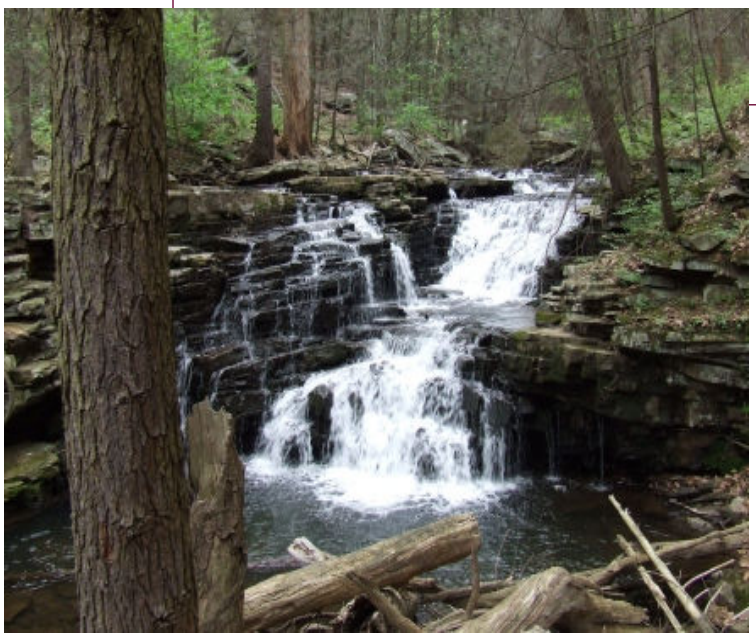
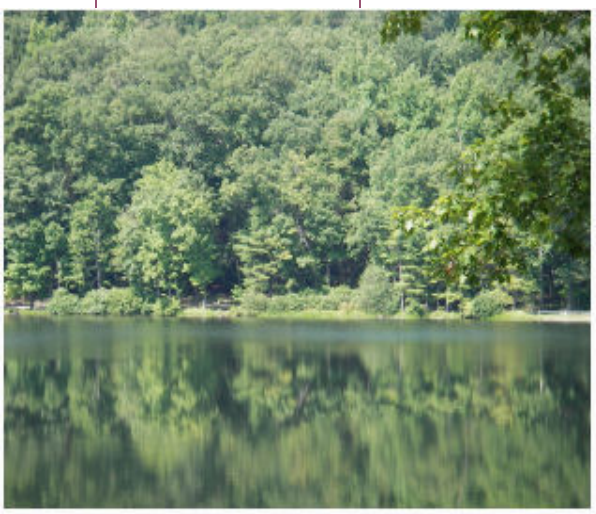
HRG
Herbert, Rowland & Grubic, Inc.
Engineering & Related Services

Fulton County Regional Planning Commission

Act 167 County-Wide Plan
Stormwater Management Plan for Fulton County
Phase I – Scope of Study

December, 2008





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INTRODUCTION

PURPOSE

This report was prepared under, and in accordance with, a grant from the Pennsylvania Department of Environmental Protection (PADEP) for Fulton County to conduct an Act 167 Stormwater Management Plan, Phase I for all the watersheds within the County. This report presents the final results of the Phase I effort, which includes:

- A summary of watershed characteristics
- An inventory of relevant problems
- A proposed Scope of Study, schedule and budget for completion of Phase II of the Act 167 Plan project.

The purpose of an Act 167 Study is to assess the current and future stormwater runoff conditions within a designated watershed and develop stormwater management standards, criteria and other provisions for adoption by the municipalities within the County to minimize adverse impacts from stormwater runoff associated with new or future development.

STORMWATER RUNOFF – ITS PROBLEMS AND ITS SOLUTIONS

The water that flows across the ground from precipitation is referred to as stormwater runoff. Human activities in a watershed may change the way stormwater flows. When development occurs, the volume of stormwater runoff resulting from a particular rainfall event increases along with the rate the water flows. This is due to several factors including the reduction of pervious land area (i.e., natural land covered by pavement, concrete, or buildings), changing the contour of the ground, and alterations of floodplains. This alteration of natural land cover and land contours by residential, commercial, industrial, forestry, and farmland uses also results in decreased infiltration of rainfall. This leads to the lowering of the groundwater table and reduced baseflow in streams.

The need to plan and manage the impacts of stormwater throughout the State of Pennsylvania has been demonstrated repeatedly in the past. As the population of an area increases, land development is required to meet the needs of the population. As a result of continued development, the volume and rate of stormwater runoff increases causing environmental impacts including flooding, stream channel erosion and siltation, water quality degradation, and reduced groundwater recharge. In addition, removal of trees and other vegetation during development decreases evapotranspiration which further contributes to an increase in the volume and rate of stormwater runoff. Cumulative effects of development in some areas of a watershed can result in flooding of natural watercourses with associated costly infrastructure and property damages.

History has shown that individual land development projects are often viewed as separate incidents and not necessarily part of the bigger picture of urbanization. This has also been the case when individual land development projects are scattered throughout a watershed within many different municipalities. However, it is also observed and verified that the cumulative nature of individual land surface changes dramatically affects stormwater runoff and flooding conditions. This cumulative effect of development in some areas has resulted in flooding of both small and large streams, resulting in property damage, stream bank erosion, and destruction of habitat, and even causing 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.

Fulton County Planning Commission has recommended (Fulton County Joint Comprehensive Plan, 2007) that in order to reduce the impact of stormwater runoff that results from large conventional land development projects, the concept of a conservation subdivision design should be followed (Plates A, B & C).

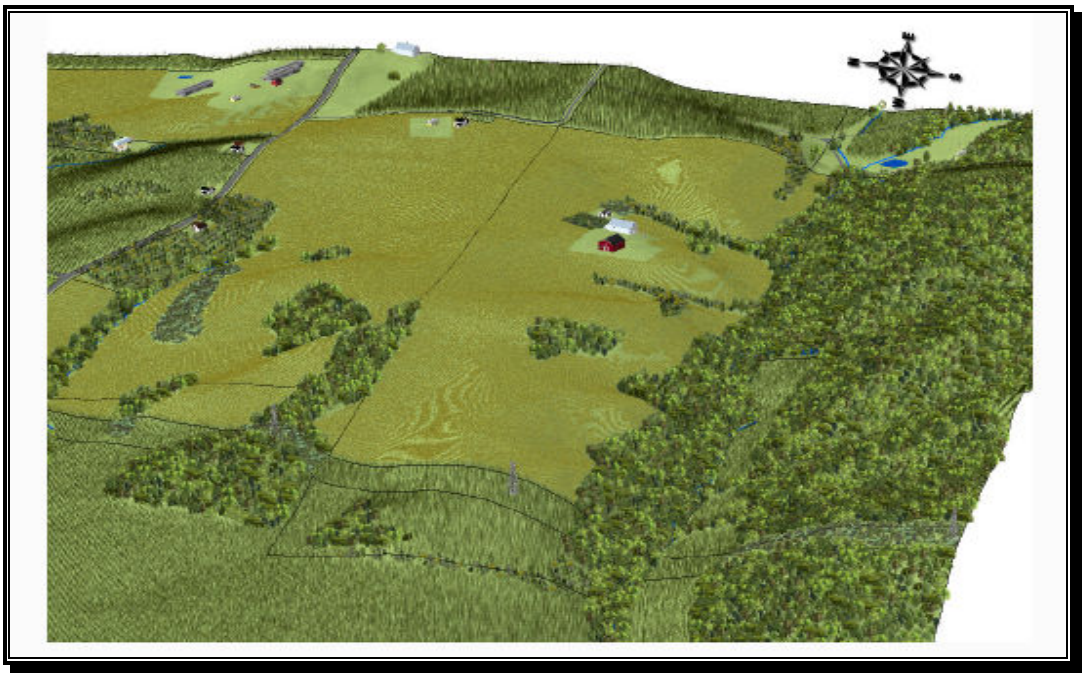


Plate A: Undeveloped Tract, (Source: Fulton County Joint Comprehensive Plan, 2007)

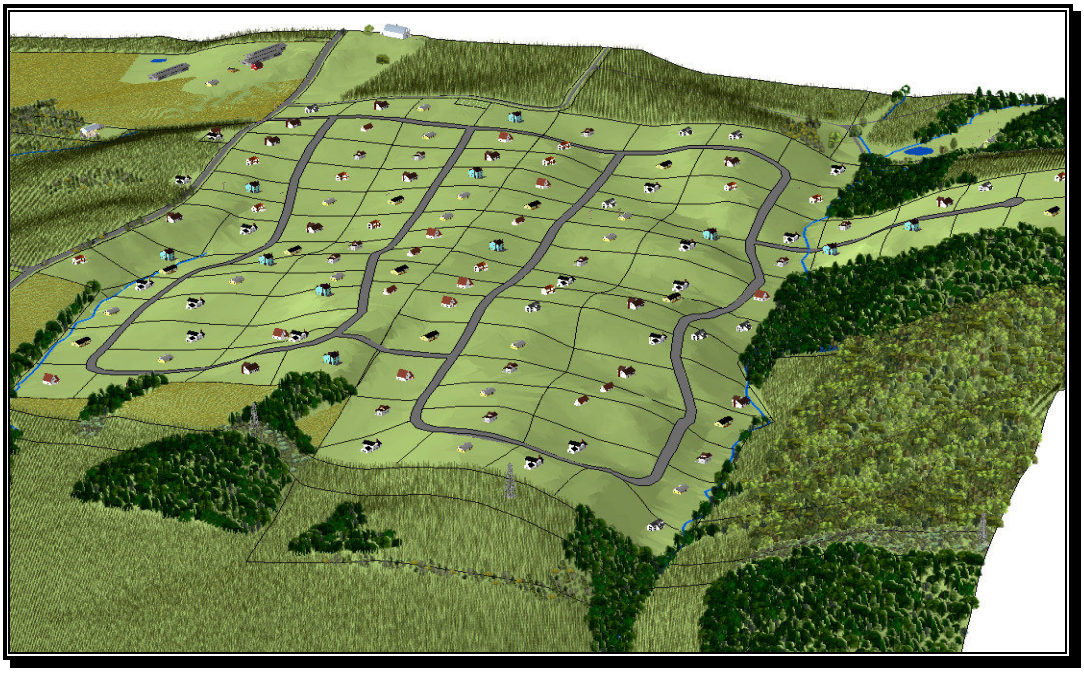


Plate B: Conventional Subdivision Design, (Source: Fulton County Joint Comprehensive Plan, 2007)

Plate C: Conservation Subdivision Design, (Source: Fulton County Joint Comprehensive Plan, 2007)

PENNSYLVANIA STORMWATER MANAGEMENT ACT (Act 167)

Recognizing the need to deal with the serious and growing problem of extensive damage from uncontrolled stormwater runoff, the Pennsylvania General Assembly enacted Act 167. The statement of legislative findings at the beginning of the Pennsylvania Stormwater Management Act sums up the critical interrelationship among development, accelerated stormwater runoff, and floodplain management. Specifically, this statement points out that:

"Inadequate management of accelerated runoff of stormwater resulting from development throughout a watershed increases flood flows and velocities, 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 flood control efforts in downstream communities, reduces groundwater recharge, and threatens public health and safety. 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 the environment."

In past years, stormwater management has been oriented primarily toward addressing the increase in peak runoff rates discharging from individual development sites to protect property immediately downstream. Minimal attention had been given to the effects on groundwater recharge and channel stability, flooding, and water quality in locations further downstream (frequently because they were located in another municipality) or designing stormwater controls within the context of an entire watershed. Management of stormwater has typically been regulated on a municipal level with little or no consistency among adjoining municipalities in the same watershed regarding the types or degree of control to be practiced. Since many municipalities do not have stormwater management ordinances or controls, the impacts from stormwater runoff may be exacerbated from additional development.

Act 167 changed this approach by instituting a comprehensive program of stormwater planning and management on a watershed level. The Act requires Pennsylvania counties to prepare and adopt stormwater management plans for each watershed located in the County, as designated by PADEP. Most importantly, these plans are to be prepared in consultation with municipalities located in the County, working through a Watershed Plan Advisory Committee (WPAC). Due to a recent change in PADEP Act 167 policy, in lieu of providing plans for each designated watershed, Act 167 Plans are now being created on a county-wide basis. Act 167 Plans are intended to provide uniform technical standards and criteria throughout the County for the management of stormwater runoff from new land development sites. The new PADEP policy also stresses the opportunity for municipalities to retrofit existing sites to improve existing water quality impairments, and reduce problem area flooding and erosion, and to maintain or increase groundwater recharge rates. Moreover, they describe a stormwater management approach to not only prevent or minimize stormwater problems through comprehensive planning and development techniques, but also to mitigate any remaining potential problems by employing structural and non-structural Best Management Practices. Furthermore, the Plan's goals and objectives will be developed and implemented to also be consistent with the Pennsylvania Clean Streams Law, and the federal National Pollutant Discharge Elimination System (NPDES) Phase II requirements for construction work.

The types and degree of control that are prescribed in the Stormwater Management Plan must be based on the expected development patterns and hydrologic characteristics of each individual watershed within the County. The Plan, more specifically the standards and criteria, are to be developed from the technical evaluations performed in the analysis process, in order to respond to the "cause and effect" nature of existing and potential storm runoff impacts in each watershed. The final product of the Act 167 planning process will be a comprehensive Stormwater Management Plan and model ordinance, to be developed and implemented with a firm sensitivity to the unique water resources and the overall needs (e.g., environmental, financial, legal, political, technical, etc.) of the municipalities in Fulton County.

ACT 167 PLANNING FOR FULTON COUNTY

Given the above history and information, the county-wide watershed planning process for Fulton County must be designed with the individual watershed characteristics in mind, as well as the political and economic structure of the County and municipalities. This is particularly important since some of the watersheds in the County have been designated as Special Protection Waters by PADEP. The Phase I - Scope of Study presents the concept and approach that has been developed to fully meet these requirements, as well as the specific requirements of Act 167, for this county-wide stormwater management project.

BENEFITS OF THE PLAN

The purpose and benefit of the Plan is to provide all of the municipalities in Fulton County with an implementation strategy and procedures for:

- developing and implementing a comprehensive program of stormwater management
- establishing uniform standards throughout the County
- ensuring that existing problem areas are not exacerbated by future development
- encouraging infiltration of stormwater to maintain groundwater recharge, prevent degradation of surface and groundwater quality, and protect water resources, and
- meeting legal water quality requirements under State law

The following basic principles of stormwater management will become goals and objectives of the Phase II Plan:

- Managing stormwater as a resource
- Preserving and utilizing existing natural features and systems
- Managing stormwater as close to the source as possible
- Sustaining the hydrologic balance of surface and ground water
- Disconnecting, decentralizing and distributing sources and discharges
- Slowing runoff down, and not speeding it up
- Preventing potential water quality and quantity problems
- Minimizing problems that cannot be avoided
- Integrating stormwater management into the initial site design process
- Inspecting and maintaining all BMPs

Currently, there is a great deal of variance among the municipalities regarding implementation and enforcement of stormwater management regulations. There are also a number of other regulations (e.g., NPDES Phase II for construction work) that impact development and land use. It is important that the Fulton County Act 167 Stormwater Management Plan be developed in a manner consistent with these other regulations so that, given the nature of stormwater runoff and its impacts, it provides for consistency of stormwater management requirements throughout the County. 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 based on a county-wide consideration. A primary goal of those regulations would be to preserve the high quality and exceptional value of the streams in Fulton County and prevent any increase in flooding or erosion due to continued development.

The technical and institutional county-wide planning approach recommended by PADEP also provides the municipalities with a considerable amount of useable technical information, such as detailed watershed runoff simulation models, that can be used for other stormwater management purposes. Therefore, as a result of developing the Plan, municipalities and Fulton County will realize benefits and/or products that are useable for other planning and engineering purposes. For example, land use updates and environmental data management are necessary for effective planning in a specific watershed. The technical component of the Plan will provide hydrologic data for the County as well as for municipal use. Another example of the associated benefits of the Plan relates to basic public works and/or engineering functions, primarily at the municipal level.

In addition, technical support information provided as a part of a specific watershed modeling effort can be used by municipal officials in the design and regulatory permitting efforts for bridge replacement and floodplain management analysis. 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 more efficiently and cost-effectively developed using the hydrologic model developed for selected problem areas. Therefore, the benefits of the watershed planning process are extensive, even beyond the important functions of developing comprehensive stormwater management strategies and ordinance provisions.

A new initiative from PADEP indicates that the Plan may investigate and provide conceptual solutions to correct existing problems. Specifically, the Plan will identify and summarize problem areas; provide hydrology for selected areas 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.

APPROACH FOR THE DEVELOPMENT OF THE STORMWATER MANAGEMENT PLAN

In order to implement county-wide comprehensive planning and management of stormwater runoff, it was necessary to review the 10 PADEP designated watersheds within Fulton County during Phase I. Since the Act itself is very dependent on municipal coordination to provide for the planning and management of stormwater throughout their respective municipalities, it is important to get involvement and endorsement from each municipality early in the planning process.

As required by the Act and the County's Agreement with PADEP, a Watershed Plan Advisory Committee (WPAC) was formed and consists of the Fulton County Planning Commission, the 13 municipalities in the County, and other interested organizations. As stated previously, it was deemed critical to initiate municipal level involvement in the overall development of the Plan. Two (2) meetings with the WPAC were held during Phase I to obtain their general commitment to the project and to gather information on any stormwater related problems they experience. The intent of the first meeting was to provide public awareness and education as well as to disseminate and obtain information from the municipal representatives and other participants. Discussions from this meeting and an evaluation of the questionnaires, in conjunction with in-house knowledge from the Fulton County Planning Commission staff, Fulton County Conservation District staff, and PADEP, determined to what level this Plan should be created. The second meeting was for discussing the questionnaire responses and review of the draft Phase I report, which included the proposed scope of work for Phase II.

THE NEED FOR A COMPREHENSIVE APPROACH FOR STORMWATER MANAGEMENT

The goal of Fulton County's Act 167 planning process is to provide a county-wide comprehensive program to assist in the planning and management of stormwater. With input from the 13 municipalities in Fulton County, the resulting stormwater management ordinance will address ongoing stormwater related problems throughout the County. The Plan will also address flood control, stream channel stability, protection of property and infrastructure, and groundwater recharge. Furthermore, cooperating municipalities will be able to adopt stormwater management controls that will have a collectively beneficial impact on the waters of Fulton County.

Another key element for consideration is coordination with Bedford, Franklin and Huntingdon Counties in their Act 167 planning activities. Since Fulton County shares significant portions of the Roaring Creek, Sideling Creek and Aughwick Creek with Huntingdon County, Licking Creek with Franklin County, and the Crooked Run with Bedford County, it is ideal that the County Plans be developed in a coordinated manner to ensure consistent goals, regulations, and implementation techniques.

The Plan itself is divided into two phases, of which Fulton County has received Phase I funding from PADEP and is highly dependent on gaining support from the municipalities in the early stages of Plan development. Phase II will result in the final Stormwater Management Plan and model ordinance. More specifically, the development process for the Stormwater Management Plan is as follows:

Phase I - Scope of Study - Establishing procedures used to prepare the Plan. These procedures are determined by an overall survey of:

- Specific watershed and County characteristics and hydrologic conditions.
- Stormwater related problems and significant obstructions.
- Alternative measures for control.

Phase II - 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 identified problem areas.
- Identification of administrative procedures for implementation of the Plan.
- Adoption by Fulton County.
- Approval by PADEP.
- Municipal implementation.

PREVIOUS PLAN EFFORTS

The following relevant documents have been previously prepared by others and will provide a valuable source of information for the development of the Plan:

- Fulton County Planning Commission, *Moving Fulton Forward: A Joint Comprehensive Plan*, January, 2007.
- Fulton County Conservation District, *County Implementation Plan*, March 2006.
- Fulton County Board of Commissioners, *Fulton County Comprehensive Plan: A Planning Guide for the 21st Century,* May, 2000.
- Fulton County Conservation District, *Licking/Tonoloway Creek Watershed Assessment of Non-Point Source (NPS) Pollution*, 1997.
- Fulton County Conservation District, *Big Grove Creek Urban Stream Restoration Project*.
- Fulton County Conservation District, *Fulton County Medical Center Innovative Stormwater Management Project*.
- Fulton County Conservation District, *Cove Creek Watershed Act 167 Stormwater Management Plan*, 1993.
- Fulton County, *Natural Heritage Inventory*, 2008.

GENERAL COUNTY DESCRIPTION

Fulton County is located in the Appalachian Mountains of south central Pennsylvania along the Maryland State line. According to the United States Geological Survey (USGS) quadrangle maps of Fulton County, the County is a series of small, narrow, flat valleys surrounded by ridges running northeast and southwest, which is typical of the Appalachian Mountain area. Sideling Hill is the principal mountain within the County boundaries with an elevation of 2,345-feet (Joint Comprehensive Plan, 2007).

Fulton County shares common boundaries with Bedford, Franklin and Huntingdon Counties. Ray's Hill Mountain provides the common boundary between Fulton and Bedford Counties on the west, while the majestic cove and Tuscarora Mountains separate Fulton from Franklin County on the east. Huntingdon County bounds Fulton County on the north while the Mason-Dixon Line between Pennsylvania and Maryland bounds the County on the south.

Fulton County records show that the settlement of the County began as early as 1719. The County's name was chosen in recognition of Robert Fulton of Lancaster, Pennsylvania, inventor of the steamboat. In 1993, McConnellsburg's historic district was recognized by the United States Department of the Interior and was listed in the National Register of Historic Places.

The United States Census Bureau reported that Fulton County is approximately 440-square miles in area (approximately 278,000-acres) and had an estimated population of 14,261 in 2000. A largely rural area, Fulton County's average of 33.3-people per square mile is well below the state average of 274-people per square mile. The original rural nature of Fulton County is still preserved today as indicated by the United States Census Bureau which lists the County's population in 1885 as 7,564 compared to only 14,261 in 2000. The County population has increased by only 6,697-people over a time period of 115-years.

Tourism in Fulton County has contributed over the years to the County's economy as it has become a major activity in the County based on the significant hunting, fishing, and camping resources as well as the water- and snow-based recreational activities available. Significant acreage in the County is protected from development due to state forests, national, regional and state parks, and state game lands (Table 1). There are approximately 50,000-acres of Pennsylvania State Forest land with lakes and streams that are replete with game and fish (Fulton County Webpage www.fultoncntypa.org).

Cowans Gap State Park serves as an excellent example of a regional park. The 1,085-acre facility is nestled in a scenic valley of the Tuscarora Mountains. Other regional facilities in the area include Buchanan State Forest, Meadow Grounds Lake, and all or part of State Game Land numbers 49, 53, 65, 81, and 124 (PA Game Commission). Meadow Ground Lake, a 204-acre lake located within State Game Lands number 53 offers fishing and boating opportunities.

Table 1 provides estimated acreages of Protected Land in Fulton County:

TABLE 1: PROTECTED LAND IN FULTON COUNTY

NAME	AREA (ACRES)	SOURCE
Buchanan State Forest*	75,000	Department of Conservation and Natural Resources
Cowans Gap State Park	1,085	Department of Conservation and Natural Resources
Meadow Ground Lake	204	Fish and Boat Commission
Buck Valley Park	13	Fulton County Joint Comprehensive Plan, 2007
McConnellsburg Lions Club Park	9.6	Fulton County Joint Comprehensive Plan, 2007
Wells Tannery Community Park	6	Fulton County Joint Comprehensive Plan, 2007
State Game Lands	13,706	PA Game Commission
Total:	**90,024**	

** The Buchanan State Forest extends over three (3) counties in Pennsylvania*

POLITICAL JURISDICTIONS

In Pennsylvania, much of the governmental control is on the local level, i.e. municipalities. As such, municipalities are the primary agencies to regulate stormwater through land use controls. Fulton County is comprised of 13 municipalities. The political jurisdictions include 11 townships and two (2) boroughs as listed in Table 2:

TABLE 2: POLITICAL JURISDICTIONS IN FULTON COUNTY

TOWNSHIPS		BOROUGHS
Ayr Township	Taylor Township	McConnellsburg Borough*
Belfast Township	Thompson Township	Valley-Hi Borough
Bethel Township	Todd Township	
Brush Creek Township	Union Township	
Dublin Township	Wells Township	
Licking Creek Township		

** County Seat*

TRANSPORTATION

Fulton County is centrally located in southern Pennsylvania with easy accessibility to Interstate Routes 68, 70 and 81 plus the Pennsylvania Turnpike. There are major thoroughfares and crossroads that provide a critical transportation and commuting link for County residents and for the significant tourist trade that takes advantage of summer and winter attractions in the County.

GENERAL DEVELOPMENT PATTERNS

The general development patterns are critical to stormwater management planning. While development is important to the County, the impacts of development could have a negative effect on the existing infrastructure as well as the environment. As described previously, development causes increases in stormwater runoff that need to be managed properly. Identifying and predicting major development patterns is the first step to managing their effects on stormwater runoff.

Fulton County has maintained a lower population density than its contiguous and neighboring counties. The County's 2007 Joint Comprehensive Plan anticipates a continuation of low population growth trend and identifies areas in the County that are more likely to experience increased development, due to their location and proximity to population centers. Fulton County's population increased at a rate of 2.97 percent between 1990 and 2000, and was slightly lower than the growth rate in Pennsylvania of 3.4 percent (USCB, 2000). However, the County is expected to grow in coming decades (Fulton County Joint Comprehensive Plan, 2007). Growth pressures are expected to be felt along the Maryland border, especially along Interstate-70.

The total number of housing units increased in every municipality in the County between 1980 and 2000, with the exception of McConnellsburg Borough (Fulton County Joint Comprehensive Plan, 2007). The percentage increase in the number of housing units has been greater than the percentage increase in population, demonstrating the effect of declining household size. There is very little diversity in housing unit types offered in the County. The majority of the housing units are single family detached dwellings. The second most common type of housing unit is the mobile home. In addition, there are very few multi-unit structures in the County, according to the County's Joint Comprehensive Plan of 2007.

WATER RESOURCES

Fulton County is located entirely within the Chesapeake Bay Watershed. Fulton County lies in the headwaters of both the Susquehanna and Potomac River Watersheds. The northern third and western edge of Fulton County drain north to the Juniata River and eventually the Susquehanna River. The main stems of the Susquehanna Watershed (in Fulton County) include Brush Creek, Sideling Hill Creek, Wooden Bridge Creek, and Aughwick Creek. The other two-thirds of Fulton County drain largely to Licking Creek, Tonoloway Creek, and Little Tonoloway Creek, which are all tributaries of the Potomac River.

Being located at the "top of the hill" presents opportunities and hazards for Fulton County's residents. With the vast majority of local streams originating within the County, Fulton County does not inherit the polluted surface and groundwater that could emanate from upstream neighbors. However, the obvious counterpoint to this advantage is the fact that degraded water bodies and water quality in Fulton County have local origins. Consequently, it becomes important to manage stormwater runoff that is originated in the County efficiently.

PADEP designated watersheds throughout the state for which Act 167 studies would be prepared. The designated watersheds in Fulton County are listed in Table 3 and their boundaries are shown on Figure 2:

TABLE 3: PADEP DESIGNATED WATERSHEDS

SUSQUEHANNA RIVER WATERSHED	*POTOMAC RIVER WATERSHED*
Aughwick Creek	Licking Creek
Wooden Bridge Creek	Little Tonoloway Creek
Sideling Hill Creek	Tonoloway Creek
Brush Creek	Cove Creek
Great Trough Creek	Potomac River

IMPOUNDMENTS

There are a number of small lakes and ponds throughout the County. Some of these impoundments include:

TABLE 4: MAJOR IMPOUNDMENTS IN FULTON COUNTY

MUNICIPALITY	IMPOUNDMENT NAME
Ayr Township	Meadow Ground Lake
Dublin Township	Camp Sinoquipe Lake
Todd Township	Cowans Gap Lake
Valley-Hi Borough	Valley-Hi Eagle Lake

SURFACE WATER QUALITY

The County is located at the headwater of streams that are tributary to the Potomac and Susquehanna River. Water quality in the Susquehanna River Watershed is excellent due to the forested and sparsely populated land uses found within the watershed boundaries.

Nearly three-fourths of the surface in Fulton County flows south into the Potomac River in Maryland. The principal streams of the Potomac River system within Fulton County are the Tonoloway Creek, Little Tonoloway Creek, and Licking Creek. The Potomac River Watershed in Fulton County has poorer surface water quality than the Susquehanna River Watershed. The by-products of agriculture increase the level of nutrients in the watershed.

The Pennsylvania Chapter 93 Water Quality Standards classify all surface waters according to their water quality criteria and protected water uses. Selected waterbodies that exhibit exceptional water quality and other environmental features are referred to as "Special Protection Waters". Certain activities in those watersheds that could adversely affect surface water are more stringently regulated to prevent degradation.

Table 5 shows a list of the streams within the County and their Chapter 93 Protected Use classification:

TABLE 5: PROTECTED USE DESIGNATION OF STREAMS IN FULTON COUNTY

STREAM	*ZONE*	*PROTECTED USE DESIGNATION*
SUSQUEHANNA RIVER WATERSHED (JUNIATA RIVER WATERSHED)		
Sideling Hill Creek	Basin	HQ-CWF
North Branch Little Aughwick Creek	Basin, Source to Confluence with South Branch	HQ-CWF
South Branch Little Aughwick Creek	Basin, Source to Inlet of Cowans Gap Lake	EV
South Branch Little Aughwick Creek	Basin, Inlet of Cowans Gap Lake to Confluence with North Branch	HQ-CWF
Brush Creek	Basin, Source to Fulton-Bedford County Border	HQ-CWF
POTOMAC RIVER WATERSHED		
Sideling Hill Creek	Basin, Confluence of West and East Branches to PA-MD State Border	EV
Unnamed Tributaries to Sideling Hill Creek	Basins (all sections in PA), PA-MD State Border to Mouth	EV
Crooked Run	Basin (all sections in PA)	EV
Bear Creek	Basin (all sections in PA)	EV
Unnamed Tributaries to Little Tonoloway Creek	Basins (all sections in PA)	WWF
Sawmill Hollow	Basin (all sections in PA)	WWF
Tonoloway Creek	Main Stem, Source to PA-MD State Border	WWF
Unnamed Tributaries to Tonoloway Creek	Basins, Source to PA-MD State Border	WWF
Crane Run	Basin	WWF
Sawmill Run	Basin	WWF
Foster Creek	Basin	WWF
Cummings Run	Basin	WWF
Palmer Run	Basin	WWF
Barnetts Run	Basin	TSF
Little Tonoloway Creek	Basin, Source to I-70	CWF
Little Tonoloway Creek	Basin, I-70 to Mouth	TSF
Plum Run	Basin (all sections in PA)	WWF
Ditch Run	Basin (all sections in PA)	WWF
Licking Creek	Main Stem, Source to PA-MD State Border	CWF
Unnamed Tributaries to Licking Creek	Basins, Source to PA-MD State Border	CWF
Fortune Teller Creek	Basin	CWF
Sindeldecker Branch	Basin	CWF
Baby Run	Basin	CWF
Patterson Run	Basin	CWF
Owl Creek	Basin	CWF
Joes Run	Basin	CWF
Cove Creek	Main Stem	CWF
Unnamed Tributaries to Cove Creek	Basins	CWF
Kendall Run	Basin	CWF
Back Run	Basin	CWF
Roaring Run	Basin	HQ-CWF
Spring Run	Basin	CWF
Esther Run	Basin	CWF

CWF – Aquatic Life – Cold Water Fishes	**MF** – Aquatic Life – Migratory Fishes
EV – Special Protection – Exceptional Value Waters	**WWF** – Aquatic Life – Warm Water Fishes
HQ – Special Protection – High Quality Waters	**TSF** – Trout Stocked Fishes

IMPAIRED STREAMS

In Pennsylvania, municipal solid waste includes municipal waste, sewage sludge, construction and demolition waste, asbestos, and ash. According to a report prepared by PA Clean Waterways (2008), none of the municipalities in Fulton County offer trash collection, and none of the 13 municipalities have a curbside recycling program within their community. The report stated that 19 illegal dumpsites totaling more than 169-tons of trash were identified. The sites ranged in size from approximately 0.5-tons to 50-tons of waste. However, the report concluded that the impacts of illegal dumping on wetlands and waterways in Fulton County are much less than other counties surveyed.

Section 303(d) of the Federal Clean Water Act requires states to list all impaired waters not supporting uses even after appropriate and required water pollution control technologies have been applied. PADEP has an ongoing program to assess the quality of waters in Pennsylvania and identify streams and other bodies of water that do not meet water quality standards (WQSs) as "impaired."

The 2007 County Joint Comprehensive Plan found that the majority of the County's water quality impairments are located in the Potomac River Watershed and are found in association with population centers and agricultural areas. The Potomac River Watershed contains seven (7) of the streams with reaches officially denoted as "impaired" by the PADEP Source Water Assessment Program.

PADEP protects four (4) stream water uses:

TABLE 6: PROTECTED WATER USES

WATER USE
Aquatic Life
Fish Consumption
Potable Water Supply
Recreation

The stream segments have been evaluated by PADEP for attainment of those uses. If a stream segment is not attaining any one of its four (4) uses, it is then considered "impaired" (Plate D).

The following are the stream segments in the County listed as impaired streams and their causes:

TABLE 7: IMPAIRED STREAM SEGMENTS

STREAM NAME	*CAUSE*	*LOCATION*
Bear Run	Grazing Related Agriculture	Union Township
Big Cove Creek	Grazing Related Agriculture, Siltation, Nutrients	Ayr Township
Cove Run	Grazing Related Agriculture, Siltation, Nutrients	Bethel Township
Kendall Run	Grazing Related Agriculture, Siltation	Ayr Township
Licking Creek	Grazing Related Agriculture, Unknown, Mercury	Thompson Township
Spring Run	Grazing Related Agriculture, Siltation, Nutrients	Ayr Township
Stahle Run	Grazing Related Agriculture, Siltation, Nutrients, Vegetation Removal	Union Township

The Potomac River Watershed contains the seven (7) streams in Table 7 and have reaches officially denoted as "impaired" by PADEP Source Water Assessment Program. These streams are found in agricultural valleys and are listed as "impaired" largely due to the impact of agriculture (e.g. grazing, loss of vegetation, excessive nutrients or sediments).

Of the seven, none have developed a Total Maximum Daily Load (TMDL). The state or EPA is required to develop a Total Maximum Daily Load (TMDL) for each waterbody on the impaired streams list. A TMDL identifies allowable pollutant loads to a waterbody from both point and non-point sources that will prevent a violation of water quality standards. A TMDL also includes a margin of safety to ensure protection of the water. At present there are no streams in Fulton County that are in the TMDL development process.

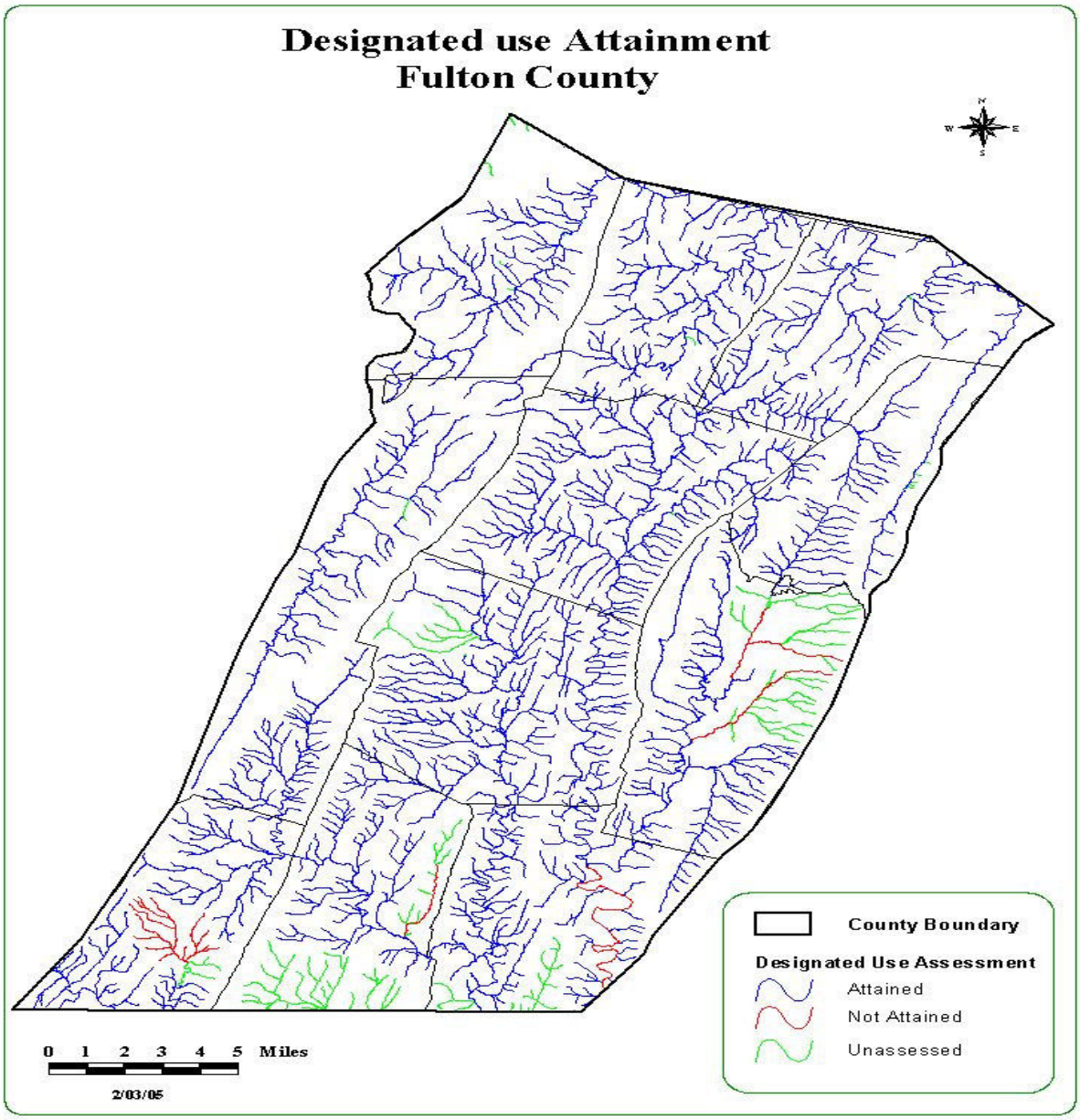


Plate D: Designated Use Attainment, (Source: Fulton County Implementation Plan, 2006)

CLIMATE

Climate is a critical component of stormwater – precipitation, its source. This section summarizes the information that was complied from (http://www.bestplaces.net/County/Fulton-Pennsylvania.aspx#6). Fulton County is characterized by a humid, continental climate with warm summers and cold winters. Precipitation is adequate and normally well distributed. Winds prevail from the west and bring most of the major pressure systems that affect the area.

Summers are generally warm with daytime high temperatures averaging in the high 70°s and low 80°s. On average, there are 196 sunny days per year in Fulton County. The July high is around 85°. The annual precipitation is approximately 38-inches with thunderstorms occurring in the summer months.

Winter is characterized by cold temperatures and cloudy skies. Daytime temperatures average in the mid to upper 20°'s. The January high is approximately 19°. Winter precipitation is frequent and sometimes heavy, averaging between 40- and 50-inches of seasonal snowfall. The ground is generally covered with snow for more than half of the winter.

Spring and fall are characterized by rapidly changing weather patterns. Alternate periods of freezing and thawing are common during both seasons.

GEOLOGY

Fulton County is situated within the Ridge and Valley physiographic province, which is characterized by folded and faulted sedimentary rocks of early to middle Paleozoic age. Fulton County is located in the Appalachian Mountain Section, which consists of numerous, long, narrow mountain ridges separated by narrow to wide valleys.

The two (2) principal features of the County's geology are the McConnellsburg limestone cove lying along its eastern border, and the Broad Top coal field which occupies about 8-square miles of its north-west corner, at an elevation of 2000-feet above mean sea level, and is surrounded by a deep red shale valley (Fulton County Joint Comprehensive Plan, 2007).

The limestone area in the McConnellsburg Cove is considered as a sensitive geologic feature because of its susceptibility of being dissolved by the Action of percolating water. Once large volumes of limestone are dissolved, underground caverns are created thus increasing the potential for surface collapse, or sinkhole development. Consequently, another danger from this condition arises, that is the prospect of widespread groundwater pollution.

The McConnellsburg Cove is floored with the limestone, and walled in by a mountain of slate with a crest of Medina sandstone, all round except on the western side. The limestone floor of the cove is 2-miles wide and 13-miles long, pointed at the north and south ends. The Fulton County Joint Comprehensive Plan of 2007 states that a little iron ore has been found in it. Fossil ore outcrops run northward into Huntington County and southward along Licking Creek into Maryland.

The Broad Top coal field is surrounded by Sideling Hill, which is prolonged southward to the Maryland state line, but sends out a long prong south-westward called Town Hill. These mountains are outcrops of Pocono sandstone and contain a number of little coal beds. More workable coal beds are located in Wells Township on the Broad Top. Through the middle of the County passes a broad belt of Catskill, Chemung and Hamilton rocks. At the northern line is a

loop of Oriskany sandstone and Lower Helderberg limestone enclosing a Clinton red shale valley with some fossil iron ore circling round the south end of Black-Log Mountain.

The land surface has been created through millions of years of tectonic and weathering forces. The geological characteristics are reflected in terms of groundwater, drainage and excavation conditions. Geological formations are categorized in groups, with 28 present in the County. Table 8 summarizes the information that was complied from the Atlas of Preliminary Geologic Quadrangle Maps of Pennsylvania.

TABLE 8: GEOLOGICAL FORMATIONS IN FULTON COUNTY

SOIL FORMATION	*SYMBOL*
Catskill Formation	Dck
Pocono Formation	Mp
Mauch Chucnk Formation	Mmc
Rockwell Formation	MDr
Foreknobs Formation	Df
Scherr Formation	Ds
Brallier and Harrell Formations	Dbh
Hamilton Group Formation	Dh
Allegheny Formation	Pa
Bellefonte Formation	Obf
Bloomsburg and Mifflintown Formation, undivided	Sbm
Burgoon Sandstone Formation	Mb
Clinton Group Formation	Sc
Coburn Formation through Loysburg Formation, undivided	Ocl
Irish Valley Member of Catskill Formation	Dciv
Juniata and Bald Eagle Formations, undivided	Ojb
Keyser and Tonoloway Formations, undivided	DSkt
Keyser Formation through Mifflimtown Formation, undivided	DSkm
Keyser Formation through Clinton Group, undivided	DSkc
Nittany and Stonehenge/Larke Formations, undivided	Ons
Nittany Formation	On
Onondaga and Old Part Formations, undivided	Doo
Pottsville Formation	Pp
Reedsville Formation	Or
Rockdale Run Formation	Orr
Shady Grove Formation	Csg
Tuscarora Formation	St
Wills Creek Formation	Swc

SLOPES

The slope of the land not only delineates drainage patterns, but it is an indication of the capability of the land to accommodate different types of development. The County's location is a major factor in explaining the slope ranges in Fulton County. As mentioned earlier, the County lies within the Ridge and Valley section of the Appalachian Mountains. In addition, topography of the County is categorized by steep, high; generally narrow mountainous ridges and rolling intermountain valleys. Big Mount, on the Tuscarora Mountain, represents the highest point with an elevation of 2,440-feet (Fulton County Joint Comprehensive Plan, 2007). The Joint Comprehensive Plan states also that the lowest point in Fulton County is where Tonoloway Creek crosses the Pennsylvania-Maryland State Line at an elevation of 420-feet.

Fulton County's land area is comprised of varying degrees of slope, ranging from nearly level plateaus (1 percent) to severe slopes (53 percent). Slopes that are 15 percent or greater are considered environmentally sensitive due to their increased potential for erosion, low degree of slope stability and difficult access in poor weather conditions. Steep slopes can also be an inhibiting factor in road construction, on-lot wastewater systems, and stormwater management.

The general characteristics and development potentials and limitations of each category of slope are described as follows:

0-8% slope: 94-square miles; 21.5 percent of the County. Flat to moderate; capable of all normal development for residential, commercial, and industrial uses; involves minimum amount of earth moving; suited to row crop agriculture, provided that terracing, contour Planting, and other conservation practices are followed. In Fulton County, a significant portion of the land in this slope range is wetland and would most likely be restricted from normal use or development.

9-15% slope: 89.2-square miles; 20.5 percent of the County. Rolling terrain and moderate slopes; generally suited only for residential development; site Planning requires considerable skill; care is required in street layout to avoid long sustained gradients; drainage structures must be properly designed and installed to avoid erosion damage; generally suited to growing of pastures with occasional small grain plantings.

16-24% slope: 124.2-square miles; 28.5 percent of the County. Steep slopes; generally unsuited for most urban development; individual residences may be possible on large lot areas, uneconomical to provide improved streets and utilities; overly expensive to provide public services; foundation problems and erosion usually present; agricultural uses may be limited to pastures and tree farms.

> 24% slope: 129.4-square miles; 29.5 percent of the County. Severe and precipitous slopes; no development of an intensive nature should be attempted; land not to be cultivated; permanent tree cover should be established & maintained; adaptable to open space uses (recreation, game farms, & watershed protection).

SOILS

A soil's composition dictates important planning characteristics such as flooding, suitability for on-lot sewage disposal, and ability to support agricultural practices. A hydric soil is one that in its undrained condition is flooded, ponded, or saturated long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic

vegetation. Hydric soils generally have a seasonally high water table. An evaluation of the fertility of the region's soils helps to identify the areas best suited to long-term agricultural use and most worthy to be preserved. A detailed listing of the County's soils and their classifications are provided in the County Comprehensive Plan.

Soils affect the manner in which precipitation is transformed into stormwater runoff. Different soils absorb and infiltrate precipitation at varying rates. Soils also play a hand in land use planning including the selection of building sites, construction limitations, agricultural production and forest management. A significant property of soil is its ability to absorb rainfall through infiltration. This property has been extensively studied by soil scientists and a rating system has been developed, referred to as the Hydrologic Soil Grouping. Table 9 identifies the four (4) Hydrologic Soil Groups and provides a description of their infiltration potential:

TABLE 9: HYDROLOGIC SOIL GROUPS

SOIL GROUP DESIGNATION	*SOIL CHARACTERISTICS AND INFILTRATION POTENTIAL*
A	Low runoff potential; high infiltration rates even when thoroughly wetted. Generally, sand, loamy sand, or sandy loam.
B	Moderate infiltration rates when thoroughly wetted; well drained. Consist of silt loams and loams.
C	Low infiltration rates when thoroughly wetted with a layer that impedes downward movement of water. Consist of sandy clay loams.
D	High runoff potential; very low infiltration rates; consist of clayey soils with a high swelling potential, soils with a permanent high water table, and soils with a claypan or clay layer at or near the surface.

The farmland soils which are defined in the County are the most productive soils for crop production because they are well drained, not highly erodible, and resist flooding during the growing season.

The following list describes the major soil associations in the County. These principle soils are named in order of their importance in the association. After the soil name there is a brief description explaining the extent of the soil in the association. It is important to note that minor soils occurring within the association are estimated and that one soil series can occur in more than one (1) association, depending on its relative extent:

Berks-Weikert-Bedington Association
Shallow to deep, gently sloping to very steep, well drained soils that formed in material weathered from gray and brown shale, siltstone, and sandstone; on uplands.

Hagerstown-Duffield Association
Deep, nearly level to moderately steep, well drained soils that formed in material weathered from limestone; on uplands.

Hazleton-Laidig-Buchanan Association
Deep, nearly level to very steep, well drained to somewhat poorly drained soils that formed in material weathered from gray and brown quartzite, sandstone, siltstone, and shale; on uplands.

Murrill-Laidig-Buchanan Association
Deep, nearly level to moderately steep, well drained to somewhat poorly drained soils that formed in colluviums from gray sandstone, conglomerate, quartzite, and limestone, on uplands.

Weikert-Calvin-Berks Association
Shallow and moderately deep, gently sloping to very steep, well drained soils that formed in material weathered from red, gray, and brown shale, siltstone and sandstone; on uplands.

HYDRIC SOILS

The analysis of hydric soils has recently become an important consideration when performing almost any kind of development review. These soils are important to identify and locate because they provide an approximate location where wet areas may be found. Wetland areas are lands where water resources are the primary controlling environmental factor as reflected in hydrology, vegetation, and soils. Thus, the location of hydric soils is one indication of the potential existence of a wetland area. Wetland areas are now protected by PADEP and should be examined before deciding on any type of development Activity. Refer to the Fulton County Soil Survey which graphically depicts the approximate location of hydric soils throughout Fulton County.

FLOODPLAIN DATA

Many scenic areas in the County are located within floodplains. The Pennsylvania Floodplain Management Act requires municipalities identified as being flood-prone to enact floodplain regulations which, at a minimum, meet the requirements of the National Flood Insurance Program (NFIP). All municipalities within the County are participating in the NFIP.

A review of the Federal Emergency Management Agency (FEMA) flood insurance maps and digitized data base revealed that 100-year floodplains exists within Fulton County for the main streams draining the County. Table 10 lists Fulton County streams, at least portions of which, have either approximate or detailed studies:

TABLE 10: STREAMS WITH FEMA DEFINED FLOODPLAINS

STREAM NAME	*DESCRIPTION*
North Big Cove Creek	Detailed Study
Sideling Hill Creek	Approximate Study
Brush Creek	Approximate Study
Little Brush Creek	Approximate Study
Aughwick Creek	Approximate Study
Little Aughwick Creek	Approximate Study
Tonoloway Creek	Approximate Study
Little Tonoloway Creek	Approximate Study
Roaring Run	Approximate Study
Oregon Creek	Approximate Study
Spring Run	Approximate Study
South Big Cove Creek	Approximate Study
Cove Creek	Approximate Study
Wooden Bridge Creek	Approximate Study
Licking Creek	Approximate Study

Floodplain management is a key issue in managing stormwater within the County. It is important to realize the function of a floodplain as a natural buffer for streams during significant storm events and to understand that unmanaged development typically increases flooding levels and, thereby, the floodplain boundary. Two (2) goals of the Phase II Plan will be to manage development and its associated storm runoff so that flooding levels will not increase and to preserve the existing floodplain areas to minimize potential for property and infrastructure damage in future storm events.

LAND USE

Land use is also important to stormwater planning, because the way in which the land is used, directly impacts the way stormwater is transformed into runoff.

As cited in the County Joint Comprehensive Plan of 2007, Fulton County is not projected for significant population growth; however, 12 municipalities are already experiencing significant growth pressures occurring to the east and south of them in other counties. Valley-Hi Borough has not experienced such growth pressure.

In 2007, 61.4 percent of Fulton County was considered as forests; 0.7 percent as developed; 0.3 percent as open water; 0.4 percent as wetlands; 0.2 percent was assigned for extractive uses; 2.9 percent was assigned for other uses; and 34.1 percent was assigned as agriculture. In addition, approximately 95 percent of the land in the 12 municipalities is associated with natural or rural landscape, while in contrast approximately 5 percent has been developed.

Some of the critical land uses are analyzed below:

INDUSTRY

The majority of industry sectors experienced increases in total employment with manufacturing employing the greatest percentage of the total labor force. Industrial uses occupy a very small portion of Fulton County. Nevertheless, this area can be a potential source of stormwater runoff and water pollution due to typically high percentages of impervious surfaces on lots.

FOREST AND PARK LAND

State and Federal forest and park lands and other municipal public lands represent over 26 percent of the land surface. The majority of forest ownership is private. Forest lands are important resources that, when properly managed, can preserve surface water quality and prevent stream bank erosion and sediment pollution. Recreation/tourism is an important industry to the County as is forestry. A focus of many within the County is the protection and preservation of the forest resource while managing the economic needs of forestry operations. A concern is the impact of the forestry operations on the environment, including runoff and pollution.

Recent statistics (Fulton County Joint Comprehensive Plan, 2007) show that approximately 61.4 percent of Fulton County is forested.

AGRICULTURE

Agriculture is an important land use with respect to stormwater management as it limits development and the impervious cover of the land. However, agriculture can also be a source of pollution through siltation and nutrient runoff. Approximately, 34.1 percent of the

County's land is utilized for agricultural purposes according to the County Joint Comprehensive Plan of 2007.

The majority of the cropland and pasture land in Fulton County are rented (Fulton County Implementation Plan, 2006). Previous stormwater management studies have shown that rental land is often not treated with the same care as owned land. According to the Fulton County Implementation Plan, 2006, it is suggested that conservation plans be developed and implemented on these rental lands.

Recently, Fulton County's agricultural industry, while still an important part of the local economy and landscape, has declined both in the number of farms and as a source of employment. Over the last decade, there has been an average of 550-farming operations per year in Fulton County, totaling approximately 100,000-acres. In 2006, the average farm size was around 180- acres. However, the average acreage under management for many of Fulton County's farms, particularly dairy operations, has increased, as has the average size of dairy herds (Fulton County Implementation Plan, 2006). It is expected that one of the primary challenges facing Fulton County in the coming years, a challenge already being faced by many locations in Pennsylvania and across the Mid-Atlantic region, is balancing the preservation of the rural landscape with the decreasing profitability of agriculture and the corresponding increase in development pressure.

One area of agriculture that has not been addressed to any great degree in Fulton County is equine operations. While Fulton County does not have many large operations (over 100-Animal Equivalent Units (AEUs)), it is believed that increasing the use of BMPs at such operations would be beneficial to water quality.

Moreover, agriculture has been shown to be a significant source of sediment and nutrient pollution for Fulton County streams. As mentioned earlier, according to PADEP assessment studies, the following streams have non-attainment status: the upper reaches of Bear Creek and Stahle Run in Union Township, the majority of Cove Run in Bethel Township, the lower reaches of Licking Creek in Thompson Township and the entire main branches of Spring Run and Kendall Run in Ayr Township. These streams appear to be impaired primarily due to agricultural influences

According to the Fulton County Implementation Plan, the 1992 Licking/Tonoloway Creek Assessment of Non-Point Source Pollution identified "excessive sediment", "excessive nutrients from fertilizer", and "nutrient laden surface and groundwater from animal wastes" as the major pollution issues in these watersheds. The Spring Run watershed was studied more intensely in 2003 and the study noted areas of severe impairment as a result of agricultural operations.

RESIDENTIAL SUBDIVISIONS

Historically, residential development has been localized and well defined. Examples of these communities include McConnellsburg, Knobsville, Hustontown, Needmore, Warfordsburg, Crystal Spring, and Wells Tannery.

According to the County Joint Comprehensive Plan of 2007, recent development patterns within the region have been in the form of low density residential development located along the region's roadway network. This sprawling development pattern has begun to erode the once vibrant villages and boroughs and has placed a strain on financing and addressing infrastructure needs. Many of the County's smaller communities had established localized supporting commercial areas to suit their daily needs. For example, the Crystal

Spring area supports a restaurant and general store, and is in close proximity to the Breezewood commercial center. However, those localized commercial efforts have also begun to erode and have now been relocated along major collector roadways throughout the region.

Should the current development patterns continue the trend of growth along major road corridors, the effects on the future of the County's Stormwater Management problems is clear and will only magnify. Fulton County Implementation Plan of 2006 listed some likely direct factors that will eventually impact the existing stormwater system in Fulton County:

- Insufficient densities within hamlets, villages, and boroughs to support needed infrastructure such as roads, utilities, and transit.
- Continued subdivision and land development Activity that occurs along the roadway.
- Increasing traffic congestion along the major collector roads throughout the region.
- Erosion of the view sheds that are a trademark of the region.
- Loss of prime agricultural lands, natural resources and historic properties

UNPAVED ROADS

Dirt and gravel roads have the potential to contribute to sediment pollution to local waterways. Fulton County has approximately 160-miles of dirt and gravel roads maintained by the municipalities (Fulton County Implementation Plan, 2006). This figure does not include private and state-owned dirt and gravel roads. Fulton County Conservation District administers active Dirt and Gravel Road Program, which by 2007 has stabilized approximately 9-miles of unpaved township roads in Fulton County. However, the program does not provide funding to address the sediment problems associated with privately owned dirt and gravel roads in the County.

PHASE I PLANNING PROCESS

AGREEMENT BETWEEN PADEP AND FULTON COUNTY

An agreement for a Phase I Watershed Stormwater Management Plan Grant for all watersheds of Fulton County was made between PADEP and Fulton County.

The agreement was made in order for Fulton County to prepare a Stormwater Management Plan in two phases. The first phase (Phase I) is the preparation and submission of a Scope of Study to PADEP for their review and approval. The Scope of Study includes a determination of the level of effort and cost required to satisfactorily complete the second phase (Phase II). Phase II includes the preparation and adoption of the Stormwater Management Plan based on the level of effort identified in Phase I.

ENGINEERING CONSULTANT

In order to assist in the preparation of Phase I, the Fulton County Commissioners retained Herbert, Rowland & Grubic, Inc. to provide stormwater planning services to Fulton County to complete this Phase I Report.

CREATION AND DISTRIBUTION OF A QUESTIONNAIRE

The "Fulton County-Wide Plan Act 167 Stormwater Management Plan Questionnaire" was distributed and reviewed during the WPAC#1 meeting. All municipalities and other interested citizen groups and public organizations were encouraged to complete the form. The purpose of the 8-page Questionnaire 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.

ESTABLISHMENT OF A WATERSHED PLAN ADVISORY COMMITTEE (WPAC)

An additional purpose of the Questionnaire Form was to gather contact information for representatives of each of the municipalities as well as other concerned organizations, groups, or citizens that would be interested in participating in the WPAC. The purpose of the WPAC is to serve as a conduit for municipal input, assistance, voicing of concerns and questions, and to serve as a mechanism to ensure that the inter-municipal coordination and cooperation is secured.

As part of a new initiative by PADEP, it is their position that if a representative from each municipality does not volunteer to join the WPAC, then the head of the 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 appointed member will also be asked to assist their municipality in adoption of the provisions and requirements of the Final Plan.

TABLE 11: WPAC MEMBERS

REPRESENTING	*WPAC MEMBER*
Ayr Township	Gary Hopkins, Marlin Harr
Belfast Township	Rick Harr, Bill Shives
Bethel Township	Ray E. Powell
Brush Creek Township	Delmas Bard, Robert Layton
Dublin Township	Robert Cromer
Licking Creek Township	LuAnne Keebaugh, Donald Swope
Taylor Township	Richard Doney
Thompson Township	Bob Swadley
Todd Township	Mack Clevenger, Mark Washabaugh
Union Township	Paul Schriever, Gery Sheeder
Wells Township*	Arnold Hann*
McConnellsburg Borough	Pat Frazier
Valley-Hi Borough*	Nelson Gothie*
Friends of Little Aughwick Creek Watershed Group	Derrick Wineqardner
Fulton County Planning Commission	Steven Thomas, Mary K. Seville
Fulton County Conservation District	Seleen Shives, Scott Alexander
Fulton County Builder Association	Joseph Hagerty
PA Department of Environmental Protection	Nancy Cisar

* Appointed Member – Head of the Municipality's Governing Body

WATERSHED PLAN ADVISORY COMMITTEE MEETINGS

Two (2) Watershed Plan Advisory Committee meetings were held during the Phase I process. The purposes of the meetings were to gather information and provide education to the WPAC.

WPAC Meeting #1 was held on July 23, 2008. The meeting provided an overview of the Act 167 process, provided expectations and potential results and outcomes of the Plan, provided an explanation of the Questionnaire, began the formation of the WPAC membership and concluded with a question and answer period.

WPAC Meeting #2 was held on October 29, 2008. Prior to the meeting, a draft copy of the Phase I report was supplied to the WPAC for their review. The purpose of this meeting was to summarize the Phase I report, outline the tasks to be completed during Phase II, and address any comments or concerns of the WPAC from their review of the draft Phase I report.

PHASE I REPORT

The Phase I Report includes a Scope of Study to assist Fulton County in the preparation and adoption of a Phase II Act 167 Stormwater Management Plan. The Phase I Report identifies the scope and provides estimated costs to complete the identified Phase II tasks.

SUBMISSION OF PHASE I REPORT TO PADEP

The final Phase I Report was submitted to PADEP in December, 2008. Finalization of the Phase I Report will lead to an additional contract between Fulton County and PADEP for the completion of a Phase II Stormwater Management Plan.

EXISTING/PREVIOUS WATERSHED PLAN DISCUSSION

COVE CREEK WATERSHED ACT 167 STORMWATER MANAGEMENT PLAN (1993)

The Cove Creek Watershed plan was completed in 1993 and provided general standards for all development with the watershed, detention/infiltration standards, design criteria for stormwater management facilities, and specific calculation methodologies for preparing drainage plans. Post-development peak rates of runoff were to be less then or equal to pre-development peak rates of runoff for the 2 and the 10 year storm events. Infiltration was encouraged, but not required, and water qualities issues were not addressed. A model ordinance was provided.

FULTON COUNTY WATER RESOURCES FORUM

From 2001-2004, the Fulton County Conservation District used various sources of funding to sponsor three (3) Fulton County Water Resource Forums. The District wanted to provide a venue for local citizens to learn of and discuss water resource issues with water resource professionals and municipal officials. The forums had been successful, averaging an attendance of 70 participants, at highlighting watershed management, wastewater treatment, non-point source pollution, stormwater runoff and stream restoration issues in the local landscape.

SPRING RUN ADOPT – A – STREAM

In March 2003, the Pennsylvania Fish and Boat Commission (PAFBC) included a reach of stream toward the mouth of Spring Run in the Adopt-A-Stream program, with the Fulton County Conservation District serving as the sponsor. The program provided habitat assessment and technical assistance, including up to $2,000.00 per year for the installation of habitat improvement structures.

LICKING/TONOLOWAY CREEK WATERSHED ASSESSMENT AND MANAGEMENT PLAN

In August of 2001, the Fulton County Conservation District received $46,035.11 in Growing Greener funds to conduct the Licking/Tonoloway Creek Watershed Assessment.

The assessment, encompassing roughly two-thirds of Fulton County, has included macro-invertebrate and stream chemistry assessments, as well as spring and groundwater sampling. The bulk of the work has been done in house by Conservation District staff and seasonal interns. Final results have assisted the Conservation District in setting priorities for the implementation of agricultural conservation practices and stream restoration projects to reduce sediment and nutrient loads to Fulton County's streams. Ms. Seleen Shives explained that these results helped in identifying impairment in Spring Run (phone conversation, September 15, 2008). The next two (2) projects were created as direct response to the findings of the Licking/Tonoloway Creek Watershed Assessment and Management Plan.

SPRING RUN WATERSHED TECHNICAL ASSESSMENT

Funded by the Growing Greener Grant Program ($40,800.00) in August 2002, the main purpose of the Spring Run Watershed Technical Assessment was to develop a comprehensive stream corridor evaluation of the Spring Run watershed, in order to develop an effective Watershed Management Plan.

The assessment effort included identifying stream reaches along Spring Run where future stream restoration and stabilization efforts will be most beneficial.

THE SPRING RUN AGRICULTURAL BMP NUTRIENT REDUCTION PROJECT

In December 2004, the Fulton County Conservation District was awarded $78,715.00 in Section 319 Clean Water Act monies. The Spring Run Agricultural BMP Nutrient Reduction project implemented agricultural Best Management Practices on three (3) agricultural operations along the main stem of Spring Run. These projects constituted an integral part of an overall comprehensive Plan for each operation and will significantly reduce nutrient and sediment loading to the main stem of Spring Run. The three proposed projects represented the elimination of 90 percent of the remaining direct livestock access to the perennial main stem of this valuable waterway. Spring Run is on the list of impaired streams according to the 2008 Pennsylvania Integrated Water Quality Monitoring and Assessment Report, and consequently is Fulton County's highest priority for conservation and restoration.

Subsequent study and fundraising requests garnered $28,500.00 through the Pennsylvania Growing Greener II County Environmental Initiative funding to implement a stream restoration design along approximately 500 feet of Spring Run. An additional $283,750.00 was granted in 2008 to design and build more than 2,200 linear feet of stream restoration project along a lower reach of Spring Run

BIG COVE CREEK URBAN STREAM RESTORATION PROJECT

In September 2003, the Fulton County Conservation District received $31,500.00 in Growing Greener funding to implement a previously funded design for a stream bank restoration project along Big Cove Creek, as it flows south of Lincoln Way, west along the McConnellsburg Borough/Ayr Township line. The proposed project was designed to serve as a demonstration project, highlighting the benefits of stream restoration.

In 2006, $25,000 in National Fish and Wildlife Federation funding was secured to design 1,600 feet of stream restoration that would enhance and restore stream form and function, with special attention toward restoring a trout fishery and minimizing the potentially deleterious effect of stormwater flow from within and above the borough of McConnellsburg. In 2008, $160,500.00 in Pennsylvania Growing Greener II funding was awarded to construct the completed design.

FULTON COUNTY MEDICAL CENTER INNOVATIVE STORMWATER MANAGEMENT PROJECT

In September 2003, Fulton County Conservation District, in cooperation with the Fulton County Medical Center, secured $50,000.00 in Growing Greener Grant funding to incorporate unique environmental strategies into the development of a new healthcare facility. The grant proposed an innovative, onsite approach to stormwater management. Best Management Practices such as infiltration trenches, rain gardens, rainwater cisterns, porous pavement and enhanced landscaping was implemented in order to reduce runoff, improve water quality and encourage groundwater infiltration. In addition, the site will serve as a demonstration of improved stormwater management practices for local municipalities, developers and their contractors.

AGRICULTURAL BMP IMPLEMENTATION AND TECHNICAL ASSISTANCE PROJECT: POTOMAC AND JUNIATA RIVER WATERSHEDS

The Western Pennsylvania Conservancy received a $50,000.00 Growing Greener Grant in January 2004 to conduct the Agricultural BMP Implementation and Technical Assistance Project. A partnership among the Western Pennsylvania Conservancy, the Fulton County Conservation

District, the Natural Resources Conservation Service, and the Bedford-Blair County Crop Management Association, addressed Fulton County agriculturally–linked watershed conservation challenges by:

- Inventorying the County's existing agricultural conservation practices to improve the ability to assess conservation gaps and report progress made in recent years to PADEP for credits toward the Commonwealth's Chesapeake Bay Watershed conservation goals.

- Laying the foundation for increased use of no-till Planting and cover crops and laying the foundation for a Crop Management Association in Fulton County.

RAYSTOWN BRANCH-POTOMAC-AUGHWICK WATERSHEDS - COVER CROPS INCENTIVE PROGRAM

In September 2003, the Western Pennsylvania Conservancy received $154,694.00 in Growing Greener funds to implement a Cover Crops Incentive Program. This program directly led to reductions in nutrient runoff, soil erosion, and soil quality declines on 2,650-acres of the watersheds' farmland by establishing cover crops on corn silage fields.

In its first year of implementation (2004), 30 Fulton County producers enrolled 1,564-acres of corn silage ground for cover crop planting and cost share funding through the program. High corn yields resulted in less silage harvest than anticipated. The grant for this project has expired, but Fulton County Conservation District (2008) continued to tally the planted cover crops according to Ms. Seleen Shives.

QUESTIONNAIRE DISCUSSION

QUESTIONNAIRE RESULTS

The Questionnaire was designed to solicit input from each municipality and other interested organizations relative to specific problem areas throughout Fulton County, as well as the needs they may see for stormwater management in their particular municipality. The Questionnaire was distributed along with an educational handout during the WPAC#1 meeting in Phase I. (A copy of the Questionnaire is included as Appendix A of this document.) The Questionnaire was explained in detail during the meeting to assist the attendees in its completion. The information contained within the Questionnaires was instrumental in determining the scope of Phase II Planning.

Because the most important part of the Act 167 Planning process is the implementation of the final provisions and standards of the Plan, another reason for utilizing the Questionnaires is to develop interest in stormwater management issues by the municipalities. Promoting municipal involvement in the project was an important element during the Phase I process and will continue to be a key goal during Phase II. Obtaining support from these municipalities early in the process will ensure a better end product and hopefully ease the process of adoption and implementation by each municipality within Fulton County.

Questionnaires were received from 11 of the 13 municipalities in Fulton County. Some of the questions used a sliding scale to rate the respondents' attitudes toward stormwater issues. Of the typical types of stormwater issues presented, the most important issues are Peak Flow Rates, Water Quality, Stream Bank Protection, and Groundwater Recharge. Through further analysis of the results of the Questionnaires it was determined that the three (3) principal stormwater problems are flooding (mostly due to inadequate structure capacity), bank erosion, and water quality.

The Questionnaire also requested the identification of problem areas, significant obstructions and stormwater management systems. Respondents identified 27 problem areas, 4 significant obstructions and 25 stormwater management systems. The identified problem areas, as well as the significant obstructions, will form the basis for the watersheds scheduled for detailed study and modeling in Phase II.

A summary of the results of the Questionnaires can be found in Appendix B.

PHASE II DISCUSSION

ITEMS TO BE ADDRESSED IN PHASE II

During Phase I, several decisions were made regarding certain specific items that should be addressed during the Phase II Planning process and the Phase II Final Plan. Refer to Appendix C of this report for a detailed breakdown of the Phase II Scope of Work.

A summary of the specific tasks and subtask shall be as follows:

Task A – Data Collection/Review/Analysis
- SubTask A.1 – Data Collection
- SubTask A.2 – Municipal Ordinance Review/Evaluations
- SubTask A.3 – Data Preparation for Technical Analysis

Task B – Technical Analysis
- SubTask B.1 – Implement Volume Controls
- SubTask B.2 – Implement Rate Controls
- SubTask B.3 – Implement Water Quality Controls
- SubTask B.4 – Model Subwatersheds of Designated Watersheds
- SubTask B.5 – Provide Conceptual Solutions for Existing Problem Areas
- SubTask B.6 – Goals, Objectives, and Compilation of All Technical Standards
- SubTask B.7 – Implementation of Technical Standards and Criteria
- SubTask B.8 – Economic Analysis
- SubTask B.9 – Regulations for Activities Impacting Stormwater Runoff
- SubTask B.10 – Water Quality Impairments

Task C – Public/Municipal Participation
- SubTask C.1 – WPAC Meetings

Task D – Plan Preparation and Implementation
- SubTask D.1 – Phase II Report Preparation
- SubTask D.2 – Model Ordinance Preparation
- SubTask D.3 – Plan Adoption

Detailed hydrologic studies of the watersheds is a key activity during Phase II. The determination of which portions of the PADEP designated watersheds would be modeled during Phase II were made keeping several factors in mind. The main factors are consideration of projected growth areas to identify possible problem sources; evaluation of special protection areas to ensure that these vital resources are shielded from detrimental impacts associated with development; and an analysis of conditions related to the identified problem areas. In Phase II, problem areas will be more thoroughly analyzed and prioritized, and decisions will be made as to whether other subwatersheds will be modeled.

As part of the Phase II work, a Model Ordinance will be created which includes the standards and provisions of the Plan to protect water quality, encourage groundwater recharge, minimize streambank erosion, and control overbank and extreme flood events. An important part of the Model Ordinance will be the inclusion of regulations for activities impacting stormwater runoff. These regulations are not meant to discourage the activities, but instead make sure that they are completed in a manner that meets anti-degradation and flood management goals. The anti-degradation goals are based on protecting the High Quality streams in Fulton County. According to PADEP, the anti-degradation rules are applied to three (3) tiers:

1. Basic Water Quality Protection
2. High Quality (HQ) Waters
3. Exceptional Value (EV) Waters

In addition, the regulations will help improve consistency of municipal stormwater requirements with related state and federal requirements. Of particular importance will be to incorporate regulations that will protect the character and quality of the streams in Fulton County. Since there are relatively few existing problems in the County, it is anticipated that the focus of the Plan will be on protecting/maintaining existing water quality more than on mitigation of existing problems.

Two (2) noteworthy goals of the Phase II Plan will be to manage development and its associated storm runoff so that flooding levels will not increase and to preserve the existing floodplain areas to minimize potential for property and infrastructure damage in future storm events.

MUNICIPAL RESPONSIBILITIES AFTER THE ADOPTION OF THE PLAN

During the preparation of the Plan, each municipality will participate in its creation through the WPAC. It is anticipated that in addition to the WPAC meetings, several public meetings may be held to educate the general public. Therefore, the resulting completed Plan will reflect the municipalities' input in addressing stormwater management consistent with Act 167 requirements.

After the Plan is officially adopted by the County, it will be submitted to PADEP for approval. Within six (6) months of PADEP's approval, each municipality shall adopt or amend, and shall implement such ordinances and regulations as are necessary to regulate development within the municipality in a manner consistent with the Plan and the provisions of Act 167. A Model Ordinance will be created in the Plan to assist municipalities in implementing the standards and requirements of the Plan.

GENERAL WORK PLAN – PHASE II

PHASE II AGREEMENT

Upon completion and submission of the Phase I Report to PADEP, Fulton County and PADEP will enter into an agreement to complete the Phase II portion of the project. Funding for the project should be allocated by PADEP prior to the beginning of any of the Phase II tasks. A 75 percent reimbursement procedure will be implemented between Fulton County and PADEP during the Phase II project.

CONSULTANT

It is recommended that Fulton County retain an engineering consultant to assist in completing at least the technical analysis task of the Phase II 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 II process.

QUESTIONNAIRE

Questionnaire Form was distributed at the first WPAC meeting (07/23/2008) during Phase I. The Questionnaire (see Appendix A) solicited information on problem areas, obstructions, and existing and proposed stormwater 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 Questionnaire was helpful in the technical and non-technical aspects of the Planning process and in scoping the overall Plan. The problem areas and significant obstructions indicated in the Questionnaires will be analyzed during Phase II and will be a factor in selecting subwatersheds for modeling.

WATERSHED PLAN ADVISORY COMMITTEE (WPAC)

During the Phase I portion of this project, a WPAC was formed. Many of the WPAC members indicated their willingness to join the committee through the Questionnaire Form. In addition, letters were mailed to each municipality requesting them to name at least one (1) person from their individual municipality to become a member of the committee. These invitations 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 watershed plan advisory committee composed of at least one representative from each municipality within the watershed, the county soil and water conservation district and such other agencies or groups as are necessary and proper to carry out the purposes of the committee." Follow up letters were sent to municipalities that did not attend the initial WPAC meeting meet or that did not completed the questionnaire. In those letters, it was stated that PADEP's position is that if a municipality was not participating, then the head of the governing body would be appointed to the WPAC.

It is intended that the WPAC will continue to serve as the primary source of Plan guidance for the overall Planning process throughout Phase II. 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.

Through the Questionnaire, the WPAC identified the following organization as a possible additional WPAC participant:

- Pennsylvania Department of Transportation

The Pennsylvania Department of Transportation was contacted and invited to join the WPAC during Phase I. Additional stakeholders may be identified during Phase II. If appropriate, an invitation to join the WPAC will be extended to these entities.

WPAC TECHNICAL MEETING

The WPAC will meet to discuss the more technical aspects of the Plan. These elements include modeling, technical analysis, and development of management criteria. The municipal engineers will be specifically invited to join the WPAC for this meeting. The meeting will focus solely on the engineering aspects of the Plan as opposed to the more general objectives and overall contents of the Plan.

WPAC LEGAL MEETING

The WPAC will meet to discuss the legal aspects of the Plan with regards to implementation at the municipal level. Municipal solicitors will be specifically invited to join the WPAC for this meeting. The purpose of the meeting will focus on implementation of the standards and requirements of the Plan from a legal and regulatory framework standpoint.

STANDARDS

The Plan will include criteria for a comprehensive stormwater management strategy that may include the following elements:

Peak Rate Control Management – Implementation of rate controls for various subwatersheds will be developed based on collected data, modeling, engineering judgment, and committee input. Rate controls may include release rates in addition to alternative methods to achieve the same results.

Volume Control Management – Implementation of Control Guidance 1 and Control Guidance 2 from the Pennsylvania Stormwater Best Management Practices Manual of 2006.

Water Quality Control Management – Implementation of Best Management Practices to prevent degradation of physical, chemical, and biological characteristics of receiving waters consistent with Pennsylvania's anti-degradation guidelines.

ROLES OF COUNTY AND CONSULTANT

The division of work and responsibilities between Fulton County and the Consultant will be determined prior to the beginning of Phase II tasks. Generally, the County will serve as project coordinator and be responsible for 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 may 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 will be developed early in the Phase II process in conjunction with Fulton County and the Consultant. The work schedule will be formulated to set target dates for various tasks with the intention of completing the project for PADEP review and approval within the Phase II contract period. A preliminary schedule was developed and is presented in Appendix E.

REFERENCES

1. Fulton County Conservation District: *Big Grove Creek Urban Stream Restoration Project.*

2. Fulton County Conservation District, March 2006: *County Implementation Plan*.

3. Fulton County Conservation District, 1997: *Licking/Tonoloway Creek Watershed Assessment of Non-Point Source (NPS) Pollution.*

4. Fulton County Conservation District, 2004: *The 1992 Licking/Tonoloway Creek Assessment of Non-Point Source Pollution.*

5. Fulton County Department of Community and Economic Development, January, 2007: *A Joint Comprehensive Plan.*

6. Fulton County Department of Community and Economic Development, 2000: *Fulton County Comprehensive Plan.*

7. Fulton County Planning Commission, 1993: *Cove Creek ACT 167 Plan.*

8. PA Clean Waterways, 2008: *Fulton County Final Report*.

9. Pennsylvania Association of Conservation Districts, November 14, 1997: *Pennsylvania Handbook of Best Management Practices for Developing Areas.*

10. Pennsylvania Department of Environmental Protection – Bureau of Watershed Management, January, 2007: *Pennsylvania Model Stormwater Management Ordinance.*

11. Pennsylvania Department of Environmental Protection – Bureau of Watershed Management, December, 2006: *Pennsylvania Stormwater Best Management Practices Manual.*

12. Pennsylvania Geological Survey, 1980: *Atlas of Preliminary Geologic Quadrangle Maps of Pennsylvania.*

13. The Free Encyclopedia, (http://en.wikipedia.org/wiki/Fulton_County,_Pennsylvania).

14. United States Department of Agriculture Soil Conservation Service, December, 1975: *Soil Survey of Fulton County, Pennsylvania.*

15. USDA Forest Service, Riparian Forest Buffers: *Function and Design for Protection and Enhancement of Water Resources*, David Welsch, USDA Forest Service, NE Area, Radnor, PA, Pub. No. NA-PR-07-91.

APPENDIX A
QUESTIONNAIRE

FULTON COUNTY-WIDE PLAN

Act 167 Stormwater Management Plan

QUESTIONNAIRE

PLEASE COMPLETE THE FOLLOWING AND RETURN THE QUESTIONNAIRE AND MARKED UP MAP TO:		
Matthew S. Bonanno, P.E., Regional Service Group Manager		
Herbert, Rowland & Grubic, Inc.		
369 East Park Drive		
Harrisburg, PA 17111		
(717) 564-1121	mbonanno@hrg-inc.com	

PERSON COMPLETING QUESTIONNAIRE	
Municipality	
Name	
Phone	
e-mail	

1. DOES YOUR MUNICIPALITY HAVE?			
	Yes	No	Location
Comprehensive Plan	☐	☐	
Zoning Ordinance	☐	☐	
Subdivision/Land Development Ordinance	☐	☐	
FEMA Flood Insurance Study	☐	☐	
Floodplain Regulations *	☐	☐	
Stormwater Management Regulations *	☐	☐	
Erosion Control Regulations *	☐	☐	
Drainage Regulations *	☐	☐	
*For the above regulations, please list where the regulation is found in the “Location” column.			

2. THE ACT 167 PLAN WILL ADDRESS FIVE KEY STORMWATER CONSIDERATIONS. THESE FIVE ARE LISTED BELOW. PLEASE INDICATE HOW IMPORTANT YOU BELIEVE IT IS TO ADDRESS EACH CONSIDERATION.

CONSIDERATION		Very Important 5	4	3	2	Not Important 1
Peak Flows	Increased flows from stormwater runoff contribute to stream erosion, localized ponding and flooding, may cause damage to infrastructure (roads, sewers, etc.).	☐	☐	☐	☐	☐
Water Quality	Dissolved and un-dissolved pollutants washed off the land surface – negative impacts to surface and groundwater quality, recreation, aesthetics and in-stream habitat.	☐	☐	☐	☐	☐
Groundwater Recharge	Increased runoff decreases amount of rain that becomes groundwater; decreased groundwater supplies may have negative effects on well water supplies and decrease or dry up stream baseflow in dry periods.	☐	☐	☐	☐	☐
Stream Erosion	Eroding banks and beds may undercut roads and utilities, damages in-stream habitat, clog culverts and bridges.	☐	☐	☐	☐	☐
Flooding	Larger scale overbank flows such as the 100-year flood associated with extreme storm events	☐	☐	☐	☐	☐

3. WOULD YOU LIKE TO SEE INFORMATION ON ANY OF THE FOLLOWING PRESENTED AT A WATERSHED PLAN ADVISORY COMMITTEE MEETING?

	Yes	Maybe	No
Best Management Practices	☐	☐	☐
Model/Implemented Ordinances	☐	☐	☐
Information on Act 167 reimbursements	☐	☐	☐

Other topics you would like to have considered: _____

4. WHAT IS THE MOST IMPORTANT STORMWATER RELATED ISSUE TO YOUR MUNICIPALITY?

5. THE FOLLOWING LISTS THE TYPES OF STORMWATER RELATED PROBLEMS YOUR MUNICIPALITY MAY BE EXPERIENCING. FOR EACH PROBLEM TYPE, PLACE A CHECK MARK IN THE COLUMN THAT BEST DESCRIBES THE SEVERITY, FREQUENCY AND CAUSE. IF YOUR MUNICIPALITY IS EXPERIENCING A PROBLEM NOT LISTED, PLEASE LIST IT IN THE SPACE MARKED "OTHER".

PROBLEM	SEVERITY			FREQUENCY (YEARS)				CAUSE				
	Severe	Moderate	None	<1	1-2	3-6	>6	Increased Runoff	Poor/No Drainage	Undersized Structure	Floodplain Development	Unknown
Stream Flooding	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Street Flooding	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Property Flooding	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Soil Erosion	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Sediment in Streams	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Stream Bed/Bank Erosion	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Scour at Outfalls	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Property/Infrastructure Damage	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pollution	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Habitat/Resource Damage	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

6. STORMWATER MANAGEMENT PLANS ARE REQUIRED UNDER THE PENNSYLVANIA STORMWATER MANAGEMENT ACT, ACT 167. AUTHORIZATION TO PROCEED WITH THIS PLAN AS REQUIRED BY ACT 167 HAS BEEN GIVEN BY THE COUNTY COMMISSIONERS. THE LONG-TERM GOAL OF THIS PLAN WILL BE TO MAINTAIN EXISTING HYDROLOGIC CONDITIONS INCLUDING GROUNDWATER LEVELS, WATER QUALITY, STREAM BASE FLOW AND STREAM STORM FLOWS. WITH THIS IN MIND, WHAT LEVEL OF SUPPORT WILL YOUR MUNICIPALITY OR AGENCY PROVIDE FOR THIS PROJECT?

Strongly Support				Strongly Oppose
5	4	3	2	1
☐	☐	☐	☐	☐

7. WILL YOUR MUNICIPALITY/AGENCY ATTEND WATERSHED PLAN ADVISORY COMMITTEE MEETINGS? MEETINGS ARE EXPECTED TO BE HELD APPROXIMATELY 4 TIMES PER YEAR FOR APPROXIMATELY 2 YEARS DURING PHASE II. (PLEASE CIRCLE ONE)

Yes	No

If yes, who will attend meetings on behalf of your municipality or organization?

Name	
Address	
Phone	
e-mail	

8. WOULD YOU SUGGEST ANY OTHER AGENCIES OR ORGANIZATIONS THAT SHOULD BE INCLUDED ON THE WATERSHED PLAN ADVISORY COMMITTEE? IF SO, PLEASE GIVE CONTACT INFORMATION BELOW:	
Name	
Organization	
Address	
Phone	
e-mail	

9. DO YOU KNOW OF ANY EXISTING OR PROPOSED FLOOD CONTROL PROJECTS IN YOUR MUNICIPALITY? (PLEASE CIRCLE ONE)	
Yes	No
If yes, please describe the project(s) below:	

10. ARE EXISTING (PUBLIC OR PRIVATE) STORMWATER MANAGEMENT FACILITIES (OUTFALLS, BASINS, ETC.) BEING MAINTAINED (I.E. REMOVAL OF DEBRIS FROM OUTLET STRUCTURES, ADEQUATE CONTROL OF VEGETATION, CAPACITY MAINTENANCE, ETC.)? (PLEASE CIRCLE ONE)	
Yes	No
If no, please describe the locations(s) below:	

11. PLEASE PROVIDE ANY INPUT YOU FEEL IS RELEVANT REGARDING CURRENT WATERSHED MANAGEMENT OR STORMWATER MANAGEMENT PROCEDURES.

12. THE FOLLOWING TABLE REQUESTS INFORMATION ON PROBLEM AREAS AND OBSTRUCTIONS. PLEASE PLACE A CHECK MARK IN THE "P" COLUMN IF THE SITE IS A PROBLEM AREA OR PLACE A CHECK MARK IN THE "O" COLUMN IF THE SITE IS AN OBSTRUCTION.

Problem Areas - Areas of ponding or flooding, 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.

In the "Description" column describe the type, location, & size of the Problem Area or Obstruction, (i.e. "undersized 36-inch CMP where Oregon Road crosses Sideling Creek". For each site listed, place the Number of the site at the appropriate location on the enclosed map of your Municipality (attached at the end of this packet). If a solution to the Problem Area or Obstruction is proposed, describe the solution in the "Solution" column. Please copy this sheet if additional space is needed.

Number	Problem	Obstruction	Description	Solution
1	☐	☐		
2	☐	☐		
3	☐	☐		
4	☐	☐		
5	☐	☐		
6	☐	☐		
7	☐	☐		
8	☐	☐		
9	☐	☐		
10	☐	☐		
11	☐	☐		
12	☐	☐		

Please copy this sheet if additional space is needed.

13. THE FOLLOWING REQUESTS INFORMATION ON EXISTING OR PROPOSED STORM SEWER SYSTEMS OR MANAGEMENT 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 LETTER EACH SITE SEQUENTIALLY AND PLACE THE LETTER CORRESPONDING TO EACH SITE AT THE APPROPRIATE LOCATION ON A MAP OF YOUR MUNICIPALITY. PLEASE COPY THIS SHEET IF ADDITIONAL SPACE IS NEEDED.

Letter	Description
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	
K	
L	

Please copy this sheet if additional space is needed.

PLEASE NOTE THAT THE INTENT OF QUESTIONS 14-16 IS INTENDED TO ASSESS THE EFFECTIVENESS OF THE EXISTING STORMWATER REGULATIONS. THEREFORE, THERE MAY BE SOME SIMILARITIES TO QUESTIONS PREVIOUSLY ASKED.

14. ARE ANY OF THE PROBLEMS LISTED BELOW OCCURRING IN YOUR MUNICIPALITY?

ISSUE/CONCERN	Yes	No	WATERSHED
A. Increased channel erosion/scour at outfalls of stormwater management facilities or storm sewer systems?	☐	☐	
	☐	☐	
B. Increased general channel erosion not associated with outfalls?	☐	☐	
	☐	☐	
C. Increased nuisance flooding?	☐	☐	
	☐	☐	
D. Increased stream flooding?	☐	☐	
	☐	☐	
E. Increased incidence of undersized bridges or culverts?	☐	☐	
	☐	☐	
F. Noticeable increase in sediment deposits in streams?	☐	☐	
	☐	☐	
G. Increase in sediment related problems (sediment deposits, gravel bars, clogged pipes/culverts)?	☐	☐	
	☐	☐	
H. Has there been significant development within your municipality since the existing plan was completed?	☐	☐	
	☐	☐	
I. Are existing stormwater management facilities being maintained (i.e. removal of debris from outlet structures, adequate control of vegetation, capacity maintenance)?	☐	☐	
	☐	☐	

15. HOW WOULD YOU ASSESS THE EFFECTIVENESS OF PEAK FLOW MANAGEMENT AND WATER QUALITY OF THE WATERSHEDS IN YOUR MUNICIPALITY?

	Effective	Not Effective	Unknown
A. Peak Flow Management	☐	☐	☐
B. Water Quality	☐	☐	☐

16. PLEASE INDICATE IF THERE IS ANY OTHER INFORMATION THAT YOU FEEL WOULD BE RELEVANT TO THIS PROCESS?
Comments:

APPENDIX B
QUESTIONNAIRE SUMMARY

FULTON COUNTY ACT 167 STUDY
QUESTIONNAIRE SUMMARY

Municipality	Q1								Q2					Q3			Q4	Q6	Q7	Q9	Q10
	Comprehensive Plan	Zoning Ordinance	Subdivision/Land Development Ordinance	FEMA Flood Insurance Study	Floodplain Regulations	Stormwter Management Regulations	Erosion Control Regulations	Drainage Regulations	Peak Flow Rates	Water Quality	Groundwater Recharge	Stream Erosion	Flooding	Best Management Practices	Model/Implemented Ordinances	Information on Act 167 reimbursements	Most Important Stormwater Issue	Support Project	WPAC Representative	Flood Control Projects	Maintain SWM Facilities
McConnellsburg Borough	Y	Y	N	Y	Y	Y	N	N	5	5	5	5	5	M	M	Y	Runoff from Todd and Ayr Townships	5	Y	N	Y
Valley-Hi Borough	N	N	N	N	N	N	N	N													
Ayr Township	Y	N	Y	N	Y	Y	Y	Y	5	4	4	2	5	Y	Y	Y	Flooding	3	Y	N	Y
Belfast Township	Y	N	Y	N	Y	N	Y	Y	3	5	5	4	4	M	M	M	Severe storm runoff	3	Y	N	Y
Bethel Township	Y	N	Y	N	Y	N	Y	Y	2	2	2	2	2	M	M	M		2		N	N
Brush Creek Township	Y	N	Y	N	Y	Y	N	N	5	5	5	5	5	Y	Y	Y	Flooding and erosion	3	Y	N	Y
Dublin Township	Y	N	Y	N	Y	Y	Y	Y	5	5	5	5	5	Y	Y	Y	No riparian buffer ordinance, No floodplain surveys	4	Y	Y	
Licking Creek Township	Y	N	Y	N	N	Y	Y	N	5	5	5	5	5	Y	Y	Y	Flooding and erosion	4	Y	Y	
Taylor Township	Y	N	Y	N	Y	N	Y	N	5	5	5	5	5	Y	Y	Y	None	5	Y	N	N
Thompson Township	Y	N	Y	N	Y	Y	Y	Y	5	4	4	4	5	M	Y	Y	Stormwater runoff	5	Y	N	Y
Todd Township	Y	N	Y	N	Y	Y	Y	Y	4	5	5	4	4	Y	Y	Y	Flooding	5	Y	Y	N
Union Township	Y	N	Y	N	Y	N	Y	Y	1	4	4	2	3	Y	Y	Y	Water quality	3	Y	N	Y
Wells Township	Y	N	Y	N	N	Y	Y	Y													

Question 1. Does your municipality have?
Question 2. The Act 167 Plan will address five key stormwater considerations. Indicate how important ((5 - Very Important) to (1- Not Important)) you believe it is to address each consideration.
Question 3. Would you like to see information on any of the following presented at a Watershed Plan Advisory Committee Meeting? (Yes/No/Maybe)
Question 4. What is the most important stormwater related issue to your municipality?
Question 6. What level of support will your municipality or agency provide for this project? ((5 - Strongly Support) to (1- Strongly Oppose))
Question 7. Will your municipality/Agency attend Watershed Plan Advisory Committee Meetings? (Yes or No)
Question 9. Do you know of any existing or proposed flood control projects in your municipality? (Yes or No)
Question 10. Are existing (public or private) stormwater management facilities being maintained? (Yes or No)

Note: Answers to Question 1 were provided by Fulton County Planning Commission

Summary Table of Problem Areas provided by the WPAC through the Questionnaire:

ID	MUNICIPALITY	LOCATION	DESCRIPTION	SOLUTION
P1	McConnellsburg Borough	East of the intersection of Crystal Drive and East Popular Street	Runoff from townships – east of town - flooding	--
P2	McConnellsburg Borough	West of the intersection of Lincoln Way West and South First Street	Flooding to bridge when it rains severely	--
P3	Brush Creek Township	Intersection of Spade Rd and Old 126	--	Widen and clean stream
P4	Dublin Township	Boy Scout Road – Township Bridge	--	--
P5	Thompson Township	Tonoloway, Little Tonoloway, Cove, and Licking Creeks	Runoff during heavy rain	Better stormwater management upstream
P6	Todd Township	Johnston Drive	Debris	New Box Culvert
P7	Todd Township	Big Cove Creek as it flows along the west side of town	Flooding	Restore Floodplain
P8	Todd Township	Cooper Lane	Flooding	--
P9	Todd Township	Fairgrounds to K.G. Richards flood area	Flooding	--
P10	Licking Creek Township	Back Hollow Road	Flooding	Sides of road need to be built up so water does not run in the roadway
P11	Licking Creek Township	Possum Hollow and Route 655	Sediments	Need to build up sides of stream to allow water to flow efficiently
P12	Licking Creek Township	Diamond Road	Flooding	Tile needs to be placed to help water runoff
P13	Licking Creek Township	Creek Road	Flooding and Debris	Install a tile so water flows underground
P14	Licking Creek Township	Owl Creek Road	Debris	Install a tile so water flows more efficiently
P15	Licking Creek Township	Grade Road – Roadway Washout	Erosion	Clean out the site and install stones so water flows efficiently
P16	Licking Creek Township	Pump Station Road – Roadway Washout	Erosion	Clean out the site and install stones so water flows efficiently
P17	Licking Creek Township	Lear Road – Roadway Washout	Erosion	Remove debris and install tiles
P18	Licking Creek Township	Circle Drive – Roadway Washout	Erosion	Remove debris and place stone so the water flows more efficiently
P19	Union Township	Slide on Old 126 above Interstate 70	Slide and Erosion	--
P20	Union Township	South Hixon Road – Fording Problem	Flooding	--
P21	Dublin Township	South Branch of Little Aughwick Creek – Grist Mill Water Diversion	Dam Erosion	Repair Dam and stream construction
P22	Dublin Township	Turnpike Flooding to Properties (Burnt Cabins)	Flooding	Stormwater Plan and Dirt and Gravel Road Funding
P23	Dublin Township	Burnt Cabins – Hazardous Material Building	Hazardous material in floodplain	Enforcement to Township laws
P24	Dublin Township	1/4 West of Plum Run Bridge on Plum Hollow Road Crossing Culvert	Stream Bank Erosion	Stream bank and channel redesigned
P25	Dublin Township	Decorum Road (Burnt Cabins)	Stormwater Drainage Ditch	Fulton County Growing Green Grant
P26	Belfast Township	Gem Curve Bridge – US 522	Flooding	--
P27	Dublin Township	Boy Scout Road	--	Replace Concrete Tiles

Summary Table of Obstructions provided by the WPAC through the Questionnaire Form:

ID	MUNICIPALITY	LOCATION	DESCRIPTION	SOLUTION
O1	Todd Township	Peach Orchard Road at Bill Cunningham	--	--
O2	Licking Creek Township	Possum Hollow Road	Debris	--
O3	Licking Creek Township	Creek Road at the new Bridge	Debris Flooding	Remove trees, shrubs and debris
O4	Brush Creek Township	Layton Road (Walt Schrierver Property)	Debris	Remove Debris and check the feasibility of installing a larger pipe

Summary Table of Stormwater Facilities provided by the WPAC through the Questionnaire Form:

ID	MUNICIPALITY	FACILITY
SM1	Brush Creek Township	Crystal View Acres
SM2	Brush Creek Township	Breezewood Park
SM3	Ayr Township	Fulton County Business Park
SM4	Ayr Township	JLG Industries, Inc.
SM5	Ayr Township	Giant Food Store
SM6	Ayr Township	G&P Distributors
SM7	Ayr Township	Woodlands Estates
SM8	Ayr Township	My Fathers House Ministries
SM9	Ayr Township	Magsam Creek Estates
SM10	Todd Township	Fulton County Medical Center
SM11	Todd Township	Mountain View Mennonite Church
SM12	Todd Township	Hendershot Development
SM13	Todd Township	HOPE Development
SM14	Todd Township	Mountain View House
SM15	Todd Township	Lion's Park
SM16	Todd Township	McConnellsburg Water Treatment Plant
SM17	Todd Township	Tom King Development
SM18	Todd Township	Joyce Engle Development
SM19	Todd Township	Meadow Lane (Gracey Development)
SM20	Todd Township	Thomas Dealerships
SM21	Todd Township	Richard's Dairy
SM22	Union Township	Shaded Acres Subdivision
SM23	Belfast Township	Needmore Waste Water Treatment Plant
SM24	Bethel Township	Southern Fulton Elementary School
SM25	Licking Creek Township	Mountain Vista Estates

APPENDIX C
PHASE II SCOPE OF WORK

Appendix C is included to provide a description of the work that Fulton County intends to perform in Phase II. Appendix C is not intended to form a contract between Fulton County and any other party.

Phase II Scope of Work

The Final Phase II Report and associated Model Ordinance shall be considered as the PLAN.

Fulton County Planning Commission shall be considered as the COUNTY.

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

The engineering firm shall be considered as the CONSULTANT.

The Phase II contract between Fulton County and The Pennsylvania Department of Environmental Protection shall be considered as the AGREEMENT.

The COUNTY shall prepare Phase II of the PLAN in accordance with the tasks described in this Appendix C. For the purpose of carrying out work described in this Appendix C, the Fulton County Planning Commission shall perform the management and support responsibilities of the COUNTY. The COUNTY, with the help of the CONSULTANT, will accomplish the technical and non-technical components of the PLAN.

PROJECT ADMINISTRATION

The COUNTY shall be responsible for, but not limited to, overall administration of all tasks, including the preparation of invoices and progress reports, organizing and/or attending meetings, attending to budgeting and organizational matters, and participating in teleconferences regarding the PLAN.

This task also covers the administrative work required to initiate the AGREEMENT between the DEPARTMENT and the COUNTY, and to initiate selection of a CONSULTANT and, upon selection, to initiate contracts between the COUNTY and the CONSULTANT and to lay out a framework for the critical coordination aspect with the municipalities. Activities include defining the framework for accomplishing various elements of the PLAN, scheduling of time and defining the budget, progress reporting procedures and formats, and finalizing the work schedule. It will also include the preparation for and holding the Phase II start-up meeting between the DEPARTMENT, the COUNTY, and the CONSULTANT.

This task also includes the delineation of work for Phase II between the COUNTY and the CONSULTANT.

PROJECT BILLING

The COUNTY, with the help of the CONSULTANT, shall complete all of the tasks (A through D) and report the progress and status of the PLAN. The COUNTY shall prepare and submit quarterly invoices and report the status of work accomplished to the DEPARTMENT pursuant to the terms and conditions specified in the AGREEMENT.

TASK A - Data Collection/Review/Analysis

SubTask A.1 - Data Collection

This task will involve the necessary efforts to gather, review, and analyze the required data to complete the technical and institutional planning steps for the PLAN. The CONSULTANT and COUNTY will work jointly to collect data from county offices, municipalities, and local, state, and federal agencies that will aid in preparation of the PLAN. The data will consist of information concerning existing and future conditions throughout Fulton County. All data collection activities will be accomplished by gathering available information from the WPAC or from the Questionnaire that was distributed to the municipalities during Phase I.

Data to be collected will include, but may not be limited to (and will be based on available information and/or questionnaire results):

1. Comprehensive land use plans.
2. Existing municipal ordinances.
3. Stormwater-related problem areas and proposed conceptual solutions.
4. Existing and proposed flood control projects.
5. Existing and proposed stormwater control facilities.
6. A listing of existing and proposed (e.g., recorded land development Plans) stormwater collection and control facilities. In addition, data on any County or municipal Plans for stormwater control facilities.
7. Soils.
8. Geology.
9. Significant water obstructions.
10. Topographic and other readily available mapping.
11. Aerial photographs.
12. Previously completed engineering and planning studies.
13. Stream flow and rainfall gauge data and other water quality information.
14. FEMA FIS floodplain information.

Necessary field investigations will be accomplished to gather and/or confirm the data. This task also involves the review and preliminary analysis of the technical data that has been obtained for consistency and usability. It also includes the review of the institutional data collected through the Phase I Questionnaire for consistency and usability in the final PLAN.

Problem Areas and Obstructions Inspection/Summary/Proposed Solutions

A detailed investigation will be performed to evaluate any problem areas and obstructions identified during Phase I. Those problem areas and obstructions recognized as "significant" would be field evaluated. Storm runoff and stream flow modeling will be completed for the subwatershed where these "significant" problem areas or obstructions occur (SubTask B.4), then these sites shall be designated as points-of-interest, and associated design storm flows will be developed. A collection of past studies/investigations including any PennDOT hydrologic computations, if possible, will be compiled and reviewed for proposed solutions. The PLAN will summarize these problem areas and obstructions, provide proposed solutions, and will specify possible sources of funding to pursue for implementation. The PLAN will make suggestions for other programs/activities to deal with the issues raised during the planning process. The

identification of the problem areas will help in assessing the stormwater management rate controls needed for the subwatersheds.

Although the identification of the problem areas will help in assessing the stormwater management rate controls needed for the subwatersheds, the Act 167 program will not provide funds to correct infrastructure problems or implement conceptual solutions. It will however, provide for a systematic approach and help to identify potential sources of funding to correct the problems, and will, through the preparation and implementation of stormwater ordinances or regulations, provide administrative means to correct existing problems and prevent future problems from uncontrolled runoff from future development and activities that may affect stormwater.

Review of Existing Plans/Studies/Reports/Programs

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

Anticipated Product

The product will include the information listed above, gathered and organized in such a way as to be usable for both short and long term municipal and county stormwater planning (including updates). A final data summary will be prepared that will identify and/or catalogue the collected data and funding streams.

SubTask A.2 - Municipal Ordinance Reviews/Evaluations

This task will involve the detailed evaluation of the provided municipal ordinances in order to prepare a municipal ordinance comparison matrix. This matrix is intended to display (for both the actual preparation of the implementation PLAN and also for the municipal education process), the current stormwater management provisions in the various municipal ordinances for all municipalities within Fulton County. The objectives in the preparation of the matrix are to show similarities and differences as well as the consistency/inconsistency among the various municipal ordinances in the County.

Anticipated Product

The product will be a complete matrix of stormwater management ordinance provisions for the municipalities, which identify the current status of ordinance provisions as they relate to stormwater management.

SubTask A.3 - Data Preparation for Technical Analysis

This task involves the engineering work necessary to transform the information collected under SubTask A.1 into a Geographic Information System (GIS) database that can be used for the later technical tasks and map (plate) production. Included will be the preparation of "land characteristics" GIS data layers for modeling and display purposes. All data will be incorporated into the GIS database on an as needed basis.

The GIS data layers will include:

- Base Mapping – Existing base map information (roads, streams, municipal boundaries, text, etc.) will be collected and the most accurate data will be

utilized to develop the County's base map. All data will be projected into the coordinate system utilized by Fulton County. All data from various sources will be merged into a seamless base map.

- Land Use/Land Cover Information – Current aerial (photographic and/or digital) images, available GIS land use files, and zoning maps will be collected and converted into the format required for hydrologic modeling based on NRCS (formerly SCS) land use classifications. Land development projects completed subsequent to existing data will be added as necessary.

- Information Concerning Infill Potential in Existing Subdivisions – Infill development in existing subdivisions has been found to create problems with respect to storm runoff quantity and quality. Locations where significant infill development could occur will be identified and flagged for further consideration.

- Future Land Use Conditions – Future projected Planning information will be overlaid on the existing land use conditions mapping to determine the future land use scenario for development at a 10-year build-out condition.

- Soils Information – The County Soils Survey maps will be modified and/or prepared to illustrate NRCS hydrologic soils groups instead of individual soil types. Overlay mapping will be necessary to prepare the hydrologic soils group map necessary for modeling.

- Digital Elevation Models – Available digital Elevation Models (DEMs) will be utilized and evaluated for watershed and subwatershed delineation and to assign slope category information to the subwatersheds for which detailed modeling will be completed. The DEMs will be merged to form a seamless watershed map and projected to the appropriate coordinate system.

- Digital Raster Graphics (DRGs) – Available ortho digital USGS topographical maps will be compiled and utilized to evaluate NRCS land use classifications and to determine the location of significant obstructions and problem areas.

- Geology – Available digital geologic maps that include pertinent geologic features (limestone, sandstone, etc.) will be obtained and be extracted and displayed as part of the PLAN.

- Obstructions – Obstructions will be located on the appropriate base map and data or attributes will be attached or linked to the locations.

- Problem Areas, Flood Control Structures, Stormwater Management Facilities – These items will be located on the appropriate base map and data or attributes will be attached or linked to the locations.

- Floodplains – Available FEMA FIS floodplain data will be transposed to the appropriate base map and displayed with the development in Fulton County.

- Source Water Protection areas – Areas will be mapped.

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

As required, the watersheds and subwatersheds will be delineated by the CONSULTANT on a base map at the scale that results in a manageable map size and adequate detail. Subwatersheds will be established based on PADEP's list of designated watersheds in Fulton County. This breakdown of the watersheds by major tributary drainage courses and points-of-interest will be the basis for the hydrologic and hydraulic analyses.

The subwatersheds will be delineated based on the following:

1. The location of existing regionally significant stormwater management problems, as identified by the WPAC in the Questionnaire, during the field reconnaissance, or from data compiled in any previous studies or reports.

2. The location of significant regional stormwater and flood control obstructions such as highway bridges and culverts, or stormwater control facilities.

3. Confluence points of tributaries, as deemed appropriate and significant relative to regional stormwater management planning based on engineering judgment and good modeling practice.

4. Other points of interest, such as stream gage or water quality monitoring stations, locations of water quality concerns, potential flood control project sites, significant outfall locations downstream of existing developments, or where significant development is anticipated and projected to occur.

This task will also include mapping of relevant regional watershed planning information onto GIS data layers. This mapped information will include:

1. Floodplain Areas - The approximate floodplain limits plotted over the watershed base map or the highlighting of those stream segments for which FEMA detailed or approximate Flood Insurance Studies are available.

2. Regionally significant stormwater obstructions and their capacities - "Significant" obstructions will be those that are identified in the Questionnaire and/or which are confirmed by the CONSULTANT as being areas where insufficient capacity exists to pass the necessary storm flows, thereby resulting in a flooding hazard to persons or property, or those obstructions that would act as regionally significant impoundments that may affect watershed modeling and the watershed stormwater response.

3. Storm Sewer Systems - Areas where significant storm sewer systems exist will be indicated generally on the final base map.

4. Existing local, state, and federal flood protection and stormwater management facilities.

5. Proposed stormwater facilities within the 10-year Planning period - Where known and confirmed by the municipalities through the Questionnaire completion process.

6. Regional stormwater related "problems" - Those areas indicated in the Questionnaire and where confirmed by the CONSULTANT through technical modeling/analysis (for example, flooding points or areas of streambank erosion).

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 will describe the analytical processes involved with developing a strategy to regulate existing and new land development and activities that may affect stormwater runoff quantity and quality. Since stormwater runoff has a direct impact on flooding, water quality, and groundwater recharge, this analysis will consider the following objectives:

- Maintain existing water quality by implementing non-point source pollution removal methodologies that emphasize source control.
- Preserve and restore natural stormwater runoff regimes and natural course, current, and cross section of Waters of the Commonwealth, to the maximum extent practicable.
- Preserve, protect, maintain, and restore groundwater recharge and recharge areas.
- Protect stream channels and land areas from erosion.
- Restore and preserve flood carrying capacity of streams.
- Manage over-bank and extreme flood events.

Technical standards will be established for meeting these objectives based on authorization provided under PA Act 167, the PA Clean Streams Law, the Federal Water Pollution Control Act, and the provisions of 25 PA Code Chapter 93.

These objectives will be accomplished under SubTasks B.1 to B.10.

SubTask B.1 - Implement Volume Controls

Establish the Design Storm Method (Control Guidance 1 in *The Pennsylvania Stormwater Best Management Practices Manual)* and the Simplified Method (Control Guidance 2 in *The Pennsylvania Stormwater Best Management Practices Manual)* consistent with the Department of Environmental Protection, Bureau of Watershed Management's *Pennsylvania Model Stormwater Management Ordinance*.

SubTask B.2 - Implement Rate Controls

Establish a minimum 100 percent release rate for all lands contained within Fulton County. More restrictive release rates may be developed in subwatersheds with existing problem areas or intense development pressures. The subwatershed modeling performed in Task B.4 will be used to determine whether more strict release rates are needed.

SubTask B.3 - Implement Water Quality Controls

Establish guidelines for implementing Best Management Practices to manage storm runoff to protect the physical, chemical, and biological characteristics of the receiving waters consistent with the state's anti-degradation guidelines. The PLAN's goals and objectives will be developed to be consistent, to the maximum extent practical, with the anti-degradation criteria of the PA Clean Streams Law, and the federal National Pollutant Discharge Elimination System (NPDES) Phase II requirements for construction work. The PLAN will also identify the extent of the above goals that can not be reasonably met so they can be addressed outside of this PLAN or in future updates. Additionally, it is anticipated that the focus of the PLAN will be on protecting/maintaining existing water quality in addition to mitigation of existing problems. Control techniques that will be considered for incorporation into the PLAN requirements will include, but not be limited to:

a. Riparian buffers
b. Steep slope protection
c. Low Impact Development (LID)
d. Impervious cover restrictions
e. Floodplain protection
f. Best management practices (BMP) for non-point source pollution control
g. Minimization of road widths, restrictions on paved sidewalks, use of roadside swales in lieu of curb and gutter and storm sewers.

SubTask B.4 - Model Subwatersheds of Designated Watersheds

This task involves selecting specific subwatersheds to be modeled and performing the hydrologic modeling, quantitative computations, and evaluations necessary to analyze runoff characteristics of the subwatersheds under existing and future conditions. It will also establish the need and extent of release rates for the subwatersheds.

Based on information reviewed to date, the Cove Creek and Licking Creek will be modeled in their entirety. In addition, the problem areas in other watersheds will be more thoroughly analyzed and prioritized and decisions will be made as to whether other subwatersheds will be modeled. For pricing purposes, it was assumed that twenty (20) additional subwatersheds with drainage areas of less than one (1) square mile would also be modeled. Selection of subwatersheds to model will be based on the identification of problem areas through the Phase I Questionnaire responses and field observations of those areas during this task. Final selection of the subwatersheds chosen to be modeled will be based on existing problem areas or future development pressures based on input provided by the WPAC. Subwatersheds to be modeled are assumed to be relatively small (less than 1 square mile). Existing and future land use and land cover will be used to determine existing and future peak rates of discharge. Input data including rainfall information, drainage network layouts and capacities, travel times within subwatersheds, significant obstructions, and GIS based data will be added to develop the selected hydrologic model.

Model Calibration

The individual subwatershed models will be run to get preliminary results. The models will be calibrated using available data to verify the results. Calibration efforts will include the adjustment of the model parameters to accurately simulate natural runoff conditions of the subwatershed. Consideration will be given to calibration techniques including, but not limited to: use of any available gauging information, comparison with rainfall and runoff information from similar watersheds, comparison with Flood Insurance Study information, and regression analyses. As necessary, calibration will be performed at multiple points within the subwatersheds to assure the most accurate modeling.

Design Storm Selection

Subsequent to calibration of the model, the model will be run for the 1-, 2-, 10-, 25-, 50- and 100-year storm events under various durations. An analysis of downstream impacts during these storms will be performed to determine the required design storm(s) based on the subwatershed hydrologic response of the six (6) storms.

Model Runs

The calibrated models will be run for the selected subwatersheds under the design storm(s) for both the existing and future projected land uses. This will also involve the detailed evaluation of modeling results to perform a problem identification analysis (i.e., a "cause and effect" analysis). This will concentrate on identifying the downstream storm runoff impacts of projected future land development projects. Future development conditions will be approximated using the County's Comprehensive Plan and accumulated new address information of the affected municipalities. This evaluation will consider both the increases in current downstream storm runoff problems, as well as anticipated projected downstream runoff problems.

This work step also consists of performing a technical evaluation of the hydrologic analysis for existing and future land use conditions (estimated 10-year build out) and recommending standards and criteria to regulate land development activities which impacts stormwater runoff. This subtask may also involve performing a release rate analysis and a preliminary distributed storage analysis, and developing criteria and standards for the management of both overbank flooding events (1-, 2-, 10- and 25-year storms) and the extreme flooding events (50- and 100-year storms), to be determined by the WPAC.

SubTask B.5 - Provide Conceptual Solutions for Existing Problem Areas

Based on the results of SubTask B.4, this information will be used to develop alternative conceptual solutions for the problem areas identified in the Questionnaire Form and other problems areas as identified by the WPAC. Problem areas may generally consist of flooding, stream channel or bank erosion, property damage, detention basin (retrofitting), etc. The developed solutions will be conceptual in nature (i.e. no final engineering or specification will be completed). These conceptual solutions will be presented as recommendations to the municipalities. It will be up to the individual municipality's discretion whether or not to implement the conceptual solutions to the problem areas. The municipality will also be responsible to acquire funding sources to implement the final solutions.

SubTask B.6 - Goals, Objectives, and Compilation of All Technical Standards

Stormwater problems will be restated as goals and objectives for the Act 167 planning process. The goals and objectives need to be developed keeping in mind that some of the watersheds in the County are classified as Special Protection Waters by PADEP. As such, the goals and objectives will:

- Satisfy state and federal regulatory requirements (including correcting water quality impairments related to stormwater or urbanization appearing in the EPA 303(b) and (d) lists, or impairments associated with approved TMDLs).
- Meet the purpose and policy of Act 167.
- Develop site design standards to meet anti-degradation requirements, as needed.
- Meet regulatory and permit requirements associated with the NPDES Phase II program for construction projects.
- Meet local requirements and objectives established by the WPAC.

When restated as engineering performance standards for the PLAN, the goals and objectives become the basis for the standards and criteria for regulation and control of land development and activities that may affect stormwater.

The standards and criteria will provide a basis for the selection and application of analytical methodologies and BMPs for the implementation of stormwater controls.

The candidate stormwater management strategies that meet the identified goals and objectives (i.e. show how the proposed standards and criteria for the Final Report and Model Ordinance meet the goals and objectives set by the WPAC) will be prepared and presented to the WPAC.

The proposed standards and criteria need to address the following control requirements:

1. Apply to all areas covered by the PLAN.
2. Establish volume, rate, and quality controls and release rate percentages (if applicable), or other levels of control of runoff quantity and quality.
3. Specify design flood frequencies and computational methodologies for design of stormwater management measures.
4. Provide specifications for construction and maintenance of stormwater management systems (if applicable).
5. Provide conceptual solutions to both regional and local problems areas.
6. Summary and prioritization strategies for long-term potential solutions.
7. Identify funding sources for correction of existing problems related to infrastructure.
8. Maintain consistency with concurrent studies including a summary of what tasks will be completed so as to avoid duplication of effort.
9. Provide a fee schedule for: submissions of permit applications, review of permit applications, construction inspections, periodic inspections, and enforcement actions.
10. An implementation strategy, including funding, for retrofit measures, if necessary.

The recommendations will be presented in layman's language, keeping in mind that they are directed towards local municipalities and are to address solutions to stormwater management issues. The technical standards and criteria developed as a part of this task will apply to all areas covered by the PLAN.

Water quality BMP information will be presented including recommendations for the implementation of water quality BMPs for land development and activities to minimize stormwater impacts from land development and activities. This educational effort will primarily involve discussions, presentations, and handouts on BMP technology to municipal officials during regularly scheduled WPAC meetings and the workshops (see SubTask C.1). Information available from PADEP and other sources will be distributed.

SubTask B.7 - Implementation of Technical Standards and Criteria

This subtask will involve the identification of the necessary ordinance provisions for each municipality. Included will be the modification of the Model Ordinance and/or recommendations for updating existing municipal ordinances, including but not limited to, subdivision and land development, zoning, erosion and sediment control, and building code ordinances to effectively implement the technical standards and criteria for stormwater management throughout Fulton County. A design example will be

provided to show how to incorporate the various aspects of the Model Ordinance into the stormwater management design process.

Anticipated Product

The product will be the charts, tables, figures, plates, and graphs needed to present the technical analysis including evaluation of both water quantity and water quality requirements. The product will also include modeling results, the technical interpretation of the modeling results, and the definition of the technical standards and criteria for use in the preparation of the PLAN. The product will also include the identification of necessary recommended municipal ordinance provisions to implement the technical standards, including a complete Stormwater Management Model Ordinance.

SubTask B.8 - Economic Analysis

This subtask will involve an economic analysis of implementing the technical standards and provisions of the PLAN. A design example will be created and estimated costs will be associated with the design example to demonstrate how implementation of the standards and provisions can be cost effective to developers.

Anticipated Product

The product will be the design example.

SubTask B.9 - Regulations for Activities Impacting Stormwater Runoff

This subtask will involve the research and development of standards and provisions regarding regulating activities that may impact stormwater runoff. These activities may include, but are not limited to: timber harvesting, quarrying, oil and gas mining, land development, and agriculture. Any standards developed for these activities will relate only to stormwater management controls and water quality protection to ensure the protection of health, safety, and property of the people and Waters of the Commonwealth.

Anticipated Product

The product will be a section in the PLAN addressing activities (regulated and exempt) that may impact stormwater runoff.

SubTask B.10 - Water Quality Impairments

This subtask involves the research and identification of water quality impairments throughout Fulton County from the 303(b) and 303(d) lists and designated Total Maximum Daily Loads (TMDLs).

Anticipated Product

The product will be to identify how to improve the water quality for waters not attainting their designated use category.

TASK C – Public/Municipal Participation

SubTask C.1 - WPAC Meetings

Coordination efforts and/or activities will continue throughout the duration of the project and will be organized to include the necessary meetings with the COUNTY, CONSULTANT, DEPARTMENT, and WPAC.

As previously indicated, the WPAC consists of representatives from each municipality in Fulton County, as well as the Fulton County Conservation District, and other interested groups. The WPAC meetings will be held to provide education on the planning process and to receive advice from the municipal officials to assure the PLAN fits the needs of the municipalities while soliciting valuable technical and institutional data and other information. The advisory role of the WPAC during the development of the PLAN is vital to the ultimate adoption and implementation process.

A BMP Workshop for the municipalities and municipal engineers will be developed and conducted. The presentation of the workshop shall be based on the Pennsylvania Stormwater Best Management Practices Manual. The workshop will contain one or more examples showing recommended site design procedures for comprehensive stormwater management, design and construction of BMPs, including design calculations, review procedures, and approval of permit applications.

The following describes proposed WPAC meetings and public hearing schedules including the purpose of each meeting:

Note WPAC #1 and WPAC #2 meetings were held during Phase I.

MEETING	PURPOSE OF MEETING	MEETING SCHEDULE
WPAC #3	Review Phase I, discuss problem areas and obstructions from Questionnaire Form, present GIS maps and data, and review overall goals of Phase II.	Beginning of Phase II
WPAC #4	Review the project status, review technical aspects of the PLAN, including initial modeling runs, calibration efforts, and review of technical standards (Control Guidance 1 & 2). Purpose is to receive comments and direction in the development of the Model Ordinance.	Middle of Task B
WPAC #5	Focus of meeting will be on the technical aspects of the Study. Present final technical modeling results, present technical standards and criteria; discuss water quality issues, and preliminary ordinance provisions for the municipalities. Review final modeling runs and present draft PLAN and address previous comments.	End of Task B
WPAC #6	Focus of meeting will be on the legal aspects of implementation of the PLAN. Present final draft and review municipal implementation procedures. Educate WPAC on the ordinance/regulation adoption and implementation requirements of the PLAN.	End of Phase II
Public Hearing	Conduct the pubic hearing as required by Act 167 to present the final PLAN to the public.	End of Phase II
WPAC #7	Meeting to review any changes made to the PLAN as a result of comments received at the Public Hearing (optional).	End of Phase II
BMP Workshop	Educate municipalities on implementing stormwater management BMPs.	End of Phase II
Municipal Workshop	Municipal Implementation Workshop: Provide assistance to municipalities on implementation of the PLAN including adoption, enactment, and implementation of ordinances/regulations and other items.	Within 3 months of PADEP's approval of the PLAN

This task will also involve the production and distribution of a meeting agenda and meeting minutes updating the WPAC members, municipal officials, interest groups and the public on the program, status, and issues of the PLAN. The agenda and minutes will be created for each meeting during Phase II.

Anticipated Product

The product will include correspondence and meeting notes/minutes from the individual committee meetings. In addition, the presentation materials prepared for the individual committee meetings will constitute a defined product of this subtask for the overall project.

TASK D - PLAN Preparation and Implementation

SubTask D.1 - Final Phase II Report Preparation

Components of the previous task and subtasks will be included, or at least referred to in the PLAN. In this way the PLAN shall contain such provisions as are reasonably necessary to manage stormwater such that storm runoff from land development or other activities in each municipality shall not adversely affect health, safety, property, and water quality. In addition, the PLAN shall consider and be consistent with other existing municipal, county, regional and state environmental and land use plans and local and state laws and regulations. The PLAN shall include the following:

- A description of the hydrologic characteristics of the subwatersheds; the existing and future land uses and their impacts on stormwater runoff and stormwater collection systems; the available runoff control techniques and their efficiencies in the subwatersheds; a list of significant obstructions; and available FEMA FIS floodplain information. The available floodplain information will either be included in the PLAN or their sources will be referenced.

- Based upon the results of the subwatershed modeling, the technical evaluation resulting in the criteria and standards governing the use of stormwater management controls throughout the subwatersheds. An important aspect of the technical components of the PLAN will be the delineation of subwatersheds with specific management strategies. This determination will be accomplished based upon an evaluation of any land development activities on critical drainage points throughout Fulton County. Peak discharge tables will be compiled for the critical drainage points from the hydrologic model runs involved in the modeling effort. BMP tables and data on their effectiveness and applicability will be presented or referenced.

- The tables for the rainfall depths for various frequency durations which are computed as part of the hydrologic modeling.

- Approximate floodplain limits for areas where detailed FIS studies are available. Where detailed flood control engineering plans for proposed remedial measures are available from municipality, county, or private agencies, a summary analysis and evaluation of those plans will be included in the PLAN. Where detailed plans are not available, preliminary recommendations relating to such measures will be provided.

- Recommendations for solutions to the existing drainage problems will only be conceptual in nature indicating the type of approach needed and inter-municipal cooperation issues. Identification of sites for potential restoration and/or protection projects that would qualify for Pennsylvania's "Growing Greener" Funds will be identified.

- Requirements and/or recommendations for control criteria and guidelines to prevent future problems due to new land development and a discussion regarding inter-municipal arrangements for funding the recommended solutions to existing problems will also be discussed.

- The PLAN will summarize the extent to which the implementation of the PLAN will address the goals and objectives of Act 167, the PLAN and the extent to which it will solve identified problems.

- Priorities for Implementation. The conclusions and recommendations of the goals and objectives of the PLAN will be summarized. Recommended actions will be listed according to agency, municipality, or individual responsible for each action. Priority of recommended actions will be based on chronological order, importance, hydrologic significance, or other factors as may be appropriate. This will include type and location of potential watershed projects that could be considered under Pennsylvania's "Growing Greener" grant program.

- PLAN Update. As a part of the implementation strategy for the PLAN, specific steps and/or procedures will be established for pursuing and completing the PLAN as required by Act 167. Specific circumstances will be identified and described in the PLAN document that will "trigger" a decision to update. For example, land development circumstances (such as major changes in the type and/or amount of proposed land development, and in excess of that which was assumed for the preparation of the original PLAN) will be identified as reasons for pursuing an update of the PLAN prior to the required 5-year time frame identified in Act 167.

The preliminary outline for the PLAN is as follows:

Part I

Section I – Introduction
Section II – Fulton County Description
Section III – Significant Problem Areas and Obstructions
Section IV – Comprehensive Stormwater Management Planning
Section V – Technical Analysis
Section VI – Existing Municipal Regulations
Section VII – Economic Impact of Stormwater Management Standards
Section VII – Goals, Objectives, and Additional Recommendations
Section IX – PLAN Implementation and Update Procedures
Section X – References

Part II

Model Ordinance

Plates:

- Existing Land Use Basemap.
- Future Land Use Basemap.
- Subwatersheds used for hydrologic analysis including information on applicable release rate management strategies.
- Hydrologic soil groups, development patterns, and floodplains.
- Stream obstructions, flooding, and problem areas.
- Areas where storm sewer networks exist (if available) and areas where proposed storm sewer networks have been identified on development Plans.

Anticipated Product

The product will be the final Phase II Report. The Phase II Report will be prepared in both digital and paper formats.

SubTask D.2 - Model Ordinance Preparation

A Model Ordinance which includes the provisions and standards developed during Phase II will be created consistent with the Department of Environmental Protection Pennsylvania Model Stormwater Management Ordinance. The WPAC will provide input on which stormwater management standards and criteria will be included as requirements or recommendations. Since implementation of the Model Ordinance provisions could require changes to municipal zoning ordinances, those changes will be documented to ensure the resulting ordinances are properly coordinated. As previously discussed, the Model Ordinance will be designed to meet the requirements, to the maximum extent practical, of Act 167, the PA Clean Streams Law, and the NPDES Phase II requirements for construction work. The PLAN will provide sound reasoning for setting those standards into law via local ordinances.

Anticipated Product

The product will be the final Model Ordinance. The Model Ordinance will be prepared in both digital and paper formats.

SubTask D.3 - PLAN Adoption

The PLAN will include the final Phase II Report and the Model Ordinance. One copy of the PLAN will be transmitted to the official agency and governing body of each involved municipality, each member of the WPAC, and the DEPARTMENT by official correspondence. The involved municipalities, WPAC, and DEPARTMENT will then review the PLAN. Their review will include an evaluation of the PLAN's consistency with other plans and programs affecting stormwater management. The reviews and comments will be submitted to the COUNTY by official correspondence. The review comments will be received, tabulated, and responded to appropriately and the PLAN will be revised accordingly.

Prior to final PLAN adoption, and as necessary, meetings will be held with each municipality individually as identified in WPAC meetings and municipal training schedule; to identify specific ordinance changes and method(s) of incorporation of the standards and criteria into municipalities' existing ordinance framework. In addition, the meeting(s) can also serve to provide clarification of any remaining questions or concerns that municipalities may have concerning the implementation of the PLAN.

The COUNTY will hold a public hearing concerning the PLAN. A notice for the public hearing will be published at least two (2) weeks before the hearing date. The public hearing notice will contain a brief summary of the principal provisions of the PLAN and a reference to the sites and/or website 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 in the PLAN will be reviewed with the WPAC and incorporated, as applicable.

The Fulton County Commissioners will vote by resolution on the adoption of the PLAN. The resolution will have to be carried by an affirmative vote of at least a majority of the

Commissioners, and should refer expressly to the maps, charts, textual matter, and other materials intended to comprise the PLAN. Upon positive resolution, this action will then be recorded on the adopted PLAN.

The COUNTY will then submit to the DEPARTMENT a letter of transmittal, and three (3) copies of the adopted PLAN, along with a digital version and GIS data layers, the review by the official Planning agency and/or governing body of each municipality, Fulton County Planning Commission, regional planning agencies (Section 6(c) of Act 167), public hearing notice and minutes (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 procedures outlined in Act 167 and will request the DEPARTMENT to approve the adopted PLAN. The COUNTY will also submit to the DEPARTMENT a current list of all names, addresses, and phone numbers of the municipalities, municipal engineers, and solicitors located in Fulton County. Subsequent to the DEPARTMENT's approval of the PLAN, thirty (30) copies of PLAN will be printed and distributed. As desired by the County, the adopted PLAN could be posted on the COUNTY's and/or CONSULTANT's websites.

All backup material including hydrologic and hydraulic analyses of the subwatersheds will be retained at the COUNTY office for future use during PLAN updates or any other reference.

Anticipated Product

The product of this subtask will include the official documentation regarding PLAN adoption and implementation process, including the necessary documentation from the COUNTY certifying the adoption of the PLAN, an adopted PLAN, and associated Plates.

The PLAN will contain, at a minimum, the following items:

1. A survey of existing runoff characteristics in minor as well as large storms, including the impact of soils, slopes, vegetation, and existing development.
2. A survey of existing significant obstructions, their capacities, and associated storm return periods.
3. An assessment of projected and alternative land development patterns in Fulton County, and the potential impact of runoff quantity, velocity, and quality.
4. An analysis of existing and future development in flood hazard areas, and its sensitivity to damages from future flooding or increased runoff.
5. A survey of existing drainage problems and proposed conceptual solutions.
6. A review of existing and proposed stormwater collection systems and their impacts.
7. An assessment of alternative runoff control techniques and their efficiency in the individual subwatershed.
8. An identification of existing and proposed local, State, and Federal flood control projects located in Fulton County and their design capacities.
9. A designation of those areas to be served by stormwater collection and control facilities within a ten (10) 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 FIS delineated floodplains throughout Fulton County.

11. Criteria and standards for the control of stormwater runoff from existing and future development which are necessary to protect water quality minimize dangers to property and life and carry out the purposes of Act 167.
12. A BMP Workshop to inform engineers and local officials about enhanced water quality and groundwater recharge stormwater management techniques (information on BMPs is also to be included or referenced in the PLAN).
13. Priorities for implementation of conceptual solutions.
14. Provisions for periodically reviewing, revising, and updating the PLAN.
15. Provisions as are reasonably necessary to manage stormwater such that land development or activities in each municipality do not adversely affect health, safety, and property in other municipalities of Fulton County and in drainage basins to which the watershed is tributary.
16. Consideration for consistency with other existing municipal, county, regional, and State environmental and land use plans.

APPENDIX D
PHASE II COST PROPOSAL

FULTON COUNTY ACT 167 STUDY

Phase II Cost Proposal

The estimated cost associated with completing the Phase II work is Two Hundred Twenty-Five Thousand Dollars ($225,000.00) as per the following breakdown:

	TIME	EXPENSES	TOTAL
Task A – Data Collection/Review/Analysis	$50,000.00	$2,000.00	**$52,000.00**
Task B – Technical Analysis	$80,000.00	$2,000.00	**$82,000.00**
Task C – Public/Municipal Participation	$30,000.00	$3,000.00	**$33,000.00**
Task D – PLAN Preparation and Implementation	$30,000.00	$5,000.00	**$35,000.00**
Task E – Project Management & Administration	$22,000.00	$1,000.00	**$23,000.00**
PHASE II PROJECT TOTALS:	**$212,000.00**	**$13,000.00**	**$225,000.00**

	TIME	EXPENSES	TOTAL
Fiscal Year #1 (2008 – 2009)	$26,000.00	$4,000.00	**$30,000.00**
Fiscal Year #2 (2009 – 2010)	$105,000.00	$5,000.00	**$110,000.00**
Fiscal Year #3 (2010 – 2011)	$81,000.00	$4,000.00	**$85,000.00**
PHASE II PROJECT TOTALS:	**$212,000.00**	**$13,000.00**	**$225,000.00**

APPENDIX E
PHASE II PRELIMINARY SCHEDULE

FULTON COUNTY ACT 167 STUDY
Phase II Preliminary Schedule

The preliminary Phase II Schedule is as follows:

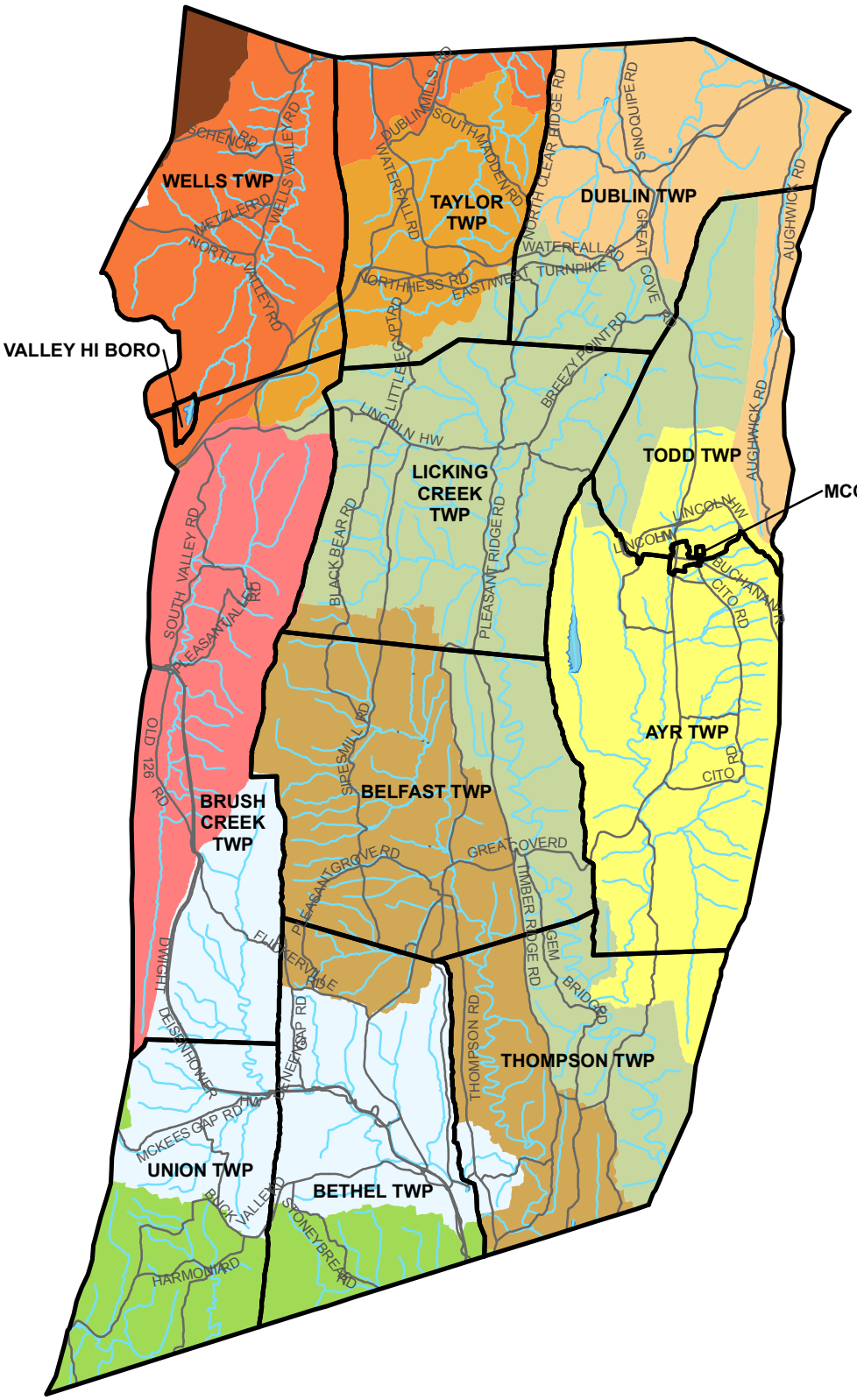
ANTICIPATED DATE	MILESTONE
January 2009	PADEP and Fulton County Phase II Contract Executed
April 2009	WPAC Meeting #3
May 2009	Field View of Problem Areas/Modeling
June 2009	Conceptual Solutions to Problem Areas
January 2010	WPAC Meeting #4
May 2010	Draft Phase II Report
May 2010	Draft Model Ordinance
June 2010	WPAC Meeting #5
July 2010	Finalize Phase II Report, Model Ordinance, and Plates
August 2010	WPAC Meeting #6 and BMP Workshop
September 2010	Public Hearing
November 2010	Commissioners Approval of Phase II Plan
January 2011	Phase II Report Submission to PADEP
January 2011	WPAC Meeting #7, if needed
March 2011	Implementation Workshops
June 2011	PADEP and Fulton County Phase II Contract Expires

This schedule will be re-evaluated at the beginning of Phase II and adjusted as needed.

APPENDIX F
FIGURES

Figure 1: Municipal Boundaries

Fulton County, Pennsylvania



Legend

- STATE ROAD
- STREAM
- WATER BODY
- AUGHWICK CREEK: HQ-CWF
- BRUSH CREEK: HQ-CWF
- COVE CREEK: CWF
- GREAT TROUGH CREEK: TSF
- LICKING CREEK: CWF
- LITTLE TONOLOWAY CREEK: CWF
- POTOMAC RIVER: WWF
- SIDELING HILL CREEK: HQ-CWF
- TONOLOWAY CREEK:WWF
- WOODEN BRIDGE CREEK: HQ-CWF
- MUNICIPAL BOUNDARY

4 2 0 4 Miles

HRG
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www.hrg-inc.com
Offices Statewide

NOTE: Mapping derived from data provided by PennDOT, PA DEP, and USGS.

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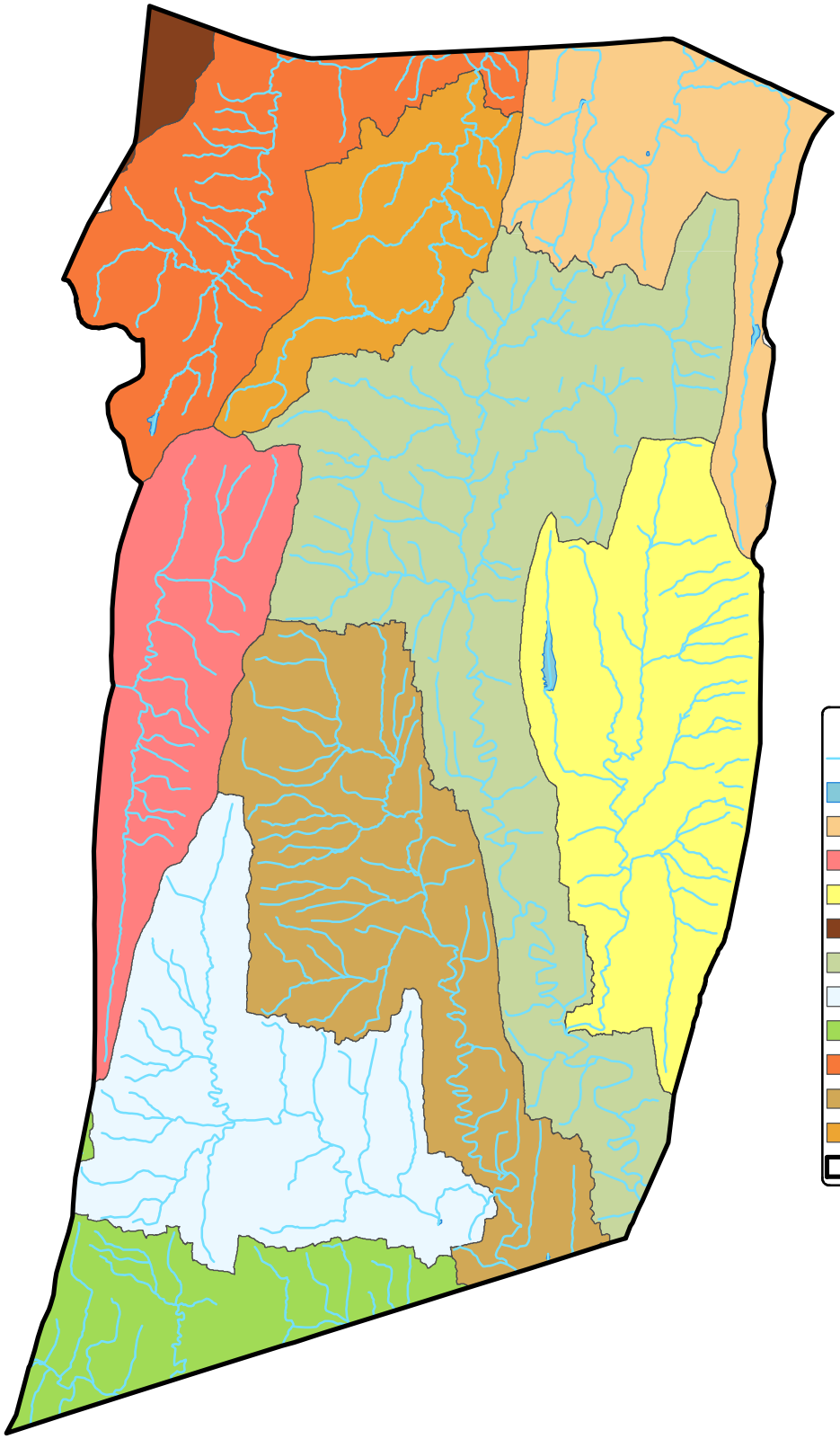
Figure 2: Watershed Boundaries

Fulton County, Pennsylvania



Legend

- STREAM
- WATER BODY
- AUGHWICK CREEK: HQ-CWF
- BRUSH CREEK: HQ-CWF
- COVE CREEK: CWF
- GREAT TROUGH CREEK: TSF
- LICKING CREEK: CWF
- LITTLE TONOLOWAY CREEK: CWF
- POTOMAC RIVER: WWF
- SIDELING HILL CREEK: HQ-CWF
- TONOLOWAY CREEK:WWF
- WOODEN BRIDGE CREEK: HQ-CWF
- COUNTY BOUNDARY

4 2 0 4 Miles

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Fulton County Act 167 Stormwater Management Plan

Problem Areas, Significant Obstructions & Existing Stormwater Systems

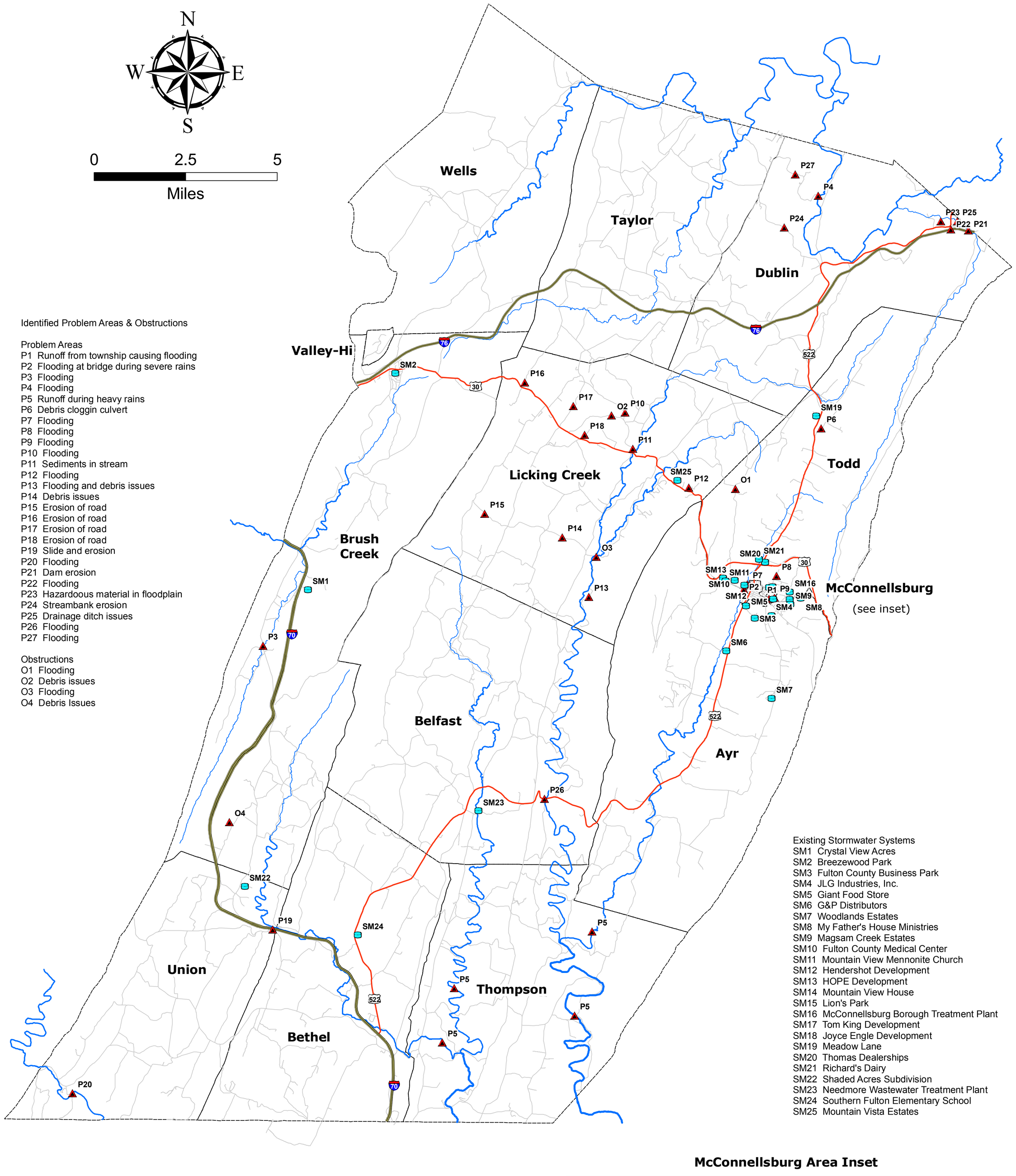
N
W E
S

0 2.5 5
Miles

Identified Problem Areas & Obstructions

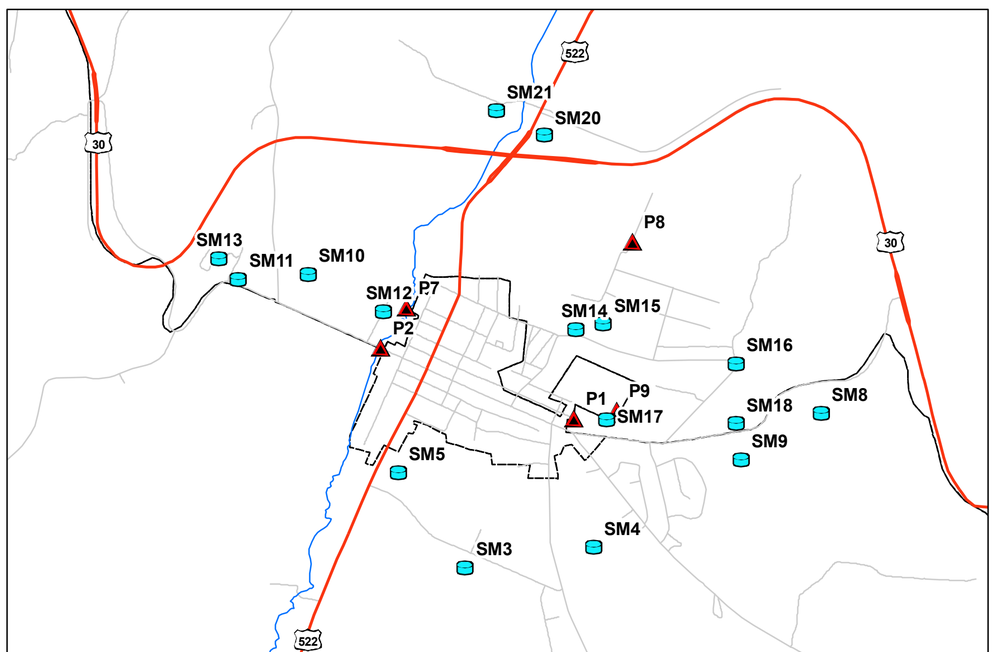
Problem Areas
P1 Runoff from township causing flooding
P2 Flooding at bridge during severe rains
P3 Flooding
P4 Flooding
P5 Runoff during heavy rains
P6 Debris cloggin culvert
P7 Flooding
P8 Flooding
P9 Flooding
P10 Flooding
P11 Sediments in stream
P12 Flooding
P13 Flooding and debris issues
P14 Debris issues
P15 Erosion of road
P16 Erosion of road
P17 Erosion of road
P18 Erosion of road
P19 Slide and erosion
P20 Flooding
P21 Dam erosion
P22 Flooding
P23 Hazardoous material in floodplain
P24 Streambank erosion
P25 Drainage ditch issues
P26 Flooding
P27 Flooding

Obstructions
O1 Flooding
O2 Debris issues
O3 Flooding
O4 Debris Issues



Existing Stormwater Systems
SM1 Crystal View Acres
SM2 Breezewood Park
SM3 Fulton County Business Park
SM4 JLG Industries, Inc.
SM5 Giant Food Store
SM6 G&P Distributors
SM7 Woodlands Estates
SM8 My Father's House Ministries
SM9 Magsam Creek Estates
SM10 Fulton County Medical Center
SM11 Mountain View Mennonite Church
SM12 Hendershot Development
SM13 HOPE Development
SM14 Mountain View House
SM15 Lion's Park
SM16 McConnellsburg Borough Treatment Plant
SM17 Tom King Development
SM18 Joyce Engle Development
SM19 Meadow Lane
SM20 Thomas Dealerships
SM21 Richard's Dairy
SM22 Shaded Acres Subdivision
SM23 Needmore Wastewater Treatment Plant
SM24 Southern Fulton Elementary School
SM25 Mountain Vista Estates

McConnellsburg Area Inset



1 inch equals 2,000 feet

Legend

- Existing Stormwater Systems
- Problem Areas
- Highways
- Major Roads
- Roads
- Municipal Boundaries

The Data contained in this map was provided by the municipalities of Fulton County through completion of a questionnaire. The information was compiled and mapped by the Fulton County Planning & Mapping Office. The Data will be updated as necessary.

Created By: Fulton County Planning & Mapping
November 6, 2008
This data is not survey accurate.