Creeks, as well as numerous private and public wells. The Crum Creek watershed provides a significant percentage of the County's drinking water via the Geist (Springton) Reservoir (upper reservoir) located in Marple, Upper Providence, and Newtown Townships, together with a smaller reservoir (lower reservoir) located on the border of Springfield and Nether Providence Townships.

Surface Water Quality

Title 25, Chapter 93 of the Pennsylvania Code contains water quality standards that classify all surface waters according to their protected uses and water quality criteria. Streams meeting certain criteria and that merit additional protection are considered High Quality (HQ) or Exceptional Value (EV) Waters. Certain activities within these "Special Protection"

watersheds are subject to stricter antidegradation regulations. The following Delaware County streams are designated Special Protection Waters:

Stream	Zone	PA Chapter 93 Designation
Crum Creek	Basin, West Branch Crum Creek to Junction of Newtown, Edgmont, and Willistown Township Borders	HQ-CWF, MF
Ridley Creek	Basin, Source to Media Water Intake	HQ-TSF, MF
Rocky Run (Chester Creek tributary)	Basin	HQ-CWF, MF

HQ = High Quality (Special Protection), CWF = Cold Water Fishery, MF = Migratory Fishery, TSF = Trout Stocking Fishery

Impairments

According to the PADEP 2024 Integrated Water Quality Report, 94.8% (364 out of 384 miles) of Delaware County's streams are impaired. The following lists water quality impairment sources for streams in the County that are currently on the PADEP 2024 Integrated Non-Attaining List:

- Agriculture 5.38%
- Habitat Modification 3.208%
- Source Unknown 48.174%
- Urban Runoff/ Storm Sewers 43.238%

A map of impaired streams and their source of impairments can be found in Appendix A.

Climate

Delaware County has a fairly moderate, humid continental climate. Winters are comparatively short and mild while the warm season is long and humid. Average annual precipitation is approximately 48 inches. Precipitation has historically been distributed relatively evenly across all seasons, with autumns being somewhat drier and summers somewhat wetter. Winds from the west are usually prevailing and typically bring storm fronts through the area.

Physiography and Geology

Pennsylvania is divided into numerous physiographic provinces, or regions that have similar geologic structure, climate, and relief and have a unified geomorphic history. Each province is characterized by distinctly different geology, which affects soil types through parent material breakdown and thus plays a direct role in surface runoff. Approximately one third of Delaware County parallel to the Delaware River is in the Atlantic Coastal Plain Province, while the remaining two thirds of the county are in the Piedmont Upland Section of the Piedmont Province.

Land within the Atlantic Coastal Plain is relatively flat and sits at elevations close to sea level. Areas of the County within the Atlantic Coastal Plain physiographic province are underlain by sandy, sedimentary bedrock types such as feldspathic quartz sand and gravelly sand. Upland areas within the Coastal Plain are underlain by a metamorphic bedrock formation, oligoclase-mica-schist, that is prevalent throughout the Delaware Valley. It is defined by clay soils with low groundwater yields and a strong capacity to form ridges. Portions of the Coastal Plain also contain igneous bedrock formations composed of anorthosite.

In contrast, the Piedmont area is characterized by broad, rounded to flat-topped hills and shallow valleys. The province is underlain primarily by anorthosite and mafic gneiss bedrock, which do not have the capacity to absorb much water. Porosity and permeability range from very low to medium, and well yields are generally not very high. There is no carbonate (limestone and dolomite) surface geology in Delaware County.

Soils

Soil properties together with cover type influence erodibility and stormwater runoff generation. The NRCS has established a criterion for determining how soils will affect runoff by placing all surface horizon soils into four Hydrologic Soil Groups (HSGs) based on infiltration rate and depth. Soils with high infiltration rates (sands and gravels) and high storage capacity produce less stormwater runoff than soils with lower infiltration rates (silts and clays) and reduced storage capacity.

There are three generalized soil groups in the County as listed below. Generalized soils are groups of soils that exhibit a regularly repeating pattern. The descriptions were derived from the USDA STATSGO statewide NRCS soils database.

1. Chester-Glenelg-Manor - The Chester-Glenelg-Manor soil association is the largest soil association in Delaware County and is found throughout the county. This association consists of shallow to deep, silty and channery soils on grayish-brown schist and gneiss. Glenelg soils are typically found in upland areas on level to steep slopes. They are typically well drained and moderately permeable.
2. Neshaminy-Lehigh-Glenelg - The Neshaminy-Lehigh-Glenelg soil association is found in the northwestern portion of the County. This association consists of moderately deep and deep, silty, channery, and gravelly soils on gabbro and granodiorite. Drainage varies from moderately well drained to somewhat poorly drained. Permeability is moderate to moderately slow.
3. Urban Land-Westbrook-Pits - The Urban Land-Westbrook-Pits soil association is found in the southern portion of the county. This association consists of deep, silty, or sandy soils on coastal plain sediments. Urban Land and Pits are areas that have been highly disturbed, and drainage characteristics are not provided. Westbrook soils are characterized as very poorly drained.

Slopes

The slope of the land affects its developability. Because of their sensitivity to cut and fill, development of steep slopes (slopes 15% and above) should be restricted. While steep slopes are likely to remain stable when left undisturbed, development on them removes vegetation, which can cause erosion. When this occurs along stream valleys, lack of vegetation and slope disturbance contributes to erosion & sedimentation issues in the stream, increases the volume and rate of stormwater runoff entering the stream, and contributes to flooding. Development of steep slopes can also increase construction costs.

There are no significant steep slopes in the Atlantic Coastal Plain portion of the County, whereas portions of the County within the Piedmont province contain notable areas of steep slope. These are frequently located along stream corridors.

Floodplains

Floodplains are the flat low-lying lands along streams and other water bodies that are subject to flooding. They are extensions of stream channels provided by nature to carry overbank flows resulting from rainfall or melting snows. Areas with a 1% annual chance of flooding are referred to as 100-year floodplains.

The Federal Emergency Management Agency (FEMA) prepares Flood Insurance Studies (FIS) and floodplain mapping for municipalities. Reviews of FEMA data reveal that 100-year floodplains exist in Delaware County. The following waterbodies have delineated floodplains associated with Flood Insurance Studies:

Bezor's Run	Green Creek	Naylors Run
Brandywine Creek	Gulph Creek	Old Barn Drive Tributary
Cherry Farm Lane Tributary	Harvey Run	Pony Tail Run
Chester Creek	Harvey Run Branch	Ridley Creek
Chester Creek Tributary	Hermesprota Creek (Lower Reach)	Rocky Run
Chrome Run	Hermesprota Creek (Upper Reach)	

Cobbs Creek	Hermesprota Creek (MacDade Boulevard)	South Fork West Branch Chester Creek
Crum Creek (Lower Reach)	Lewis Run	Spring Run
Crum Creek (Upper Reach)	Little Crum Creek	Stackhouse Mill Run
Darby Creek	Little Darby Creek	Stoney Creek
Dilworthtown Road Tributary	Lobbs Run	Stony Creek
East Branch Chester Creek	Marcus Hook Creek	Sweet Water Road Tributary
East Branch Chester Creek Trib. 2	Muckinipattis Creek	Vernon Run
East Branch Marcus Hook Creek	Naaman Creek	West Branch Chester Creek
Foxes Run		

Floodplains provide critical ecological services and recreational benefits. It is important to protect and maintain floodplains to protect our communities from negative flooding impacts as well as to conserve the important natural resource and recreational values floodplains provide.

ACT 167 PLANNING PROCESS

The Pennsylvania Department of Environmental Protection (DEP) and Delaware County entered into an agreement for funding to create a Phase I Scope of Study for all watersheds in the County. During Phase I of the Act 167 Plan project, the County conducted an evaluation of the tasks and level of effort necessary to prepare a countywide Act 167 Stormwater Management Plan. Existing watershed characteristics and stormwater issues were surveyed, and the County's previous Act 167 planning efforts were reviewed. Perhaps most importantly, County stakeholders including all County municipalities, relevant County agencies, and interested NGOs were engaged in the Act 167 planning process through establishment of a Watershed Plan Advisory Committee (WPAC), to ensure that the updated Act 167 Plan reflects the needs of all the County's communities. Phase I culminated in a proposed scope of work and budget for the County to complete the Stormwater Management Plan during Phase II of this project.

DEP and Delaware County

The Delaware County Planning Department has been proactively engaged with PADEP through their designated representatives since the inception of the Phase I plan to ensure that plan expectations are met. Funding for Phase I was obtained through PADEP and within the initial application Delaware County indicated its interest in continuing with the Act 167 countywide planning process supported by Phase II funding.

Delaware County's approach to Act 167 planning is to follow the requirements of the Act. As such, the effort has been divided into two phases with the required components within each. Phase I establishes the WPAC as well as scopes Phase II deliverables, namely being countywide modeling and a final stormwater management plan.

Engineering Consultant Selection

A consultant was not utilized for the development of Phase I of the plan. However, we anticipate that a consultant will be utilized for the development of Phase II. Said consultant will be carefully selected through an RFP process per strict criteria and a vetting process. The selection criteria will include but not be limited to 1) expertise in stormwater management techniques and requirements, 2) stormwater modeling, 3) data collection and development, 4) expertise in public and stakeholder engagement, and 5) demonstrated innovation and collaboration within prior planning and implementation approaches that leverage direct and related planning efforts.

Establishment of Watershed Plan Advisory Committee (WPAC) and Stakeholder Committee

Per the requirements of Act 167, within Phase I we engaged Delaware County's 49 municipalities and identified specific representatives from each for participation within the WPAC. In addition to developing the WPAC, we also engaged nongovernmental organizations (NGOs) throughout the County as well as neighboring Counties (including New Castle County, Delaware), and the City of Philadelphia for participation within the Act 167 planning process as Stakeholders (see attached Stakeholder Committee participant list). Our neighboring County connections were made to ensure modeling consistency within Phase II. The engaged NGOs have stormwater specific expertise within Delaware County and we foresee their support as being beneficial for plan implementation. Finally, we expect that a final Phase II plan recommendation will be to maintain engagement with both the WPAC and Stakeholders to support implementation and ongoing/required updates of the plan in the future.

WPAC and Stakeholder Committee members are as follows:

Watershed Plan Advisory Committee (WPAC) Members	
Municipality	**Representative**
Aldan	J. P. Kelly
Aston	William DeFeo
Bethel	Matthew R. Houtmann, P.E.
Brookhaven	Charles J. Catania, Jr., P.E.
Chadds Ford	Lacey Faber

Chester City	David Schwartz
Chester Heights	Michael Kissinger, P.E.
Chester Township	Michael Galante
Clifton Heights	J. P. Kelly
Collingdale	Michael Kozlowski
Colwyn	Michael Galante
Concord	Nathan M. Cline
Darby Borough	Eileen Mulvena/Ken Woznicki
Darby Township	Jamie Anderson
East Lansdowne	Eileen Mulvena
Eddystone	J. P. Kelly
Edgmont	Neil D. Vaughn
Folcroft	Elizabeth (Lisa) A. Catania, P.E., F. NSPE
Glenolden	Brian Razzi
Haverford	Steven Poole
Lansdowne	Kevin Matson
Lower Chichester	Joseph Viscuso, P.E.
Marcus Hook	Charles J. Catania, Jr., P.E.
Marple	Bridget Gillen
Media	Kevin Matson
Middletown	Meredith Merino
Millbourne	Nancy Baulis
Morton	Charles J. Catania, Jr., P.E.
Nether Providence	David Grady
Newtown	Eric P. Johnson, P.E.
Norwood	Kristen Chorney
Parkside	Elizabeth (Lisa) A. Catania, P.E., F. NSPE
Prospect Park	Elizabeth (Lisa) A. Catania, P.E., F. NSPE
Radnor	Stephen Norcini, P.E.
Ridley Park	Charles J. Catania, Jr., P.E.
Ridley Township	Charles J. Catania, Jr., P.E.
Rose Valley	Matthew R. Houtmann, P.E.
Rutledge	Charles J. Catania, Jr., P.E.
Sharon Hill	Susan Lynch
Springfield	Eric P. Johnson, P.E.
Swarthmore	Eric P. Johnson, P.E.
Thornbury	Michael Ciocco
Tinicum	David D. Schreiber
Trainer	Michael Kozlowski
Upland	Dan Smith
Upper Chichester	Michael J. Ciocco
Upper Darby Township	Daniel Lutz, P.E.
Upper Providence	J. P. Kelly
Yeadon	Eileen Mulvena

Stakeholder Committee	
Organization	**Representative**
Brandywine Conservancy	Grant DeCosta
Chester County Water Resources Authority	Seung Ah Byun, PhD, P.E.
Chester-Ridley-Crum Watersheds Association	Carly Lare
Chester-Ridley-Crum Watersheds Association	Robert Ott
City of Philadelphia Office of Sustainability	Korin Tangtrakul
Clean Air Council	Echo Alford
Clean Air Council	Eve Miari
Darby Creek Valley Association	Jaclyn Rhoads
Delaware Valley Regional Planning Commission	Amy Verbofsky
Drexel University	Franco Montalto
Eastern Delaware County Stormwater Collaborative; Darby Creek Valley Association	Jamie Anderson
Chester Stormwater Authority	Suhas Nagavalli
John Heinz National Wildlife Refuge	Lamar Gore
Montgomery County Planning Commission	Drew Shaw
Montgomery County Planning Commission	Jon Lesher
Penn State Extension	Meagan Hopkins-Doerr
Pennsylvania Sea Grant	Zach Nemec
University of Pennsylvania Water Center	Ellen Kohler
Widener University Environmental Science and Sustainability Program	Scott Van Mramer
Delaware County Conservation District	Karen Wilwol
Delaware County Conservation District	Chris Cook
Delaware County Emergency Management	Larry Bak
Delaware County Office of Data and Mapping Innovation	Julie DelMuto
Delaware County Office of Sustainability	Becca Yurkovich

WPAC Meetings

Due to the plan being a countywide effort, four (4) separate WPAC meetings were held strategically located regionally throughout the County. The primary intent was to develop positive connections and relay the general intent of the Plan (see attached meeting sign-in sheets). The basis for the separate meetings was 1) locational convenience for participants and 2) to provide multiple options in the event of scheduling conflicts. When possible, we also merged the WPAC meetings with a relatable meeting to avoid duplication and to add interest. The WPAC members were briefed as to 1) the reasoning behind a countywide stormwater plan 2) status of current plans 3) preliminary goals for the new plan 4) initial data gaps and needs and 5) completion of the WPAC survey. Topics added to compliment the meetings included rain garden tours/discussions and presentations on related themes.

WPAC Engagement

Online Project Hub

Delaware County created an online Act 167 project hub using the Zencity platform to serve as an information clearinghouse and to facilitate public engagement throughout the planning process. The project hub informs the public about Act 167 and enables stakeholders to follow the planning process as well as provide input through surveys. The Phase I WPAC Survey was posted on the project hub, in addition to being distributed to WPAC members via email.

The County intends to utilize the hub throughout the Phase II process to obtain municipal "buy-in" of the project and develop municipal interest in stormwater management issues. Proposed strategies include:

- Hosting additional surveys to assist with data collection of significant obstructions, drainage problems, stormwater collection systems and their impacts, flood control projects, and areas to be served by stormwater collection and control facilities, as well as to help determine municipal support for proposed solutions to stormwater issues, alternative runoff control techniques, and implementation priorities
- Posting draft plan documents on the project hub for public review and comment
- Streamlining WPAC member communications

This will help ensure a better end product and improve municipal adoption and implementation of the SMP in Delaware County.

WPAC Survey Creation, Distribution, and Results

As part of the ongoing WPAC engagement process, an online survey on municipal stormwater regulations and programs was sent out to all WPAC members early in the Phase I process. The purpose of the survey was to verify the significant stormwater issues that affect each municipality as well as their proposed solutions, to help determine the level of commitment from each municipality, to confirm each municipality's current mechanisms for regulating activities that generate stormwater, and to increase municipal interest in stormwater management. The survey results also helped determine the scope of Phase II planning.

A link to the survey was distributed at the three WPAC meetings that the County held during Phase I. WPAC member municipalities that did not attend the Phase I meetings received the survey link via email. County Planning Department staff also followed up with non-participating municipalities via email to encourage participation. Completed surveys were received from 11 of the County's 49 municipalities. Input on stormwater issues was also submitted by the public during other County initiatives that occurred concurrently with Phase I of the Act 167 project, which identified stormwater issues in a 12th municipality.

Survey questions and full results are presented below:

1. Municipality Name:
2. Name of WPAC Representative:
3. WPAC Representative Contact Information (phone number and/or e-mail):
4. Please indicate the agencies/individuals responsible for reviewing/approving land development plans in your municipality:
    a. Municipal Council
    b. Municipal Engineering Department
    c. Municipal Planning Department/Commission
    d. Municipal Zoning Hearing Board
    e. Municipal Consultant
    f. County Planning Department
    g. County Conservation District
    h. Other:

5. Please indicate the status of the following plans/maps for your municipality (Approved/In Progress/Planned within the next year):
    a. Act 537 Sewage Facilities Plan
    b. Comprehensive Plan
    c. Existing Land Use Map(s)
    d. Proposed Land Use Map(s)
    e. Zoning Map(s)
6. National Flood Insurance Program (NFIP): Please indicate whether your municipality participates in the following (Yes/No/Unsure):
    a. FEMA Emergency Program
    b. FEMA Regular Program
    c. Flood Hazard Boundary Map (FHBM)
    d. NFIP Community Rating System (CRS)
7. What is the most important stormwater related issue to your municipality?
8. Has your municipality adopted the 2022 Model Stormwater Ordinance provided by the Delaware County Planning Department? (Yes/No/Unsure)
9. Would your municipality be interested in collaborating with neighboring municipalities to address stormwater management issues? (Yes/No)
10. Does your municipality have plans for proposed stormwater management facilities and/or best management practices like riparian buffers? (Yes/No/Unsure)
11. If you answered 'Yes' to the previous question: May the Delaware County Planning Department contact you for more information about your municipality's proposed stormwater management projects? (Yes/No)

Stormwater Problem Prioritization

Survey results and non-survey public input reported that the most significant stormwater problems are flooding and inadequate or aging infrastructure. Survey respondents noted that the County contains numerous "legacy neighborhoods" that were developed with no stormwater management facilities or with under-sized or inefficient facilities. These neighborhoods are experiencing localized flooding. Other communities in the County have issues with combined sewer overflows (CSOs), which cause water pollution problems in addition to flooding.

Two municipalities indicated that maintenance and upkeep of stormwater management facilities was a significant issue; given that many communities across the County consist of older developments with aging infrastructure, it is highly likely that other municipalities also share this concern. Lack of funding to implement infrastructure upgrades or Pollutant Reduction Plans (PRPs) was also cited as a concern by several survey respondents. The Phase II plan will propose possible solutions to the noted problems, as well as investigate funding sources to assist municipalities with their stormwater management projects.

WPAC Survey Results

Municipality	WPAC Representative	WPAC Representative Contact Information	Agencies/individuals responsible for reviewing/approving land development plans:	Act 537 Sewage Facilities Plan Status	Comp Plan Status	Existing Land Use Map(s) Status
City of Chester	David Schwartz	david.schwartz@c	Municipal Consultant;County Conservation District;County Planning Department;	Approved	Approved	Approved
Darby Township	Elizabeth A. Catania, PE, F.NSPE	eac@cataniaengir	Municipal Council;Municipal Planning Department / Commission;Municipal Consultant;County Planning Department;County Conservation District;	Approved	In Progress	In Progress
Edgmont Township	Neil D. Vaughn	manager@edgmc	Municipal Council;Municipal Engineering Department;Municipal Planning Department / Commission;County Planning Department;Municipal Consultant;	Approved	Approved	Approved
Middletown Township	Meredith Merino	mmerino@middle	Municipal Council;Municipal Planning Department / Commission;County Planning Department;	Approved	Approved	Approved
Millbourne Borough	Nancy Baulis	assistant@millbo	Municipal Council;Municipal Consultant;	Approved	Approved	Approved
Newtown Township	Eric Johnson	epjohnson@penn	Municipal Planning Department / Commission;Municipal Council;Municipal Consultant;	Approved	Approved	Approved
Norwood Borough	Elizabeth A. Catania, PE, F.NSPE	eac@cataniaengir	Municipal Council;Municipal Planning Department / Commission;Municipal Consultant;County Planning Department;County Conservation District;	Approved	Approved	Approved
Parkside Borough	Elizabeth A. Catania, PE, F.NSPE	eac@cataniaengir	Municipal Council;Municipal Planning Department / Commission;Municipal Consultant;County Planning Department;County Conservation District;	Approved	Approved	Approved
Prospect Park Borough	Elizabeth A. Catania, PE, F.NSPE	eac@cataniaengir	Municipal Council;Municipal Planning Department / Commission;Municipal Consultant;County Planning Department;County Conservation District;	Approved	Approved	Approved
Springfield Township	Eric Johnson	epjohnson@penn	Municipal Council;Municipal Planning Department / Commission;Municipal Consultant;Municipal Engineering Department;County Planning Department;	Approved	Approved	Approved
Swarthmore Borough	Eric Johnson	epjohnson@penn	Municipal Council;Municipal Engineering Department;Municipal Planning Department / Commission;Municipal Consultant;	Approved	Approved	Approved

WPAC Survey Results

Municipality	Proposed Land Use Map(s) Status	Zoning Map(s) Status	FEMA Emergency Program Participation	FEMA Regular Program Participation	Flood Hazard Boundary Map (FHBM) Participation	NFIP Community Rating System (CRS) Participation	Most important stormwater related issue?
City of Chester	Approved	Approved	Unsure	Unsure	Unsure	Unsure	Flooding from Stormwater and Combined Sewer Overflows (CSOs)
Darby Township	In Progress	In Progress	Yes	Yes	Yes	No	Flooding
Edgmont Township	Approved	Approved	Yes	Yes	Yes	Yes	Maintenance and upkeep
Middletown Township		Approved				Yes	The stormwater infrastructure system is largely comprised of old corrugated pipes which are now failing. Capital project planning and funding for pipe replacement is the biggest issue currently.
Millbourne Borough	Approved	Approved	Yes	Yes	Unsure	Unsure	sewer concerns
Newtown Township	Approved	Approved	Yes	Unsure	Yes	Unsure	localized flooding from increased storm events in legacy neighborhoods; funding to implement PRP plans
Norwood Borough	Approved	Approved	Yes	Yes	Yes	No	Inefficient stormwater systems
Parkside Borough	Approved	Approved	Yes	Yes	Yes	No	Flooding /inefficient stormwater systems
Prospect Park Borough	Approved	Approved	Yes	Yes	Yes	No	Stormwater systems under capacity; lack of stormwater management facilities due to age of developments
Springfield Township	Approved	Approved	Yes	Unsure	Yes	Unsure	localized flooding from increased storm events in legacy neighborhoods; funding to implement PRP plans
Swarthmore Borough	Approved	Approved	Yes	Unsure	Yes	Unsure	localized flooding from increased storm events in legacy neighborhoods; funding to implement PRP plans

WPAC Survey Results

Municipality	Adopted 2022 Model Stormwater Ordinance?	Interested in collaborating to address stormwater management issues?	Plans for proposed stormwater management facilities and/or BMPs?	IF YES: May Delaware County contact you about proposed stormwater management projects?
City of Chester	Unsure	Yes	Yes	Yes
Darby Township	Yes	Yes	Yes	Yes
Edgmont Township	Yes	Yes	No	
Middletown Township	No	Yes	Yes	Yes
Millbourne Borough	Yes	Yes	No	
Newtown Township	No	Yes	Yes	Yes
Norwood Borough	Yes	Yes	Yes	Yes
Parkside Borough	Yes	No	No	
Prospect Park Borough	Yes	Yes	No	
Springfield Township	Yes	Yes	Yes	Yes
Swarthmore Borough	Yes	Yes	Yes	Yes

PHASE II SCOPE DISCUSSION

Refer to Appendix B for the proposed Phase II Scope of Work.

Throughout Phase I, Delaware County project staff utilized WPAC meeting discussions, survey results, and interviews with key project stakeholders to inform the design of the Phase II scope. The culmination of the Phase II work will be the adoption of a Countywide Stormwater Management Plan ("SMP"/ "Plan") as well as of a Model Ordinance that includes the standards and provisions of the Plan. The Model Ordinance will include regulations for activities impacting stormwater runoff. Delaware County adopted a Model Ordinance in 2022 that utilized the ordinance developed by DEP as its basis. This Countywide update of the SMP will evaluate the 2022 Model Ordinance and may augment it by providing additional, value-added benefits to existing standards.

The County will also assess "complementary measures" to be included in the Plan over and above the requirements of Act 167. It is understood that, since these complementary measures are outside the scope of Act 167, work on assessing and including them in the Plan will be outside the project budget.

General Work Plan

Phase II Agreement

Upon completion and submission of the Phase I report to DEP, Delaware County and DEP will enter into an agreement to complete the Phase II portion of the project. The County is applying to DEP for Act 167 Phase II funding, and will begin Phase II tasks upon allocation of funding by the DEP.

Consultant Selection

It is recommended that Delaware County secure an engineering consultant knowledgeable in the Act 167 process to assist in completing the Phase II project. A qualified consultant with experience in the County's stormwater issues and municipalities will benefit the County during the Phase II process, particularly the technical analysis tasks.

Survey

A survey was distributed to WPAC members following each of the Phase I kick-off meetings. The survey solicited information on municipalities' land development and stormwater regulations and programs, stormwater issues, proposed stormwater facilities, and interest in stormwater best management practices (BMPs). The municipalities were also asked to appoint a WPAC representative. The data collected through the survey assisted in scoping Phase II and will continue to assist in various aspects of the Phase II planning process.

Additional municipal outreach will be necessary in Phase II to survey stormwater problems in the municipalities that did not participate in the Phase I survey. The County will also need to follow up with municipalities that submitted Phase I survey responses in order to geolocate specific stormwater problem areas. Stormwater issues identified in the surveys will need to be analyzed during Phase II to support watershed modeling and finding solutions.

Watershed Plan Advisory Committee (WPAC)

A WPAC was formed early in Phase I. The County requested a representative from each municipality to be appointed to the WPAC in accordance with section 6(a) of Act 167, which states

> *The county shall establish, in conjunction with each watershed storm water planning program, a watershed plan advisory committee composed of at least one representative from each municipality within the watershed, the county soil and water conservation district and such other agencies or groups as are necessary and proper to carry out the purposes of the committee.*

For those municipalities that did not respond to the survey or did not appoint a WPAC member, PADEP policy is that the head of the governing body will be appointed to the WPAC.

It is intended that the WPAC will continue to serve as the advisory panel throughout the Phase II planning process. The committee members will also serve as the primary contact point for the municipalities that they represent. It is anticipated that each of these municipalities will continue to have representation in the WPAC.

WPAC Engineering Meetings

Certain WPAC meetings will focus on the more technical aspects of the SMP as opposed to the more general objectives and overall Plan contents. These technical elements include modeling, technical analysis, and development of management criteria. Municipal engineers will be encouraged to attend these meetings to review Plan elements and give feedback.

WPAC Legal Meetings

Certain WPAC meetings will focus on the legal aspects of the SMP, including implementation of the Model Ordinance from a legal and regulatory framework standpoint. Municipal solicitors will be encouraged to attend these meetings to review and give feedback.

Standards

The SMP will utilize criteria and standards for a comprehensive stormwater management strategy that includes the elements listed below. Standards in the County's existing Model Ordinance will be evaluated for implementation based on collected data, modeling, Consultant and Municipal engineers' judgment, and WPAC input:

- Infiltration / Groundwater Recharge
- Volume Control Management
- Water Quality Management
- Stream Bank Erosion Requirements
- Peak Rate Control Management

Roles of the County and Consultant

The division of work and responsibilities between Delaware County and the Consultant will be determined prior to the beginning of Phase II tasks. Generally, the County will serve as project coordinator and be responsible for the non-technical aspects of the SMP. This may include certain data collection, plan composition, mapping, and assisting the Consultant with field data collection and ordinance analysis.

The Consultant will be responsible for the Plan's technical aspects, including data review, problem area and significant obstruction analysis, hydrologic modeling, development of technical criteria, and economic analysis. The Consultant will also compose technical components of the Plan text; may provide some draft and final project mapping; and may assist with WPAC and public engagement.

Work Schedule

A work schedule will be developed early in the Phase II process in accordance with the Phase II Project Scope and in conjunction with the County and Consultant. The work schedule will set target dates for various tasks with the intention of completing the project for DEP review within the Phase II contract period.

Phase II Task Outline

A summary of the specific tasks in the Phase II Scope of Work will be as follows:

Task 1 – Data Collection and Analysis (3 months)

Subtask 1.1 – WPAC Survey

Subtask 1.2 – Data Collection and Review

Subtask 1.3 – Municipal and County Ordinance Review

Subtask 1.4 – Data Preparation for Technical Analysis

Subtask 1.5 – Goals and Objectives

Task 2 – Technical Analysis (10 months)

Subtask 2.1 – Evaluate water quality, peak flow, stream stability, and groundwater recharge requirements

Subtask 2.2 – Modeling

Subtask 2.3 – Standards and Criteria

Task 3 – Stormwater Management Plan Preparation and Review (5 months)

Subtask 3.1 – Conceptual Solutions for Stormwater Problem Areas

Subtask 3.2 – Priority Projects and Funding

Subtask 3.3 – Plan Review, Revision, and Update Procedures

Subtask 3.4 – Plan Report Preparation

Subtask 3.5 – WPAC Review of Plan

Task 4 – Model Ordinance Review (2 months)

Subtask 4.1 – Implementation of Technical Standards and Criteria

Subtask 4.2 – WPAC Review of Model Ordinance

Task 5 – Stormwater Management Plan and Model Ordinance Adoption and DEP Submittal (4 months)

Subtask 5.1 – Plan Review by County Planning Agency, the Municipal Governing Bodies, County Planning Commission, and Regional Planning Agency

Subtask 5.2 – County Adoption

Subtask 5.3 – DEP Submittal

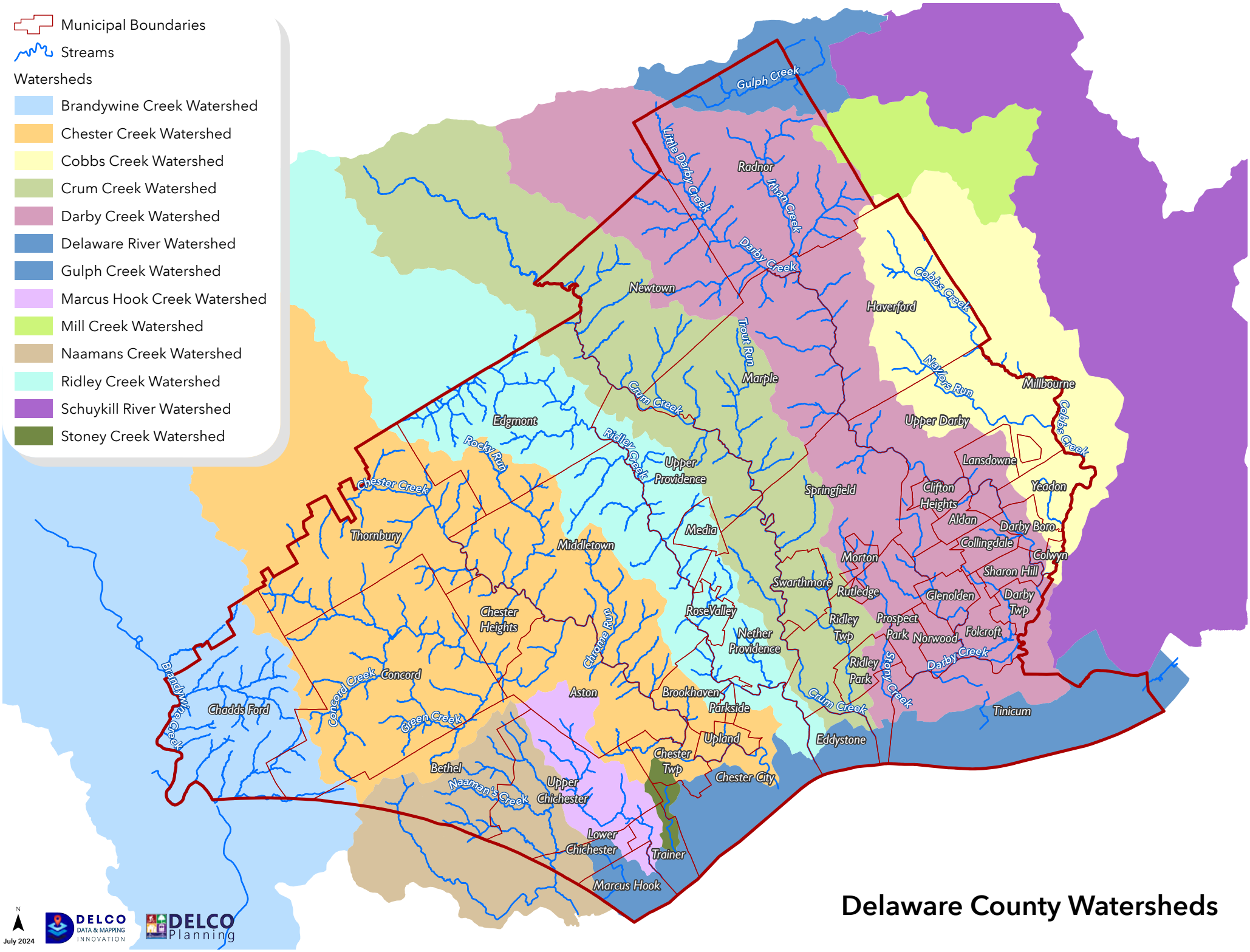
Subtask 5.4 – Municipal Implementation

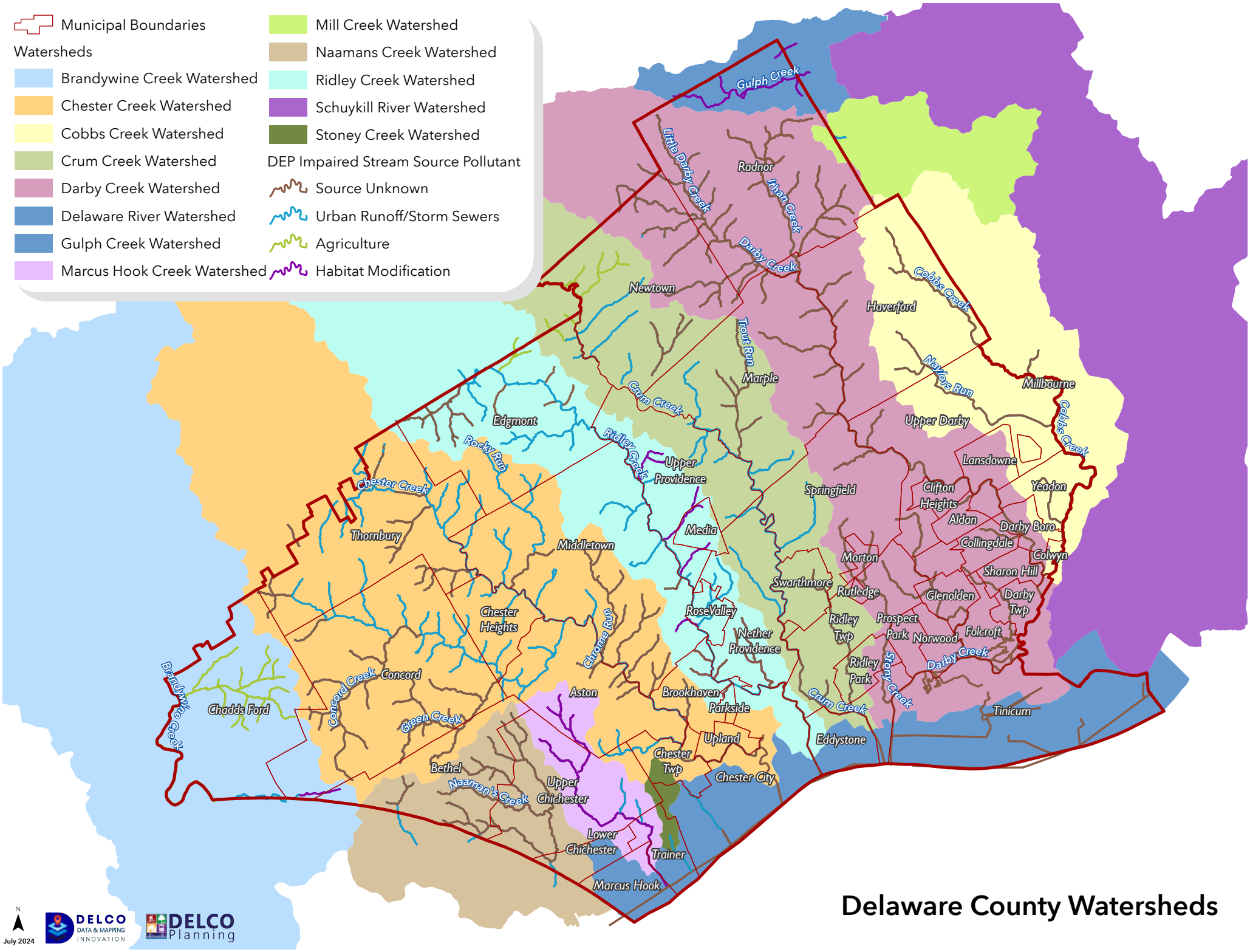
Subtask 5.5 – Educational Workshops

Phase II Costs

The Department is requesting $750,000 in DEP funding to be coupled with a required 25% County match valued at $250,000 (monetary, in-kind, or combination thereof).

Refer to the Phase II Scope of Work in Appendix B for cost estimates for each project task.


Municipal Boundaries
Streams
Watersheds
Brandywine Creek Watershed
Chester Creek Watershed
Cobbs Creek Watershed
Crum Creek Watershed
Darby Creek Watershed
Delaware River Watershed
Gulph Creek Watershed
Marcus Hook Creek Watershed
Mill Creek Watershed
Naamans Creek Watershed
Ridley Creek Watershed
Schuykill River Watershed
Stoney Creek Watershed
Gulph Creek
Little Darby Creek
Radnor
Ithan Creek
Darby Creek
Newtown
Haverford
Cobbs Creek
Trout Run
Marple
Naylors Run
Millbourne
Crum Creek
Edgmont
Upper Darby
Rocky Run
Ridley Creek
Upper Providence
Lansdowne
Chester Creek
Springfield
Clifton Heights
Yeadon
Aldan
Thornbury
Media
Darby Boro.
Middletown
Collingdale
Morton
Colwyn
Sharon Hill
Swarthmore
Rutledge
Glenolden
Darby Twp
Chester Heights
Rose Valley
Ridley Twp
Prospect Park
Norwood
Folcroft
Nether Providence
Chrome Run
Ridley Park
Stony Creek
Darby Creek
Brandywine Creek
Concord
Concord Creek
Aston
Brookhaven
Parkside
Crum Creek
Chadds Ford
Green Creek
Upland
Tinicum
Eddystone
Chester Twp
Chester City
Bethel
Naaman's Creek
Upper Chichester
Lower Chichester
Trainer
Marcus Hook
N
July 2024
DELCO DATA & MAPPING INNOVATION
DELCO Planning
Delaware County Watersheds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Darby Creek Watershed
Delaware River Watershed
Gulph Creek Watershed
Marcus Hook Creek Watershed
Mill Creek Watershed
Naamans Creek Watershed
Ridley Creek Watershed
Schuykill River Watershed
Stoney Creek Watershed
DEP Impaired Stream Source Pollutant
Source Unknown
Urban Runoff/Storm Sewers
Agriculture
Habitat Modification
Gulph Creek
Little Darby Creek
Radnor
Ithan Creek
Darby Creek
Newtown
Haverford
Cobbs Creek
Trout Run
Marple
Naylors Run
Millbourne
Crum Creek
Edgmont
Upper Darby
Rocky Run
Ridley Creek
Upper Providence
Lansdowne
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Swarthmore
Rutledge
Glenolden
Darby Twp
Chester Heights
Rose Valley
Ridley Twp
Prospect Park
Norwood
Folcroft
Nether Providence
Chrome Run
Ridley Park
Stony Creek
Darby Creek
Brandywine Creek
Concord Creek
Concord
Aston
Brookhaven
Parkside
Crum Creek
Chadds Ford
Green Creek
Tinicum
Upland
Eddystone
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ACT 167 PHASE II PROPOSED SCOPE[1] AND BUDGET

WORK ELEMENTS FOR PREPARATION OF THE PLAN

The following three major work elements are required to prepare the Plan:

I. Project Administration
II. Plan Preparation
III. Plan Adoption

Public participation including involvement of the Watershed Plan Advisory Committee (WPAC) will be an integral component of Work Elements II and III.

The Delaware County Planning Department shall be considered as the County.

The final Act 167 Phase II Report and associated Model Ordinance shall be considered as the Plan. This Plan shall be considered as an update to County Act 167 Plans that are existing prior to the date of the Agreement, and shall utilize data, criteria, and standards from the existing Plans to the extent practical. Additionally, the Plan related Model Ordinance shall be considered as a potential revision to the existing County Act 167 Model Ordinance as developed in 2022.

The Pennsylvania Department of Environmental Protection shall be considered as the Department.

The selected planning/engineering firm shall be considered as the Consultant.

The Phase II contract between the County and the Department shall be considered as the Agreement.

I. PROJECT ADMINISTRATION	**COST ESTIMATE**
The County, with input from the Consultant, is responsible for the overall administration of all work required to complete the Plan. This includes but is not limited to all the administrative efforts described in this section of the Agreement. Project administration includes, but is not limited to, the following activities: **1.** Meeting organization (or oversee Consultant organization) and attendance. **2.** Define a framework for accomplishing all tasks associated with preparation of the Plan. **3.** Prepare and submit invoices and progress reports pursuant to the terms and conditions specified in this Agreement. **4.** Manage the work schedule for the completion of the Plan. **5.** Participate in telephone/virtual discussions. **6.** Attend to County budgeting and organizational matters. **7.** Initiation of this Agreement between the Department and the County. **8.** If the County employs a consultant, the County shall initiate selection of the Consultant and, upon selection, prepare and initiate contracts between the County and the Consultant.	$75,000

[1] Actual Scope may differ when issued by PADEP.

a. Any selected Consultant shall be required to utilize industry and regulatorily accepted modeling tools and protocols in preparation of the Plan prior to selection. **b.** Any selected Consultant shall be required to furnish examples of past work with Act 167 Plans and/or closely related stormwater modeling projects prior to selection. **9.** Prepare and conduct the Phase II start-up meeting among the Department, the County and the County's selected Consultant (if a consultant is used). **10.** Manage work according to the budget established herein **11.** Participate in other activities, as appropriate, regarding the preparation and submission of the Plan.	

II. PLAN PREPARATION

TASK	TASK DESCRIPTION	ANTICIPATED PRODUCT(S)	TIMELINE	COST ESTIMATE
TASK 1: DATA COLLECTION AND ANALYSIS	This task involves work to gather, review and analyze data and information regarding existing and future conditions in the watershed. The data collection will be accomplished by gathering available information from local, state, and federal agencies. The level of effort expended for this task will be commensurate with the objectives of the Plan. Data will be reviewed and updated as necessary and incorporated into the Plan in the most appropriate manner, e.g., by copy or by reference.		3 months	$200,000
Subtask 1.1 – WPAC Survey	Building on the efforts of the Phase I survey, the Consultant with County input will create and distribute a map-based survey to WPAC members to gather additional information on stormwater problem areas including areas indicated in TMDL documents, obstructions and capacities, and proposed stormwater facilities.	Map-based WPAC survey		
Subtask 1.2 – Data Collection and Review	The Consultant, with County assistance when applicable, will work with local, state, and federal agencies to gather and review data on existing and future conditions in each of the County's watersheds. Data to be collected may include but not be limited to the following: • Relevant Municipal and County plans including existing Act 167, comprehensive land use, and hazard mitigation plans • Municipal and County ordinances • Existing significant obstructions • Projected and alternative development and potential stormwater impacts	Narrative of watershed characteristics, stormwater problem areas and previously proposed solutions, and existing and proposed stormwater management facilities for the entire County		

	• Existing and projected development in flood hazard areas and sensitivity to stormwater impacts • Existing stormwater problems and previously proposed solutions • Existing and proposed stormwater collection systems and their impacts • Existing and proposed flood control projects and their design capacities • Areas to be served by stormwater collection and control facilities within a 10-year period, including estimates of design capacity and cost, schedule and proposed methods of financing the development, construction and operation of such facilities, and an identification of the existing or proposed institutional arrangements to implement and operate the facilities • Environmental resources including floodplains, soils, geology, and wetlands • Topography • Landcover • Water quality monitoring stations or stream gages • Water quality, including Special Protection waters and source and cause of impairments Data collected will utilize the results of the WPAC surveys distributed in Phases I and II. Field investigations will be conducted by the Consultant to collect or confirm data only when necessary.			
Subtask 1.3 – Municipal and County Ordinance Review	The County will evaluate, compare, and tabulate existing Municipal and County ordinances, in support of Model Stormwater Ordinance preparation in Task 4.	Matrix summary and comparison of stormwater management provisions in existing Municipal and County plans and ordinances		
Subtask 1.4 – Data Preparation for Technical Analysis	The Consultant will translate data collected during Subtask 1.2 into Geographic Information Systems (GIS) format to support technical analysis and graphical content of the Plan. Existing County GIS layers shall be utilized to the extent possible to maximize efficiency. GIS layers to be created from the collected data may include but shall not be limited to the following in order to complete the Plan: • Base map information including political and watershed boundaries, roads, and streams	GIS Database of watershed characteristics, stormwater problem areas and proposed solutions, and existing and proposed stormwater management		

	• Existing Land Use/Landcover • Future Land Use • Environmental resources including floodplains, soils, geology, and wetlands • Topography, including Digital Elevation Models (DEMs) • Obstructions • Stormwater Problem Areas • Flood Control Structures, Stormwater Management Facilities, etc. • Water quality monitoring stations or stream gages • Water quality, including Special Protection waters, source and cause of impairments as noted in state water quality assessments (e.g., 303(d) or 305(b) lists), and TMDL areas The Consultant will delineate watersheds on a base map at a scale that results in a manageable map size and adequate detail. When necessary for preparation of the Plan, subwatersheds and subareas will be delineated in a manner consistent with the guidance associated with the model. The following shall guide the delineation of subwatersheds and subareas: • Sound engineering judgment and the guidelines associated with the chosen model. • Location of identified stormwater problems and obstructions related to the purpose of the Plan. • Other points of interest as necessary to accomplish the purpose of the Plan, such as stream gages or water quality monitoring stations, locations of water quality impairment/concern, and/or anticipated future flood control project sites. Where significant effects on stormwater runoff are indicated, this task may also include delineation and mapping of: • Existing storm sewer systems including combined sewer overflows (CSOs) • Existing Federal, State, and local flood protection and stormwater management facilities • Stormwater facilities proposed for construction within the 10-year planning period • Stormwater related problems, such as areas indicated in municipal survey and/or identified during WPAC, in state water quality	facilities for the entire County GIS maps of watershed characteristics, stormwater problem areas and proposed solutions, and existing and proposed stormwater management facilities for the entire County		

	assessments, or streams with TMDLs, as being susceptible to flooding problems or as not meeting state water quality standards.			
Subtask 1.5 – Goals and Objectives	The Consultant with input from the WPAC, Stakeholders, and County will establish goals and objectives for the Plan that incorporates the policy, purpose, and requirements outlined in Act 167 and establishes the purpose of the Plan. Special consideration will be given to the concerns and problems identified by the County and the WPAC in Phase I and in Phase II Task 1.	Statement of Plan Goals and Objectives		
TASK 2: TECHNICAL ANALYSIS	This task entails developing alternative strategies to manage stormwater runoff in development, redevelopment, and other activities that may affect stormwater runoff. This will be accomplished under the following subtasks. The level of effort expended for this task will be commensurate with the objectives of the Plan.		10 months	$300,000
Subtask 2.1 – Evaluate water quality, peak flow, stream stability, and groundwater recharge requirements	The Consultant with input from the County will assess alternative runoff control techniques and their applicability to the County's watersheds. Water quality, peak flow, stream stability, and groundwater recharge/infiltration requirements are satisfied by the methods in Article III of the County's Model Ordinance, which utilizes DEP's draft Model Ordinance as a basis. The Plan shall provide the following only if other methods are deemed necessary to be utilized: • A water quality capture volume computational methodology acceptable to DEP to meet State Water Quality Standards pursuant to Chapter 93 regulations • A streambank erosion standard (for example, detain 1 year, 24-hr storm event and discharge over 24-hr to 72-hour period from the end of the storm). This work may involve an analysis of the erodibility of soils in and along streams and their channels within the watersheds • Methodologies for computing stormwater capture volumes for groundwater recharge and infiltration • Methodologies for control of peak runoff rates for the 1-, 2-, 5-, 10-, 25-, 50- and 100-year storm events. Methodologies must be applicable for design of post construction stormwater management BMPs as well as retrofit BMPs that may be required to address existing stormwater problems. The methodologies	Narrative assessment of alternative runoff control techniques and their applicability to the County's watersheds.		

	need to ensure that retrofits/redevelopment as well as new development projects are consistent with the purpose of Plan.			
Subtask 2.2 – Modeling	The Consultant with input from the County will evaluate watershed/ subwatershed runoff characteristics under existing and future conditions to assess alternative solutions to identified existing or anticipated future problems and meet to the purpose of the Plan. Hydrologic models and other quantitative tools will be used to conduct this analysis. Stormwater quality and peak rate controls will be evaluated for the 1-, 2-, 5-, 10-, 25-, 50- and 100-year 24-hour events. Sub-areas delineated for hydrologic modeling purposes should not be less than 5 square miles in area except when engineering judgement determines it to be necessary. Data required for modeling, such as rainfall, will be obtained from the most quality source publicly available. Hydrologic models should be calibrated using rain gage records, stream gage records, USGS regression models for Pennsylvania, and anecdotal historical information. The purposes of hydrologic modeling include development, evaluation, and selection of standards and criteria for the regulation of development and activities that may affect stormwater runoff for watersheds or sub-watersheds where implementation of DEP's draft Model Stormwater Management Ordinance alone is unlikely to be sufficient to meet the purpose of the Plan. Existing modeling products from previous County Act 167 plans shall be utilized to the extent feasible to maximize efficiency. Charts, tables, and graphs will be prepared and presented to show the results of modeling including an explanation of how the proposed technical standards and criteria meet the purpose of the Plan.	Hydrologic modeling data, including narrative text, charts, tables, and graphs that show the results of modeling and demonstrate how the proposed technical standards and criteria meet the purpose of the Plan.		
Subtask 2.3 – Standards and Criteria	Existing standards and criteria from previous County Act 167 plans shall be evaluated against modeling results in Subtask 2.2 and shall be incorporated into the Plan to the extent that they remain effective in controlling stormwater runoff from existing and new development in a manner that minimizes dangers to property and life consistent with Act 167 requirements and the purpose of the Plan. Where modeling demonstrates that existing standards and criteria are no longer effective, new standards and criteria will be compiled and presented to show: • A detailed list of specific standards and criteria for stormwater control	Summation of the standards and criteria developed for the control of stormwater runoff from existing and new development, including charts, tables, graphs, and narrative text as necessary to demonstrate how the proposed technical		

	• Where within watersheds and sub-watersheds the various standards and criteria apply • A list of applicable stormwater management controls methodologies and the design procedures associated with each • Performance criteria for design of stormwater management facilities • Locations where cluster or regional stormwater management facilities will be required • Cost estimates for construction of new stormwater management facilities to correct existing problems • A summary of funding sources for new facilities • An analysis of what problems will, and what problems will not, be solved by implementation of the Plan • Evaluation of existing floodplain ordinances and recommendations for changes where necessary. Standards and criteria will be consistent to the greatest practical extent within County municipalities and across the County.	standards and criteria meet the purpose of the Plan.		
TASK 3: STORMWATER MANAGEMENT PLAN PREPARATION AND REVIEW	This task entails preparation and WPAC review of the Plan, including assessment and compilation of conceptual solutions to identified stormwater issues as well as procedures to facilitate future Plan reviews, revisions, and updates. The Plan will contain provisions as necessary to meet the purpose of the Plan and Act 167. Whenever appropriate, material readily available from existing sources should be included by reference or by copy, whichever is more efficient. In each case, and for each watershed and sub-watershed, the level of detail should be commensurate with the purposes of the Plan and the strategies anticipated for managing stormwater runoff in a manner consistent with the Plan.		5 months	$300,000
Subtask 3.1 – Conceptual Solutions for Stormwater Problem Areas	The Consultant with input from the County, WPAC and Stakeholders, will develop an inventory of conceptual solutions for identified stormwater issues/problem areas, and evaluate those solutions for feasibility, benefits, and costs. Solutions should include proactive strategies and/or emphasize community education and engagement in stormwater management.	Inventory of applicable innovative stormwater management designs and best practices linked to existing stormwater problems in the County		
Subtask 3.2 – Priority Projects and Funding	The Consultant with input from the County, WPAC and Stakeholders, will utilize the information gained from the previous tasks together with land use planning considerations to identify and evaluate current and future stormwater projects in the County. Evaluation criteria will be developed	Prioritized list of potential stormwater projects that address stormwater issues		

	to aid in prioritization of potential stormwater projects. Additionally, current stormwater project funding agencies and programs will be identified and aligned with this prioritized list of potential stormwater projects. The project list should clearly identify lead and partner organizations.	identified in the Plan, with a list of potential project funding sources		
Subtask 3.3 – Plan Review, Revision, and Update Procedures	The Consultant, with input from the WPAC and County, will create an outline of administrative procedures for periodic Plan review, revision, and update. Procedures should strive to streamline future updates and ensure consistency with planning efforts of County municipalities and agencies as well as neighboring governmental agencies.	Outline of procedures for Plan review, revision, and update		
Subtask 3.4 – Plan Report Preparation	The Consultant with County input will compile the products of each previous task/subtask into the Plan. The Plan shall be prepared in a manner consistent with the approved Phase I Report (i.e., the Scope of Study) and the approved Scope of Work, ultimately meeting the requirements of Act 167 and providing a base for future watershed planning and implementation efforts (including updates to the Plan). The contents of the Plan shall comply with the requirements of 1978 Act 167. At a minimum, the Plan shall include the following in accordance with Section 5 of Act 167: 1. A survey of existing runoff characteristics in small as well as large storms, including the impact of soils, slopes, vegetation, and existing development 2. A survey of existing obstructions that significantly affect stormwater management and flooding within the watershed(s), and their capacities 3. An assessment of projected and alternative land development patterns in the watershed(s), and the potential impact of runoff quantity, velocity, and quality 4. An analysis of present and projected development in the flood hazard areas, and its sensitivity to damages from future flooding or increased runoff 5. A survey of existing drainage problems and proposed solutions 6. A review of existing and proposed stormwater collection systems and their impacts 7. An assessment of alternative runoff control techniques and their efficiencies in each watershed identified	Draft Updated County Act 167 Stormwater Management Plan		

	8. An identification of existing and proposed State, Federal and local flood control projects located in the watersheds and their design capacities 9. A designation of those areas to be served by stormwater collection and control facilities within a ten-year period, an estimate of the design capacity and costs of such facilities, a schedule and proposed methods of financing the development, construction, and operation of such facilities, and an identification of the existing or proposed institutional arrangements to implement and operate the facilities 10. An identification of flood plains within the watersheds 11. Criteria and standards for the control of stormwater runoff from existing and new development which are necessary to minimize dangers to property and life and carry out the purposes of the Act 12. Priorities for implementation of action within each watershed identified 13. Provisions for periodically reviewing, revising and updating the Plan In addition, the Plan shall: 1. Contain such provisions as are reasonably necessary to manage storm water such that development or activities in each municipality within the watershed do not adversely affect health, safety, and property in other municipalities within the watershed and in basins to which the watershed is tributary; and 2. Consider and be consistent with other existing municipal, county, regional and State environmental and land use plans. 3. Not regulate or endorse the regulation of "High Tunnels" in a manner contrary to Act 15 [Act of April 15, 2018, P.L. 91, No. 15].			
Subtask 3.5 – WPAC Review of Plan	The Consultant will present the draft Plan to the WPAC for review and feedback and will incorporate WPAC feedback into the Plan as necessary.	Draft Updated County Act 167 Stormwater Management Plan		
TASK 4: MODEL ORDINANCE REVIEW	The Consultant with County input will evaluate the County's existing Stormwater Model Ordinance against the criteria and standards of the Plan and make revisions only if strictly necessary. The County may augment the standards of the existing Model Ordinance (2022) with voluntary provisions that provide value-added benefits to development and redevelopment.		2 months	$75,000

Subtask 4.1 – Implementation of Technical Standards and Criteria	The final standards and criteria will be incorporated into a Model Stormwater Management Ordinance that will be included in the Plan. Where necessary, the ordinance provisions will be varied to meet differing requirements, or conditions, among the watersheds and municipalities in the County.	Draft Augmented Stormwater Model Ordinance		
Subtask 4.2 – WPAC Review of Model Ordinance	The Consultant will present the draft augmented Stormwater Model Ordinance to Municipal Engineers for review and feedback on engineering aspects. Municipal Engineer feedback will be incorporated into the Stormwater Model Ordinance as necessary. The Consultant will present the draft augmented Stormwater Model Ordinance to Municipal Solicitors for review and feedback on legal aspects, including adoption and enforcement. Municipal Solicitor feedback will be incorporated into the Stormwater Model Ordinance as necessary.	Adoption Draft Augmented Stormwater Model Ordinance		

III. PLAN ADOPTION				
TASK	**TASK DESCRIPTION**	**ANTICIPATED PRODUCT(S)**	**TIMELINE**	**COST ESTIMATE**
TASK 5: STORMWATER MANAGEMENT PLAN AND MODEL ORDINANCE ADOPTION AND DEP SUBMITTAL	This task will involve review of the Plan by the County, County municipalities, WPAC members, regional planning agencies, and the Department, as well as adoption of the Plan by the County and approval of the Plan by the Department. Task products will include the official documentation regarding Plan adoption, Department approval, and implementation process, including the necessary documentation from the County certifying the adoption of the Plan, and the actual adopted Plan.		4 months	$50,000
Subtask 5.1 – Plan Review by County Planning Agency, the Municipal Governing Bodies, County Planning Commission, and Regional Planning Agency	In accordance with Section 6(c) of Act 167, prior to adoption, the County shall produce and submit one (1) printed copy as well as one (1) electronic PDF copy of the Plan to the following for review to ensure consistency with other plans and agencies affecting County watersheds: • Official planning agency and governing body of each County municipality • County Planning Commission • Delaware Valley Regional Planning Commission The Plan shall also be submitted to the Department to ensure that the Plan is complete prior to County adoption. The County will also provide	Letters of review by County municipal planning agencies and governing bodies, County Planning Commission, and applicable regional planning agencies		

	one (1) electronic PDF copy of the Plan to each member of the WPAC. The involved County municipalities, WPAC members, regional planning agencies, and the Department will review the Plan and provide comments to the County. All such reviews shall be incorporated into the submittal package to the Department for Plan approval during Subtask 5.3. The County shall allow 90 days for return of comments. The County will tabulate and respond to all comments received. After consideration of the comments and responses, the County will revise the Plan accordingly. Prior to the County's public hearing on the Plan, the County will hold a WPAC meeting to present the final version of the Plan.			
Subtask 5.2 – County Adoption	In accordance with Section 8 of Act 167, the County shall hold a public hearing pursuant to public notice of not less than two weeks. The notice shall contain a summary of the principal provisions of the Plan, and a reference to the places within each affected municipality where copies may be examined or purchased at cost. Adoption or amendment of the Plan shall be by resolution carried by an affirmative vote of at least a majority of the members of the County governing body. The resolution shall refer expressly to the maps, charts, textual matter, and other materials intended to form the whole or part of the official Plan, or amendment thereto, and the action shall be recorded on the adopted Plan, part or amendment.	Stormwater Management Plan (Plan) and Stormwater Model Ordinance adopted by the County		
Subtask 5.3 – DEP Submittal	The County will submit the following to the Department for final approval: • One (1) printed copy as well as one (1) electronic PDF copy of the adopted Plan and Model Ordinance, together with letters of review by County municipal planning agencies and governing bodies, County Planning Commission, and applicable regional planning agencies from Subtask 5.1 • All supporting data in native digital format One (1) printed copy as well as electronic PDF copies of the final approved Plan, as well as hard copies of all backup material including technical analyses and models of watersheds or sub-watersheds will be retained at the County's offices. In order to support consistent modeling efforts within future plan revisions, the Consultant will provide the County all finalized model software related running specifications, data inputs (datasets, GIS, calibration data, etc.), and data outputs to enable replication	Approved County Stormwater Management Plan, Model Stormwater Ordinance, and supporting data		

	of the modeling process. Additionally, the modeling software final project file should be provided to the County.			
Subtask 5.4 – Municipal Implementation	The County will engage the WPAC and municipal solicitors within workshops to provide information regarding municipal obligation to implement the Plan. The workshops will cover procedures to adopt, enact, administer, and enforce the stormwater management ordinance as well as municipal obligations to implement other action items in the Plan. The workshops will address availability of resources to implement the Plan, establishment of fees for stormwater management, and other issues related sources of funding. Alternatives for pooling resources including municipal authorities and intergovernmental cooperative agreements will be presented and discussed. The municipal implementation workshops will be conducted within three months following DEP's approval of the Plan.	Meeting materials may include but not be limited to agendas, presentations, meeting minutes, and informational pamphlets with resources to implement the Plan.		
Subtask 5.5 – Educational Workshops	The County will conduct educational workshops on topics including the Plan, stormwater management, and BMPs. The purpose and design of these public education events will revolve around creating awareness of stormwater, Best Management Practices, and resources. Also covered will be goals and benefits of the Plan and responsibilities and methods for residents to meet the Plan's requirements.	Meeting materials may include but not be limited to agendas, presentations, meeting minutes, and informational pamphlets with resources to implement the Plan.		
		TOTAL PROJECT COST ESTIMATE		**$1,000,000**

Darby/Cobbs Municipal Leaders Group
Act 167 County-wide Stormwater Mngt Plan - Watershed Plan Advisory Committee (WPAC)

MEETING DATE: May 7, 2024

Please print your name	Municipality or Affiliation	Email Address
David Schreiber	Tinicum Township	dschreiber@TinicumTownship.delco.com
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Ken Woznicki	for: Eileen Mulvenna Darby Boro, East Lansdowne	KtmL@verizon.net ccc emulvena.ccc@gmail.com ~~emulvena@gmail.com~~
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Amy Verbofsky	DVRPC	averbofsky@dvrpc.org

Act 167 County-wide Stormwater Mngt Plan – Watershed Plan Advisory Committee (WPAC)

Meeting Date: June 4, 2024

Please print your name:	Municipality or Affiliation:	Email Address:
Becca Yurkovich	DCOS	yurkovichr@co.delaware.pa.us
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Meredith Marino	Middletown Twp	mmarino@middletownde.pa.gov

Act 167 County-wide Stormwater Mngt Plan – Watershed Plan Advisory Committee (WPAC)

Meeting Date: June 11, 2024

Please print your name:	Municipality or Affiliation:	Email Address:
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Delaware County Coastal Zone Task Force

Delaware County Planning Department | 610.891.5200

Marcus Hook Municipal Building
1111 Market St. Marcus Hook, PA

Wednesday, June 12, 2024

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