



Westmoreland County Department of Planning and Development

Greensburg, Pennsylvania

Act 167 Scope of Study for
Westmoreland County
Stormwater Management Plan



June 2010 ©

PHASE 1 – SCOPE OF STUDY
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I. INTRODUCTION

Purpose

This report was prepared under and in accordance with a grant from the Pennsylvania Department of Environmental Protection (PADEP) for Westmoreland County to conduct a countywide Act 167 Stormwater Management Plan Phase 1. This report presents the results of the Phase 1 effort, which includes:

- A summary of County watershed characteristics
- An inventory of relevant problems
- A proposed Scope of Study, schedule and budget for completion of the Phase 2 Plan project.

Stormwater Runoff Problems and Solutions

The water that runs off the land into surface waters during and immediately following a rainfall event is referred to as stormwater. In a watershed undergoing land use conversion or urban expansion, the volume of stormwater resulting from a particular rainfall event increases because of the reduction in pervious land area (i.e., natural land cover being changed to pavement, concrete, buildings, or unmanaged cropland). These surface changes can also substantially degrade stormwater runoff water quality, increasing the pollutant load to the rivers and streams. The alteration of natural land cover and land contours to residential, commercial, industrial, and crop land uses results in decreased infiltration of rainfall, an increased rate and volume of runoff, and increased pollutant loadings to surface watercourses.

As the population of an area increases, land development is inevitable. As land disturbance and development increases, so does the problem of dealing with the increased quantity and decreased quality of stormwater runoff. Failure to properly manage this runoff results in greater flooding, stream channel erosion and siltation, degraded water quality, as well as reduced groundwater recharge. The cumulative effects of development in some areas of a watershed can result in flooding of natural watercourses with associated costly property damages, and can have a negative impact on wastewater treatment plant operations. These impacts can be minimized if the land use and development incorporates appropriate runoff and stormwater management systems and designs.

Individual land disturbance/development projects have historically been viewed as independent or discrete events or impacts, rather than as part of a larger watershed process. This has also been the case when the individual land development projects are scattered throughout a watershed (and in many different municipalities). However, it is now being observed that the cumulative nature of individual land surface changes dramatically affects runoff and flooding conditions. These cumulative effects of development and land disturbance in some areas have resulted in flooding of both small and large streams with the associated property damages and, in some cases, loss of life. Therefore, given the distributed and cumulative nature of the land alteration

process, a comprehensive approach must be taken if a reasonable and practical management and implementation approach or strategy is to be successful.

Pennsylvania Storm Water Management Act (Act 167)

Recognizing the need to address this serious and growing problem, the Pennsylvania General Assembly enacted Act 167 of 1978. The statement of legislative findings at the beginning of the Pennsylvania Storm Water Management Act (Act 167) sums up the critical interrelationship among land development, accelerated runoff, and floodplain management. Specifically, this statement of legislative findings points out that:

1. Inadequate management of accelerated stormwater runoff resulting from development throughout a watershed increases flood flows and velocity, contributes to erosion and sedimentation, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control stormwater, undermines floodplain management and floodplain control efforts in downstream communities, reduces groundwater recharge, and threatens public health and safety.
2. A comprehensive program of stormwater management, including reasonable regulation of development and activities causing accelerated runoff, is fundamental to the public health, safety, and welfare and the protection of the people of the Commonwealth, their resources, and their environment.

The policy and purpose of Act 167 is to:

1. Encourage planning and management of storm water runoff in each watershed that is consistent with sound water and land use practices.
2. Authorize a comprehensive program of storm water management designated to preserve and restore the flood carrying capacity of Commonwealth streams; to preserve to the maximum extent practicable natural storm water runoff regimes and natural course, current and cross section of water of the Commonwealth; and to protect and conserve ground waters and groundwater recharge areas.
3. Encourage local administration and management of storm water consistent with the Commonwealth's duty as trustee of natural resources and the people's constitutional right to the preservation of natural, economic, scenic, aesthetic, recreational and historic values of the environment.

Until the enactment of Act 167, stormwater management had been oriented primarily towards addressing the increase in peak runoff rates discharging from individual land development sites to protect property immediately downstream. Management of stormwater throughout the state paid minimal attention to the effects on locations further downstream (frequently because they were located in another municipality) or to designing stormwater controls within the context of the entire watershed.

Stormwater management has also typically been regulated at the municipal level, with little or no design consistency (concerning the types or degree of storm runoff control to be practiced) between adjoining municipalities in the same watershed.

Act 167 changed this approach by instituting a comprehensive program of watershed stormwater management planning. The Act requires Pennsylvania counties to prepare and adopt stormwater management plans for each designated watershed within the County; and recent changes in PADEP Act 167 policy now provide for Act 167 planning efforts on a countywide basis. Perhaps most significantly, Act 167 plans are to be prepared in consultation with municipalities located in the County, working through a Watershed Plan Advisory Committee (WPAC). The plans are to provide technical standards and criteria throughout the County's watersheds for the management of stormwater runoff from new land development sites. The Act 167 Plan must now also address retrofits of existing sites to improve existing water quality impairments and existing sources of flooding problems.

The types and degree of controls that are prescribed in the stormwater management plan must be based on the development pattern and hydrologic characteristics of each individual watershed. The final product of the Act 167 watershed planning process is to be a comprehensive and practical implementation plan, developed with a firm sensitivity to the overall needs (financial, legal, political, technical, etc.) of the municipalities in Westmoreland County.

Act 167 Planning for Westmoreland County

Based on the above history and information, the countywide watershed planning process for Westmoreland County must be designed with the individual watershed characteristics in mind, as well as the resources (technical, political, and economic) of the County. This Phase 1 - Scope of Study presents the concept and approach that has been developed to meet these requirements, as well as the specific requirements of Act 167 for this countywide watershed stormwater management project.

The goal of Westmoreland County's Act 167 planning process is to provide a countywide comprehensive program for the planning and management of stormwater. With coordination from the sixty-five (65) municipalities in Westmoreland County, the resulting stormwater management ordinance will address stormwater related problems in critical areas throughout the County. Furthermore, all County municipalities must adopt the resulting stormwater management ordinance, or amend and implement ordinances and regulations as necessary to regulate development in a manner consistent with the proposed Plan and the provisions of Act 167. The stormwater management controls addressed in the stormwater management ordinance will collectively have a beneficial impact on the waters of Westmoreland County and those "problem" areas that presently remain unmanaged.

Westmoreland County has received Phase 1 Scope of Study funding from PADEP. The Phase 2 efforts will generate the final stormwater management plan and model ordinance.

Plan Benefits

1. Consistency in Stormwater Management Planning, Regulation, and Implementation

The purpose and benefit of the study and implementation plan is to provide all of the municipalities in the County with an accurate and consistent implementation strategy and procedures for comprehensive stormwater management. Current stormwater management regulations, strategies, and enforcement criteria vary widely among the municipalities. Given the nature of storm runoff and its impacts, as described earlier in this document, a critical objective of sound stormwater management planning is to provide for consistency of implementation requirements throughout the watershed. Therefore, the primary objective of the technical study and planning process is to develop a technical and institutional support document to encourage and/or support the consistency of regulations for implementation of effective stormwater management based on watershed-wide consideration.

2. Integrated Stormwater Management Plan

Water resources are one integrated resource, connected through the hydrologic cycle. Stormwater runoff is a major component of this cycle. Surface water and groundwater are interconnected. The Westmoreland County Stormwater Management Plan will not only address water quantity or peak flows, but will also take a more holistic approach to watershed management by also evaluating the interaction between surface water and groundwater, where and how water quality concerns should be addressed, and how stormwater management (or lack thereof) affects stream bank erosion. The results will be a Plan to preserve and enhance Westmoreland County's water resources through proper stormwater management.

3. Usable Technical Information in GIS Format

The technical and institutional watershed planning approach recommended by the PADEP also provides the municipalities within this watershed with a considerable amount of usable technical information, such as a detailed watershed runoff simulation model, that can be used for numerous other associated purposes by participating municipalities. Consequently, the municipalities and the County will receive beneficial products that can be used for other planning and engineering purposes. For example, land use updates and environmental data management are functions that are necessary for effective planning in a watershed. The technical component of the plan, primarily the water resources geodatabase created for the watershed, will provide the County and municipalities with a tool to perform a range of environmental assessments, such as future water quality impact studies after the plan is completed.

4. Technical Information for Future Hydrologic and Hydraulic Analysis and Regulatory Activities

In addition, technical support information, provided as a part of watershed modeling efforts, can be useful in the analysis, design and regulatory permitting process for floodplain management and bridge replacement efforts. Further, the stream encroachment permit process, which involves the need to supply detailed

stream flow data as a part of the application process, can be developed more efficiently and cost-effectively using the calibrated watershed model.

The benefits of the watershed planning process are extensive, even beyond the important functions of developing comprehensive stormwater management strategies and ordinance provisions.

The plan will investigate and provide solutions to correct existing problems. Specifically, the plan will identify and summarize problem areas; provide much of the hydrology that will be required in the design of proposed solutions; provide potential conceptual solutions to correct these problems; and will specify possible funding streams for project implementation.

Stormwater Management Planning Approach

In order to implement countywide comprehensive planning and management of stormwater runoff, it was necessary to take a close look at all major watersheds within Westmoreland County during Phase 1. Since the goals of the Act itself depend on municipal coordination and participation to provide for the planning and management of stormwater throughout their respective municipality, it was necessary to get "buy-in", endorsement, and involvement from each municipality early in the planning process.

In order to initiate municipal level involvement in the overall development of the plan, a Watershed Plan Advisory Committee (WPAC) was formed and consists of the Westmoreland County Department of Planning and Development, municipalities, the Westmoreland County Conservation District, and other interested agencies or organizations. Two WPAC meetings were held during Phase 1 to introduce the planning process, to distribute map-based Stormwater Management Planning Surveys, and to review the Phase 1 Scope of Study document.

The development process for the stormwater management plan is as follows:

1. Phase 1 - Scope of Study - Establishing procedures used to prepare the Plan. These procedures are determined by an overall survey of:
 - Specific watershed characteristics and hydrologic conditions.
 - Stormwater related problems and significant obstructions.
 - Alternative measures for control.
 - Goals, objectives, solution strategies, and estimated costs for the Phase 2 Plan.
2. Phase 2 - The Plan - The technical assessment and development of the model ordinance that includes:
 - Watershed modeling and planning.
 - Development of technical standards and criteria for stormwater management.
 - Conceptual solutions to identify problem areas.

- Identification of administrative procedures for implementation of the plan.
- Adoption of Plan by Westmoreland County.
- Approval of Plan by PADEP.
- Adoption of stormwater management ordinances by all municipalities.
- Municipal implementation and enforcement of stormwater management ordinances.

Previous County Stormwater Management Planning and Related Planning Efforts

In addition, the following relevant documents have been prepared and will provide a valuable source of information for the development of the Plan:

1. Westmoreland County Comprehensive Plan, Westmoreland County Department of Planning and Development, January 2005
2. Westmoreland County Subdivision and Land Development Ordinance of the County of Westmoreland, Westmoreland County Department of Planning and Development, 2002
3. Sewickley Creek Watershed Conservation Plan, August 2003
4. Tubmill Creek Watershed Protection and Restoration Project, 1991
5. Westmoreland County Natural Heritage Inventory, September 1998
6. Kiski Conemaugh Basin Greenway Feasibility Study, 1999
7. Turtle Creek Watershed Act 167 Stormwater Management Plan, 1991
8. Macroinvertebrate Study, Loyalhanna Watershed Association, 2004-2005
9. Loyalhanna Watershed Assessment and Restoration Plan, Loyalhanna Watershed Association, 2006

II. GENERAL COUNTY DESCRIPTION

Westmoreland County covers approximately 660,000 acres and, according to the 2000 census, has a population of 369,993. The largest municipality in Westmoreland County is the Hempfield Township, with a population of 40,721. North Huntingdon is the second largest in population with 29,123.

Political Jurisdictions

The County is comprised of sixty-five municipalities. The political jurisdictions include twenty-one townships, thirty-six boroughs, five cities, and three home rule municipalities.

Townships	Boroughs	Cities
Allegheny	Adamsburg	North Belle Vernon
Bell	Arona	North Irwin
Cook	Avonmore	Oklahoma
Derry	Bolivar	Penn
Donegal	Delmont	Scottdale
East Huntingdon	Derry	Seward
Fairfield	Donegal	Smithton
Hempfield	East Vandergrift	South Greensburg
Ligonier	Export	Southwest Greensburg
Loyalhanna	Hunker	Sutersville
Mount Pleasant	Hyde Park	Trafford
North Huntingdon	Irwin	Vandergrift
Penn	Laurel Mountain	West Leechburg
Rostraver	Ligonier	West Newton
Salem	Madison	Youngstown
Sewickley	Manor	Youngwood
South Huntingdon	Mount Pleasant	
St. Clair	New Alexandria	
Unity	New Florence	
Upper Burrell	New Stanton	
Washington		

Refer to Figure 1 for a County Base Map.

NPDES Phase 2 Involvement

Municipalities within Urbanized Areas (UA) as designated by the 2000 U.S. Census are required to comply with the National Pollutant Discharge Elimination System (NPDES) Phase 2 requirements for operators of municipal separate storm sewer systems (MS4s).

Those municipalities that fall within an Urbanized Area as defined above are shaded in the following table:

Townships		Boroughs	Cities
Allegheny	Adamsburg	North Belle Vernon	Arnold
Bell	Arona	North Irwin	Jeannette
Cook	Avonmore	Oklahoma	Lower Burrell
Derry	Bolivar	Penn	Monessen
Donegal	Delmont	Scottdale	New Kensington
East Huntingdon	Derry	Seward	
Fairfield	Donegal	Smithton	Home Rule
Hempfield	East Vandergrift	South Greensburg	Greensburg
Ligonier	Export	Southwest Greensburg	Latrobe
Loyalhanna	Hunker	Sutersville	Murrysville
Mount Pleasant	Hyde Park	Trafford	
North Huntingdon	Irwin	Vandergrift	
Penn	Laurel Mountain	West Leechburg	
Rostraver	Ligonier	West Newton	
Salem	Madison	Youngstown	
Sewickley	Manor	Youngwood	
South Huntingdon	Mount Pleasant		
St. Clair	New Alexandria		
Unity	New Florence		
Upper Burrell	New Stanton		
Washington			

General Development Patterns

Over the past decade, Westmoreland County’s overall population has declined only slightly, and the County’s economy remains strong, with an increase in the workforce and household incomes.

There is growth in new household formation in the County, and incomes are rising, translating to an increased consumption of goods and services, and absorption of land for development. Although the population has remained relatively constant, significant shifts in population have occurred, following a consistent pattern of population migration from the cities to the suburbs.

The housing goal for suburban areas in the County is to create alternatives to large lot subdivisions in order to preserve the County’s predominant rural character, conserve key natural resources, and halt the declines in farms and farm acreage. The housing goal for urban areas is to reclaim residential neighborhoods through revitalization activities, in hopes of attracting residents seeking automobile independence, and lessen the urban sprawl pattern. The goal for rural areas is to preserve the integrity of existing housing in rural villages, and assure limited development in areas that lack

public water and sewer service. Another goal of the County is to mix affordable housing together with market rate housing in new developments, in order to provide housing options for all County residents.

Historically, development in the County has been concentrated in a triangular area bounded roughly by Monessen in the south, Latrobe in the east, and New Kensington in the north. It is expected that development will continue to be concentrated in this triangle due to the availability of public water and sewer and building sites. Though there are no formal growth boundaries, the County hopes to direct future development to this area in order to preserve the low-density character of areas outside the triangle. The County stresses that development sites be linked by roadways, walkways, bicycle trails and contiguous tracts of unimproved open space to increase the value of these developed areas and the quality of life for County residents.

Land Use

According to Westmoreland County Department of Planning and Development estimates, 11.7% of the total acreage in the County (17.3% of developable land) has been developed. The average rate of development between 1967 and 2003 was 693 acres/year. Using this rate of growth to project new development to the year 2040, results show there will be approximately 15.6% of total land developed. Preserved lands, such as flood plains, steep slopes, wetlands, open space, parks, gamelands, campgrounds, reservoirs, agricultural security areas, and golf courses, account for 210,748 acres, or 32% of the total land acreage in Westmoreland County. The remaining 56% of total land acreage (368,186 acres) is occupied by rural/very low-density residential uses, unprotected farms and/or forests, vacant land and other uses.

Physiography

Westmoreland County is part of the Laurel Highlands and lies on the northeastern end of the soft coal fields on the Appalachian plateau, with the eastern part lying within the Allegheny Foothills. The highest elevation is 2,960 feet above Median Sea Level (MSL) at Birch Rock Hill on Laurel Hill, and the lowest elevation of approximately 740 feet above MSL is located at the Allegheny River in New Kensington. A significant amount of land in Westmoreland County is classified by the United States Geological Survey mapping as having excessive slopes (exceeding 25%), and therefore is considered unsuitable or marginally suitable for development. Variations in aspect, slope, and elevation combine to create a number of different microenvironments throughout the County. Numerous soil types influenced by weathering of underlying bedrock, slope, organic material and climate and sometimes the bedrock itself create the ecological foundation for Westmoreland County.

There are two major types of mining activities in Westmoreland County: surface mining for bituminous coal, and deep surface mining for industrial minerals such as sand, gravel, shale, slag, sandstone, limestone, clay, topsoil, and "other" sedimentary minerals. Bituminous Coal is currently mined from 12 active bituminous coal surface mines. Industrial mining of minerals is on the upswing in Westmoreland County, as more

than 3.4 million tons was mined in both surface and underground operations during 2002.

Soils

There are seven main soil associations and approximately 125 soil types identified in Westmoreland County.

Westmoreland-Guernsey-Clarksburg Association - Deep and moderately deep, well drained to somewhat poorly drained soils over interbedded sandstone, shale, and limestone. This Association consists chiefly of rounded hills that have long, smooth, convex slopes, and of nearly level to gently sloping benches and fans. This Association is mainly found in the west-central part of the County and is found at elevations above the Pittsburgh coal seam.

Gilpin-Wharton-Cavode Association - Deep and moderately deep, well drained to somewhat poorly drained soils over acid, gray shale and siltstone. This Association is steep and hilly and is generally found at elevations below the Pittsburgh coal seam.

Gilpin-Dekalb-Cavode Association - Deep and moderately deep, well drained to somewhat poorly drained soils on ridges; underlain by acid, gray shale and sandstone. This Association occurs mainly on Chestnut Ridge and Laurel Hill in the eastern part of the County, at elevations below the Freeport coal seam.

Calvin Association - Moderately deep, well-drained, red soils on ridges. This Association occurs in the eastern part of the County on the uppermost parts of Chestnut Ridge and Laurel Hill.

Weikert Association - Shallow, well-drained, rocky soils on escarpments along streams. This Association occurs as escarpments cut by Loyalhanna Creek and the Kiskiminetas, Conemaugh, Allegheny, Youghiogheny, and Monongahela Rivers. The largest areas occur where the streams have cut across Chestnut Ridge and Laurel Hill. Most of the geologic formations in the County are exposed in these cuts. The rocks include sandstone, shale, siltstone, and limestone.

Philo-Monongahela-Atkins Association - Deep, moderately well drained to poorly drained soils on terraces and floodplains. This Association occurs along the larger streams of the County.

Upshur-Gilpin-Clarksburg Association - Deep and moderately deep, well drained and moderately well drained soils over red and brown clay shale, siltstone, and sandstone. This Association is gently sloping to steep and occurs in the northwestern part of the County. The steeper and the more dissected slopes are nearer the larger streams.

Water Resources

Westmoreland County contains eleven major watersheds that may overlap county boundaries and in recent times, have become prominent boundaries for a variety of planning activities and studies. These eleven watersheds include:

Allegheny River
Conemaugh River
Indian Creek
Jacobs Creek
Kiskiminetas River
Loyalhanna Creek

Monongahela River
Pucketa Creek
Sewickley Creek
Turtle Creek
Youghiogheny River

All of the creek-based watersheds either have watershed plans or assessments in place, or are currently developing such plans. In addition, the Turtle Creek watershed is the only watershed in the county that has an Act 167 plan in place, which is in need of an update.

The Westmoreland Conservation District identified the following high priority watershed issues in the 2005 Comprehensive Plan:

- Erosion and sedimentation. A result of increased development in rural and suburban areas, erosion and sedimentation affect lower parts of all watersheds. Sedimentation causes the largest impact to streams by volume.
- Stormwater management/flooding. As development continues throughout the county, infrastructure put in place to move stormwater quickly to creeks and tributaries often have a detrimental effect on communities downstream. Since the stormwater runoff moves to the creeks faster, the volume of the creek is higher earlier in a storm event. This moves the water to larger water bodies more quickly, often reaching rivers when they are still rising. This phenomenon results in regular flooding of low-lying areas.
- Acid mine drainage (AMD). AMD has the biggest negative impact on water quality in the county. Treatment of AMD in the county primarily consists of passive treatment systems through engineered wetland treatment cells. Beyond the short-term need of locating land suitable for use in this process, long-term maintenance of passive treatment systems is also an issue.
- Act 167 plans. Act 167 plans regulate land and water use for flood control and stormwater management purposes. The Sewickley Creek Watershed and the Pucketa-Chartiers Watershed were identified as two areas of the county that could benefit from Act 167 plans. The Sewickley Creek area has experienced increased development, with resultant sedimentation and erosion issues that impact the creek. The Pucketa-Chartiers Watershed, with large amounts of land developed over time, has regular flooding problems in the lower watershed. Act 167 plans would help to mitigate these issues in each watershed.

There are numerous lakes, dams, creeks and other streams in Westmoreland County. The following water bodies are the ones that are most popular in the county, and are part of a formal park system.

- Donegal Lake. Donegal Lake is comprised of 232 acres and is owned and managed by the Pennsylvania Fish and Boat Commission.
- Bridgeport Dam. Bridgeport Dam is part of the County Parks system located in Mt. Pleasant. The 70-acre lake is a flood control dam located on Jacob's Creek.

- Cedar Creek. Cedar Creek is located in Cedar Creek Park, another facility owned and operated by the County Parks system. The creek has created a gorge offering views from a trail that runs alongside the creek.
- Mammoth Lake – 24 acre Mammoth Lake is part of Mammoth Park, another facility owned and operated by the County Parks system.
- Northmoreland Lake – 17 acre Northmoreland Lake is part of Northmoreland Park, another facility owned and operated by the County Parks system.
- Upper and Lower Twin Lakes - Upper and Lower Twin Lakes are part of Twin Lakes Park, another facility owned and operated by the County Parks system.
- Indian Lake - Indian Lake is located in North Huntingdon Township.
- Streams - There are 2,200 miles of streams in Westmoreland County, of which 940 have been assessed by the Pennsylvania Department of Environmental Protection (DEP).

Designated Act 167 watersheds in Westmoreland County include:

Allegheny River
 Conemaugh River
 Indian Creek
 Jacobs Creek
 Kiskiminetas River
 Loyalhanna Creek

Monongahela River
 Pucketa Creek
 Sewickley Creek
 Turtle Creek
 Youghiogheny River

PA Chapter 93 Stream Classifications

A summary table of the 2008 PA Chapter 93 stream water quality classifications for streams in Westmoreland County is presented below:

<u>Classification</u>	<u>County Stream Miles</u>	<u>Percent</u>
Exceptional Value	64.79	2.75
High Quality – Cold Water Fishes	430.46	18.25
High Quality – Warm Water Fishes	3.71	0.16
High Quality – Trout Stocking	2.37	0.10
Cold Water Fishery	313.22	13.28
Warm Water Fishery	918.53	38.95
Trout Stocking	625.15	26.51

Impaired Waterways

The following table identifies the water quality impairment sources and extents for those streams within Westmoreland County that are currently on the PADEP 2010 Integrated Non-Attaining List. This List represents stream assessments for the Clean Water Act Section 305(b) reporting and Section 303(d) listing. The PADEP protects four stream water uses: aquatic life, fish consumption, potable water supply, and recreation. This data represents stream segments that have been evaluated for attainment of those uses. If a stream segment is not attaining any one of its four uses, it is considered impaired.

<u>Primary Impairment</u>	<u>Stream/Reach Name</u>	<u>Miles</u>
AMD	Beaver Run	6.314
	Beckets Run	0.616
	Big Spring Run	3.549
	Brady Run	0.223
	Brush Creek	6.614
	Buffalo Run	1.235
	Bushy Run	3.389
	Byers Run	1.783
	Cedar Creek	1.568
	Coal Run	0.236
	Coal Tar Run	2.002
	Conemaugh River	5.277
	Crabtree Creek	4.434
	Crawford Run	0.808
	Fourmile Run	1.919
	Freeman Run	1.445
	Getty Run	4.534

<u>Primary Impairment</u>	<u>Stream/Reach Name</u>	<u>Miles</u>
	Green Lick Run	0.399
	Harbridge Run	1.356
	Hunters Run	0.249
	Hypocrite Creek	1.068
	Jacks Run	3.994
	Jacobs Creek	3.213
	Kelly Run	0.022
	Kiskiminetas River	10.874
	Loyalhanna Creek	8.141
	Lutz Run	0.135
	Lyons Run	2.134
	McGee Run	3.413
	Meadow Run	0.534
	Monastery Run	1.796
	Monongahela River	1.402
	Naugle Run	0.028
	Pine Run	2.198
	Poke Run	2.342
	Pollock Run	2.641
	Porters Run	3.146
	Pucketa Creek	1.185
	Richards Run	0.044
	Saxman Run	0.813
	Sewickley Creek	7.718
	Sherrick Run	0.244
	Shupe Run	0.289
	Speers Run	1.109
	Spuce Run	2.855
	Stauffer Run	0.439
	Steels Run	0.101
	Stony Run	1.575
	Sugar Run	1.628
	Sulphur Run	0.418
	Thorn Run	1.036
	Tinkers Run	0.369
	Trout Run	0.394
	Tubmill Creek	1.717
	Turtle Creek	3.034
	Union Run	1.962
	Welty Run	0.722
	Wilson Run	1.535
	Wolford Run	2.974
	Youghiogheny River	0.562
	unnamed	152.704
	<i>Total:</i>	<i>280.458</i>

Primary Impairment	Stream/Reach Name	Miles
Agriculture	Beaver Run	0.791
	Big Spring Run	0.484
	Brush Creek	1.894
	Bushy Run	0.314
	Byers Run	0.151
	Conemaugh River	4.623
	Crabtree Creek	2.296
	Fourmile Run	0.379
	Freeman Run	0.362
	Hunters Run	0.488
	Jacks Run	3.845
	Kelly Run	0.110
	Kiskiminetas River	2.132
	Loyalhanna Creek	4.516
	McGee Run	0.488
	Poke Run	0.014
	Pollock Run	0.998
	Porters Run	1.075
	Pucketa Creek	0.787
	Saxman Run	0.660
	Sewickley Creek	2.611
	Shupe Run	0.215
	Spruce Run	1.466
	Stony Run	1.580
	Sugar Run	0.058
	Thorn Run	0.827
	Tinkers Run	0.254
Turtle Creek	0.239	
Union Run	1.175	
Welty Run	2.161	
Wolford Run	1.302	
unnamed	46.087	
	Total:	84.380
Bank Modifications	Beaver Run	1.878
	Boyer Run	0.005
	Brush Creek	4.173
	Buffalo Run	0.174
	Bushy Run	0.363
	Cedar Creek	0.369
	Conemaugh River	2.201
	Crabtree Creek	0.853
	Fourmile Run	0.640
	Getty Run	0.139
	Hypocrite Creek	0.157
	Jacks Run	2.975

<u>Primary Impairment</u>	<u>Stream/Reach Name</u>	<u>Miles</u>
	Jacobs Creek	1.179
	Kiskiminetas River	2.064
	Loyalhanna Creek	1.551
	Lyons Run	0.005
	McGee Run	0.532
	Monongahela River	0.368
	Naugle Run	0.110
	Poke Run	1.252
	Porters Run	0.133
	Saxman Run	0.888
	Sewickley Creek	3.851
	Sherrick Run	0.850
	Shupe Run	0.736
	Spruce Run	1.242
	Stauffer Run	1.691
	Stony Run	0.587
	Sugar Run	0.436
	Thorn Run	1.114
	Trout Run	1.798
	Turtle Creek	1.543
	Union Run	0.500
	Welty Run	0.795
	Youghiogheny River	0.040
	Zellers Run	0.353
	unnamed	42.290
	Total:	79.835
Channelization	Beaver Run	0.281
	Spruce Run	1.143
	Turtle Creek	0.628
	unnamed	0.951
	Total:	3.002
Crop Related Agriculture	Beaver Run	0.047
	Brush Creek	0.208
	Conemaugh River	0.250
	Fourmile Run	0.047
	Gillespie Run	0.249
	Jacobs Creek	0.232
	Kiskiminetas River	1.032
	Loyalhanna Creek	0.341
	McGee Run	0.186
	Pine Run	0.024
	Porters Run	0.472
	Pucketa Run	1.031
	Sewickley Creek	0.768
	Speers Run	0.978

<u>Primary Impairment</u>	<u>Stream/Reach Name</u>	<u>Miles</u>
	Spruce Run	0.836
	Steels Run	0.401
	Thorn Run	0.567
	Turtle Run	0.963
	Union Run	2.016
	Wilson Run	0.256
	unnamed	9.392
	Total:	20.335
Erosion from Derelict Land	Conemaugh River	0.027
	Jacobs Creek	0.373
	Kiskiminetas River	0.782
	unnamed	0.686
	Total:	1.907
Flow Regulation/Modification	Steels Run	0.006
	unnamed	0.625
	Total:	0.631
Grazing Related Agriculture	Beaver Run	0.730
	Beckets Run	0.667
	Brush Creek	1.269
	Bushy Run	1.341
	Byers Run	1.166
	Cedar Creek	0.957
	Conemaugh River	1.872
	Getty Run	1.780
	Hypocrite Creek	1.088
	Jacks Run	1.019
	Loyalhanna Creek	1.402
	McGee Run	0.321
	Pine Run	0.955
	Poke Run	0.926
	Porters Run	1.145
	Pucketa Creek	0.537
	Sewickley Creek	1.797
	Thorn Run	0.929
	Tubmill Run	0.222
	Turtle Creek	0.630
	Welty Run	0.183
	unnamed	13.521
	Total:	34.575
Habitat Modification-Siltation	Saxman Run	0.565
	Total:	0.565
Land Development	Crabtree Creek	0.431
	Kiskiminetas Creek	0.541
	Pine Run	0.526
	Pucketa Creek	0.599
	Union Run	0.398

Primary Impairment	Stream/Reach Name	Miles
	Wolford Run	0.521
	unnamed	3.209
	Total:	6.224
Natural Sources-Siltation	Sewickley Creek	0.022
	Wilson Run	0.519
	unnamed	4.214
	Total:	4.756
On site Wastewater	Byers Run	0.579
	Jacobs Creek	2.008
	Kiskiminetas River	0.579
	McGee Run	1.474
	Sewickley Creek	0.528
	Steels Run	0.754
	Turtle Creek	0.331
	Unity Run	0.253
	unnamed	11.546
	Total:	18.051
Petroleum Activities-pH	unnamed	0.154
	Total:	0.154
Removal of Vegetation	Getty Run	0.390
	Harbridge Run	0.416
	Jacobs Creek	0.716
	Kiskiminetas River	0.032
	Porters Run	0.898
	Stauffer Run	0.710
	Wolford Run	1.129
	Youghiogheny River	0.631
	unnamed	3.345
	Total:	8.268
Road Runoff	Beaver Run	0.566
	Brinker Run	2.169
	Brush Creek	1.411
	Bushy Run	0.227
	Conemaugh River	2.651
	Crabtree Creek	1.853
	Hunters Run	1.577
	Hypocrite Creek	0.371
	Jacks Run	1.529
	Jacobs Creek	0.605
	Kiskiminetas River	1.001
	Long Run	0.513
	Loyalhanna Creek	2.641
	Porters Run	0.753
	Sewickley Creek	0.962
	Turtle Creek	0.395
Union Run	0.215	

<u>Primary Impairment</u>	<u>Stream/Reach Name</u>	<u>Miles</u>
	Unity Run	0.327
	Welty Run	0.849
	Wilson Run	0.485
	Wolford Run	2.288
	Youghiogheny River	0.705
	unnamed	18.128
	Total:	42.222
Small Residential Runoff	Beaver Run	0.589
	Crabtree Creek	0.527
	Getty Run	0.101
	Jacks Run	1.719
	Jacobs Creek	0.999
	Kiskiminetas River	0.740
	Little Sewickley Creek	0.401
	Loyalhanna Creek	1.713
	Lyons Run	0.330
	McGee Run	0.047
	Monongahela River	1.585
	Poke Run	0.415
	Porters Run	1.197
	Saxman Run	0.108
	Sewickley Creek	2.030
	Shupe Run	0.577
	Speers Run	0.371
	Spruce Run	0.477
	Stauffer Run	0.064
	Stony Run	2.522
	Turtle Creek	0.206
	Welty Run	0.967
	Wolford Run	0.668
	unnamed	23.707
	Total:	42.061
Source/Cause Unknown	Loyalhanna Creek	0.521
	Lutz Run	0.332
	unnamed	2.137
	Total:	2.990
Source Unknown-Metals	Kiskiminetas River	1.286
	unnamed	0.420
	Total:	1.706
Source Unknown-PCB	Brinker Run	0.662
	Brush Creek	0.174
	Bushy Run	0.959
	Cedar Creek	1.494
	Coal Run	0.808
	Lyons Run	0.131
	McGee Run	0.461

<u>Primary Impairment</u>	<u>Stream/Reach Name</u>	<u>Miles</u>
	Pine Run	0.265
	Sewickley Creek	0.836
	Sherrick Run	0.840
	Spruce Run	0.416
	Stony Run	0.703
	Turtle Creek	0.784
	Wilson Run	0.551
	unnamed	11.673
	Total:	20.758
Source Unknown-PCB	Big Spring Run	1.157
	Loyalhanna Creek	0.031
	unnamed	0.397
	Total:	1.585
Source Unknown-PCB; Source Unknown - Chlordane	unnamed	0.486
	Total:	0.486
Source Unknown-Siltation	Big Spring Run	0.213
	Conemaugh River	0.264
	Thorn Run	0.589
	Wolford Run	0.670
	unnamed	2.690
	Total:	4.426
Upstream Impoundment	Conemaugh River	0.561
	Crabtree Creek	0.027
	Getty Run	0.018
	Kiskiminetas River	1.054
	Speers Run	0.054
	Union Run	0.933
	unnamed	6.178
	Total:	8.825
Urban Runoff/Storm Sewers	Brush Creek	0.949
	Kiskiminetas River	0.053
	Loyalhanna Creek	0.019
	Sewickley Creek	2.307
	unnamed	5.484
	Total:	8.812
Industrial Point Source – Salinity/TDS/Chlorides; Industrial Point Source – Other Organics	unnamed	0.263
	Total:	0.263
Total Impaired Stream Miles:		677.277

Dams and Impoundments

Existing permitted dam locations are listed below.

PADEP Dam No.	Dam Name	Municipality	Stream Name
65-001	Tubmill	Fairfield Township	Tubmill Creek
65-003	Sugar Run	St Clair Township	Tr Conemaugh River
65-004	Big Spring	St Clair Township	Big Spring Run
65-006	Lower Bridgeport	Mount Pleasant Township	Jacobs Creek
65-009	Jeannette (Mountain Valley Lake)	Hempfield Township	Tr Brush Creek
65-011	Upper Ridge	Derry Township	McGee Run
65-012	Lower Ridge	Derry Township	McGee Run
65-013	Ethel Springs	Derry Borough	Tr McGee Run
65-020	Kingston Dam	Derry Township	Loyalhanna Creek
65-024	Whitney Ridge	Unity Township	Tr Ninemile Run
65-029	New Florence	St Clair Township	Baldwin Run
65-032	Borough Reservoir	Ligonier Township	Wtrshd Furnace Run
65-033	Township Line	Unity Township	Township Line Run
65-040	Unnamed	**Westmoreland County**	Tr Turtle Creek
65-041	Brinkerton Dam	Mount Pleasant Township	Tr Sewickley Creek
65-042	Twin Lakes No 1	Hempfield Township	Little Crabtree Creek
65-043	Unnamed	Mount Pleasant Township	Tr Boyer Run
65-044	Keystone State Park	Derry Township	Mccune Run
65-049	Howell	Sewickley Township	Tr Little Sewickley Creek
65-052	Greenwalt	Unity Township	Crabtree Creek
65-055	Twin Lakes No 2	Hempfield Township	Little Crabtree Creek
65-056	Yukon	Sewickley Township	Tr Sewickley Creek
65-065	Unnamed	Unity Township	Fourmile Run
65-066	H A Stewart	Ligonier Township	Trout Run
65-068	Saint Vincents Lake Dam	Unity Township	Fourmile Run
65-069	Unnamed	Derry Township	Tr McGee Run
65-071	Bear Pond Dam	Fairfield Township	Freeman Run
65-076	Lake Eron Memorial Park	East Huntingdon Township	Tr Mock Hollow Run
65-078	Trout Run	Derry Township	Trout Run
65-080	Club Dam	Ligonier Township	Rolling Rock Creek
65-081	Lake Janet Ruth Dam	Ligonier Township	Loyalhanna Creek
65-085	Waterford Intake	Ligonier Township	Middle Branch Mill Creek
65-086	Gatehouse	St Clair Township	Tubmill Creek

PADEP Dam No.	Dam Name	Municipality	Stream Name
65-089	Bull Run	Penn Township	Bull Run
65-093	Unnamed	Fairfield Township	Fhendricks Creek
65-098	Exton Lake	Washington Township	Tr Pucketa Creek
65-099	Thorne Dam	Ligonier Township	Washington Furnace Run
65-108	West Leechburg Reservoir	West Leechburg Borough	West Branch Penn Run
65-112	Laurel Wood Dam	Fairfield Township	Hendricks Creek
65-114	Beaver Run	Bell Township	Beaver Run
65-117	Ligonier Reservoir	Ligonier Township	South Fork Mill Creek
65-118	Kenda	North Huntingdon Township	Tr Little Sewickley Creek
65-119	New Alexandria Reservoir Dam	Derry Township	Tr Loyalhanna Creek
65-124	Lodge Dam	Cook Township	Tr Keffer Run
65-126	Donegal	Donegal Township	Fourmile Run
65-127	Westinghouse	Trafford Borough	Turtle Creek
65-128	Meadow Run	South Huntingdon Township	Meadow Run
65-130	Mammoth Lake	Mount Pleasant Township	Wetley Run
65-133	Acme (Pa-657)	Mount Pleasant Township	Jacobs Creek
65-134	Breskin No 2	Ligonier Township	Tr Fourmile Run
65-135	Unnamed	Rostraver Township	Cedar Creek
65-137	Unnamed	Allegheny Township	Tr Allegheny River
65-138	Thorn Run Dam	Washington Township	Thorn Run
65-141	Breskin No 1	Ligonier Township	Tr Fourmile Run
65-143	Derry Rod And Gun Club	Derry Township	Miller Run
65-144	Little Sugar Run	St Clair Township	Little Sugar Run
65-146	Mill Service No 5	South Huntingdon Township	Tr Sewickley Creek
65-150	Pond 1	Rostraver Township	Wtrshd Youghiogheny River
65-151	Pond 2	Rostraver Township	Wtrshd Youghiogheny River
65-152	Pond 3	Rostraver Township	Wtrshd Youghiogheny River
65-153	Mill Service No 6	South Huntingdon Township	Tr Swickley Creek
65-154	Westinghouse Electric	Derry Township	Tr Conemaugh River
65-155	Holding Pond A	Hempfield Township	Tr Slate Creek
65-158	Ridilla Upper Pond A	Hempfield Township	Tr Little Crabtree Creek

PADEP Dam No.	Dam Name	Municipality	Stream Name
65-159	Ridilla Lower Pond B	Hempfield Township	Tr Little Crabtree Creek
65-163	Eidemiller Lake	Hempfield Township	Tr Slate Creek
65-164	Northmoreland Lake (Pa-117)	Allegheny Township	Tr Pine Run
65-166	Dargate Pond Dam	Murrysville Borough	Tr Haymakers Run
65-167	Hutchinson Fresh Water Dam	Sewickley Township	Tr Sewickley Creek
65-171	Bridgeport (Pa-655)	Mount Pleasant Township	Jacobs Creek
65-173	Detention Basin No 6	Hempfield Township	Tr Sewickley Creek
65-174	Helmans Lower Lake	Hempfield Township	Tr Brush Creek
65-175	R T Green Dam	Ligonier Township	Fourmile Run
65-176	Detention Basin No 5	Hempfield Township	Tr Little Sewickley Creek
65-177	Valley Landfill Wetland Basin	Penn Township	Tr Byers Run
65-178	Valley Landfill Sed Basin No 3	Penn Township	Tr Byers Run
65-180	Mannitto	Loyalhanna Township	Tr Loyalhanna Creek
65-183	Weaver Lake	Allegheny Township	Tr Pine Run
65-184	Upper Borough Reservoir	Ligonier Township	Wtrshd Furnace Run
65-185	Gfs Club	Ligonier Township	Tr Mill Creek
65-186	Berlin Road Detention Basin	Penn Township	Tr Bushy Run
65-187	Laspina Lane	Penn Township	Tr Brush Creek
65-188	Lake Ridge Estates Detention	Murrysville Borough	Tr Turtle Creek
65-189	Easy Living	East Huntingdon Township	Tr Belson Run
65-190	King Dam	Rostraver Township	Tr Pollock Run
65-191	Unnamed	Ligonier Township	Two Mile Run
65-192	Borough Reservoir Diversion	Ligonier Township	Wtrshd Furnace Run
65-193	Bargerstock	Allegheny Township	Tr Chartiers Run
65-194	Salina Dam	Bell Township	Unnamed
65-195	Rolling Rock Club No. 23-E	Ligonier Township	Rolling Rock Creek
65-196	Rolling Rock Club No 22-D	Ligonier Township	Rolling Rock Creek
65-197	Rolling Rock Club No 22-E	Ligonier Township	Rolling Rock Creek
65-198	Rolling Rock Club No. 18-D	Ligonier Township	Rolling Rock Creek
65-199	Rolling Rock Club No 18-E	Ligonier Township	Rolling Rock Creek

PADEP Dam No.	Dam Name	Municipality	Stream Name
65-202	Rolling Rock Club No 10-B	Ligonier Township	Rolling Rock Creek
65-205	Rolling Rock Club No 22-F	Ligonier Township	Rolling Rock Creek
65-206	Rolling Rock Club No. 20-J	Ligonier Township	Rolling Rock Creek
65-207	Rolling Rock Club No. 17-E	Ligonier Township	Rolling Rock Creek
65-208	Rolling Rock Club No. 16-B	Ligonier Township	Rolling Rock Creek
65-209	Rolling Rock Club No. 16-C	Ligonier Township	Rolling Rock Creek
65-210	Rolling Rock Club No. 12-K	Ligonier Township	Rolling Rock Creek
65-211	Rolling Rock Club No. 10-D	Ligonier Township	Rolling Rock Creek
65-212	Rolling Rock Club 9-Bb	Ligonier Township	Rolling Rock Creek
65-213	Rolling Rock Club 9-G	Ligonier Township	Roaring Branch Creek
65-214	Martha's Dam	Derry Township	Miller Run

Acid Mine Drainage (AMD)

Coal mining has been and still is an integral part of the Pennsylvania economy. Unfortunately, drainage from abandoned coal mines is the single biggest water pollution problem in Pennsylvania, impacting over 2,400 stream miles in the State. Westmoreland County is no exception, as AMD has the largest negative impact on water quality in the County. Treatment of AMD in the County range from passive treatment systems through engineered wetland treatment cells.

Floodplains

Westmoreland County has over 31,000 acres of flood prone land located in the 100-year floodplain. All municipalities within the County participate in the National Flood Insurance Program except for those shaded below:

Townships	Boroughs	Cities
Allegheny	Adamsburg	Arnold
Bell	Arona	Jeannette
Cook	Avonmore	Lower Burrell
Derry	Bolivar	Monessen
Donegal	Delmont	New Kensington
East Huntingdon	Derry	Home Rule
Fairfield	Donegal	Greensburg
Hempfield	East Vandergrift	Latrobe
Ligonier	Export	Murrysville

Townships	Boroughs		Cities
Loyalhanna	Hunker	Trafford	
Mount Pleasant	Hyde Park	Vandergrift	
North Huntingdon	Irwin	West Leechburg	
Penn	Laurel Mountain	West Newton	
Rostraver	Ligonier	Youngstown	
Salem	Madison	Youngwood	
Sewickley	Manor		
South Huntingdon	Mount Pleasant		
St. Clair	New Alexandria		
Unity	New Florence		
Upper Burrell	New Stanton		
Washington			

Climate

The humid continental climate of Westmoreland County is characterized by warm summers and cold winters. Precipitation is adequate for all crops and well distributed. The prevailing winds are from the west. Almost daily changes in weather occur in winter and spring. From December through the early part of March, cold spells accompanied by brisk northwesterly winds occasionally last for several days. In summer and fall, changes are less frequent; the weather remains essentially the same for a few days to a week or more. For extended periods in the summer, days are sunny, hot and humid, cooled only by an afternoon shower and nights are warm. Dry sunny days and cool clear nights are typical of the fall.

Most of the local climate variations within the County result from differences in topography. Because of higher elevation and more rugged terrain, the eastern part has lower temperatures and more cloudiness, precipitation and thunderstorms than the central and western portions of Westmoreland County. Variations in the central and western parts are confined mainly to nighttime drops in temperature that result from cool air drainage. Where air drainage is relatively poor, as it is in valleys, temperatures are lower and growing seasons are shorter than in surrounding high terrain. The warmest parts of the County are the valleys of the Monongahela River and Youghiogheny River, where the average annual temperature is 55 degrees Fahrenheit. The average annual temperature is 50 degrees in most of the central areas and 45 degrees in the Chestnut Ridge and Laurel Hill areas in the eastern portion of the County. The average winter daily high temperature is 39 with an average low of 24 degrees. The average summer daily high temperature is 84 degrees, with the average daily low of 61 degrees. The normal annual precipitation is adequate for all crops, although the summer temperature and the length of the growing season, particularly at the higher elevations, may be inadequate.

Winters are cold and snowy at the higher elevations in the County. They are frequently cold in the valleys, but intermittent thaws preclude a long-lasting snow cover. Summers are fairly warm on the mountain slopes. They are very warm and have occasional very

hot days in the valleys. Rainfall is evenly distributed during the year, but it is appreciably heavier on the windward, west-facing slopes than in the valleys. The normal annual precipitation is adequate for all crops, although the summer temperature and the length of the growing season, particularly at the higher elevations, may be inadequate. Average annual total precipitation is somewhat variable across Westmoreland County. It ranges from about 40 inches across the western and northwestern parts of the county, to about 52 inches in the extreme southeast corner of the county, in the higher elevation area on the border with Somerset and Fayette Counties (near the Seven Springs Ski Area). At Derry the average annual amount is about 48.80 inches. Of this, about 23.4 inches, or 48 percent, usually falls in May through September.

The average seasonal snowfall varies throughout the County due to topographical differences. The average snowfall in the western portion of the County is 25 inches, compared to 40 inches in the central part, and 80 inches in the eastern portion of the County. The greatest snow depth at any one time during the period of record was 84 inches.

III. ACT 167 PLANNING FOR WESTMORELAND COUNTY

This section of the Phase 1 Scope of Study presents the concept and approach that has been developed to meet the Act 167 requirements for this countywide watershed stormwater management project.

PADEP and Westmoreland County Agreement

The Pennsylvania Department of Environmental Protection and Westmoreland County entered into an agreement for a Phase 1 Watershed Stormwater Management Plan Grant for all watersheds of Westmoreland County.

The agreement is structured for Westmoreland County to prepare a Stormwater Management Plan in two phases. Phase 1 is the preparation and submission of a Scope of Study to PADEP for their review and approval. The Scope of Study generally consists of a determination of the level of effort and cost required by Westmoreland County to complete the second phase (Phase 2). Phase 2 includes the preparation and adoption of the Stormwater Management Plan based on the level of effort identified in Phase 1.

Engineering Consultant Selection

In order to assist in the preparation of Phase 1, the Westmoreland County Commissioners selected L. Robert Kimball & Associates, Inc., (Kimball) to provide stormwater planning services to Westmoreland County; and to prepare this Phase 1 document.

Survey Creation and Distribution

Kimball created a map-based Stormwater Management Plan Survey, which was distributed by the Westmoreland County Planning Commission early in the Phase 1 process. All municipalities and other interested citizen groups and public organizations were encouraged to complete the Survey. The purpose of the Survey was to gather various pieces of information to help determine the level of commitment from each municipality, to reveal what the major stormwater issues were that affected each municipality, and to determine the location of existing problem areas, significant obstructions, and stormwater management facilities.

Watershed Plan Advisory Committee (WPAC)

The purpose of the WPAC is to serve as a conduit for municipal input, assistance, voicing of concerns and questions; and to also serve as a mechanism to ensure intermunicipal coordination and cooperation is secured. The WPAC was formed by the Westmoreland County Department of Planning and Development, in conjunction with the Westmoreland County Conservation District, and consists of the required municipalities, the County Conservation District, and other interested agency or group representatives.

The DEP has taken the position that if a representative from each municipality does not volunteer to join the WPAC, then the head of each governing body will be the appointed member to the WPAC. As an appointed member, that member will be

provided all correspondence, be considered an active member, and their name will be included in a list as a member of the WPAC contained within the Plan. The head of each governing body will also be asked to assist their municipality in adoption of the provisions and requirements of the final Plan.

<u>WPAC Member</u>	<u>Organization</u>	<u>Stormwater Survey Returned?</u>
Chris Bova	Westmoreland County Department of Planning and Development	---
Jim Pillsbury	Westmoreland County Conservation District	---
Cities		
Ken Orie	Arnold	Y
Edward Antonacci	Jeannette	Y
Tony Farina	Lower Burrell	Y
Head of Governing Body	Monessen	N
Anthony Males	New Kensington	Y
Boroughs		
Head of Governing Body	Adamsburg	N
Head of Governing Body	Arona	N
Head of Governing Body	Avonmore	N
Head of Governing Body	Bolivar	N
Beth Keppler	Delmont	Y
Doug Siler	Derry	Y
Head of Governing Body	Donegal	N
Head of Governing Body	East Vandergrift	N
Head of Governing Body	Export	N
Head of Governing Body	Hunker	N
Head of Governing Body	Hyde Park	N
Lucien Bove	Irwin	Y
Head of Governing Body	Laurel Mountain	N
Head of Governing Body	Ligonier	Y
Head of Governing Body	Madison	N
Edward Antonacci	Manor	Y
Head of Governing Body	Mount Pleasant	Y
Head of Governing Body	New Alexandria	N

WPAC Member	Organization	Stormwater Survey Returned?
Head of Governing Body	New Florence	Y
Emil Bove	New Stanton	Y
Head of Governing Body	North Belle Vernon	N
Head of Governing Body	North Irwin	N
Head of Governing Body	Oklahoma	Y
Head of Governing Body	Penn	N
Head of Governing Body	Scottdale	Y
Head of Governing Body	Seward	Y
Head of Governing Body	Smithton	Y
Head of Governing Body	South Greensburg	N
Head of Governing Body	Southwest Greensburg	N
Head of Governing Body	Sutersville	N
Head of Governing Body	Trafford	Y
Head of Governing Body	Vandergrift	N
Head of Governing Body	West Leechburg	N
Head of Governing Body	West Newton	N
Tami Roach	Youngstown	Y
Emil Bove	Youngwood	Y
	Townships	
Steven Kanas	Allegheny	Y
Head of Governing Body	Bell	Y
Head of Governing Body	Cook	
Head of Governing Body	Derry	
Douglas Regola	Donegal	Y
Douglas Regola	East Huntingdon	Y
Head of Governing Body	Fairfield	N
Ken Orié	Hempfield	Y
Head of Governing Body	Ligonier	Y
Mary Trunzo	Loyalhanna	Y
Douglas Regola	Mount Pleasant	Y
Andy Blenko	North Huntingdon	Y
Dallas Leonard	Penn	Y
Robert Lohr	Rostraver	Y

<u>WPAC Member</u>	<u>Organization</u>	<u>Stormwater Survey Returned?</u>
Douglas Regola	Salem	Y
Head of Governing Body	Sewickley	N
Head of Governing Body	South Huntingdon	N
Head of Governing Body	St. Clair	Y
Jake Blank	Unity	Y
Head of Governing Body	Upper Burrell	N
Bob Grigas	Washington	Y
Home Rule Municipalities		
Barb Clampim	Greensburg	Y
Joe Bush	Latrobe	Y
Richard Conorr	Murrysville	Y
Agencies and Stakeholders		
Diane Selvaggio	Turtle Creek Watershed Association	Y

Watershed Plan Advisory Committee Meetings

One Watershed Plan Advisory Committee meeting was held during the Phase 1 process. The purpose of the meeting was to exchange information and to provide opportunities for inter-municipal and County agency coordination.

The WPAC Meeting was held on November 18, 2008. Kimball led the discussion by providing an overview of the Act 167 planning process, provided expectations and potential results and outcomes of the Plan, distributed the municipal/agency surveys, initiated the formation of the WPAC membership, and concluded with a question and answer period.

The County elected to not hold a second WPAC because they met individually with the WPAC members to discuss specific issues, problems, and the proposed Phase 1 document. In addition, a workshop meeting was held with County staff to review a draft copy of the Phase 1 document and to review high priority watersheds and planning goals.

IV. STORMWATER MANAGEMENT SURVEY RESULTS

The Survey was designed to solicit input relative to specific stormwater problem areas throughout Westmoreland County from each municipality and other interested stakeholders. The Survey was distributed to those present at the WPAC No. 1 meeting. Westmoreland County distributed the remaining surveys shortly after the initial Phase 1 WPAC Meeting. The GIS-based Survey included a map of the individual municipalities to be used to identify locations and types of problem areas, significant obstructions, and existing or proposed stormwater management facilities. A copy of the Survey document is included as Appendix A. The information contained within the Surveys helped determine the scope of Phase 2 planning.

Because the most important part of the Act 167 planning process is the implementation of the final provisions and standards of the Phase 2 Plan, the Survey also was intended to help develop municipal interest in stormwater management issues. Generating interest and obtaining support from the municipalities early in the process will ensure a better product and ease the process of adoption and implementation by each municipality within Westmoreland County. This Survey exercise might also enable the municipalities to act accordingly to change current development plans and regulations, to try to fix inadequacies in their storm sewer system(s) and other problems, or take measures to procure funding to do so.

Completed Surveys were received from 37 of the 65 municipalities in Westmoreland County. Additional information was obtained from the Westmoreland County Conservation District and the Turtle Creek Watershed Association. A geodatabase was then constructed and used to summarize and analyze the Survey results in sufficient detail for determining the Scope for the Phase 2 Plan.

Stormwater Problem Prioritization

Through analysis of the Survey results, Kimball and County staff determined that the top three primary stormwater problem types are flooding, inadequate infrastructure, and water pollution. The top three stormwater problem causes are Stormwater volume increases, poor drainage, and a tie between stormwater velocity, stormwater obstructions, and floodplain development.

Although the Phase 2 Plan effort will initially focus on the primary stormwater problems identified above, the planning effort will also include further refinement and prioritization of stormwater problem solutions and strategies. This prioritization effort will be based on WPAC input and a more detailed review and verification of the stormwater problem information collected by Survey during the Phase 1 effort.

A summary of the Survey results can be found in Appendix B. The identification of the problem areas will help in assessing the stormwater management controls needed in the future. Figure 2 presents a summary of the locations and types of stormwater management problems identified through the Survey process and as identified by local residents and other agencies.

Modeling Needs Assessment

One of the most critical assessments completed during Phase 1 was the determination of where detailed hydrologic modeling is necessary as part of the Phase 2 work. The following is a summary and rationale behind the Modeling Needs Assessment.

Designated Watershed	Detailed Modeling Necessary?	Rationale	Focus of Modeling Effort
Allegheny River	Yes - Partial	Numerous areas that experience recurrent flooding. Growth area.	Tributaries through urban areas noted on Figure 3.
Conemaugh River	Yes - Partial	Recurrent flooding problems	Upland tributary in Derry Township/Derry Borough
Indian Creek	No	Minimal growth pressure	NA
Jacobs Creek	Yes	Recurrent flooding problems in Mount Pleasant Borough, Mount Pleasant Township, and Scottsdale. Lower watershed in Growth Area.	Designated watershed
Kiskiminetas River	Yes - Partial	Recurrent flooding problems in Allegheny Township/Washington Township/Bell Township	Tributaries and Beaver Run watershed starting at reservoir.
Loyalhanna Creek	Yes - Partial	Recurrent flooding problems, inadequate infrastructure, and Growth Area	Tributaries and watersheds noted on Figure 3.
Monongahela River	Yes - Partial	Growth Area	Tributaries noted on Figure 3.
Pucketa Creek	Yes	Numerous areas that experience recurrent flooding. Growth area.	Designated watershed
Sewickley Creek	Yes	Growth Area, numerous recurrent flooding problems, rapid development	Designated watershed
Turtle Creek	Yes	Growth Area, numerous recurrent flooding problems, rapid development, update existing 167 Plan	Designated watershed
Youghiogheny River	Yes-Partial	Growth Area	Tributaries in lower watershed

Figure 3 presents the subwatersheds or watersheds that are to be modeled under Phase 2.

High Priority Goals for Phase 2

- Update Turtle Creek Act 167 Plan within Westmoreland County.
- Watershed modeling for those watersheds identified in Figure 3. Release rate or comparable analyses as necessary.
- Assess and verify existing identified obstruction and other structure-related stormwater management issues. Refer to Appendix B for the Survey Summary Tables listing the areas that have stormwater problems identified as being related to obstructions or undersized culverts.
- Assess stormwater impacts from those areas identified by the County as Growth Areas. Future development and growth patterns will be refined with the County and other stakeholders before starting the engineering evaluations.

In order to make the Phase 2 Planning effort more affordable, the County has broken the Countywide Phase 2 Planning effort into the following Subphases:

1. DEM spatial data processing for hydrologic model input for all watersheds to be modeled.

This effort will include GIS data processing work in each watershed up to but not including the point where actual model input or methodology decisions are to be made. These decisions will vary depending on the watershed and the remaining spatial data processing incorporating methodology and model decisions or assumptions will be completed in subsequent modeling subphases.

Based on the selected watersheds for hydrologic modeling, the approximate area of geoprocessing required is 634.7 square miles.

2. Turtle Creek watershed (97.4 mi²) data collection, hydrologic model and technical analysis

Budget assumes that the County will complete the fieldwork needed for inspection of the problem areas and obstructions.

Budget assumes Consultant work will include DEP 167 Scope Task A and Task B.1 through B.5.

3. Sewickley Creek watershed (167.5 mi²) data collection, hydrologic model and technical analysis

Budget assumes that the County will complete the fieldwork needed for inspection of the problem areas and obstructions.

Budget assumes Consultant work will include DEP 167 Scope Task A and Task B.1 through B.5.

4. Pucketa Creek watershed (31.8 mi²) data collection, hydrologic model and technical analysis

Budget assumes that the County will complete the fieldwork needed for inspection of the problem areas and obstructions.

Budget assumes Consultant work will include DEP 167 Scope Task A and Task B.1 through B.5.

5. Remaining watersheds (338.0 mi²) data collection, hydrologic model and technical analysis

Budget assumes that the County will complete the fieldwork needed for inspection of the problem areas and obstructions.

Budget assumes Consultant work will include DEP 167 Scope Task A and Task B.1 through B.5.

6. Countywide Phase 2 Plan and Model Ordinance preparation and implementation.

Budget assumes Consultant work will include DEP 167 Scope Tasks B.6 through D.3 and Municipal Workshops and Training.

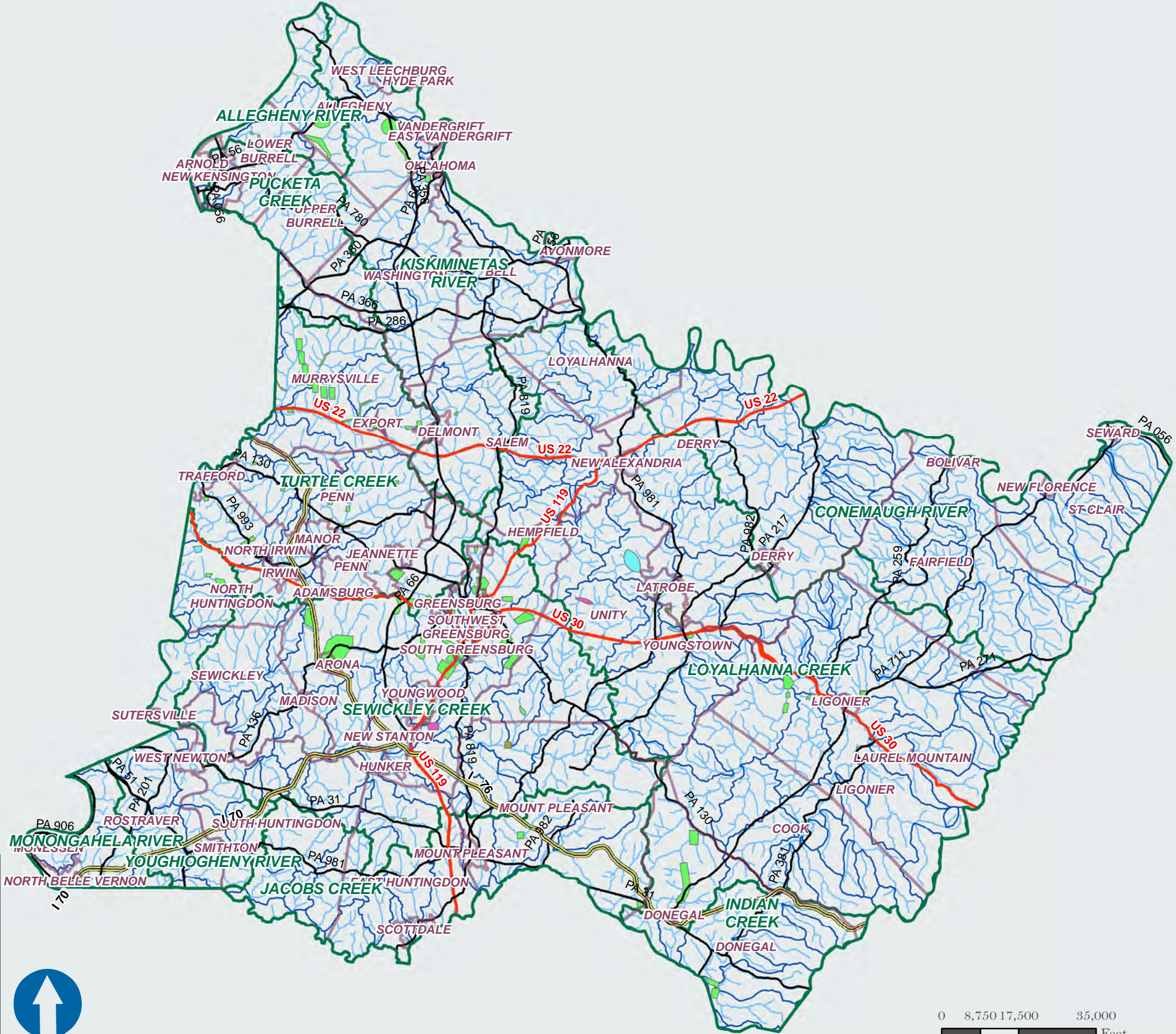
All Subphase budgets assume the County will take the lead in coordinating and setting up WPAC meetings, conducting implementation workshops and Model Ordinance training, and coordinating and communicating with County stakeholders in requests for additional information and review comments.

Depending on funding, the County may or may not combine Subphases together as they progress in their Act 167 Phase 2 planning effort.

Westmoreland County

Act 167 SWM Plan Phase 1 Scope of Study

Figure 2 Stormwater Problem Areas



- Act 167 Watersheds
- Streams
- SWM Problem Types**
- Accelerated Erosion
- Flooding
- Habitat Loss or Damage
- Inadequate Infrastructure
- Other
- Sedimentation
- Water Pollution

Legend

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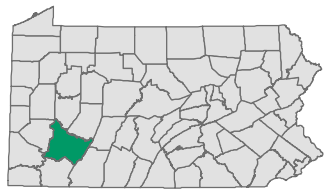
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L.R. KimballSM
ARCHITECTURE • ENGINEERING • COMMUNICATIONS TECHNOLOGY

415 Moon Clinton Road, Coraopolis, PA 15108

Prepared By: TCD
Project No. 08-1300-0544
Date: 03-16-10



Location of Westmoreland County within Pennsylvania.

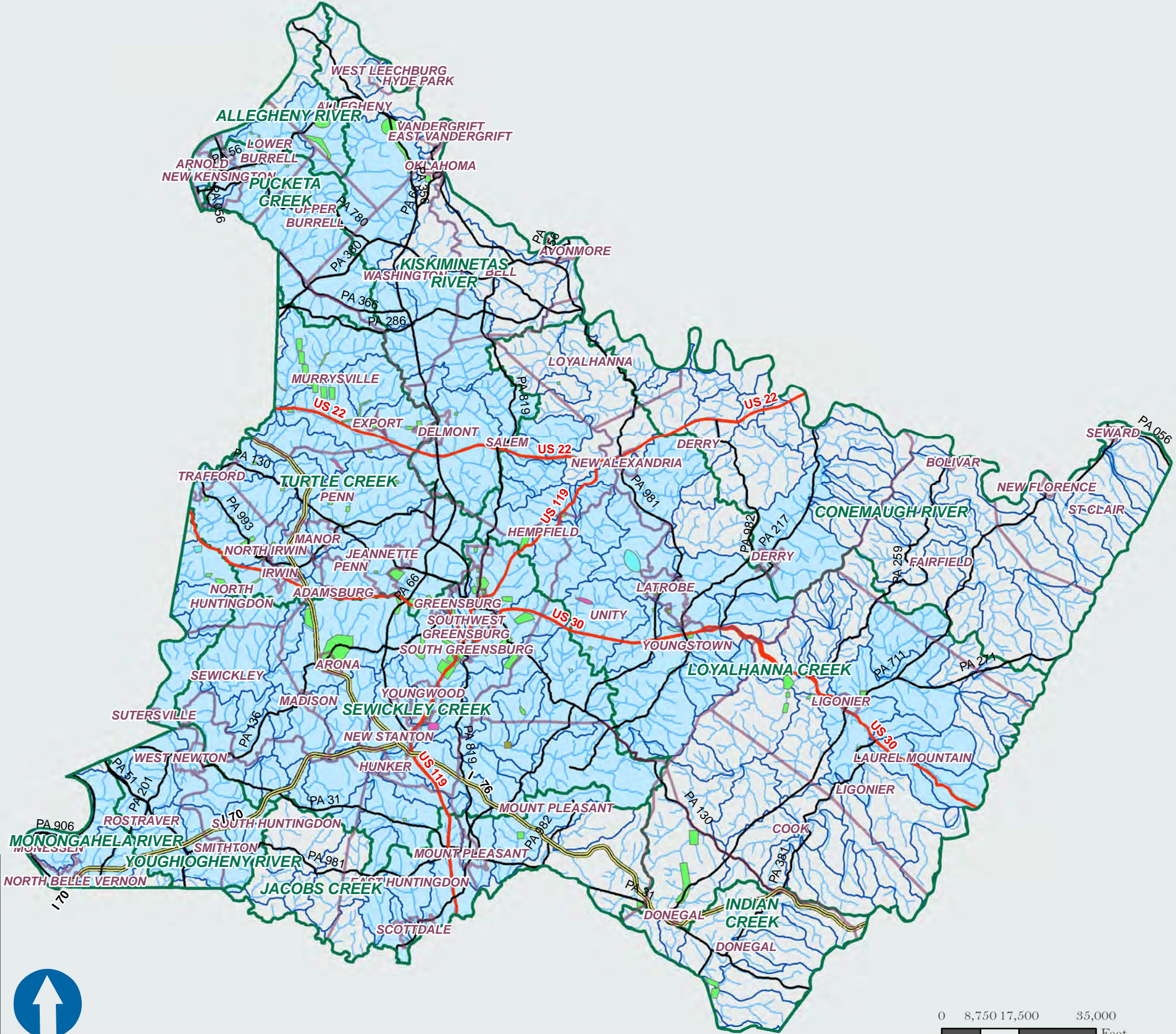


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Westmoreland County

Act 167 SWM Plan Phase 1 Scope of Study

Figure 3 Phase 2 Watersheds to be Modeled



SWM Problem Types

- Accelerated Erosion
- Flooding
- Habitat Loss or Damage
- Inadequate Infrastructure
- Other
- Sedimentation
- Water Pollution
- Act 167 Watersheds
- Streams
- Detailed Model Areas

Legend

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Location of Westmoreland County within Pennsylvania.



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V. PHASE 2 SCOPE DISCUSSION

Refer to Appendix C for a copy of the Phase 2 Scope of Work anticipated to be issued by the PADEP in Westmoreland County's Phase 2 Agreement.

As part of the Phase 2 work, a Model Ordinance will be created which includes the standards and provisions of the Plan. An important part of the Model Ordinance will be the inclusion of regulations for activities that may affect stormwater runoff. These regulations are not meant to discourage the activities, but rather to ensure that they are completed in a proper manner with due regard to stormwater management.

General Work Plan

Phase 2 Agreement

Upon completion and submission of the Phase 1 report to PADEP, Westmoreland County and PADEP will enter into an agreement to complete the Phase 2 portion of the project. Funding for the project should be allocated by PADEP prior to the beginning of any of the Phase 2 tasks. A 75% reimbursement procedure will be implemented between Westmoreland County and PADEP during the Phase 2 project.

Consultant Selection

It is recommended that Westmoreland County secure an engineering consultant to assist in completing at least the technical analysis task of the Phase 2 project. A qualified consultant knowledgeable in the Act 167 process (including adoption and implementation procedures), stormwater issues in the County, and municipalities within the County, will benefit the County during the Phase 2 process.

Survey

A Survey Form was distributed subsequent to the first Phase 1 WPAC meeting. The Survey (see Appendix A) solicited information on problem areas, obstructions, existing and proposed stormwater facilities, and flood control facilities. Other information requested relates to municipal ordinances, support for the plan, relative importance of various plan criteria, and interest in best management practices (BMPs). The municipalities were also asked to appoint a WPAC representative. The data collected through the Survey will assist in technical and non-technical aspects of the planning process and in scoping the overall Plan. The problem areas and significant obstructions indicated in the Surveys will need to be analyzed during Phase 2 and will become the basis of required subwatershed area modeling.

Watershed Plan Advisory Committee (WPAC)

During Phase 1, a WPAC was formed. The County requested each municipality to appoint at least one person from their individual municipality to the WPAC. These requests were in response to Section 6(a) of the Pennsylvania Management Act (Act 167), which states "The county shall establish, in conjunction with each watershed stormwater planning program, a WPAC 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 for the overall planning process throughout Phase 2. The committee members will also serve as the primary contact point for the municipalities/organizations that they represent. It is anticipated that each of these municipalities/organizations will continue to have representation in the WPAC.

The WPAC identified the following organizations as possible WPAC participants:

Westmoreland County Conservation District

Turtle Creek Watershed Association

PennDOT

These organizations and entities were contacted and invited to join the WPAC during Phase 1. Additional stakeholders may be identified during Phase 2. If appropriate, an invitation to join the WPAC will be extended to these entities.

WPAC Engineering Meetings

Certain WPAC meetings will focus on the more technical aspects of the Plan. These elements include modeling, technical analysis, and development of management criteria. Municipal engineering representatives should attend and the agenda will focus on the engineering aspects of the Plan as opposed to the more general objectives and overall Plan contents.

WPAC Legal Meetings

Certain WPAC meetings will focus on the legal aspects of the Plan. Municipal solicitors should attend and the agenda will focus on implementation of the Model Ordinance from a legal and regulatory framework standpoint.

Standards

The Plan will include criteria and standards for a comprehensive stormwater management strategy that includes the elements listed below. The criteria and standards established in the plan will be mandatory for municipal implementation through the local ordinances.

1. Peak Rate Control Management - Implementation of Release Rates for various subwatersheds will be developed based on collected data, modeling, engineering judgment, and committee input.
2. Volume Control Management - Implementation of Control Guidance 1 and Control Guidance 2 from the Pennsylvania Stormwater Best Management Practices Manual.

3. Water Quality Management – Implementation of non-point source pollution removal methodologies that meet the requirements of:
 - State Water Quality Chapter 93
 - Pennsylvania Clean Streams Law
 - TMDL pollutant reduction (Clean Water Act 305(b) and 303(d))
4. Establish stream bank erosion requirements using an analysis of the erodibility of soils in and along streams and their channels within the watershed.
5. Establish groundwater recharge/infiltration requirements
6. Establish channel protection requirements based on detention of the 2-year design storm with the discharge of this volume over 24 hours.

Roles Of County And Consultant

The division of work and responsibilities between Westmoreland County and the Consultant should be determined prior to the beginning of Phase 2 tasks. Generally, the County may serve as project coordinator and be responsible for non-technical aspects of the Plan. This may include appropriate data collection, plan composition, ordinance analysis, and assisting the Consultant with field data collection.

The Consultant would be responsible for technical aspects of the Plan. This includes data review, problem area and significant obstruction analysis, hydrologic modeling, development of technical criteria, and economic analysis. The Consultant would compose technical components of the Plan text and provide draft and final project mapping.

Work Schedule

A work schedule should be developed early in the Phase 2 process in conjunction with Westmoreland County and the Consultant. The work schedule will set target dates for various tasks with the intention of completing the project for PADEP review within the Phase 2 contract period.

VI. REFERENCES

1. Westmoreland County Comprehensive Plan, Westmoreland County Commissioners and Planning Commission, 2005
2. Soil Survey of Westmoreland County, Pennsylvania, United States Department of Agriculture Soil Conservation Service
3. Maryland Stormwater Design Manual Volumes I & II, Maryland Department of the Environment, 2000.
4. Pennsylvania Handbook of Best Management Practices for Developing Areas, Pennsylvania Association of Conservation Districts, November 14, 1997
5. Pennsylvania Model Stormwater Management Ordinance, Pennsylvania Department of Environmental Protection – Bureau of Watershed Management, January, 2007
6. Pennsylvania Stormwater Best Management Practices Manual, Pennsylvania Department of Environmental Protection – Bureau of Watershed Management, December, 2006

APPENDIX A
STORMWATER SURVEY FORM



Municipal & Agency Stormwater Planning Survey

Name of Municipality or Agency:

Contact Person:

Name _____ Phone: _____

Address _____

Person Completing Survey:

Name _____ Phone: _____

Address _____

Watershed Advisory Committee Designee:

Name _____ Phone: _____

Address _____

Alternate Designee:

Name _____ Phone: _____

Address _____

This survey is the initial stage of Westmoreland County's stormwater planning effort for the entire County. Your input and information will help focus the future planning efforts on those areas experiencing stormwater-related problems.

The Survey has two sections. The first section requests general information about municipal ordinances and current municipal Stormwater – related issues in your community. If you do not represent a municipality, please skip those questions related to ordinances or other questions applicable only to municipalities. The second section requests an inventory and identification of stormwater facilities, problem areas, and other related information.

SECTION 1

1. Please identify which of the following your Municipality has:

	YES	NO	LOCATION
Comprehensive Plan	<input type="checkbox"/>	<input type="checkbox"/>	[Redacted]
Zoning Ordinance	<input type="checkbox"/>	<input type="checkbox"/>	
Subdivision/Land Development Ordinance	<input type="checkbox"/>	<input type="checkbox"/>	
FEMA Flood Insurance Study	<input type="checkbox"/>	<input type="checkbox"/>	
Floodplain Regulations *	<input type="checkbox"/>	<input type="checkbox"/>	
Stormwater Management Regulations *	<input type="checkbox"/>	<input type="checkbox"/>	
Erosion Control Regulations *	<input type="checkbox"/>	<input type="checkbox"/>	
Drainage Regulations *	<input type="checkbox"/>	<input type="checkbox"/>	

* Please list where the regulation is found in the "Location" column (e.g., Subdivision / Land Development Ordinance, Zoning Ordinance, etc.) using the following abbreviations:
CP = Comprehensive Plan
ZO = Zoning Ordinance
SL = Subdivision/Land Development Ordinance
BC = Building Code
SO = Separate Ordinance

2. Is your Municipality considered a small MS4 Municipality under the current NPDES Phase II stormwater regulations?

Yes No

↳ If yes, is your small MS4 Municipality currently in compliance with the NPDES Phase II Permit?

Yes No

3. Do you know of any existing or proposed flood control projects in your Municipality?

Yes No

↳ If yes, please describe the project(s) below:

4. Please list any areas or neighborhoods in your municipality that are experiencing a substantial amount of growth or are developing areas.

5. Please provide any input you feel is relevant regarding current stormwater management procedures or controls in your municipality.

6. The Westmoreland County Act 167 Plan will address five (5) key stormwater design criteria, as listed below. Please identify the importance of each in your community.

	<u>Very</u>				<u>Not</u>
	<u>Important</u>				<u>Important</u>
Peak Flow Rates	5	4	3	2	1
Water Quality	5	4	3	2	1
Groundwater Recharge	5	4	3	2	1
Stream Bank Protection	5	4	3	2	1
Localized Flooding	5	4	3	2	1

Peak Flow Rates: Increased flow rates of stormwater runoff contribute to stream erosion, localized ponding, and flooding, which may cause damage to infrastructure.

Water Quality: Dissolved and un-dissolved pollutants washed off the land surface have negative impacts to recreation, aesthetics, and in-stream habitat.

Groundwater Recharge: Increased runoff volumes decrease the amount of rain that recharges groundwater. Decreased groundwater supplies may have negative effects on well water supplies and may decrease or eliminate stream baseflow during periods of dry weather.

Stream Bank Protection: Eroding banks and beds may undercut roads and utilities, damage in-stream habitat, and clog and or scour culverts and bridges.

Localized Flooding: Local flooding from smaller storm events (as opposed to the 50-year and 100-year floods associated with extreme storm events) that cause culvert, road, and localized structure damage.

SECTION 2

- Step 1. On the attached map, please identify the location of the stormwater problem areas, obstructions, and those areas where you predict stormwater problems developing within the next 10 years. These predicted areas are often those areas where you see growing development pressure.

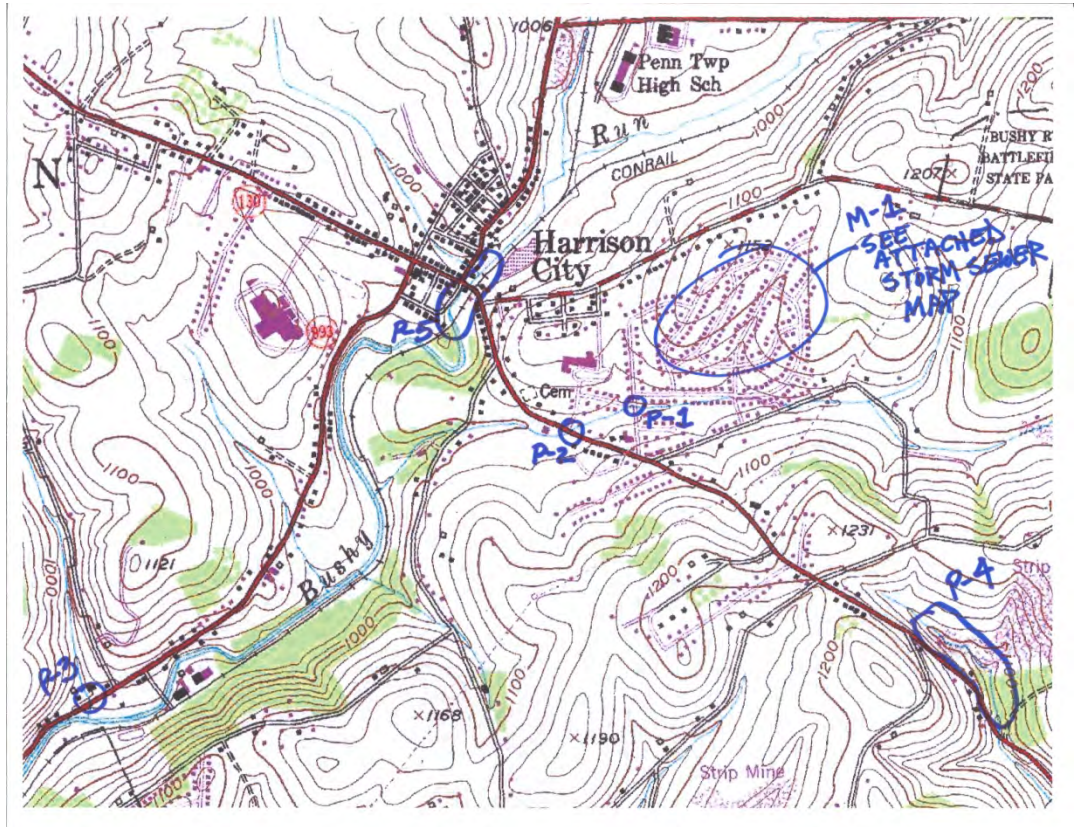
Number each stormwater problem area with a map identification number, beginning with **P-1**, then **P-2**, etc. Enter the map identification number at the head of the column on the attached **Form P**, and describe the problem by placing an **X** in the appropriate boxes below the map identification number. If further description or explanation is required, please use the **Further Explanation Form**, with the appropriate map identification number.

Definitions:

Stormwater Problem Areas - Areas of ponding or flooding after rain events, including erosion, stream channel or bank erosion, property damage, safety concerns, etc.

Obstructions - Bridges, pipes, culverts, dams or other physical barriers to stream flow that restrict the channel flow and typically cause ponding or flooding upstream of the structure.

Refer to the map and problem identification example on the next page.



The above image is only an example, and may or may not be representative of the stormwater problems in the areas shown.

- Step 2. Please also identify on the attached map all existing or proposed stormwater management or drainage facilities. These are storm sewer systems, permanent stormwater detention ponds, underground detention facilities or other systems or facilities intended to collect, convey, or detain stormwater.

Please number each existing or proposed stormwater management or drainage facility with a map identification number, beginning with **M-1**. Enter the map identification number at the beginning of each row on the attached **Form M** and include a description of each facility in the Description column.



Should you have any question about this Survey or about the information being requested, please do not hesitate to call either of the following:

Chris Bova, Westmoreland County Planning Department, 724-830-3995

or

Tim Dean, L. Robert Kimball & Associates, 412-262-5400

We value your input and your responses will provide focus and direction for the County's stormwater planning process.

Please return the completed survey to:

**Chris Bova
Senior Planner
Westmoreland County Planning Department
Fifth Floor, Suite 520
40 North Pennsylvania Avenue
Greensburg, PA 15601**

Thank you for participating.

APPENDIX B
STORMWATER SURVEY SUMMARY

Survey Questions																						
Municipality	Q1												Q2	Q3	Q4	Q5	Q6					
	Comp Plan	Zoning Ord	Subdivision/LDO	FEMA FIS	Floodplain Regs	Floodplain Regs Locn	SWM Regs	SWM Regs Locn	Erosion Control Regs	Erosion Cntrl Regs Locn	Drainage Regs	Drainage Regs Locn	MS4	MS4 Compliant	Flood Control Projects	Growth/Development	Current SWM Input	Peak Flow Rates	Water Quality	Groundwater Recharge	Stream Bank Protection	Localized Flooding
OKLAHOMA	N	Y	N	Y	Y	ZO	Y	ZO	Y	ZO	Y	ZO	N	---	N	N	N	3	3	3	4	4
PENN	Y	Y	Y	Y	Y	BC	Y	SO	Y	SO	Y	ZO	Y	Y	Y	Y	---	5	5	5	5	5
PENN BORO	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ROSTRAVER	Y	Y	Y	Y	Y	SO	Y	SO	---	---	---	---	Y	Y	N	Y	Y	5	5	5	5	5
SALEM	N	N	Y	Y	Y	SO	Y	SO	Y	SL	Y	SL	Y	Y	N	Y	N	4	3	3	3	5
SCOTTDAL	Y	Y	Y	Y	Y	SO	Y	SO	Y	SO	Y	BC	Y	Y	---	N	Y	5	5	4	4	5
SEWARD	---	---	---	---	---	---	---	---	---	---	---	---	---	---	N	N	N	1	1	1	1	1
SEWICKLEY	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SMITHTON	N	N	N	Y	Y	---	N	---	N	---	N	---	N	N	---	N	Y	3	4	3	3	3
SOUTH GREENSBURG	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SOUTH HUNTINGDON	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SOUTHWEST GREENSBURG	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
ST CLAIR	---	---	N	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SUTERSVILLE	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TRAFFORD	Y	Y	Y	Y	Y	SL	Y	SL	Y	SL	Y	SL	Y	Y	N	Y	Y	5	4	2	4	5
TCWA	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	Y	Y	5	5	5	5	5
UNITY	N	Y	N	Y	Y	---	Y	SO	N	SO	N	---	Y	Y	Y	Y	---	5	5	5	5	5
UPPER BURRELL	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
VANDERGRIFT	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WASHINGTON	N	Y	N	N	N	SL	N	SL	N	SL	N	SL	Y	Y	N	Y	---	4	4	4	4	4
WEST LEECHBURG	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
WEST NEWTON	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
YOUNGSTOWN	Y	N	N	Y	N	---	N	---	N	---	N	---	N	---	N	N	Y	1	1	1	5	1
YOUNGWOOD	N	N	N	Y	Y	SO	Y	SO	Y	SO	N	---	Y	Y	N	N	Y	5	5	5	5	5

Question Key:

Q1	Does your municipality have the following regulations?
Q2	Is your municipality considered a small MS4 municipality, and if so are you in compliance?
Q3	Do you know of any existing or proposed flood control projects in your municipality?
Q4	Where are the growth areas or areas experiencing development pressure?
Q5	Other Stormwater Management issues or input?
Q6	How important (5 = Very Important to 1 = Not Important) are the following issues?

Survey Results - Summary of Problem Areas

Stakeholder	Problem Type	Problem Cause	Problem Frequency	Damage Type	Description
ALLEGHENY	1	3	4	3	Caused damage to shoulder and exposed high pressure sewage line.
	1	3	4	6	Blocks or floods roadway
	1	1	2	0	Residential flooding
	1	1	2	0	Residential flooding
	1	3	1	3	Allegheny River
ARONA	1	4	3	2	Wickes Lumber
DELMONT	0	0	0	0	Subdivision SWM Problems
	0	0	0	0	Some stream erosion
DERRY	1	0	4	3	McGree Run, channel cutting is leading to undermined walls
	1	0	4	3	Inadequate exposed culvert
	1	0	0	0	private inadequate drains during larger storms
	3	5	0	0	Water obstruction within the channel
	1	3	1	2	Flooding of yards roads and streets
	1	3	1	3	street and residential flooding
DONEGAL	1	1	4	0	
	1	1	4	0	
	1	1	4	0	
	1	1	4	0	
EAST HUNTINGDON	1	0	1	3	Church Street in Ruffsdale flooding
	1	0	4	3	CC Builder Supply, inadequate pipe size causes flooding
EXPORT	1	1	1	3	Export floodplain
	1	1	1	3	Export Boro
	2	6	1	3	Export Mine discharge
	2	6	1	3	Italy Run
GREENSBURG	1	1	4	3	Steam floods causing residential flooding
	1	1	3	3	Meadow Drive, backyard flooding
	1	1	4	3	Northmont Street, sanitary sewer overflow flooding residences
	1	3	3	3	Zellers Run, residential flooding with pollutant/water quality issues
	1	1	2	3	Dornin Street, flooding commercial property
HEMPFIELD	1	1	2	2	Grapeville, multiple flooding issues
	1	1	1	2	Millersdale Road, multiple flooding issues
	1	1	1	2	North Greengate Road, Flooding and inadequate infrastructure
	1	1	2	2	West Hempfield, no stormwater controls
	1	1	2	2	Zellers Street
	1	1	3	2	Union Gemeteny Road, inadequate stormwater controls
	1	1	3	3	Roseytown Road
	1	1	2	2	Slate Run Road
	1	6	3	2	Brookdale
	1	4	3	3	West Point-Large residential subdivision with inadequate stormwater controls
	1	6	2	2	University of Pitt at Greensburg, multiple flooding issues
	2	7	2	2	Fairgrounds Road, floodplain of Seweckley Creek
	1	1	2	2	Willow crossing
	1	1	3	2	Hunter Road, residential flooding
	1	1	2	2	Ford Allen, residential and fire department flooding
	1	3	3	2	Hannastown, Fire Station and Post Office
1	1	4	3	Sheffield Drive, stream flooding low lying homes	
1	1	1	3	Lynch Field, stream flooding	

Stakeholder	Problem Type	Problem Cause	Problem Frequency	Damage Type	Description
IRWIN	1	1	2	3	Sells Lane, flooding
	1	6	2	3	Davis Plaza, runoff shopping area
	1	1	1	3	Greengate Commercial area
	1	9	4	3	P2: Tinkers Run Tributary No. 1- Flooding in Irwin Park.
	1	1	4	3	P1: Penn Ave: Street flowing. Basement and yard flooding. Street damage.
	1	1	1	3	P4: Tinkers Run- Scour at First street Bridge.
	1	1	3	0	P5: Brush Creek- Occasional flooding.
	1	1	2	3	P8: Unnamed Tributary between Ash Street and Poplar Street. Stream erosion and roadside ditch erosion.
	1	1	2	3	P9: Unnamed tributary flooding between Cypress and Elm Streets.
	4	9	2	3	P10: Embankment Stability along Route 30.
	3	1	1	3	P11: Conley Drive Drainage problems. Inadequate drainage.
	4	2	2	0	P12: Undermined concrete lines channel off Colony Drive.
JEANNETTE	1	0	4	0	Flooding of low lying areas
	1	0	4	3	Phase 2 Flood Protection Project (West Jennette)
LIGONIER	1	5	2	1	West Main St. Bridge
	3	1	1	3	Walnut St. Storm Sewer
	0	0	0	0	Flooding associated with Mill Creek - Refer to FEMA Maps
	1	3	1	2	Confluence of Millcreek and Loyalhanna Creek backs water on both streams
	1	3	1	2	Peoles Road, North Ligonier
	1	3	1	2	Darlington at country bridge-debris and sandbags. Fourmile run and Loyalhanna Creek
	1	0	1	3	Confluence of Fourmile run and Loyalhanna Creek
	1	3	1	2	Route 381-Rector road floods
	1	6	1	3	Baltic Road -North Ligonier
	1	6	1	2	Four Mile Run at Red Rock, private roads and homes flooded
	1	6	1	2	Giesey Road and Four Mile Run, private roads and homes flooded
	1	4	1	2	Two Mile Run, Deeds Road, Ross Road behind Lady of the lake at Bridge
LOWER BURRELL	1	9	4	3	Pucketa Watershed
	1	9	2	3	Pucketa Watershed
	1	2	4	3	Little Pucketa Watershed
	1	5	4	3	Unnamed trib to the Little Pucketa
	1	2	4	3	Chartiers Creek
	1	2	2	3	Chartiers Creek
	1	2	4	3	Unnamed trib to Chartiers Creek
	1	5	4	3	Unnamed trib to the Little Pucketa
	1	4	4	3	Little Pucketa
LOYALHANNA	1	3	1	6	This area drains a large agricultural area of hillsides and gas wells. It accumulates in a small stream through level ground that drains slowly
	1	1	1	6	A reclaimed strip mine no longer collects and holds excess rain water in this area. The increased flow floods over roads and causes detours for mud removal
MANOR	3	3	1	3	All Vehicle Service located on State Route 993 experiences flooding

Stakeholder	Problem Type	Problem Cause	Problem Frequency	Damage Type	Description
MOUNT PLEASANT	1	1	1	3	P1: Area of Bushcreek- every year problem area.
	5	3	1	2	P2: Area of Sewickley. Hard rain can go over bridge deck.
	1	3	3	3	P3: Route 31/ Randys Rest/ Commingswood Some minor flooding.
	1	3	4	6	
	1	3	4	6	
	1	3	4	6	
	4	3	4	6	
	1	3	2	3	
MURRYSVILLE	1	1	4	0	P1: 4613 Ashbaugh Rd. Rings Farm, Tributary of Haymaker Run low lying area.
	1	1	4	0	P2: 4121 Sardis Rd, Haymaker Run in front of Sloan Elem. School. Cause: Water obstructed by dams built for fishing.
	1	1	4	0	P3: 3899 School Road, Haymaker Run north of Millerstream Court. Cause: Water obstructed by trees.
	1	1	4	0	P4: Trouthaven Drive, tributary of Haymaker Run. Sedimentation: Caused by erosion of stream banks.
	1	1	1	0	P5: Borland Farm Road. North of 2000 Borland Farm Road. Tributary of Turtle Creek. Frequently floods numerous times a year during heavier rains.
	1	4	4	3	P6: 2945 Hills Church Rd. Hoehn Residence. Home located near Turtle creek and tributary.
	1	4	4	3	P7: Industrial building flooded during heavy storm. Turtle Creek Flooded.
	0	0	0	0	White Valley
	1	1	1	3	Turtle Creek Gorge
	1	1	1	3	Entire Route 22 Expansion
	1	1	1	3	West Fork of Haymaker Run
	1	1	1	3	Main stem of Haymaker Run
	1	1	1	3	Steel's Run
	1	1	1	3	Duff Park
	2	1	1	3	Delmont Mine Discharge
	1	1	1	3	Upper Turtle Creek flood plain
	1	1	1	3	White Valley
2	1	1	3	Apple Hill area	
NEW FLORENCE	1	3	1	6	
NEW KENSINGTON	1	1	3	3	P1: Memorial Park.
	1	1	3	3	P2: ValleyHill Hlghschool
	1	1	3	3	P3: Linden Valley Area
	1	1	3	3	P4: Fourth Street Area.
	1	1	3	3	P5: Craig Dell Road Apartments.
	1	5	3	3	P6: 300 Block of Argonne Drive.
	1	5	3	3	P7: Union Way
	1	2	3	3	P8: Marini Way.
NEW STANTON	1	1	1	6	
	1	1	1	6	
	1	1	4	3	Hurricane Ivan
	1	1	4	3	Hurricane Ivan
	1	1	4	3	Hurricane Ivan
	1	1	4	0	Hurricane Ivan

Stakeholder	Problem Type	Problem Cause	Problem Frequency	Damage Type	Description
NORTH HUNTINGDON	1	1	4	3	P3: Highland Avenue Drainage Problems. Inadequate drainage system
	4	9	3	3	P6: 6th Street- Steep embankment slide. Slope stability.
	4	9	4	3	P7: SR0993- Slope stability and sliding during heavy rains.
	3	3	1	6	Manor Harrison City Road becomes flooded during heavy summer storm events
	1	1	3	3	Brush creek backwaters
	1	1	1	3	Surface runoff
	3	1	2	3	Inadequate infrastructure
	1	1	2	3	Residential flooding
	1	1	3	3	Runoff flooding
	1	1	2	3	Residential flooding
	1	1	2	3	Residential flooding due to inadequate infrastructure
	1	1	3	3	Creek flooding
	1	1	3	3	N/A
	3	1	2	3	Residential flooding from Long run trib
	1	1	3	3	Residential flooding
	1	1	1	3	Manor Park
	1	1	1	3	Lower Brush Creek
2	3	1	3	Irwin Mine Discharge	
1	1	1	3	Tinkers Run	
1	1	1	3	Irwin Interchange	
OKLAHOMA	1	3	3	0	P1: Park Area
	1	3	2	0	P2: Rear of Fire Dept Lot.
PENN	1	1	1	0	P1: Drainage from a PENN DOT outlet channels water directly from SR130 down through rear side yards. Flooding driveways and yards
	1	1	1	0	P2: Road way will flood during +.75 Rain events.
	1	3	1	0	P3: Water sheet flows down SR130 and through the ponds at high school entrance across SR130.
	1	2	2	0	P4: Water is slowed pass under small roadway bridge and will pool and reach roadway surface.
	3	1	1	0	P5: Water sheet flowing from railway road onto highland will scour shoulder are and leave heavv debris on road.
	1	3	1	0	P6: Lowland flooding.
	1	1	1	0	P7: Designated flood plain area. Due to contributing volume stream will flood civic center parking area and roadwav.
	1	1	1	2	P8: Flooding of Harrison City due to Bushy Run.
	1	1	1	3	Claridge Road area
	2	1	1	3	Lyons Run
2	3	1	3	Harrison Road area	
1	1	1	3	Harrison City area	
1	1	1	3	Penn Crossing	
SALEM	1	0	2	2	Flooding of bridge over Witthorn Creek caused by backwater from Loyal Hanna Dam.
	1	0	1	2	Flooding of Rock Spring Road from Beaver Run.

Stakeholder	Problem Type	Problem Cause	Problem Frequency	Damage Type	Description
SCOTTDALE	1	1	0	3	P1: Stream bank erosion on Anderson Run due to SE. increases. Flooding at the end of Grand Street.
	1	3	1	3	P2: West Park Plan. Poor infiltration and SW runoff often into yards and basements.
	1	3	1	2	P3: Flooding of Route 819 poor SW controls. The road is lower and curbed keeping water on roadway.
	1	1	1	3	P4: Mount Pleasant Road, 6th and 7th Streets roadways floods and there is no way for the water to get off the street.
	1	1	1	3	P5: Development on top of the hill with inadequate drainage. All flows down a swale ending in an area which was filled 80-100 years ago now SE causing problems.
	1	1	1	3	P6: Poor drainage off State Route.
	1	1	1	3	P7: Water run-off from street to basement.
	3	3	1	3	P8: Spring water freeze on sidewalk since the state repaved the street.
	1	1	1	3	P10: Drainage off a farm is in-adequate size to ditch when area is plowed or frozen.
	1	1	1	3	P11: Drainage from development floods homes below.
	1	0	1	3	P9: In-adequate drainage water; cannot make it to the stream.
SMITHTON	1	1	0	0	Pipe carries drainage 24/7 from higher elev. Need to replace 1200ft. Failure will cause flooding.
SOUTH GREENSBURG	1	1	3	2	Midway, St. Clair Sewage overflow
SOUTHWEST GREENSBURG	1	1	2	3	S. Main Street, street flooding
TRAFFORD	1	5	2	0	No description.
	1	1	2	0	No description.
	1	3	1	0	Ponding at Cul-de-sac Coventry Court.
	1	0	4	0	Ponding at Playground. 7th Street.
	1	5	2	0	Storm pipe frequently clogs with debris at end of the Belleam Woods Dr.
UNITY	1	5	3	2	Crabtree Creek- Shared by Hempfield, Salem, Unity Twn.
	3	2	1	3	Lawson Heights: Upper areas of neighborhood that are storm sewer discharges into non storm sewers areas with inadequate ditches and undersized culverts.
	3	2	1	3	Baggaley Area- Upland development cause increased runoff rates & volume. Existing bridges and culverts are inadequate for passing the flow.
	1	3	1	3	RT 30 east of SR982- Years of sedimentation in low lying areas has led to obstruction of existing drainage infrastructure on RT 30.
	3	3	1	3	Lightcap Rd. Latrobe/ Crabtree Rd- Development along Lightcap Rd caused increased runoff with existing roadside ditches culverts now inadequate
	3	3	1	3	Beatty County Rd. and Frye Farm Rd- Undersized culvert due to increased runoff from upland development

Stakeholder	Problem Type	Problem Cause	Problem Frequency	Damage Type	Description
	3	3	1	3	Marguerite- Lack of storm infrastructure in village and increased runoff due to upland development.
	1	1	1	3	Mutual (Miscocoh Rd)- Lack of storm infrastructure and some acid mine drainage; frequently floods.
	2	7	1	0	Buffermyer Rd. AMD in tributary to Fourteen Mile Run.
	1	1	1	3	Lyodsville- Undersized culvert and obstruction in culverts and waterway for Unity Run have let to localized flooding.
	1	1	4	3	Dorothy Patch- Low lying patch town along Monsaty run is flood prone and will become more so with future upland development.
	1	3	1	3	Crabtree area- streets and basement flooding issues.
	1	3	1	0	Loyalhanna Creek, residential flooding
	1	3	1	0	Unity Run, stream bank erosion, residential flooding
	1	3	1	0	Unity Run, stream bank erosion, residential flooding
WASHINGTON	1	1	4	3	The area in an old residential area with no storm water system. Flooding occurs during storm event.
YOUNGWOOD	1	1	4	6	
	1	1	4	6	
	1	1	4	6	
	1	1	4	6	
	1	1	4	6	
	1	1	4	6	

Survey Problem Area Key

Problem Type

1	Flooding
2	Water Pollution
3	Inadequate Infrastructure
4	Accelerated Erosion
5	Sedimentation
6	Habitat Loss or Damage
7	Other

Problem Cause

1	Stormwater Volume Increase
2	Stormwater Velocity
3	Poor Drainage
4	Stormwater Direction
5	Water Obstruction
6	Floodplain Development
7	Acid Mine Drainage
8	Acid Rain Impact
9	Other

Problem Frequency

1	Occurs >1 per year
2	Occurs every 1 to 3 years
3	Occurs every 4 to 8 years
4	Only during flood events

Damage Type

1	Loss of life
2	Loss of vital services
3	Property damage

APPENDIX C

PHASE 2

TYPICAL SCOPE OF WORK

(ACTUAL SCOPE MAY DIFFER WHEN ISSUED BY THE PADEP)

Work Elements for Preparation of the PLAN

Three (3) major work elements are required to prepare the PLAN. These are: I, project administration; II, preparation of the PLAN; and III, managing public participation including the Plan Advisory Committee (PAC).

I. Project Administration

The COUNTY is responsible for the overall administration of all work required to complete the PLAN. This includes, but is not limited to all of the administrative efforts described in this section of the Agreement.

Project administration includes, but is not limited to, the following activities:

1. Organize and/or attend meetings.
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 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.
9. Prepare and conduct the Phase 2 start-up meeting among the DEPARTMENT, the COUNTY and the COUNTY's selected consultant (if any 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. Preparation of the PLAN

The COUNTY is responsible for overseeing the preparation and submission of the PLAN to ensure that the PLAN will meet all applicable requirements as identified herein. This work includes Tasks A through C, plus associated subtasks, as described below.

Task A

A.1 Data Collection; Data Review; Data Analysis; Goals, Objectives and Requirements

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 and purposes of the PLAN. Existing 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.

Data to be collected may include, but may not be limited to (and will be based on available information including the results of the questionnaires collected during Phase I):

1. Comprehensive land use plans;
2. Existing municipal ordinances;
3. Existing and anticipated stormwater problems, including quality and quantity problems, impaired stream segments, and previously proposed solutions;
4. Existing and proposed flood control projects;
5. A listing of existing and proposed stormwater collection and control facilities, including a designation of those areas to be served by stormwater collection and control facilities within a 10-year period, an estimate of the design capacity and costs of proposed facilities, a schedule and the 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, where this information is readily available;
6. Storm sewer outfalls;
7. Soils;
8. Geology;
9. Significant flow obstructions;
10. Topographic mapping;
11. Aerial photographs;
12. Engineering and planning studies;
13. Streamflow data;
14. Floodplain information.

Field investigations will be accomplished to gather or confirm the data, only when necessary. This task also includes review and evaluation of the data that is collected for consistency and usability in the PLAN.

Problem Area Inspection, Summary, and Proposed Solutions

When necessary, field investigations will be performed to evaluate areas with significant problems in terms of water quality or quantity. The PLAN will summarize these problem areas, identify and evaluate proposed solutions, and identify the preferred solution based on feasibility, benefits, and costs. In addition, the PLAN will identify strategies for funding the preferred solutions.

This task will be coordinated closely with the results of the data questionnaires collected from the municipalities during Phase 1.

The preferred solutions to the problems identified in the PLAN will be the solutions that best satisfy the regulatory requirements in Pennsylvania Code Title 25 and the Clean Streams Law to protect, maintain, reclaim, and restore water quality. These preferred solutions will be incorporated into the technical standards and criteria of the PLAN, into the PLAN's Model Ordinance, and into priorities for implementation of action items.

Review of Existing Plans, Studies, Reports, and Programs

A comprehensive review of related documents and/or programs will be performed and a coordinated list of the goals and objectives from each of the documents will be developed.

Goals, Objectives, and Requirements of the PLAN

The goals, objectives, and requirements for the PLAN will incorporate the policy, purpose, and requirements in Act 167, requirements in the Pennsylvania Clean Streams Law, requirements in the State Water Quality Standards, requirements to address water quality impairments pursuant to stream impairment data listed pursuant to Sections 305(b) and 303(d) of the Clean Water Act, pollutant reduction requirements in TMDLs, and the list of problems identified by the COUNTY and the PAC. The PLAN shall be prepared in a manner consistent with the approved Phase 1 Report, (i.e. the Scope of Work). Inclusively, the goals, objectives, and requirements of the PLAN will be called hereinafter the PURPOSE of the PLAN.

Anticipated Product

The work product for this task includes a summation of the information listed above, organized in such a way as to establish and support the PURPOSE of both short-term and long-term watershed planning (including updates to the PLAN).

A.2 Municipal Ordinance Reviews and Evaluations

This task involves the evaluation, comparison, and tabulation of existing municipal ordinances. The purpose of the table is to present a summary of changes to ordinances that will be necessary in each municipality to implement the PLAN as

required by Act 167. The table also will be helpful during the preparation of the Model Ordinance(s) for the PLAN.

Anticipated Product

The product of this task will be a table showing a summary and comparison of existing stormwater management provisions in existing municipal ordinance.

A.3 Data Preparation For Technical Analysis

This task involves the work to transfer data into a geographic information system (GIS) that will be used during the technical analysis associated with preparation of the PLAN and for presentation of graphical content in the PLAN.

The level of effort expended for this task will be commensurate with the goals, objectives, and requirements of the PLAN. Data will be incorporated into the PLAN in the most appropriate and efficient manner, e.g. by copy or by reference.

Detailed GIS data layers will prepared only to the extent necessary for the technical analyses and graphical content of the PLAN:

1. Base Mapping – Existing base map information (roads, streams, municipal boundaries, text, etc.) will be compiled into a base map showing the indexed watersheds within the COUNTY. Data will be projected into the coordinate system preferred by the COUNTY.
2. Land Use/Land Cover Information – Existing aerial maps will be utilized to prepare map data in an appropriate format for hydrologic modeling, where necessary. Recent land developments will be added as necessary. Prepared GIS layers will be field checked for accuracy, when necessary.
3. Future Land Use Conditions – Maps of future land use and land cover based on zoning information and the County Comprehensive Plan will be used to estimate future land use for the planning horizon of the PLAN.
4. Soils Information – Digital County soil data will be utilized. Soil data will be obtained from the NRCS. Original overlay mapping will be prepared only where necessary to support the hydrologic modeling.
5. Digital Elevation Models – Existing USGS digital elevation models (DEMs) will be used to obtain elevation and slope information for areas where detailed hydrologic modeling will be performed.
6. Digital Raster Graphics (DRGs) – Existing ortho digital USGS topographical maps will be used for locating and displaying obstructions and problem areas, where necessary.
7. Wetlands – Wetlands data will be compiled from the National Wetlands Inventory (NWI) Maps.

8. Geology – Existing digital geologic maps will be used for the watersheds within the COUNTY. Geologic features pertinent to the watershed, i.e., limestone, sandstone, etc., will be considered in hydrologic models, where necessary, and incorporated into PLAN by reference, or by copy, as necessary.
9. Obstructions – Locations and critical attributes of obstructions associated with significant stormwater problems will be shown on the appropriate base map.
10. Problem Areas, Flood Control Structures, Stormwater Management Facilities, etc. – The locations and critical attributes of these items, when they are expected to produce a significant effect on stormwater runoff, will be shown on the appropriate base map.
11. Floodplains – FEMA Q3 data will be incorporate into the PLAN by reference, or by copy when necessary. Floodplains in other areas will be identified in the PLAN and shown on the base map when necessary.
12. Environmental Characteristics – Environmental characteristics, such as open-space, buffers, etc. that are expected to produce a significant effect on stormwater runoff will be displayed on the appropriate base map when necessary.

A summary of data sources will be supplied (simplified Metadata) and will include data type (coverage, shapefile, image) source, projection, and year.

Delineation of Subwatersheds

Designated watersheds will be delineated on a base map at a scale that results in a manageable map size and adequate detail. When necessary for preparation of the PLAN, watersheds will be broken into subwatersheds and subareas in a manner consistent with the guidance that accompanies the applied models. Sub-areas delineated for hydrologic modeling purposes should not be less than 5 square miles in area; however, areas of less than 5 square miles may be used when necessary based on engineering judgment.

The delineation of sub-watersheds may be based on the following:

1. The guidance associated with the applied model and sound engineering judgment.
2. The location of identified problems related to the PURPOSE of the PLAN.
3. The location of obstructions; primarily bridges, culverts, or stormwater control facilities with a significant effect on stormwater runoff.
4. Other points of interest, such as stream gages or water quality monitoring stations, locations of water quality impairment or concern, anticipated future flood project sites.

Where significant effects on stormwater runoff are produced, this task also may include delineation and mapping of:

1. Storm sewer systems: areas where storm sewer systems.

2. Existing state, federal or local flood protection and stormwater management facilities.
3. Stormwater facilities proposed by municipalities for construction within the 10-year planning period.
4. Stormwater related problems - areas indicated in the municipal data questionnaires, in state water quality assessments (e.g. 303(d), or 305(b) lists), or in TMDL documents, as being susceptible to flooding problems or as not meeting state water quality standards.

Anticipated Product

The product will be completed GIS watershed data layers and maps. The maps completed for this task will be preliminary and will be modified and finalized as a part of the final plan preparation efforts.

Task B - Technical Analysis

The technical analysis consists of developing alternative strategies to manage stormwater runoff consistent with the PURPOSE of the PLAN. This will be accomplished under the following subtasks.

B.1 Evaluate Water Quality, peak flow, stream stability, and groundwater recharge requirements as follows:

Water quality, peak flow, stream stability, and groundwater recharge requirements are satisfied by the Methods in Section 303 of DEP's draft Model Ordinance (copy provided separately). If other methods are to be utilized, the PLAN shall provide:

1. A water quality capture volume computational methodology acceptable to DEP to meet State Water Quality Standards pursuant to Chapter 93 regulations;
2. 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;
3. Methodologies for computing stormwater capture volumes for groundwater recharge and infiltration;
4. 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 need to ensure that retrofits as well as new development projects are consistent with the PURPOSE of PLAN.

B.2. Modeling

This task involves the use of detailed hydrologic modeling, quantitative computations and evaluations necessary to analyze runoff characteristics of watersheds or sub-watersheds under existing and future conditions to evaluate alternative solutions to identified existing or anticipated future problems and meet the PURPOSE of the PLAN. It will establish the need and the level of stormwater quality and peak rate controls for the 1-, 2-, 5-, 10-, 25-, 50- and 100-year 24-hour events (25 and 50-year events are optional). Sub-areas delineated for hydrologic modeling purposes should not be less than 5 square miles in area; however, areas of less than 5 square miles may be used when necessary based on engineering judgment.

Modeling should be based on rainfall data from NOAA Atlas 14, or equivalent.

Hydrologic models should be calibrated using rain gage records, stream gage records, USGS regression models for Pennsylvania, and anecdotal historical information. If HEC-HMS is used, the internal optimization routines should be used to the greatest extent practical

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.

B.3 Compilation of All Technical Standards

Standards and criteria will compiled and presented to show:

1. A detailed list of specific standards and criteria for stormwater control;
2. Where within watersheds and sub-watersheds the various standards and criteria apply;
3. A list of applicable stormwater management controls methodologies and the design procedures associated with each;
4. Performance criteria for design of stormwater management facilities;
5. Locations where cluster or regional stormwater management facilities will be required;
6. Cost estimates for construction of new stormwater management facilities to correct existing problems;
7. A summary of funding sources for new facilities;
8. An analysis of what problems will, and what problems will not, be solved by implementation of the PLAN; and
9. Evaluation of existing floodplain ordinances and recommendations for changes where necessary.

Standards and criteria will be consistent to the greatest practical extent within municipalities and across the COUNTY.

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.

B.4 Implementation of Technical Standards and Criteria

The final standards and criteria will be incorporated into a model municipal 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. If necessary, more than one model ordinance can be provided.

Task C - Plan Preparation and Implementation

C.1 Plan Report Preparation

The products of each previous task will be included in the PLAN. The PLAN will contain provisions as necessary to meet the PURPOSE of the PLAN. Whenever appropriate, material readily available from existing sources should be included by reference only, not by copy. 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. The contents of the PLAN shall comply with the requirements of 1978 Act 167. At a minimum, the PLAN must include the following list of items paraphrased from Section 5 of Act 167. In cases where the information is readily available from existing sources, the PLAN may include the required content either by reference or by copy, whichever is more efficient:

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 significant obstructions and their capacities that significantly affect stormwater management and flooding within the watershed(s);
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 on flooding or stormwater runoff;
7. An assessment of alternative runoff control techniques and their efficiencies in each watershed identified;

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 and flood hazard areas within the watersheds;
11. Criteria and standards for the control of stormwater runoff from existing and new development that is 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;
14. Provisions as are reasonably necessary to manage stormwater such that development or activities in each municipality within the watersheds do not adversely affect health, safety, and property in other municipalities within each watershed identified and in basins to which the watersheds are tributary; and
15. Consider and be consistent with other existing municipal, county, regional and State environmental and land use plans.

In addition, the PLAN will identify:

1. Impaired stream segments within the County's watersheds;
2. The type and nature of impairment;
3. Strategies for eliminating or mitigating the impairment to satisfy state water quality requirements pursuant to 25 Pa. Code Chapter 93 regulations and TMDL requirements, if established.
4. An analysis of what problems will, and what problems will not, be solved by implementation of the PLAN;

C.2. Recommended Outline

The recommended outline for the PLAN is as follows:

VOLUME I: Executive Summary of the PLAN

VOLUME II: THE PLAN

Section I - Introduction

Section II - Act 167 Watershed Level Stormwater Management Planning and Implementation

Section III - Watershed Characteristics

1. Present Land Use
2. Projected Land Developments
3. Significant Obstructions
4. Stormwater and Flood Management Systems
5. Stormwater Problems

Section IV - Technical Analysis – Modeling

1. Quality and Quantity of present and Future Storm Runoff

Section V - Results of Modeling

1. Interpretation and Evaluation of Models
2. Technical Standards and Criteria for Control of Stormwater Runoff

Section VI - Runoff Control Strategies

Section VII - Analysis of Existing Municipal Ordinances

Section VIII - Model Stormwater Ordinances

Section IX - Action Items and Follow-Up

1. Action Items and Priorities for Implementation of the PLAN
2. An analysis of what problems will, and what problems will not, be solved by implementation of this PLAN;

Section X - Provisions for Review, Revision, and Updating the PLAN

Plates/Figures:

1. A base map showing the watershed delineation and political subdivisions, roadway network and the location as referenced to the county.
2. Existing land use.
3. Future land use.
4. Hydrologic soil groups.
5. Development and floodplains.
6. Watershed subareas used for hydrologic analysis including information on applicable management facilities.
7. Stream obstructions, flooding and drainage problem areas.
8. Areas where storm sewer networks exist (if available) and location of storm sewer outfalls.
9. Additional information as determined by the County.

Tables:

1. Runoff characteristics of the watershed.
2. Rainfall values for various frequency durations.

3. Peak flow values at points of interest for mean annual 2-, 5-, 10-, 25-, 50- and 100-year storm events for various durations, and for present and future conditions.
4. Subareas and corresponding management strategy information.

VOLUME III, Appendixes

The following data will be included in Volume III:

1. Recommended design storms for significant obstructions;
2. A list (or table) of significant stormwater obstructions including their locations, sizes, calculated capacities and any particular information which may seem helpful to the use of the plan;
3. Any special information concerning stormwater control facilities, BMPs, and other issues.

VOLUME IV, Technical Appendixes

The following data will be included in Volume IV:

1. Input data and results of model runs;
2. Background hydrologic data;

Anticipated Product

The final product will be the adopted and approved COUNTY Stormwater Management PLAN. The final PLAN will consist of four parts: Volumes I through IV. The report and all supporting data will be submitted to DEP by the COUNTY in hard copy and in native digital format. The final PLAN also will be provided in electronic pdf format.

C.3 Plan Adoption and Submission to DEP

Prior to the COUNTY's public hearing, the COUNTY will produce one hardcopy of the PLAN for each member of the PAC, plus four hardcopies for DEP, plus ten additional hardcopies. The COUNTY also will provide DEP with one electronic copy. The involved municipalities, PAC members and Department will review the PLAN and provide comments to the COUNTY. The COUNTY shall allow 120 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 revised the PLAN accordingly.

Prior to the COUNTY's public hearing on the PLAN, the COUNTY will hold a PAC meeting to present the final version of the PLAN.

The COUNTY will hold a public hearing for on the PLAN. A notice for the public hearing will be published at least two weeks before the hearing date. The notice will contain a

brief summary of the principal provisions of the PLAN and a reference to the places within each affected municipality where copies of the PLAN may be examined or purchased at cost. The COUNTY will review the comments received at the public hearing and appropriate modifications to the PLAN will be made.

The COUNTY Board of Commissioners, or Council, will be vote on the PLAN as a resolution, for the purpose of adoption. The resolution needs to be carried by an affirmative vote of at least a majority of the members of the governing body, and must refer expressly to the maps, charts, textual matter and other materials that constitute the Plan. This action will be recorded on the adopted PLAN.

After adoption, the COUNTY will submit to DEP a letter of transmittal, two paper copies, and two electronic media copies of the adopted PLAN, the comments received from the official planning agency and governing body of each municipality, comments from the County Planning Commission, comments from regional planning agencies (Section 6(c) of Act 167), the responses-to-comments document prepared by the COUNTY, the public hearing notice and minutes of the public hearing (Section 8(a) of Act 167), and the resolution of adoption of the PLAN by the COUNTY (Section 8(b) of Act 167). The letter of transmittal will state that the COUNTY has complied with all requirements of Act 167 and it will request official approval of the adopted PLAN. Subsequent to DEP's approval of the PLAN, 100 final copies of the PLAN will be printed by the COUNTY. Two printed copies and two electronic copies of the final PLAN will be provided to DEP. The final electronic copy will include all supporting data in native digital format and the final PLAN also will be provided in electronic pdf format.

Hard copies of all backup material including technical analyses and models of watersheds or sub-watersheds will be retained at the COUNTY's offices.

Anticipated Product

The product of this task will include the official documentation regarding PLAN adoption and implementation process, including the necessary documentation from the COUNTY certifying the adoption of the PLAN, and the actual adopted PLAN.

III. Plan Advisory Committee, Public Participation, and Implementation Workshops

The following paragraphs describe the various activities that will be conducted by the COUNTY to facilitate public participation in the preparation and implementation of the PLAN. These activities include meetings of the Plan Advisory Committee (PAC), the public hearing conducted by the COUNTY, the municipal workshops, the public workshop(s) and a public information pamphlet. The relative timing and purpose of these activities are summarized in Table 1.

Discussions, presentations, and handouts on implementation of the PLAN, including various stormwater BMPs, will be an agenda item, from time to time, for regularly scheduled advisory committee meetings.

Task A: Plan Advisory Committee

A Plan Advisory Committee (PAC) will be established to provide an opportunity for dialogue with, and participation of, each municipal government, the County Conservation District, other interest groups such as watershed associations, and the public.

The COUNTY will conduct PAC meetings to provide information on the planning process and to gather data and advice from the members of the PAC to ensure that the plan is consistent with the PURPOSE of the PLAN and the needs of the municipalities and the COUNTY.

Task B: Pamphlet

A pamphlet tailored to the PLAN will be prepared to provide guidance to municipal officials and to the public regarding implementation of the PLAN.

Task C: Municipal Implementation Workshops

The COUNTY will conduct municipal workshops to provide information to municipalities regarding their obligation to implement the PLAN. The workshops will cover procedures to adapt, 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.

Task D: Public Implementation Workshops

The COUNTY will provide implementation workshops to the public regarding implementation of the PLAN within 6 months following DEP's approval of the PLAN

The workshops will cover goals and benefits of the PLAN and information on the responsibilities of residents to meet the PLAN's requirements.

Table 1: Meetings, Purpose, and Schedule

PAC Meeting	Purpose of Meeting	Meeting Schedule
1.	Phase 2 Start-up Meeting - introduce the Phase 2 Planning process. Emphasize the importance of full municipal involvement. Present summary of the data collection questionnaire from Phase 1.	Beginning of the Project
2.	Review the project status, maps, institutional data (ordinances, etc), solicit input from municipalities, provide summary of stormwater problems. Identify areas that require detailed hydrologic modeling.	Subsequent to Task A
3.	Technical issues for detailed models: Review model selection and setup, initial modeling runs, calibration procedures, solicit input on technical standards, water quality issues.	Part way into Task B
4.	Technical issues for detailed models: Review modeling results, present standards and criteria, discuss water quality issues and preliminary technical content for ordinances.	After Task B
5.	Technical review of draft PLAN for areas that require detailed models: Review technical comments. (Draft PLAN sent to municipalities prior to meeting).	Subsequent to preparation of the draft PLAN
6.	General review of draft PLAN: Gather general comments and feedback prior to finalization of the PLAN.	
7.	Pre-hearing meeting: Review comments and responses to comments. Summarize	Upon completion of the final draft PLAN

	implementation.	
Public Hearing	Conduct the hearing as required by Act 167 to present the PLAN to the public.	
8.	Municipal Implementation Workshop: Provide assistance to municipalities on implementation of the PLAN including adaptation, enactment, and implementation of the ordinances and other action items.	Within 3 months of DEP's approval of the PLAN
Public		
Workshop	Public Implementation Workshop: Provide introduction and overview of the PLAN to public.	Within 6 months of DEP's approval of the PLAN

It is not necessary for municipalities to attend PAC meetings numbered 3, 4, and 5 in Table 1 if they are not involved in, or affected by, detailed modeling.

Anticipated Product

The product will include the presentation materials prepared for the committee meetings, correspondence, notes and summaries from all committee meetings and workshops.

APPENDIX D

PHASE 2 COST ESTIMATES

Fiscal year budgets for subphases of the Westmoreland County 167 Phase 2 project are estimated. It is assumed that each subphase will be a stand-alone project. Should multiple subphases be combined into a single project, updated budgets should be prepared to account for the changes to the schedule, fiscal year budgets, and Consultant / County splits.

SUBPHASE 2 – DATA COLLECTION, HYDROLOGIC MODEL, AND TECHNICAL ANALYSES FOR THE TURTLE CREEK WATERSHED (97.4 SQUARE MILES)

	Consultant			Total
	Effort	Expenses	County	
Project Management & Administration	\$6105	\$800	\$9000	\$15,905
TASK A - Data Collection/Review/Analysis	\$34,340	\$1155	\$24,000	\$59,495
TASK B - Technical Analysis	\$56,700			\$56,700
TASK C - Public/Municipal Participation				
TASK D - Plan Preparation and Implementation				
Additional Municipal Workshops & Training				
<i>SUBPHASE 2 PROJECT TOTAL</i>	<i>\$97,145</i>	<i>\$1955</i>	<i>\$33,000</i>	<i>\$132,100</i>

FISCAL YEAR BUDGET ALLOCATION

Fiscal Year	FY Total ²
Start	\$132,100
Start + 1	
Start + 2	
Start + 3 (6 mos.)	
<i>SUBPHASE 2 PROJECT TOTAL</i>	<i>\$132,100</i>

² Allocations are approximate and may change depending on DEP-County Phase 2 Agreement language and execution date. These allocations assume a Phase 2 start date aligning with the start of a Fiscal Year.

***SUBPHASE 3 – DATA COLLECTION, HYDROLOGIC MODEL, AND TECHNICAL ANALYSES FOR
THE SEWICKLEY CREEK WATERSHED (167.5 SQUARE MILES)***

	Consultant			Total
	Effort	Expenses	County	
Project Management & Administration	\$6905	\$800	\$7900	\$15,605
TASK A - Data Collection/Review/Analysis	\$40,290	\$1455	\$27,000	\$68,745
TASK B - Technical Analysis	\$82,095		\$9000	\$91,095
TASK C - Public/Municipal Participation				
TASK D - Plan Preparation and Implementation				
Additional Municipal Workshops & Training				
<i>SUBPHASE 3 PROJECT TOTAL</i>	<i>\$129,290</i>	<i>\$2255</i>	<i>\$43,900</i>	<i>\$175,445</i>

FISCAL YEAR BUDGET ALLOCATION

Fiscal Year	FY Total ³
Start	\$175,445
Start + 1	
Start + 2	
Start + 3 (6 mos.)	
<i>SUBPHASE 3 PROJECT TOTAL</i>	<i>\$175,445</i>

³ Allocations are approximate and may change depending on DEP-County Phase 2 Agreement language and execution date. These allocations assume a Phase 2 start date aligning with the start of a Fiscal Year.

SUBPHASE 4 – DATA COLLECTION, HYDROLOGIC MODEL, AND TECHNICAL ANALYSES FOR THE PUCKETA CREEK WATERSHED (31.8 SQUARE MILES)

	Consultant		County	Total
	Effort	Expenses		
Project Management & Administration	\$6105	\$800	\$7500	\$14,405
TASK A - Data Collection/Review/Analysis	\$34,340	\$1435	\$20,000	\$55,775
TASK B - Technical Analysis	\$56,700		\$5600	\$62,300
TASK C - Public/Municipal Participation				
TASK D - Plan Preparation and Implementation				
Additional Municipal Workshops & Training				
<i>SUBPHASE 4 PROJECT TOTAL</i>	<i>\$97,145</i>	<i>\$2235</i>	<i>\$33,100</i>	<i>\$132,480</i>

FISCAL YEAR BUDGET ALLOCATION

Fiscal Year	FY Total ⁴
Start	\$132,480
Start + 1	
Start + 2	
Start + 3 (6 mos.)	
<i>SUBPHASE 4 PROJECT TOTAL</i>	<i>\$132,480</i>

⁴ Allocations are approximate and may change depending on DEP-County Phase 2 Agreement language and execution date. These allocations assume a Phase 2 start date aligning with the start of a Fiscal Year.

SUBPHASE 6 – COUNTY-WIDE PHASE 2 PLAN AND MODEL ORDINANCE PREPARATION AND IMPLEMENTATION

	Consultant			Total
	Effort	Expenses	County	
Project Management & Administration	\$12,210	\$800	\$8000	\$21,010
TASK A - Data Collection/Review/Analysis				
TASK B - Technical Analysis	\$26,090			\$26,090
TASK C - Public/Municipal Participation	\$25,920		\$14,000	\$39,920
TASK D - Plan Preparation and Implementation	\$55,875	\$2185	\$16,000	\$74,060
Additional Municipal Workshops & Training	\$22,800	\$800	\$11,000	\$34,600
<i>SUBPHASE 6 PROJECT TOTAL</i>	<i>\$142,895</i>	<i>\$3785</i>	<i>\$49,000</i>	<i>\$195,680</i>

FISCAL YEAR BUDGET ALLOCATION

Fiscal Year	FY Total ⁶
Start	\$75,680
Start + 1	\$95,000
Start + 2	\$25,000
Start + 3 (6 mos.)	
<i>SUBPHASE 6 PROJECT TOTAL</i>	<i>\$195,680</i>

⁶ Allocations are approximate and may change depending on DEP-County Phase 2 Agreement language and execution date. These allocations assume a Phase 2 start date aligning with the start of a Fiscal Year.

APPENDIX E
PROPOSED PHASE 2 SCHEDULE

Proposed Phase 2 Schedule

Phase 2 Scheduling at this time cannot be prepared given the number of variables and funding decisions that remain. For example, depending on reimbursement availability from the State, the County may or may not choose to proceed with two or more subphases of the Phase 2 effort concurrently. Given the uncertainty, proposed Subphase work schedules will be prepared when the County is ready to proceed with the Phase 2 work.