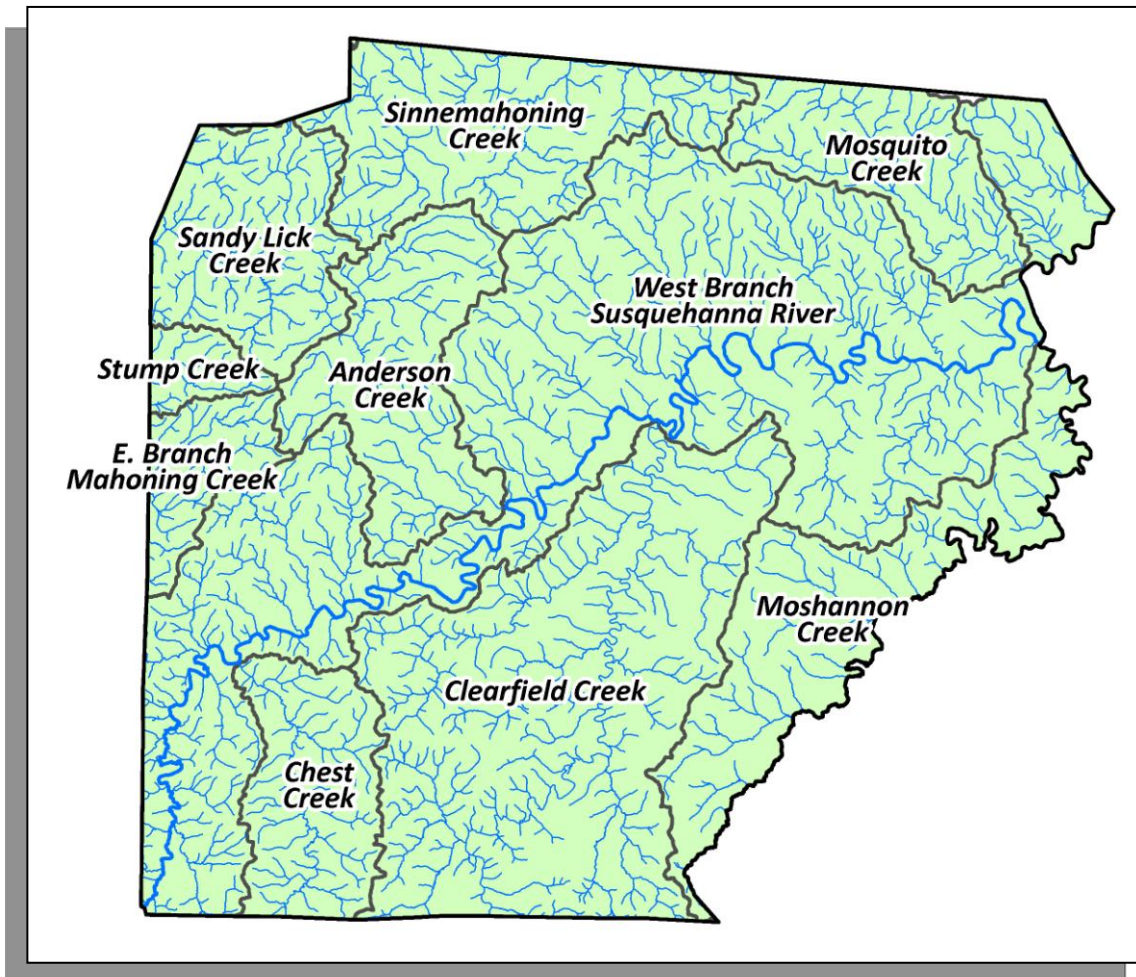


Clearfield County

Act 167 Countywide Watershed Stormwater Management Plan for Clearfield County Phase I – Scope of Study

July 2011



Clearfield County
Act 167 Stormwater Management Plan

Phase I – Scope of Study

| | |
|--|-----------|
| Executive Summary | 1 |
| 1.0 Introduction..... | 5 |
| 1.1. Purpose and Background..... | 5 |
| 1.2. Stormwater Runoff..... | 6 |
| 1.3. Regulations | 7 |
| 2.0 General County Description | 9 |
| 2.1. Land Planning and Land Use..... | 10 |
| 2.2. Water Resources..... | 12 |
| 2.3. Development Activities Related to Stormwater Management..... | 13 |
| 3.0 Phase I Planning Process..... | 15 |
| 3.1. Approach for Plan Development | 15 |
| 3.2. PAC Meetings | 15 |
| 3.3. Municipal Questionnaire..... | 16 |
| 3.4. Other Resources..... | 16 |
| 4.0 Identification of Stormwater Runoff Issues..... | 18 |
| 4.1. Designated Stream Impairments | 18 |
| 4.2. Data Analysis..... | 19 |
| 4.2.1. Anderson Creek..... | 19 |
| 4.2.2. Chest Creek | 20 |
| 4.2.3. Clearfield Creek..... | 23 |
| 4.2.4. East Branch Mahoning Creek..... | 25 |
| 4.2.5. Little Toby Creek..... | 25 |
| 4.2.6. Moshannon Creek | 26 |
| 4.2.7. Mosquito Creek..... | 28 |
| 4.2.8. Sandy Lick Creek | 28 |
| 4.2.9. Sinnemahoning Creek | 31 |
| 4.2.10. Stump Creek..... | 32 |
| 4.2.11. West Branch Susquehanna River | 32 |
| 4.2.12. Problem Areas Identified in Past Act 167 SMPs | 34 |
| 4.3. Identified TMDLs in Clearfield County | 35 |
| 4.4. Summary of Storm Runoff and Waterway Capacity Issues..... | 37 |
| 4.5. Prioritization of Storm Runoff and Waterway Capacity Issues | 37 |
| 4.6. Approach to Addressing Identified Problem Areas | 39 |
| 5.0 Phase II Discussion..... | 46 |
| 5.1 Phase II Scope of Work | 46 |
| 5.2 Municipal Responsibilities after the Adoption of the PLAN..... | 47 |
| 5.3 General Work Plan..... | 48 |
| 5.4 Schedule | 50 |
| 5.5 Estimated Phase II Costs | 50 |

Appendixes

Appendix A – Exhibits

1. Impaired streams by Section 305(b) Report
2. Summary Survey Information – Anderson Creek Watershed
3. Summary Survey Information – Chest Creek Watershed
4. Summary Survey Information – Clearfield Creek Watershed
5. Summary Survey Information – E. Branch Mahoning Creek Watershed
6. Summary Survey Information – Little Toby Creek Watershed
7. Summary Survey Information – Moshannon Creek Watershed
8. Summary Survey Information – Mosquito Creek Watershed
9. Summary Survey Information – Sandy Lick Creek Watershed
10. Summary Survey Information – Sinnemahoning Creek Watershed
11. Summary Survey Information – Stump Creek Watershed
12. Summary Survey Information – West Branch Susquehanna River Watershed (west)
13. Summary Survey Information – West Branch Susquehanna River Watershed (east)
14. Future Growth Areas, and Municipal Survey Identified Stormwater and Flooding Problem Areas
15. Future Growth Areas and Flood Risk

Appendix B – List of PAC members and group representing

Appendix C – Minutes from PAC meetings

Appendix D – Blank Municipal Survey

Appendix E – Consolidation of Municipal Surveys Responses

Appendix F – Phase II Scope of Work

Appendix G – Act 167; Pennsylvania Storm Water Management Act

List of Figures

| | |
|--|----|
| Figure 1. Clearfield County is subdivided into 51 municipalities and is located in west central Pennsylvania. .. | 9 |
| Figure 2. Watershed boundaries in Clearfield County..... | 12 |
| Figure 3. City of Dubois - Sandy Township -Huston Township Growth Area. | 42 |
| Figure 4. Curwensville Borough Growth Area and Clearfield Borough Growth Area. | 43 |
| Figure 5. Decatur-Chester Hill Growth Area and Bradford Township Growth Area. | 44 |

List of Tables

| | |
|---|----|
| Table 1. Municipalities of Clearfield County | 10 |
| Table 2. Land Planning Tools Adopted by Municipalities..... | 11 |
| Table 3. Summary of Impaired Streams in Clearfield County | 18 |
| Table 4. Miles of Impaired Streams in each Watershed..... | 19 |
| Table 5. Impaired Stream Miles in Anderson Creek Watershed | 20 |
| Table 6. Areas of Flooding or Flooding Problems In Anderson Creek Watershed..... | 20 |
| Table 7. Impaired Stream Miles in Chest Creek Watershed | 21 |
| Table 8. Areas of Flooding or Flooding Problems In Chest Creek Watershed | 21 |
| Table 9. Identified Problem Areas in the Chest Creek Watershed | 22 |
| Table 10. Identified Stormwater Management Facilities in the Chest Creek Watershed | 22 |
| Table 11. Impaired Stream Miles in Clearfield Creek Watershed..... | 23 |
| Table 12. Areas of Flooding or Flooding Problems in Clearfield Creek Watershed | 24 |
| Table 13. Identified Problem Areas in the Clearfield Creek Watershed | 24 |
| Table 14. Identified Stormwater Management Facilities in the Clearfield Creek Watershed..... | 25 |
| Table 15. Impaired Stream Miles in East Branch Mahoning Creek Watershed | 25 |
| Table 16. Areas of Flooding or Flooding Problems in E. Branch Mahoning Creek Watershed..... | 25 |
| Table 17. Impaired Stream Miles in Little Toby Creek Watershed | 26 |
| Table 18. Impaired Stream Miles in Moshannon Creek Watershed | 26 |
| Table 19. Areas of Flooding or Flooding Problems in Moshannon Creek Watershed | 27 |
| Table 20. Identified Problem Areas in the Moshannon Creek Watershed..... | 27 |
| Table 21. Identified Stormwater Management Facilities | 28 |
| Table 22. Impaired Stream Miles in Mosquito Creek Watershed | 28 |
| Table 23. Impaired Stream Miles in Sandy Lick Creek Watershed | 28 |
| Table 24. Areas of Flooding or Flooding Problems in Sandy Lick Creek Watershed | 29 |
| Table 25. Identified Problem Areas in the Sandy Lick Creek Watershed..... | 29 |
| Table 26. Identified Stormwater Management Facilities in the Sandy Lick Creek Watershed | 30 |
| Table 27. Impaired Stream Miles in Sinnemanhoning Creek Watershed | 31 |
| Table 28. Areas of Flooding or Flooding Problems in Sinnemanhoning Creek Watershed | 31 |
| Table 30. Impaired Stream Miles in Stump Creek Watershed | 32 |
| Table 31. Impaired Stream Miles in West Branch Susquehanna River Watershed | 33 |
| Table 32. Areas of Flooding or Flooding Problems..... | 33 |
| Table 33. Identified Problem Areas in the West Branch Susquehanna River Watershed | 34 |
| Table 34. Identified Stormwater Management Facilities in the West Branch Susquehanna River Watershed .. | 34 |
| Table 35. TMDLs for stream and Watersheds in Clearfield County | 36 |
| Table 36. Prioritization ranking of identified conveyance/flooding and storm runoff problem areas. | 40 |
| Table 37. Phase II Preliminary Schedule | 51 |
| Table 38. Phase II Total Cost Summary – Clearfield County Stormwater Management Plan | 51 |
| Table 39. Phase II Cost Breakdown – Clearfield County Stormwater Management Plan | 52 |

Executive Summary

The Stormwater Problem

Stormwater is the water that flows from the land surface precipitating as rainfall or snowmelt. The soil and vegetation which cover natural landscapes can absorb as much as 85 percent or more of the rainfall occurring annually. Activities on the landscape that create increased impervious surfaces, and/or remove, compact, or otherwise disturb surface vegetation and soil can significantly increase the amount of stormwater runoff by reducing the amount of water absorbed by the landscape. These activities include: residential, commercial and industrial development; road-building; and surface activities associated with mineral exploration, forestry and agriculture. The resulting impact to the landscape results in decreased infiltration of rain-water, which reduces groundwater recharge and increases the surface runoff. The increase in runoff results in increased flooding and stream erosion.

The development of individual parcels of land is often perceived to have little consequence from a stormwater runoff perspective. The cumulative effect of the development of multiple parcels within watersheds has been observed to cause flooding and erosion, and associated property damage.

The Purpose of Stormwater Management

In response to increased flooding and other problems resulting from uncontrolled stormwater runoff, the Pennsylvania General Assembly enacted the Pennsylvania Stormwater Management Act in 1978 (Act 167). A copy of the Act is included in Appendix G. A primary purpose of Act 167 is to encourage planning and management of storm-water runoff consistent with sound water and land use practices. In its findings statement, the General Assembly identified the need for reasonable regulation of activities causing increased stormwater runoff as “fundamental to protect the public health, safety and welfare, and the protection of the people of the Commonwealth, their resources and the environment.”

As identified in Act 167, managing stormwater responsibly requires the development of standards and procedures based on existing and future development patterns in the County, and the unique physical characteristics of individual watersheds. These policies and standards are to be designed to preserve and restore the flood-carrying capacity of waterways within the county; to preserve natural storm-water runoff regimes; to protect and conserve groundwaters and ground water recharge areas; and to preserve the natural, economic, scenic, aesthetic, recreational and historic values of the environment.

Phase I - Scope of Study

The purpose of the Phase I planning process was to establish the approach or scope of work necessary for preparation of the Act 167 Stormwater Management Plan (SMP). This approach was determined through consideration and review of:

- County objectives for stormwater planning;
- 1978 Act 167 Stormwater Management Act;
- State regulatory statutes impacting stormwater management;
- Geophysical characteristics unique to County watersheds;
- County-wide land use and development patterns (existing and future);
- Storm-water related problems and significant waterway obstructions;
- Prioritization of, and solution strategies for identified stormwater problems; and
- Technical analysis needs for standards development.

Municipal and other stake-holder participation in the Phase I planning process was solicited through creation of a Plan Advisory Committee (PAC) and distribution of a questionnaire to all municipalities. Two (2) PAC meetings were held during the Phase I process. The purpose of these meetings was to gather information on stormwater runoff problems and issues important to the citizens of Clearfield County, to provide an educational background on stormwater management issues, and address concerns and the Act 167 stormwater planning process.

Phase II – The Plan

The outcome of the Phase I Scope of Study (SOS) was development of a detailed scope-of-work and cost estimate for the Phase II (SMP). Development of the SMP involves technical assessment and development of a Model Ordinance (MO). The work includes:

- Further review of existing technical data;
- Field assessment and data collection to analyze identified stormwater runoff and flooding problem areas (25 priority problem areas are identified for analysis in Section 5.5 of this report);
- Technical analysis of field data for identification of problem solutions, including possible stormwater Best Management Practice (BMP) retro-fit opportunities;
- Field evaluation and problem solution identification for stream segments classified as impaired by stormwater-related causes;
- Identification of stormwater critical natural resources worthy of protection (for example, significant recharge areas, water supply areas, or natural flood storage areas);

- Technical analysis for the development of standards and criteria for stormwater management including analysis of urban and rural development patterns, as well as surface activities associated with mineral and gas exploration and forestry.
- Technical analysis for development of alternative standards for areas where infiltration techniques may not be appropriate (Brownfields, some deep-mine areas, etc.).
- Final SMP and MO preparation;
- Facilitation of public participation, including seven (7) PAC meetings, and development and distribution of an informational pamphlet;
- Facilitate Plan adoption and implementation including
 - Facilitating the final SMP public hearing,
 - Development and implementation of a municipal implementation workshop;
 - Development and facilitation of a public implementation workshop.

Benefits of the Proposed Clearfield County SMP

The overriding benefit of the proposed SMP will be improved environmental quality and long-term sustainable water quality for all Clearfield County watersheds. In addition, the following specific benefits will result from development and implementation of the proposed SMP:

- Improved management of stormwater runoff from development activities by both citizens and municipal officials;
- Identification of existing stormwater problems in the County and development of proposed solutions;
- Identification of proposed solutions to existing stormwater-related stream impairments;
- Identification of stormwater critical areas within the county that warrant additional protection to minimize the risk of environmental impacts from development activities (source water areas, flood storage areas, recharge areas, etc.);
- Implementation of stormwater management procedures and practices that provide appropriate protection of water resources;
- Development of stormwater management technical standards consistent with State regulatory standards and Clearfield County goals and objectives;
- Availability of technical and modeling data from the analysis of specific stormwater problem areas and encroachments that can be used by municipal officials to begin the design and permitting activities for modifications of bridges or other encroachments.
- Identification of retrofit opportunities and techniques for existing development within the county.

Cost of the Proposed Clearfield County SMP

The estimated cost associated with completing the Phase II SMP is \$270,000. Act 167 authorizes the Pennsylvania Department of Environmental Protection (DEP) to provide reimbursement to the County for 75% of these costs or \$202,500. The resulting County share is estimated to be \$67,500. Of the County Share, it is anticipated that County in-kind services will account for approximately \$61,524. Therefore, anticipated County out-of pocket costs are estimated to be approximately \$5,976 spread over the estimated project duration of three (3) years.

Acknowledgements

The project team would like to acknowledge the participation and contributions of County Staff and (PAC Members. Their input was critical to the development of the Phase I SOS and will continue to set the direction of the project team through Phase II.

1.0 Introduction

Uncontrolled runoff from development within a watershed increases flood volumes and velocities, contributes to erosion and sedimentation (E&S), stresses the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control storm-water, undermines flood-plain management and flood control efforts in downstream communities, reduces ground-water recharge, and threatens public health and safety.

A comprehensive approach to storm-water management that balances regulation with development and economic needs to address the activities that cause an increase in runoff is fundamental to the public health, safety and welfare of the people of Clearfield County, their resources, and the environment.

1.1. Purpose and Background

Pennsylvania's Stormwater Management Act (Act 167) provides for storm-water planning and management across the Commonwealth. The purpose of Act 167, also known as the Storm Water Management Act, is to:

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

The Phase I SOS develops the Phase II Scope of Work for Stormwater Management Planning under Act 167 in Clearfield County. During Phase I, preliminary data was gathered at two (2) PAC meetings and a Questionnaire was sent to Clearfield County municipalities. The PAC included municipal officials and representatives from watershed associations, industry, and other interested stake-holders. Data collected from the municipal questionnaires and PAC meetings identified water quality issues, drainage problems, flow obstructions, flood control structures, and stormwater collection/conveyance issues in Clearfield County. These data provide the foundation for developing the Clearfield County SMP during Phase II.

Designated watersheds for Act 167 planning in Clearfield County are:

- Anderson Creek,
- Chest Creek,
- Clearfield Creek,
- East Branch Mahoning Creek,
- Little Toby Creek,
- Moshannon Creek,
- Mosquito Creek,
- Sandy Lick Creek,
- Sinnemahoning Creek,
- Stump Creek, and
- West Branch of the Susquehanna River

Existing data and the municipal questionnaire summaries presented in Section 4 indicate that water quality and conveyance problems within Clearfield County watersheds include:

- 720 impaired stream miles (37% of the total stream miles in the County),
 - 650 stream miles (90%) impaired due to abandoned mine drainage (AMD),
 - 140 stream miles impaired due to AMD miles also suffer from siltation issues,
 - 11.5 stream miles impaired due to siltation from small residential runoff,
 - 1.2 stream miles impaired due to siltation from forestry,
 - 2.4 stream miles impaired due to siltation from upstream impoundments,
- Total Maximum Daily Load (TMDL) limits for metals, pH, and inorganics related to AMD,
- Environmental Protection Agency (EPA) approved TMDL limitations for siltation on Stump Creek,
- 33 identified flow obstructions, and
- 35 identified drainage problems.

1.2. Stormwater Runoff

All land disturbance activities impact the magnitude and characteristics of stormwater discharged from a site. These changes can be positive or negative. Activities that reduce impervious area and the overall intensity of development can have a positive impact on the environment by reducing the volume and peak-rate of runoff, and improving the quality of runoff leaving the site. Activities that increase impervious area and/or compact pervious areas increase the volume and peak-rate of runoff, and reduce the overall quality of water leaving the site. These changes often result in flooding, surface erosion, stream-bank erosion, and environmental degradation of habitat within receiving waters. The goal of stormwater management facilities is to manage the quantity and quality of post-development stormwater runoff, and to provide for the safe conveyance of surface flow to downstream receiving waters.

1.3. Regulations

The Act 167 stormwater management program, which requires counties to prepare and adopt watershed-based SMPs, is one (1) component of the Pennsylvania Department of Environmental Protection's (PADEP's) Comprehensive Stormwater Management Policy.

Pennsylvania passed the Clean Streams Law (Act 394) in 1937. The purpose of the Clean Streams Law is to preserve and improve the purity of the waters of the Commonwealth for the protection of public health, animal and aquatic life, and for industrial consumption, and recreation; empowering and directing the creation of indebtedness or the issuing of non-debt revenue bonds by political subdivisions to provide works to abate pollution; providing protection of water supply and water quality; providing for the jurisdiction of courts in the enforcement thereof; providing additional remedies for abating pollution of waters; imposing certain penalties; repealing certain acts; regulating discharges of sewage and industrial wastes; regulating the operation of mines and regulating the impact of mining upon water quality, supply and quantity; placing responsibilities upon landowners and land occupiers and to maintain primary jurisdiction over surface coal mining in Pennsylvania. It is the objective of the Clean Streams Law not only to prevent further pollution of the waters of the Commonwealth, but also to reclaim and restore to a clean, unpolluted condition every stream in Pennsylvania that is presently polluted.

The first United States (US) federal law addressing water pollution was the Federal Pollution Control Act (FPCA) of 1948. Growing awareness and concern for controlling water pollution led to sweeping amendments to the FPCA in 1972. At that time, it was recognized that the nation's waterways could no longer be used as waste conveyance and treatment systems, and the National Pollutant Discharge Elimination System (NPDES) permit program was born. With additional amendments in 1977, the law became known as the "Clean Water Act" (CWA).

The CWA establishes the basic structure for regulating discharges into the waters of the US (generally navigable and interstate waters, their tributaries, and adjacent wetlands). The Act made it unlawful to discharge point source pollutants into waters of the US without a permit.

There were numerous amendments to the CWA in the late 1970's and 1980's, but through the early years of the CWA, focus remained on point source pollutants from sewage treatment facilities and industrial pollutant discharges. Little attention was paid to runoff from streets and highways, residential and commercial development, construction sites, farms, or other potential sources of wet weather pollutants.

In response to amendments to the CWA in 1987, the U.S. Environmental Protection Agency (EPA) developed Phase I of the NPDES Stormwater Program for implementation in 1990. Under NPDES Phase I, permit coverage was required for stormwater discharges from:

- Municipal Separate Storm Sewer Systems (MS4s) in urban areas having populations greater than 100,000;

- Companies that fall within one (1) of the ten (10) categories of industrial activities; and
- Construction activities that disturbed five (5) acres or more.

Starting in the late 1980's, efforts to address "non-point" sources of pollutants in wet weather discharges increased, along with efforts to remediate impaired streams.

In 1999, Phase II of the NPDES program was signed into law. NPDES Phase II regulations expanded the Phase I requirements to require NPDES permit coverage for:

- Small MS4s in urban areas having populations greater than 50,000 or population densities greater than 1,000 persons per square mile; and
- Construction period and post construction period stormwater control for all development activities disturbing one (1) acre or more.

In addition, under NPDES Phase II, regulatory requirements for post-construction stormwater control included water quality and antidegradation requirements. NPDES II regulations went into effect in Pennsylvania in December 2002.

In response to concerns of increased flooding and erosion from accelerated storm-water runoff from development activities, and its associated increased costs to the public, the general assembly of Pennsylvania passed the Stormwater Management Act of 1978 (Act 167). This Act authorized a comprehensive watershed-based storm-water management program requiring local implementation and enforcement of stormwater ordinances. Following adoption of the SMP by the county and approval by the PADEP, anyone engaged in construction activities in the watershed is required to implement storm-water management measures consistent with the SMP. Also, each municipality in the watersheds covered by the SMP must, within six (6) months of PADEP's approval, adopt ordinances consistent with the SMP. Under the Act, PADEP provides grant money to assist counties in the development and implementation of SMPs for designated watersheds.

2.0 General County Description

Clearfield County is located in west central Pennsylvania to the west of the main ridge of the Allegheny Mountains. Clearfield County is mostly rural with steep rolling to hilly topography. The elevation ranges from a low of 789 feet above sea level where the West Branch of the Susquehanna River leaves the County to a high of 2,405 feet on Chestnut Ridge. It is surrounded by Elk and Cameron Counties to the north, Clinton and Centre Counties to the east, Cambria County to the south, and Indiana and Jefferson Counties to the west (Figure 1). The 1,147 square mile county is subdivided into 51 municipalities, 30 townships, 20 boroughs, and one (1) city (Table 1).

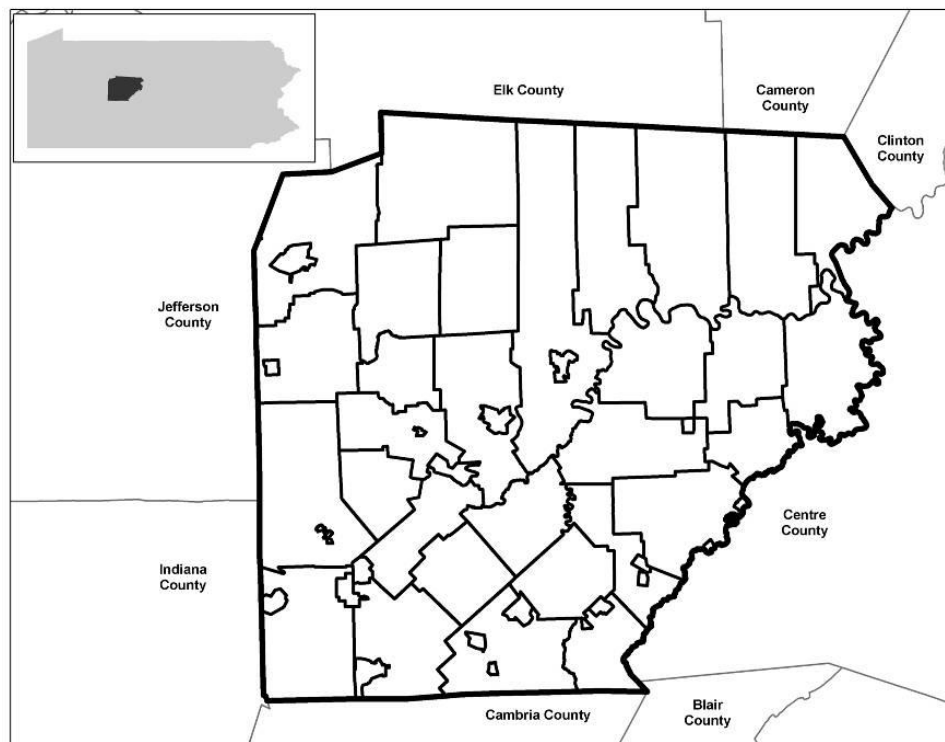


Figure 1. Clearfield County is subdivided into 51 municipalities and is located in west central Pennsylvania.

Table 1. Municipalities of Clearfield County

| Townships | Boroughs | City |
|--------------------|------------------------|-------------|
| Beccaria Township | Brisbin Borough | DuBois City |
| Bell Township | Burnside Borough | |
| Bigler Township | Chester Hill Borough | |
| Bloom Township | Clearfield Borough | |
| Boggs Township | Coalport Borough | |
| Bradford Township | Curwensville Borough | |
| Brady Township | Falls Creek Borough | |
| Burnside Township | Glen Hope Borough | |
| Chest Township | Grampain Borough | |
| Cooper Township | Houtzdale Borough | |
| Covington Township | Irvona Borough | |
| Decatur Township | Lumber City Borough | |
| Ferguson Township | Mahaffey Borough | |
| Girard Township | New Washington Borough | |
| Goshen Township | Newburg Borough | |
| Graham Township | Osceola Mills Borough | |
| Greenwood Township | Ramey Borough | |
| Gulich Township | Troutville Borough | |
| Huston Township | Wallaceton Borough | |
| Jordan Township | Westover Borough | |
| Karthaus Township | | |
| Knox Township | | |
| Lawrence Township | | |
| Morris Township | | |
| Penn Township | | |
| Pike Township | | |
| Pine Township | | |
| Sandy Township | | |
| Union Township | | |
| Woodward Township | | |

2.1. Land Planning and Land Use

The municipalities of Clearfield County have utilized planning tools to a varying extent (see Table 2). According to the Clearfield County Comprehensive Plan 2006 Update, eighteen (18) municipalities have adopted their own comprehensive plan or a joint municipal comprehensive plan with another municipality. Eleven (11) municipal comprehensive plans are more than ten (10) years old. Several municipalities have developed comprehensive plans in the past, but never formally adopted them. Eighteen (18) of the municipalities have adopted a Subdivision and Land Development Ordinance (SALDO). The other 33 municipalities fall under the jurisdiction of the County's SALDO. Zoning is the least used planning tool in Clearfield County. Only seven (7) of the municipalities have zoning ordinances.

Table 2. Land Planning Tools Adopted by Municipalities

| Municipalities with Planning Commission | Municipalities with Comprehensive Plans | Municipalities with Zoning Ordinances |
|--|--|--|
| Bell Township | Bell Township | Clearfield Borough |
| Bradford Township | Brady Township | Curwensville Borough |
| Brady Township | Brisbin Borough | DuBois City |
| Clearfield Borough | Clearfield Borough | Falls Creek Borough |
| Cooper Township | Cooper Township | Lawrence Township |
| Curwensville Borough | Curwensville Borough | Sandy Township |
| Decatur Township | Decatur Township | Woodward Township |
| DuBois City | DuBois City | |
| Falls Creek Borough | Falls Creek Borough | |
| Lawrence Township | Girard Township | |
| Mahaffey Borough | Graham Township | |
| Morris Township | Houtzdale Borough | |
| Sandy Township | Lawrence Township | |
| Wallaceton Borough | Mahaffey Borough | |
| Woodward Township | Osceola Mills | |
| | Sandy Township | |
| | Troutville Borough | |
| | Woodward Township | |

The county is rural in character with approximately 80 percent of the county landscape undeveloped. The amount of undeveloped land in the County has increased over the past 50 years due to a decrease in active agriculture and mining, which are both considered as development from a land use classification perspective. The amount of land in residential uses increased six-fold over the same time period.

An analysis of land use and development potential was conducted as a part of the 2006 update to the Clearfield County Comprehensive Plan. This analysis included consideration of limiting factors, such as environmental sensitivity, unsuitable soils, steep slopes, state-owned land, and land currently occupied by roads, water, rails, and existing structures. In addition, consideration was given to the location of existing infrastructure, as well as possible future infrastructure expansions. As a result of this analysis, the following future growth areas are identified in the Clearfield County Comprehensive Plan:

- DuBois City, Sandy Township & Huston Township area
- Clearfield Borough and Lawrence Township Area
- Areas adjacent to Philipsburg Borough and Decatur Township
- Curwensville Borough and Pike Township area
- Woodland and Bradford Township Area
- Kylertown and Cooper Township along State Route 53
- Karthaus Township in the CCEDC Industrial Park.

Figure 5o from the Comprehensive Plan includes an image of Potential Target Areas for Development. Comprehensive Plan mapping is available on the Clearfield County Geographic Information Systems (GIS) website at <http://gis.clearfieldco.org/mapping/temp/>.

Even with the additional development in these areas, the county will remain nearly 80 percent rural. Refer to the Land Use Figure and Figure 5o from the Clearfield County Comprehensive Plan for more detail on current and future land use in the County.

Interstate 80 and US Routes 322 and 219 bisect the County. Several active railroad lines also cross the County. Refer to Figure 10b in the Clearfield County Comprehensive Plan for more detail on transportation facilities in the County.

2.2. Water Resources

There are 1,960 miles of stream in eleven 11 major watersheds in Clearfield County as illustrated in Figure 2.



Figure 2. Watershed boundaries in Clearfield County.

The West Branch of the Susquehanna River and its tributaries form the principal drainage system of Clearfield County. A small area in the northwestern corner of the County drains to the Ohio River Basin and includes Sandy Lick Creek, Stump Creek and East Branch Mahoning Creek Watersheds. The majority of the County is in the Susquehanna River Basin, which is part of the Chesapeake Bay Watershed.

There are three (3) federal flood control projects in Clearfield County constructed and regulated by the United States Army Corp of Engineers (ACOE) which include the dam at Curwensville on the West Branch of the Susquehanna River, a flood control levee in Westover Borough along Chest Creek, and a flood control structure of an unnamed tributary to the Moshannon Creek in Osceola Mills Borough.

The PADEP Bureau of Waterways Engineering constructed two (2) flood control projects in Clearfield County. These facilities include the Clearfield Creek and Watmer Run flood control projects in Irvona, and the Tanners Run flood control project in Curwensville.

As reported in the municipal surveys, there are also structures to help reduce flooding in Chester Hill Borough and Decatur Township along the Moshannon Creek, and in DuBois and Sandy Township along the Sandy Lick Creek.

Three (3) additional dams were identified in Clearfield County. The first is operated by the State Department of Conservation and Natural Resources (DCNR) as a recreational facility at Parker Dam State Park. There are two (2) additional low head dams on the West Branch of the Susquehanna River; these are the Raftmans' Memorial Dam in Clearfield Borough and the Shawville power plant dam in Goshen Township. These dams were not intended for flood control.

Figure x2 in the Clearfield County Comprehensive Plan titled Clearfield County Steep Slopes (<http://gis.clearfieldco.org/mapping/temp/>) shows that many of the streams, particularly in the West Basin of the Susquehanna River Watershed, are located in deep valleys with steep to very steep slopes. These areas of steep valley slopes correspond to narrow floodplains as seen on Figure 5h, Clearfield County Floodplains, from the Clearfield County Comprehensive Plan. Figure 5i, Clearfield County Flood Loss Risk, shows that a significant number of buildings have some risk of flood loss. The buildings most at risk are concentrated in Sandy Township, the City of DuBois, Clearfield Borough, Lawrence Township, Morris Township, Decatur Township, Coalport Borough, Mahaffey Borough, Bell Township, Greenwood Township, Bigler Township, Burnside Borough/Township, Westover Borough, Irvona Township and Beccia Township.

2.3. Development Activities Related to Stormwater Management

Significant activities within the County that have an impact on storm runoff include general housing and commercial land development and industrial activities. Significant industrial activities include mining, timbering, and gas extraction. All of these activities can have an impact on the magnitude and quality of storm runoff.

Clearfield County is predominantly rural, and development activities are often small in scale and scattered. The Clearfield County Comprehensive Plan identifies several additional anticipated concentrated residential and commercial growth areas (see Comprehensive Plan growth area mapping at <http://gis.clearfieldco.org/mapping/temp/>). Key growth areas are also identified on Exhibit 14 in Appendix A. These key growth areas coincide with areas having existing or planned water and sewer service, and generally include the following municipalities and surrounding areas:

- Curwensville Borough
- Clearfield Borough and
- DuBois City.

Other areas of Clearfield County identified as growth areas include:

- Route 255 from DuBois to the Pennfield Area (mostly in Houston Township),
- Route 970 from Route 322 to Route 80 in Bradford Township,
- Route 322 from Philipsburg to Wallacetown Borough, Boggs, and Decatur Townships.

Coal mining is still an active industry in Clearfield County. In 2002, the County had the highest number of bituminous surface mine operators, employees and active mine sites in Pennsylvania. Clay, sandstone, and shale are also being mined in the County. Resource extraction is regulated at the State level, so there is currently no mechanism for local municipalities to regulate mining to protect water quality. Past mining activities have done significant damage to water quality and abandoned mine drainage (AMD) is the most prevalent water quality problem in the County

In addition, gas extraction has recently become a significant activity in Clearfield County. There have been shallow wells drilled mostly in the southeast and deep wells drilled mostly in the northwest. The recent discovery of the large volume of natural gas in Marcellus Shale, which underlies the entire County, is expected to greatly increase drilling activities. The method used to extract gas from the Marcellus Shale involves hydraulic fracturing, which requires pumping water and sand under high pressure into the rock causing it to fracture and release the gas. Hydraulic fracturing requires a large volume of water, which could potentially impact other water resources. It also involves the creation of numerous surface ponds for holding process water (clean and contaminated). These activities involve the disturbance of significant land areas during the extraction process, possibly impacting surface runoff quality and quantities.

3.0 Phase I Planning Process

Act 167 planning is conducted in two (2) phases. The purpose of the Phase I SOS is to identify the detailed Scope of Work and the costs necessary for Phase II, preparation of the final SMP for designated watersheds within Clearfield County.

All activities conducted during this Phase I SOS for the Clearfield County SMP are designed to meet the requirements of the Pennsylvania Storm Water Management Act (Act 167). SMP content is identified in Section 5 of Act 167 (See copy in Appendix G).

3.1. Approach for Plan Development

The goal of this Phase I SOS is to identify the detailed scope of work for Phase II, the Clearfield County Act 167 SMP and MO.

Background information used to identify key problems and priorities for the Clearfield County Act 167 SMP was collected through interaction at PAC meetings and through responses to municipal surveys distributed to all municipalities. This input was compiled with other available resource materials, including the Clearfield County Comprehensive Plan data, DEP stream impairment and TMDL tabulations, and the Clearfield County (flood) Hazard Mitigation Plan to identify critical flood and stormwater runoff issues within the County. This information coupled with feedback from county planning staff and requirements outlined in Act 167 as identified in Section 4.0 above was used to identify an appropriate Phase II Scope of Work.

3.2. PAC Meetings

To kick-off the Phase I project, two (2) PAC meetings were held in Clearfield on 9/18/08 and 11/12/08 to explain and develop the goals and objectives of the Clearfield County SMP and to emphasize the critical role of individual municipalities and citizen groups in guiding the preparation of the SMP. The meetings were conducted by the project lead and staff engineer from Pennoni, Clearfield County Department of Planning personnel, and PADEP. The information presented at the meetings included:

- An overview of the Act 167 planning process, including its history, purpose, and scope.
- An overview of storm-water management in Pennsylvania, including a discussion of the importance of storm-water management; the environmental impacts caused by unmanaged stormwater runoff from development activities; and the regulatory history of storm-water management, including recent developments and regulatory activities.
- A brief overview of hydrologic processes from a layman's perspective to provide members with a better understanding of the complex nature of storm-water issues.
- An overview of the specific work elements to be undertaken as a part of development of the Clearfield County SMP.
- A discussion of the end-products that will be produced as a part of the SMP.

Attendees were encouraged to ask questions about the process, provide information about existing watershed problems and identify available data and studies that could be incorporated into the project. Minutes from these meetings are attached to this report in Appendix B.

A third PAC meeting is to be scheduled near the end of the Phase I project to present the results of the SOS.

3.3. Municipal Questionnaire

A municipal questionnaire was developed to solicit information on existing watershed problems within the County. The questionnaires were distributed to all municipality supervisors, council members, watershed associations, the Clearfield County Conservation District, and other identified stakeholders. A copy of the questionnaire is included in Appendix D and a summary of the information provided by each municipality on a question-by-question basis is provided in Appendix E. The feedback provided from the Questionnaires is summarized in Section 4.2 of this SOS.

3.4. Other Resources

The following additional resources and documents were reviewed to assist in development of this SOS:

- Impaired reaches of waterways within the county and the sources of those impairments as identified by PA DEP
- Clearfield County SALDO
- Clearfield County Comprehensive Plan
- Clearfield County Emergency Management Plan
- Clearfield County Hazard Mitigation Plan
- County mapping/GIS data
 - Mapping from the Comprehensive Plan
 - GIS data
 - County data
 - Pennsylvania Spatial Data Access (PASDA)
- Existing SMPs
 - Westover Borough Storm Water Feasibility Study
 - Sandy Lick Creek Watershed
 - Upper Mahoning Creek Watershed
 - Chest Creek Watershed
- Existing FEMA Flood Insurance Studies
 - Beccaria Township
 - Bell Township
 - Bigler Township

- Burnside Borough
- Chester Hill Borough
- Clearfield Borough
- Coalport Borough
- Decatur Township
- Dubois City
- Falls Creek Borough
- Grampian Borough
- Gulich Township
- Huston Township
- Irvona Borough
- Larwence Township
- Mahaffey Borough
- Morris Township
- Osceola Borough
- Penn Township
- Pike Township
- Sandy Township
- Westover Borough

4.0 Identification of Stormwater Runoff Issues

Stormwater runoff issues were compiled through a review of Clean Water Act (CWA) Section 305(b) waterway impairments, the results of a municipal survey, and consideration of established Total Maximum Daily Loads (TMDLs) in County waterways.

4.1. Designated Stream Impairments

Past land use, particularly mining activities have left over 37% (717 miles) of the 1,960 miles of streams impaired. Of those 717 impaired stream miles, 140 miles also have siltation impairments and two (2) mi suffer from habitat modification. A stream is considered impaired when it is not able to meet its designated use. Table 3 provides a summary of dominant causes of stream impairment in the county, and the percentage each primary cause constitutes of the total number of stream miles. Exhibit 1 in Appendix A illustrates all the CWA, Section 305(b) reported impaired reaches in Clearfield County. These impairments are color coded by the primary cause of impairment. It is noted that other minor causes of impairment are included in the 305(b) listing, but only the primary cause is listed in Exhibit 1.

Table 3. Summary of Impaired Streams in Clearfield County

| | Stream Miles | % of Total Stream Miles |
|--|---------------------|--------------------------------|
| Total Miles of Streams in Clearfield Co | 1,960 | 100% |
| Total Miles of Impaired Stream | 716.9 | 37% |
| General Cause for Impairment | | |
| Abandoned Mine Drainage | 652.8 | 33% |
| Atmospheric Deposition - pH | 14.7 | 0.8% |
| Small Residential Runoff | 11.5 | 0.6% |
| Industrial Point Source | 9.3 | 0.5% |
| Draining or Filling | 7.6 | 0.4% |
| Grazing Related Agriculture | 5.9 | 0.3% |
| Source Unknown - Cause Unknown | 5.4 | 0.3% |
| Natural Sources - Water/Flow Variability | 3.7 | 0.2% |
| Upstream Impoundment | 2.4 | 0.1% |
| Silviculture | 1.2 | 0.1% |
| Habitat Modification | 1.1 | 0.1% |
| Package Plants | 0.9 | 0.1% |
| Surface Mining | 0.5 | 0.05% |

Review of Exhibit 1 indicates that a third of the streams in the County are impaired due to AMD. In comparison, the other causes of impairment are relatively insignificant on the County-wide scale. Sections 4.2.1 through 4.2.11 of this SOS provide information on stream impairments grouped by watershed.

AMD is a problem throughout Clearfield County, and the other causes of impairment are primarily found in the Clearfield Creek, Moshannon Creek, and Chest Creek Watersheds. Table 4 summarizes the miles of streams in each watershed along with the miles and percentage of impaired streams. The Moshannon Creek Watershed has the highest percentage of impairment with 88% of the stream miles impaired.

Table 4. Miles of Impaired Streams in each Watershed
(Sorted by percentage of impaired stream miles)

| Watershed | Total Stream Miles | Miles Impaired | % Impaired |
|-------------------------------|---------------------------|-----------------------|-------------------|
| Moshannon Creek | 163.4 | 144.2 | 88% |
| Clearfield Creek | 361.8 | 171.7 | 47% |
| Anderson Creek | 120.6 | 55.8 | 46% |
| West Branch Susquehanna River | 741.2 | 247.3 | 33% |
| Sandy Lick Creek | 132.7 | 30.8 | 23% |
| Stump Creek | 24.5 | 4.6 | 19% |
| Mosquito Creek | 100.2 | 17.3 | 17% |
| Sinnemahoning Creek | 165.1 | 26.5 | 16% |
| Chest Creek | 95.0 | 6.8 | 7% |
| E. Branch Mahoning Creek | 57.8 | 3.1 | 5% |
| Little Toby Creek | 0.4 | 0.0 | 0% |

4.2. Data Analysis

Problems within each watershed were compiled and summarized to assist in identifying the primary stormwater and flooding issues in the County. This compilation was developed using results of the municipal questionnaire (described in Section 3.3) and stream impairment data. A summary of the information provided by each municipality question-by-question is provided in Appendix E. Although this information was gathered by municipality, it is more meaningful for storm-water management planning purposes if it is considered by watershed. The issues identified in the municipal questionnaires were mapped in a GIS database (when location specific data was provided) and maps with summary tables were developed for each watershed. Section 4.2.1 through 4.2.11 of this SOS provide specific data for each watershed, including the number of impaired stream miles by the primary cause of impairment, and the problems identified in the municipal survey.

4.2.1. Anderson Creek

Of the 120.6 miles of streams in the Anderson Creek Watershed, 55.8 miles or 46% are impaired (Exhibit 1 and Table 5). The only documented cause of impairment in this Watershed

is AMD. The AMD problems are focused in the southern part of the watershed in Bloom and Pike Townships, and Grampian and Curwensville Boroughs.

Table 5. Impaired Stream Miles in Anderson Creek Watershed

| | Total Stream Miles | Miles of Impaired Stream | % of Impaired Stream From Each Cause |
|--|--------------------|--------------------------|--------------------------------------|
| Anderson Creek | 120.6 | 55.8 | |
| Abandoned Mine Drainage- Metals | | 23.6 | 42% |
| Abandoned Mined Drainage -Metals and pH | | 28.8 | 52% |
| Abandoned Mined Drainage –Metals, pH, and other organics | | 3.4 | 6% |

There was one (1) area of flooding reported in the Anderson Creek Watershed in Curwensville Borough. No other problem areas, areas of flooding, or stormwater management facilities were reported in the questionnaires (Exhibit 2 in Appendix A).

Table 6. Areas of Flooding or Flooding Problems In Anderson Creek Watershed

| # | Municipality | Problem or Cause | Problem Category |
|----|----------------------|--|------------------|
| 35 | Curwensville Borough | Anderson Ave – road and homes flood in heavy rains | 2 |

Flooding Problem Category

1. Inadequate storm sewer system
2. Runoff from development/population center
3. Obstruction
4. Other flooding problems

4.2.2. Chest Creek

There are 95 miles of streams in the Chest Creek Watershed, and 6.8 miles or 7% are impaired (Exhibit 1 and Table 7). There are a variety of reasons for the stream impairment in this Watershed. The primary cause, accounting for almost half of the impairment, is draining or filling. AMD impacted about 0.6 miles of stream in this watershed. The impaired reaches are primarily located in Chest Township, but are also in Burnside Township and Westover Borough.

Exhibit 3 in Appendix A shows the locations of the areas of flooding, problem areas or stormwater management facilities in the Chest Creek Watershed that were identified by responses to the municipal questionnaires.

Table 7. Impaired Stream Miles in Chest Creek Watershed

| | Total Stream Miles | Miles of Impaired Stream | % of Impaired Stream From Each Cause |
|---|--------------------|--------------------------|--------------------------------------|
| Chest Creek | 95.0 | 6.8 | |
| Abandoned Mine Drainage-Siltation | | 0.6 | 9% |
| Atmospheric Deposition - pH Draining or Filling- Siltation; | | 0.7 | 10% |
| Road Runoff-Siltation | | 3.2 | 48% |
| Industrial Point Source-Thermal modifications | | 1.0 | 14% |
| Small Residential Runoff-Siltation | | 0.0 | 0% |
| Source Unknown | | 1.3 | 19% |

Reported areas of flooding are confined to Westover Borough, along State Route 36 in southern Chest Township, close to the main-stem of Chest Creek and in Mahaffey Borough near the confluence of Chest Creek and the West Branch of the Susquehanna. These flooding areas are summarized in Table 8.

Table 8. Areas of Flooding or Flooding Problems In Chest Creek Watershed

| # | Municipality | Problem or Cause | Problem Category |
|----|-------------------------------|--|------------------|
| 20 | Chest Twp | Flooding along SR 36 along Chest Creek | 4 |
| 36 | Chester Hill Borough | Flooding of homes, streets yards at Florence, Grace and Allen Streets | 2 |
| 37 | Chester Hill Borough | Flooding of Clover Presque Isle and Gertrude | 2 |
| 16 | Westover Borough | Ashcroft Run Bridge, SR 36 | 3 |
| 17 | Westover Borough | East Bridge St over Unnamed Tribe (culvert too small) | 4 |
| 18 | Westover Borough | No drainage in park | 4 |
| 19 | Borough | no back flow valves for culverts in FEMA embankment | 4 |
| 14 | Bell Twp/ Mahaffey Borough | McGees Mills Intersection SR 36 & US 219, Mahaffey Camp Grounds along US 219 & SR 36 | 2 |

Flooding Problem Category

1. Inadequate storm sewer system
2. Runoff from development/population center
3. Obstruction
4. Other flooding problems

Reported stormwater problem areas are confined to Westover Borough and southern Chest Township close to the main-stem of Chest Creek. These problem areas are summarized in Table 9.

Table 9. Identified Problem Areas in the Chest Creek Watershed

| # | Municipal | Description of Problem | Problem Category | Owner |
|----|----------------------|---|------------------|-------|
| 27 | Chest Twp | Bridge - Main St over Chest Creek | 4 | 2 |
| 40 | Chester Hill Borough | Stormwater problem area from Chest Creek Watershed Act 167 Plan | 7 | 3 |
| 41 | Chester Hill Borough | Stormwater problem area from Chest Creek Watershed Act 167 Plan | 7 | 3 |
| 21 | Westover Borough | E. Bridge St over trib, culvert too small | 1 | 2 |
| 22 | Westover Borough | RR bridge over trib | 3 | 1 |
| 23 | Westover Borough | Corman Culvert near West over Municipal Bldg, Tannery Rd & W. Bridge St | 1 | 1 |
| 24 | Westover Borough | RR Bridge over Chest Creek | 3 | 2 |
| 26 | Westover Borough | Ashcroft Run Bridge, S. Main Street/ SR 36 bridge | 3 | 2 |
| 25 | Westover Borough | no drainage in park | 7 | 1 |
| 28 | Westover Borough | No backflow valves for culverts in FEMA embankment | 7 | 3 |

Problem Area Category

1. Culvert – Size issue
2. Culvert – Debris/clogging issue
3. Bridge – Size issue
4. Bridge – Debris/clogging issue
5. Other Obstruction
6. Water quality
7. Other problem

Ownership/Responsible Entity

1. Municipality
2. PennDOT
3. Other

There was only one stormwater management facility reported in the Chest Creek Watershed, which is located in southeast Bell Township (Table 10).

Table 10. Identified Stormwater Management Facilities in the Chest Creek Watershed

| # | Municipality | Name |
|----|--------------|---|
| 37 | Bell Twp | Stripping operation, Bethlehem Rd |
| 43 | Ferguson Twp | Identified by 2002 Chest Creek Act 167 Plan |
| 44 | Ferguson Twp | Identified by 2002 Chest Creek Act 167 Plan |
| 45 | Ferguson Twp | Identified by 2002 Chest Creek Act 167 Plan |
| 46 | Ferguson Twp | Identified by 2002 Chest Creek Act 167 Plan |

4.2.3. Clearfield Creek

The Clearfield Creek Watershed has the second largest number of stream miles (after the West Branch of the Susquehanna River Watershed) and the second highest percentage of impaired stream miles (after the Moshannon Creek Watershed) in Clearfield County. Of the 361.8 miles of streams in the Clearfield Creek Watershed, 171.7 miles or 47% are impaired (Exhibit 1 and Table 11). By far, AMD is the main cause of impairment; 72% of impairment is due to AMD. Just about the entire main stem of Clearfield Creek and many of its tributaries are impaired from AMD. Impaired streams are located in Beccaria, Bigler, Boggs, Bradford, Gulich, Jordan, Knox, Lawrence and Woodward Townships, and Coalport, Glen Hope, Irvona, and Ramey Boroughs.

Table 11. Impaired Stream Miles in Clearfield Creek Watershed

| | Total Stream Miles | Miles of Impaired Stream | % of Impaired Stream From Each Cause |
|--|--------------------|--------------------------|--------------------------------------|
| Clearfield Creek | 361.8 | 171.7 | |
| Abandoned Mine Drainage – Metals and/or pH | | 107.4 | 63% |
| Abandoned Mine Drainage- Other Organics | | 2.7 | 1% |
| Abandoned Mine Drainage- Metals and Siltation | | 13.4 | 8% |
| Atmospheric Deposition - pH | | 9.1 | 5% |
| Draining or Filling Siltation | | 4.3 | 3% |
| Grazing Related Agriculture – Siltation | | 5.9 | 3% |
| Habitat Modification-Siltation | | 1.1 | 1% |
| Industrial Point Source- Thermal Modifications | | 7.3 | 4% |
| Natural Sources, Water/Flow Variability | | 3.7 | 2% |
| Package Plants | | 0.9 | 1% |
| Silvaculture and Acid Mine Drainage | | 1.2 | 1% |
| Small Residential Runoff- Siltation and Acid Mine Drainage | | 10.3 | 6% |
| Source Unknown | | 4.0 | 2% |
| Surface Mining-Abandoned Mine Drainage and Siltation | | 0.3 | 0% |

Exhibit 4 in Appendix A shows the locations of the areas of flooding, problem areas or stormwater management facilities in the Chest Creek Watershed that were identified by responses to the municipal questionnaires.

Reported areas of flooding are located in Coalport and Glen Hope Boroughs along the main-stem of Clearfield Creek or near confluences of tributaries with the main-stem. There is also an area of flooding along Gazzam Run in Ferguson Township. These problem areas are summarized in Table 12.

Table 12. Areas of Flooding or Flooding Problems in Clearfield Creek Watershed

| # | Municipality | Problem or Cause | Problem Category |
|----|-------------------|---|------------------|
| 25 | Beccaria Twp | Flooding - part of proposed Coalport flood protection project | 2 |
| 24 | Bigler Twp | Two bridges in Floodplain | 3 |
| 21 | Coalport Borough | Flooding on Clearfield Creek | 4 |
| 22 | Coalport Borough | Flooding on Blain Run | 4 |
| 23 | Coalport Borough | Flooding on Meyers Run | 4 |
| 15 | Ferguson Twp | Flooding on Gazzam Run | 4 |
| 32 | Glen Hope Borough | Flooding of Glen Hope Park | 4 |

Flooding Problem Category

1. Inadequate storm sewer system
2. Runoff from development/population center
3. Obstruction
4. Other flooding problems

Reported stormwater problem areas are confined to Bigler and Bradford Townships due to bridges or culverts obstructing flow and leading to flooding. These problem areas are summarized in Table 13.

Table 13. Identified Problem Areas in the Clearfield Creek Watershed

| # | Municipal | Description of Problem | Problem Category | Owner |
|----|--------------|--|------------------|-------|
| 29 | Bigler Twp | Bridge in floodplain | 3 | 2 |
| 30 | Bigler Twp | Bridge in floodplain | 3 | 1 |
| 31 | Bradford Twp | Culverts at Dale Rd over Valley Fork Run | 1 | 1 |

Problem Area Category

1. Culvert – Size issue
2. Culvert – Debris/clogging issue
3. Bridge – Size issue
4. Bridge – Debris/clogging issue
5. Other Obstruction
6. Water quality
7. Other problem

Ownership/Responsible Entity

1. Municipality
2. PennDOT
3. Other

There was only one (1) stormwater management facility reported in the Clearfield Creek Watershed which is located in Bradford Township (Table 14). The stormwater management facility for the Wal-Mart warehouse (#39) is located very close to the watershed, but actually falls within the West Branch Susquehanna River Watershed.

Table 14. Identified Stormwater Management Facilities in the Clearfield Creek Watershed

| # | Municipality | Name |
|----|--------------|-----------------|
| 40 | Bradford Twp | Con-Way Express |

4.2.4. East Branch Mahoning Creek

The East Branch Mahoning Creek, tributary to Mahoning Creek, is a small watershed in Clearfield County. Of the total of 57.8 stream miles, 3.1 miles or 5% are impaired (Exhibit 1 and Table 15). The cause of impairment is AMD, which is located in Brady Township.

Table 15. Impaired Stream Miles in East Branch Mahoning Creek Watershed

| | Total Stream Miles | Miles of Impaired Stream | % of Impaired Stream From Each Cause |
|---|--------------------|--------------------------|--------------------------------------|
| E. Branch Mahoning Creek | 57.8 | 3.1 | |
| Abandoned Mine Drainage – Metals and/or pH | | 3.1 | 100% |

Exhibit 5 in Appendix A shows the locations of the areas of flooding, problem areas or stormwater management facilities in the East Branch of the Mahoning Creek Watershed that were identified by responses to the municipal questionnaires.

Reported areas of flooding are in Brady Township along the main stem of the East Branch of the Mahoning Creek (Table 16).

Table 16. Areas of Flooding or Flooding Problems in E. Branch Mahoning Creek Watershed

| # | Municipality | Problem or Cause | Problem Category |
|----|--------------|---|------------------|
| 29 | Brady Twp | Flooding along E Branch Mahoning (no specific location) | 4 |

Flooding Problem Category

1. Inadequate storm sewer system
2. Runoff from development/population center
3. Obstruction
4. Other flooding problems

There were no problem areas or stormwater management facilities reported in the East Branch of the Mahoning Creek Watershed

5.2.5. Little Toby Creek

Only a very small portion of the Little Toby Creek is in Clearfield County. Two (2) short segments of headwater streams totaling 0.4 steam miles are located and Sandy and Huston Townships. There are no impairments in Little Toby Creek in Clearfield County (Exhibit 1 and Table 17).

Table 17. Impaired Stream Miles in Little Toby Creek Watershed

| | Total Stream Miles | Miles of Impaired Stream | % of Impaired Stream From Each Cause |
|--------------------------|--------------------|--------------------------|--------------------------------------|
| Little Toby Creek | 0.4 | - | |

Exhibit 6 shows the very small area of the Little Toby Creek Watershed that is located in Clearfield County. There was no survey information reported related to this watershed.

4.2.6. Moshannon Creek

The Moshannon Creek is, by far, the most highly impaired watershed in Clearfield County. Of the 163.4 stream miles, 144.2 miles or 88% are impaired (Exhibit 1 and Table 18). AMD is the primary cause of impairment. The impairments of the Moshannon Creek Watershed affect Boggs, Cooper, Decatur, Gulich, Morris, and Woodward Townships and Brisbin and Houtzdale Boroughs.

Table 18. Impaired Stream Miles in Moshannon Creek Watershed

| | Total Stream Miles | Miles of Impaired Stream | % of Impaired Stream From Each Cause |
|---|--------------------|--------------------------|--------------------------------------|
| Moshannon Creek | 163.4 | 144.2 | |
| Abandoned Mine Drainage – Metals and/or pH | | 64.2 | 45% |
| Abandoned Mine Drainage – Metals, pH, and Other Inorganics | | 2.7 | 2% |
| Abandoned Mine Drainage – Metals, pH, and On-site Wastewater | | 3.0 | 2% |
| Abandoned Mine Drainage – Siltation | | 63.7 | 44% |
| Abandoned Mine Drainage – Metals and pH ; Grazing Related Agriculture - Siltation | | 2.2 | 2% |
| Abandoned Mine Drainage - Other Habitat Alterations | | 2.0 | 1% |
| Atmospheric Deposition - pH | | 2.9 | 2% |
| Industrial Point Source- Thermal Modifications | | 1.0 | 1% |
| Upstream Impoundment - Siltation | | 2.4 | 2% |

Exhibit 7 in Appendix A shows the locations of the areas of flooding, problem areas or stormwater management facilities in the Moshannon Creek Watershed that were identified by responses to the municipal questionnaires.

Reported areas of flooding occur throughout the watershed along the main stem of the Moshannon Creek and its tributaries (Table 19).

Table 19. Areas of Flooding or Flooding Problems in Moshannon Creek Watershed

| # | Municipality | Problem or Cause | Problem Category |
|----|-----------------------|---|------------------|
| 36 | Chester Hill Borough | Flooding of homes, streets yards at Florence, Grace and Allen Streets | 2 |
| 37 | Chester Hill Borough | Flooding of clover Presque Isle and Gertrude | 2 |
| 27 | Chester Hill Borough | Rowland St floods in heavy rain, new SW inlets installed in 2008 | 2 |
| 28 | Cooper Twp | Severe wash-out of roadway berms of Firehouse Rd (TR 726) | 4 |
| 30 | Decatur Twp | Flooding at Albert Run and Little Laurel Run | 4 |
| 31 | Decatur Twp | Flooding at Laurel Run and Little Laurel Run | 4 |
| 26 | Osceola Mills Borough | Flooding in lower end of Borough | 2 |

Flooding Problem Category

1. Inadequate storm sewer system
2. Runoff from development/population center
3. Obstruction
4. Other flooding problems

Reported stormwater problem areas located in Decatur and Woodward Townships and Houtzdale Borough. The problems are related to obstructions to flow and stormwater runoff flowing over roads. These problem areas are summarized in Table 20.

Table 20. Identified Problem Areas in the Moshannon Creek Watershed

| # | Municipal | Description of Problem | Problem Category | Owner |
|----|------------------------------------|---|------------------|-------|
| 42 | Chester Hill Borough | Crushed pipe at intersection of Presque Isle and Gertrude | 2 | 2 |
| 32 | Decatur Twp | Bridge at Graham Station Rd over Laurel Run | 3 | 1 |
| 33 | Decatur Twp | Runoff from SR 749 onto SR 53 | 7 | 2 |
| 34 | Houtzdale Borough/ Woodward Twp | Debris obstruction on Beaver Run | 2 | 2 |

Problem Area Category

1. Culvert – Size issue
2. Culvert – Debris/clogging issue
3. Bridge – Size issue
4. Bridge – Debris/clogging issue
5. Other Obstruction
6. Water quality
7. Other problem

Ownership/Responsible Entity

1. Municipality
2. PennDOT
3. Other

There were two (2) storm sewer systems for industrial and commercial developments reported in the Moshannon Creek Watershed. Both storm sewer systems are located in northeastern Decatur Township (Table 21).

Table 21. Identified Stormwater Management Facilities

| # | Municipality | Name |
|----|--------------|--|
| 41 | Decatur Twp | Cornell Moshannon Valley, storm sewer system |
| 42 | Decatur Twp | Peebles Plaza SR-322, storm sewer system |

4.2.7. Mosquito Creek

Of the 100.2 miles of stream in the Mosquito Creek Watershed, 17.3 miles or 17% are impaired (Exhibit 1 and Table 22). AMD is the source of impairment in the Watershed. The impaired stream reaches are located in Covington, Girard and Karthaus Townships.

Table 22. Impaired Stream Miles in Mosquito Creek Watershed

| | Total Stream Miles | Miles of Impaired Stream | % of Impaired Stream From Each Cause |
|--|--------------------|--------------------------|--------------------------------------|
| Mosquito Creek | 100.2 | 17.3 | |
| Abandoned Mine Drainage – Metals and/or pH | | 16.0 | 99% |
| Abandoned Mine Drainage – Metals, pH, and On-site Wastewater | | 1.3 | 1% |

There were no problem areas, areas of flooding, or stormwater management facilities reported in the municipal questionnaires for the Mosquito Creek Watershed (Exhibit 8 in Appendix A).

4.2.8. Sandy Lick Creek

The Sandy Lick Creek Watershed has about 132.7 stream miles in Clearfield County and 30.8 miles or 23% are impaired (Exhibit 1 and Table 23). Abandoned Mine Drainage is the source of impairment in the Watershed affecting Brady, Sandy, and Union Townships and the City of DuBois.

Table 23. Impaired Stream Miles in Sandy Lick Creek Watershed

| | Total Stream Miles | Miles of Impaired Stream | % of Impaired Stream From Each Cause |
|--|--------------------|--------------------------|--------------------------------------|
| Sandy Lick Creek | 132.7 | 30.8 | |
| Abandoned Mine Drainage – Metals and/or pH | | 30.8 | 100% |

Exhibit 9 in Appendix A shows the locations of the areas of flooding, problem areas, or stormwater management facilities in the Sandy Lick Creek Watershed that were identified by

responses to the municipal questionnaires. Reported areas of flooding are located in the City of DuBois and Sandy Township (Table 24).

Table 24. Areas of Flooding or Flooding Problems in Sandy Lick Creek Watershed

| # | Municipality | Problem or Cause | Problem Category |
|---|--------------|--|------------------|
| 1 | DuBois | Flooding on Pentz Run - FEMA mapped floodplain | 4 |
| 2 | Sandy Twp | Flooding - Pentz Run, within 100-yr floodplain, existing development, stream obstruction | 4 |
| 3 | Sandy Twp | Flooding - Sher-De-Lin Rd at Flowing Well Rd Intersection, within 100-yr floodplain | 2 |
| 4 | Sandy Twp | Flooding - Metal Tech, within 100-yr floodplain, undersized enclosures on private property | 3 |

Flooding Problem Category

1. Inadequate storm sewer system
2. Runoff from development/population center
3. Obstruction
4. Other flooding problems

Reported stormwater problem areas are located in the City of DuBois and Sandy Township. All the problem areas are caused by obstructions to flow from bridges or development. These problem areas are summarized in Table 25.

Table 25. Identified Problem Areas in the Sandy Lick Creek Watershed

| # | Municipal | Description of Problem | Problem Category | Owner |
|---|-----------|---|------------------|-------|
| 1 | DuBois | Bridge - RR over Pentz Run | 3 | 2 |
| 2 | DuBois | Bridge - Franklin Street over Pentz Run | 3 | 1 |
| 3 | DuBois | Bridge - West Weber Ave over Pentz Run | 3 | 1 |
| 4 | DuBois | Bridge - West Washington Ave over Pentz Run | 3 | 1 |
| 5 | DuBois | Building - Joe Fender over Pentz Run | 5 | 3 |
| 8 | Sandy Twp | Garage build over stream on Forest Ave | 5 | 3 |
| 7 | Sandy Twp | Bridge over tributary to Pentz Run on Forest Ave | 3 | 2 |
| 9 | Sandy Twp | Stream enclosures on private property between Kessler Rd and SR 219 | 5 | 3 |

Problem Area Category

1. Culvert – Size issue
2. Culvert – Debris/clogging issue
3. Bridge – Size issue
4. Bridge – Debris/clogging issue
5. Other Obstruction
6. Water quality
7. Other problem

Ownership/Responsible Entity

1. Municipality
2. PennDOT
3. Other

There were significantly more stormwater management facilities reported in the Sandy Lick Creek Watershed than any other watershed in the County due to a higher density of development in and around the City of DuBois (Table 26).

Table 26. Identified Stormwater Management Facilities in the Sandy Lick Creek Watershed

| # | Municipality | Name |
|----|--------------|--|
| 1 | DuBois | Penn State DuBois |
| 2 | DuBois | DuBois Area High School |
| 3 | DuBois | Dr. O'Bryon |
| 4 | DuBois | Stoltz Toyota/Hyundai |
| 5 | DuBois | KMA Remarketing |
| 6 | DuBois | V.F.W |
| 7 | DuBois | Rumbarger Estates |
| 8 | DuBois | Liberty Marketplace |
| 9 | DuBois | Paris Companies |
| 10 | DuBois | DRMC |
| 11 | DuBois | Meadow Lane Office Bldg |
| 12 | Sandy Twp | (no detail provided in municipal survey) |
| 13 | Sandy Twp | (no detail provided in municipal survey) |
| 14 | Sandy Twp | (no detail provided in municipal survey) |
| 15 | Sandy Twp | (no detail provided in municipal survey) |
| 16 | Sandy Twp | (no detail provided in municipal survey) |
| 17 | Sandy Twp | (no detail provided in municipal survey) |
| 18 | Sandy Twp | (no detail provided in municipal survey) |
| 19 | Sandy Twp | (no detail provided in municipal survey) |
| 20 | Sandy Twp | (no detail provided in municipal survey) |
| 21 | Sandy Twp | (no detail provided in municipal survey) |
| 22 | Sandy Twp | (no detail provided in municipal survey) |
| 23 | Sandy Twp | (no detail provided in municipal survey) |
| 24 | Sandy Twp | (no detail provided in municipal survey) |
| 25 | Sandy Twp | (no detail provided in municipal survey) |
| 26 | Sandy Twp | (no detail provided in municipal survey) |
| 27 | Sandy Twp | (no detail provided in municipal survey) |
| 28 | Sandy Twp | (no detail provided in municipal survey) |
| 29 | Sandy Twp | (no detail provided in municipal survey) |
| 30 | Sandy Twp | (no detail provided in municipal survey) |
| 31 | Sandy Twp | (no detail provided in municipal survey) |
| 32 | Sandy Twp | (no detail provided in municipal survey) |
| 33 | Sandy Twp | (no detail provided in municipal survey) |
| 34 | Sandy Twp | (no detail provided in municipal survey) |
| 35 | Sandy Twp | (no detail provided in municipal survey) |

4.2.9. Sinnemahoning Creek

Of the 165.1 miles of streams in the Sinnemahoning Creek Watershed, 26.5 miles or 16% are impaired (Exhibit 1 and Table 27). AMD is the source of impairment in the Watershed. The impaired stream reaches are primarily located in Huston Township and a short stream reach in Sandy Township.

Exhibit 10 in Appendix A shows the locations of the areas of flooding, problem areas, or stormwater management facilities in the Sinnemahoning Creek Watershed that were identified by responses to the municipal questionnaire.

Reported areas of flooding are confined to central Huston Township near State Route 255 (Table 28).

Reported stormwater problem areas are located in the vicinity of the areas experiencing flooding as well as areas that include bridge obstructions (Table 29).

There were no stormwater management facilities reported for the Sinnemahoning Creek Watershed.

Table 27. Impaired Stream Miles in Sinnemahoning Creek Watershed

| | Total Stream Miles | Miles of Impaired Stream | % of Impaired Stream From Each Cause |
|--|--------------------|--------------------------|--------------------------------------|
| Sinnemahoning Creek | 165.1 | 26.5 | |
| Abandoned Mine Drainage – Metals and/or pH | | 26.5 | 100% |

Table 28. Areas of Flooding or Flooding Problems in Sinnemahoning Creek Watershed

| # | Municipality | Problem or Cause | Problem Category |
|---|--------------|---|------------------|
| 5 | Huston Twp | From Winterburn area on Bennett Branch to Tyler area Boy Scout Camp to Bennett Branch near Mtn Run where intersects w/ | 4 |
| 8 | Huston Twp | RS 255 S of Pennfield | 4 |
| 7 | Huston Twp | Bennett Branch near Moose Run | 4 |
| 6 | Huston Twp | Mt. Pleasant area on Wilson Run to the middle of Penfield | 4 |

Flooding Problem Category

1. Inadequate storm sewer system
2. Runoff from development/population center
3. Obstruction
4. Other flooding problems

Table 29. Identified Problem Areas in the Sinnemahoning Creek Watershed

| # | Municipal | Description of Problem | Problem Category | Owner |
|----|------------|---|------------------|-------|
| 13 | Huston Twp | Bridge overflows in Winterburn (location not specified) | 3 | 1 |
| 10 | Huston Twp | Flooding around Munn Bridge | 3 | 1 |
| 11 | Huston Twp | Flooding at Ontario St Bridge | 3 | 1 |
| 12 | Huston Twp | Bridge overflows in Winterburn (location not specified) | 3 | 1 |

Problem Area Category

1. Culvert – Size issue
2. Culvert – Debris/clogging issue
3. Bridge – Size issue
4. Bridge – Debris/clogging issue
5. Other Obstruction
6. Water quality
7. Other problem

Ownership/Responsible Entity

1. Municipality
2. PennDOT
3. Other

4.2.10. Stump Creek

Stump Creek, tributary to Mahoning Creek, is a small watershed with only 24.5 stream miles in Clearfield County. A total of 4.6, or 19%, of the stream miles are impaired due to AMD. The impaired reaches are located in Brady Township (Exhibit 1 and Table 30).

Table 30. Impaired Stream Miles in Stump Creek Watershed

| | Total Stream Miles | Miles of Impaired Stream | % of Impaired Stream From Each Cause |
|----------------------------------|--------------------|--------------------------|--------------------------------------|
| Stump Creek | 24.5 | 4.6 | |
| Abandoned Mine Drainage - Metals | | 4.6 | 100% |

There were no problem areas, areas of flooding, or stormwater management facilities reported in the municipal questionnaires for the Stump Creek Watershed (Exhibit 11 in Appendix A).

4.2.11. West Branch Susquehanna River

The West Branch of the Susquehanna River is the largest watershed in Clearfield County with 741.2 miles of stream. About 33%, or 248.2 miles, are impaired. The primary source of impairment is AMD (Exhibit 1 and Table 31). The municipalities in the watershed that are impacted include: Bell, Bradford, Burnside, Cooper, Covington, Girard, Goshen, Graham, Karthaus, Lawrence, Morris, Pike, and Pine Townships; and Burnside and Wallacetown Boroughs.

Table 31. Impaired Stream Miles in West Branch Susquehanna River Watershed

| | Total Stream Miles | Miles of Impaired Stream | % of Impaired Stream From Each Cause |
|--|--------------------|--------------------------|--------------------------------------|
| West Branch Susquehanna River | 741.2 | 248.2 | |
| Abandoned Mine Drainage – Metals and/or pH | | 178.7 | 72% |
| Abandoned Mine Drainage – Metals, pH, and Other Inorganics | | 3.4 | 1% |
| Abandoned Mine Drainage – Siltation | | 61.8 | 25% |
| Abandoned Mine Drainage – Metals, pH, and On-site Wastewater | | 4.5 | 2% |

The West Branch of the Susquehanna River transects the entire County, so it is presented in two (2) exhibits to show the information at a viewable scale (Exhibit 12, west and Exhibit 13, east in Appendix A).

There are areas of flooding throughout the Watershed but flooding is slightly more concentrated in the more highly developed areas of Clearfield Borough. These flooding areas are summarized in Table 32.

Table 32. Areas of Flooding or Flooding Problems

| # | Municipality | Problem or Cause | Problem Category |
|----|----------------------------|--|------------------|
| 14 | Bell Twp/ Mahaffey Borough | McGees Mills Intersection SR 36 & US 219, Mahaffey Camp Grounds along US 219 & SR 36 | 2 |
| 10 | Clearfield Borough | Stinky Run between E11th & E 12th, Woodland Rd to Bigler Ave | 2 |
| 11 | Clearfield Borough | Chester St & Spruce portions of Cumberland, Pold, Arnold & S 6th | 2 |
| 12 | Clearfield Borough | Orr's Run along Martin St from W 7th Ave to Williams St | 2 |
| 13 | Girard Twp | Culvert at TR 648 Buck Run Rd | 3 |
| 34 | Greenwood Twp | Flooding of Zorger Road at Curry Run when Curwensville Dam is full | 4 |
| 33 | Greenwood Twp | Redden Hill Road at Bells Landing when Curwensville Dam is full | 2 |
| 9 | Lawrence Twp | Nelson Rd at unnamed Trib to Woods Run | 9 |

Flooding Problem Category

1. Inadequate storm sewer system
2. Runoff from development/population center
3. Obstruction
4. Other flooding problems

Reported stormwater problem areas are also located throughout the West Branch of the Susquehanna River Watershed. The stormwater problems are the result of undersized or blocked culverts. Two (2) spots of AMD were identified in Clearfield Borough. These problem areas are summarized in Table 33.

Table 33. Identified Problem Areas in the West Branch Susquehanna River Watershed

| # | Municipal | Description of Problem | Problem Category | Owner |
|----|--------------------|--|------------------|-------|
| 20 | Girard Twp | Culvert at Buck Run Rd Stinky Run, need for debris removal to prevent clogged | 1 | 1 |
| 18 | Clearfield Borough | culvert | 2 | 2 |
| 16 | Clearfield Borough | Mine Drainage | 6 | 3 |
| 17 | Clearfield Borough | Mine drainage Beavers clog culvert causing roadway flooding of Sylvan | 6 | 3 |
| 6 | Cooper Twp | Grove Rd (TR 727) | 2 | 1 |
| 19 | Goshen Twp | Cross drains on SR 879 at Jerry Run Rd flood road | 1 | 2 |
| 14 | Lawrence Twp | Pipe plugged with debris during heavy rain events | 2 | 1 |
| 15 | Lawrence Twp | Culvert plugged with debris during heavy rain events | 2 | 1 |
| 36 | Covington Twp | (no detail provided) | 7 | 3 |
| 37 | Covington Twp | (no detail provided) | 7 | 3 |
| 38 | Covington Twp | (no detail provided) | 7 | 3 |
| 39 | Covington Twp | (no detail provided) | 7 | 3 |

Problem Area Category

1. Culvert – Size issue
2. Culvert – Debris/clogging issue
3. Bridge – Size issue
4. Bridge – Debris/clogging issue
5. Other Obstruction
6. Water quality
7. Other problem

Ownership/Responsible Entity

1. Municipality
2. PennDOT
3. Other

Three (3) storm-water management facilities are located in the West Branch of the Susquehanna River Watershed (Table 34).

Table 34. Identified Stormwater Management Facilities in the West Branch Susquehanna River Watershed

| # | Municipality | Name |
|----|--------------|-------------------------------|
| 38 | Bell Twp | Stripping operation, Bouch Rd |
| 39 | Bradford Twp | Wal-mart Warehouse |
| 36 | Lawrence Twp | Retention Pond |

4.2.12. Problem Areas Identified in Past Act 167 SMPs

Act 167 SMPs were developed for the Chest Creek Watershed in 2002 by Borton-Lawson Engineering, Inc., Upper Mahoning Creek Watershed in 2000 by Borton-Lawson Engineering, Inc., and Sandy Lick Creek Watershed in 1995 by R.K.R. Hess Associates.

For each of these existing SMPs, all stream crossings were modeled and the results were mapped and categorized by the return period or frequency of the largest flow that could be passed without causing upstream flooding. No documentation of the crossing size or impact of the crossing/obstruction on flood levels was provided that could be used in this County-wide study.

All of the existing Act 167 SMPs included a tabulation of stormwater problem area. There were no stormwater problem areas identified in the Upper Mahoning Creek Watershed portion of Clearfield County. Stormwater problem areas identified in the other studies are outlined in the following paragraphs.

According to the Chest Creek Watershed Act 167 SMP, there are four (4) stormwater control areas and one (1) stormwater problem area in Ferguson Township, three (3) stormwater problems in Westover Borough, and one (1) stormwater problem in Chest Township. These problem areas are mapped on Exhibit A3 of the SMP. No detail or description was provided for the Chest Township stormwater problem. The Ferguson Township stormwater problem area was categorized as a stormwater pollution problem caused by uncontrolled runoff from upstream municipalities, inadequate drainage systems and obstructions in the system that need to be removed. The problem occurs only during major flood events and causes property damage. The Westover Borough problem areas were categorized as stream and street flooding. The problems are caused by too large an increase in uncontrolled runoff and inadequate drainage systems. The problems only occur during major flood events and results in property damage.

The Sandy Lick Creek Watershed Act 167 SMP identified four (4) E&S problems and six (6) flooding problems in Sandy Township. The mapping from this SMP was not available, so their location is not identified in the mapping contained in this SOS.

Although problem areas and obstructions were identified in these existing Plans, there was no assessment or prioritization reported.

4.3. Identified TMDLs in Clearfield County

According to the EPA a TMDL is the maximum amount of a pollutant allowed to enter a water body that will meet and continue to meet the water quality standards for that particular pollutant. The TMDL is set based on Waste Load Allocations (WLAs) for point sources of pollution, Load Allocations (LAs) for nonpoint sources of pollutions, and a Margin of Safety (MOS). The TMDL is set so that if the concentration of the pollutant remains below that level, the waterbody will no longer be impaired.

In Clearfield County, 27 TMDLs have been developed and approved by the EPA and another five (5) have been proposed (Table 35). These TMDLs have all been developed to primarily address AMD problems (mainly metals and pH), but also siltation, inorganics, and suspended solids.

Table 35. TMDLs for stream and Watersheds in Clearfield County

| Stream | Category | Causes | Status |
|------------------------------------|-------------------|---|---------------------------|
| Alder Run | AMD | Metals, pH | EPA Approved - 8/6/2006 |
| Anderson Creek | AMD, Point Source | Metals, pH | EPA Approved - 4/7/2005 |
| Bear Run | AMD | Metals, pH | EPA Approved - 4/7/2007 |
| Bennett Branch Sinnemahoning Creek | AMD | Metals, pH | Proposed |
| Big Run | AMD | Metals, pH | EPA Approved - 12/14/2004 |
| Blue Run | AMD | Metals, pH | EPA Approved - 7/17/2007 |
| Clearfield Creek | AMD | Metals | EPA Approved - 4/7/2007 |
| Curleys Run | AMD | Metals, pH | EPA Approved - 4/7/2005 |
| Deer Creek | AMD | Metals, pH | EPA Approved - 4/8/2005 |
| East Branch Mahoning Creek | AMD | Metals, pH | EPA Approved - 3/27/2007 |
| Fork Run | AMD | Metals, pH | EPA Approved - 4/4/2005 |
| Grimes Run | AMD | Metals, pH | EPA Approved - 4/7/2005 |
| Hartshorn Run | AMD | Other inorganics, metals, pH | EPA Approved - 4/1/2005 |
| Laurel Run | AMD | Metals, pH | EPA Approved - 4/2/2007 |
| Lick Run | AMD | Metals, pH | EPA Approved - 4/4/2005 |
| Little Anderson Creek | AMD | Metals | EPA Approved - 4/7/2005 |
| Little Muddy Run | AMD | Metals, pH | EPA Approved - 4/9/2001 |
| Little Surveyor Run | AMD | Metals, pH | EPA Approved - 9/30/2004 |
| Little Toby Creek | AMD | Metals, pH, siltation, suspended solids | Proposed |
| Luthersburg and Labord Branch | AMD | Metals, pH | EPA Approved - 4/7/2007 |
| Montgomery Creek | AMD | Metals, pH | EPA Approved - 4/9/2003 |
| Moose Creek TMDL | AMD | Metals, pH | EPA Approved - 3/21/2005 |
| Moshannon Creek | AMD | Metals, pH | Proposed |
| Narrows Creek | AMD | Metals | Proposed |
| North Branch Upper Morgan Run | AMD | Metals, pH | EPA Approved - 4/7/2005 |
| Sanbourn Run | AMD | Other inorganics, metals, pH | EPA Approved - 3/17/2005 |
| Sandy Creek | AMD | Metals, pH | EPA Approved - 4/4/2007 |

Table 35 (cont.). TMDLs for stream and Watersheds in Clearfield County

| Stream | Category | Causes | Status |
|---|-----------------|---|--------------------------|
| Sandy Creek | AMD | Other inorganics, metals | Proposed |
| Stump Creek | AMD | Metals, pH, siltation, suspended solids | EPA Approved - 4/4/2007 |
| Surveyor Run | AMD | Metals, pH | EPA Approved - 9/30/2004 |
| UNT 26641 West Branch Susquehanna River | AMD | Metals, pH | EPA Approved - 9/20/2006 |
| UNTs Trout Run and Pine Run TMDL | AMD | Metals, pH | EPA Approved - 4/4/2007 |

4.4. Summary of Storm Runoff and Waterway Capacity Issues

Storm runoff and waterway capacity issues (flooding) in Clearfield County have been identified through a review of stream impairments, municipal questionnaires distributed as a part of this SOS, and a review of established TMDLs. In general, the municipal questionnaires identified areas of flooding due to flow obstructions from undersized bridges or culverts and floodplain encroachment as the primary stormwater runoff issues in the County.

The PADEP data on stream impairments along with the TMDLs for AMD indicate that this is a significant water quality problem for waterways in Clearfield County. Clearfield Borough was the only municipality to address AMD in the municipal questionnaire. Siltation TMDLs have been established in the Stump Creek and Toby Run Watersheds. Section 303(d) and 305(b) impairments were also identified by watershed in Section 4.2. The primary impairments include siltation and habitat alterations resulting from stormwater runoff flowing over roads, draining and filling, forestry, and small residential runoff.

4.5 Prioritization of Storm Runoff and Waterway Capacity Issues

The purpose of prioritizing identified stormwater runoff and waterway capacity areas is to provide a tool for completing additional analysis of these areas as resources become available. Problem prioritization was based on the following factors:

- projected growth ,
- potential economic loss/extreme hazard risk,
- local population density,
- type of problem, and
- complexity of solution.

Areas of projected growth and high local population density were delineated in conjunction with the staff from the county planning office. Potential economic loss was assessed through review of the Clearfield County Hazard Mitigation Plan. This plan, prepared by URS in September of 2004, mapped potential economic loss and hazard risk based on the number of structures flooded, and depth of flooding for the 100-year design event. The level of risk identified by the Hazard Mitigation Plan was used as an indicator of the probability of frequent flooding. In addition, areas of frequent flooding and/or other waterway capacity problems were taken from the information compiled from the municipal surveys.

Problem data from the municipal questionnaires and identified extreme and high flood risk structures from the Hazard Mitigation Plan were superimposed onto a map of county growth areas to assist in problem prioritization for Phase II. These maps are included as Exhibits 14 and 15 in Appendix A. When evaluated as clusters on a map it is apparent that the areas with current high population density and/or extreme flood risk generally correspond with the identified growth areas. In addition, many of the problem areas identified in the municipal questionnaires also fall within these areas.

Solutions to flooding problems range from fairly benign to highly complex. In some instances, the solution to flooding problems is a simple maintenance issue. Several identified problems included clogged pipes and culverts. Routine maintenance of storm drainage systems will increase conveyance capacity and minimize flood impacts. In other cases, older culverts and bridges are undersized based on today's density of development and subsequent runoff volume. Retrofitting local and tributary infrastructure to increase flood carrying capacity can be an effective tool for minimizing flood impacts.

Historic overdevelopment in the floodplain is another reason for flood impacts and conveyance capacity problems. If these structures currently serve as homes or businesses, removing such structures can be socially and economically impractical. Removing poorly maintained, abandoned structures can mitigate flooding while removing a local nuisance. Another solution to mitigate flooding in overdeveloped floodplains is construction of significant flood control works and/or reservoirs. These solutions require significant engineering design and construction effort and cost.

Based on the criteria established in this section, identified stormwater runoff and flood problems were prioritized. Table 36 provides the results of this prioritization ranking. All identified problem areas should be further investigated during Phase II of this stormwater management planning effort, including development of concept-level solution recommendations for each problem area. As mentioned previously, the listing in Table 36 is intended for use as a tool to assist in establishing priorities as funding and resources become available. If resources are not immediately available to address all 36 identified problem areas, it is recommended that the first 25 ranked problems be completed first.

Categorically the following are types of evaluations will be applied to address flooding and problem areas within defined growth areas and additional areas with relatively high population densities.

- Evaluate opening size and conveyance capacity of existing culverts in areas of high flooding potential and problem areas, as identified through municipal questionnaires through a combination of field analysis and desktop study. Recommend retrofitting structures as appropriate.
- Evaluate stormwater controls tributary to those identified through municipal questionnaires to assess up- and downstream inefficiencies. Recommend retrofits as appropriate.
- Evaluate opening size and conveyance capacity of existing bridges, as identified by municipal questionnaires through an analysis of FEMA data and as-built drawings, when available. Recommend improvements to appropriate authority (i.e. PennDOT, Railroad, Township, Borough, etc.).
- Evaluate flood reduction benefit of removing enclosures and obstructions from the floodplain.
- Evaluate drainage and erosion patterns in areas without storm-water controls and recommend retrofits as appropriate.

4.6 Approach to Addressing Identified Problem Areas

Problem areas will be addressed through a combined effort of municipal meetings, field work, and desktop hydrologic and hydraulic analysis. Within each study area a kick-off meeting between consultant staff and/or County staff (project staff) and municipal employees will initiate Phase II work. The objective of this meeting is further discussion of flood-prone and waterway capacity problem areas identified as part of the questionnaire. Available aerial photography and topography data will be presented at these meetings so that all areas of concern can be identified and discussed prior to field work. Subsequent to the kick-off meeting, the municipal employee charged with maintaining storm-water facilities (i.e. local roadmaster or other) will be invited to conduct a drive-by reconnaissance with project staff.

Following the reconnaissance phase, project staff will spend additional days in the field evaluating the identified stormwater infrastructure, tributary stormwater infrastructure, apparent drainage issues, local erosion patterns, and areas of adjacent development. When available, as-built drawings of existing stormwater infrastructure will be obtained from the municipality, PennDOT, or other agencies.

Table 36 Prioritization ranking of identified conveyance/flooding and storm runoff problem areas.

| Priority | Municipality | Watershed | Problem Area/Frequent Flooding Area | Problem | Growth Area |
|----------|-----------------------|-------------------------------|--|--|-------------------------------------|
| 1 | Dubois | Sandy Lick | P5 | Obstruction, flooding - Building - Joe Fender over Pentz Run | Dubois – Sandy – Huston Growth Area |
| 2 | Dubois | Sandy Lick | F1, P2, P3, P4 | Bridges at Franklin, West Weber, and West Washington | Dubois – Sandy – Huston Growth Area |
| 3 | Sandy Township | Sandy Lick | F3, F2 | Flooding - Sher-De-Lin Rd at Flowing Well Rd Intersection; development within 100-yr floodplain | Dubois – Sandy – Huston Growth Area |
| 4 | Sandy Township | Sandy Lick | P7 | PennDOT Bridge over tributary to Pentz Run on Forest Ave | Dubois – Sandy – Huston Growth Area |
| 5 | Dubois | Sandy Lick | P1 | Obstruction, flooding - PennDOT Bridge - RR over Pentz Run; existing development | Dubois – Sandy – Huston Growth Area |
| 6 | Sandy Township | Sandy Lick | P8, P9, F4 | Garage build over stream on Forest Ave; Stream enclosures on private property between Kessler Rd and SR 219 | Dubois – Sandy – Huston Growth Area |
| 7 | Huston Township | Sinnemahoning Creek | F8 | Flooding- Boy Scout Camp to Bennett Branch near Mtn Run where intersects w/ RS 255 S of Pennfield | Dubois – Sandy – Huston Growth Area |
| 8 | Huston Township | Sinnemahoning Creek | P10, P11, P12, P13, F2, F5, F6, F7, F9 | Obstruction - flooding around Munn Bridge, Obstruction - flooding at Ontario St Bridge, Obstruction - bridge overflows in Winterburn (location not specified) | Dubois – Sandy – Huston Growth Area |
| 9 | Clearfield Borough | West Branch Susquehanna River | P18, F10, F11, F12 | Flooding Stinky Run between E11th & E 12th, Woodland Rd to Bigler Ave; Flooding - Chester St & Spruce portions of Cumberland, Pold, Arnold & S 6th; Flooding - Orr's Run along Martin St from W 7th Ave to Williams St | Clearfield- Lawrence Growth Area |
| 10 | Lawrence Township | West Branch Susquehanna River | P14, P15 | Obstruction, pipe - plugged with debris during heavy rain events | Clearfield- Lawrence Growth Area |
| 11 | Clearfield Borough | West Branch Susquehanna River | P16, P17 | Acid Mine Drainage | Clearfield- Lawrence Growth Area |
| 12 | Curwensville Borough | Anderson Creek | F35 | Road and homes flood along Anderson Ave | Curwensville Growth Area |
| 13 | Chester Hill Borough | Moshannon Creek | P42 | Crushed Pipe | Decatur - Chester Hill Growth Area |
| 14 | Chester Hill Borough | Moshannon Creek | F36, F37 | Flooding of homes, streets yards at Florence, Grase, Clover, Presque Isle, Gertrude and Allen Streets | Decatur - Chester Hill Growth Area |
| 15 | Chester Hill Borough | Moshannon Creek | FP27 | Rowland St floods in heavy rain, new SW inlets installed in 2008 | Decatur - Chester Hill Growth Area |
| 16 | Decatur Township | Moshannon Creek | P32, F30, F31 | Bridge at Graham Station Rd over Laurel Run | Decatur - Chester Hill Growth Area |
| 17 | Bradford Township | Clearfield Creek | P31 | Obstruction, flooding - Culverts at Dale Rd over Valley Fork Run | Bradford Growth Area |
| 18 | Osceola Mills Borough | Moshannon Creek | F26 | Flooding in lower end of Borough | Not in Growth Area |

Table 36 Prioritization ranking of identified conveyance/flooding and storm runoff problem areas.

| Priority | Municipality | Watershed | Problem Area/Frequent Flooding Area | Problem | Growth Area |
|----------|----------------------------------|---------------------------------------|--|---|--------------------|
| 19 | Westover Borough | Chest Creek | P25, P41, F18 | No drainage in park | Not in Growth Area |
| 20 | Westover Borough | Chest Creek | P22, P24 | RR bridge over trib; RR Bridge over Chest Creek | Not in Growth Area |
| 21 | Westover Borough | Chest Creek | P21, P23, P26, P28, F16, F17, F19, F20 | E. Bridge St over trib, culvert too small; Corman Culvert near West over Municipal Bldg, No backflow valves for culverts in FEMA embankment; Ashcroft Run Bridge, SR 36 | Not in Growth Area |
| 22 | Coalport Borough | Clearfield Creek | F21, F22, F23 | Flooding on Clearfield Creek, Blain Run, and Meyers Run | Not in Growth Area |
| 23 | Glen Hope Borough | Clearfield Creek | F32 | Flooding of Glen Hope Park | Not in Growth Area |
| 24 | Glen Hope Borough | Clearfield Creek | P33 | Runoff from SR 729 onto SR 53 | Not in Growth Area |
| 25 | Houtzdale Borough / Woodward Twp | Moshannon Creek | P34 | Debris obstruction on Beaver Run | Not in Growth Area |
| 26 | Greenwood Township | West Branch Susquehanna River | F33, F34 | Flooding of Redden Hill Road at Bells Landing & Zorger Road at Curry Run when Curwensville Dam is full | Not in Growth Area |
| 27 | Bell Twp / Mahaffey Borough | West Branch Susquehanna / Chest Creek | F14 | Flooding at McGees Mills Intersection SR 36 & US 219, Mahaffey Camp Grounds along US 219 & SR 36 | Not in Growth Area |
| 28 | Ferguson Township | Clearfield Creek | P40, F15 | Flooding on Gazzam Run | Not in Growth Area |
| 29 | Beccaria Township | Clearfield Creek | F25 | Flooding - part of proposed Coalport flood protection project | Not in Growth Area |
| 30 | Cooper Township | West Branch Susquehanna River | P6 | Beavers clog culvert causing roadway flooding of Sylvan Grove Rd (TR 727) | Not in Growth Area |
| 31 | Girard Township | West Branch Susquehanna River | P20, F13 | Flooding, obstruction - culvert at Buck Run Rd | Not in Growth Area |
| 32 | Goshen Township | West Branch Susquehanna River | P19 | Cross drains on SR 879 at Jerry Run Rd flood road | Not in Growth Area |
| 33 | Cooper Township | West Branch Susquehanna River | F28 | Severe wash-out of roadway berms of Firehouse Rd (TR 726) | Not in Growth Area |
| 34 | Brady Township | E. Branch Mahoning Creek | F29 | Flooding along E Branch Mahoning (no specific location) | Not in Growth Area |
| 35 | Bigler Township | Clearfield Creek | P29, P30, F24 | Two bridges in Floodplain | Not in Growth Area |
| 36 | Chest Township | Chest Creek | P27 | Bridge - Main St over Chest Creek | Not in Growth Area |
| | Covington Township | West Branch Susquehanna River | P35, P36, P37, P38, P39 | Unknown Problem assumed to be constrictions and obstructions | Not in Growth Area |

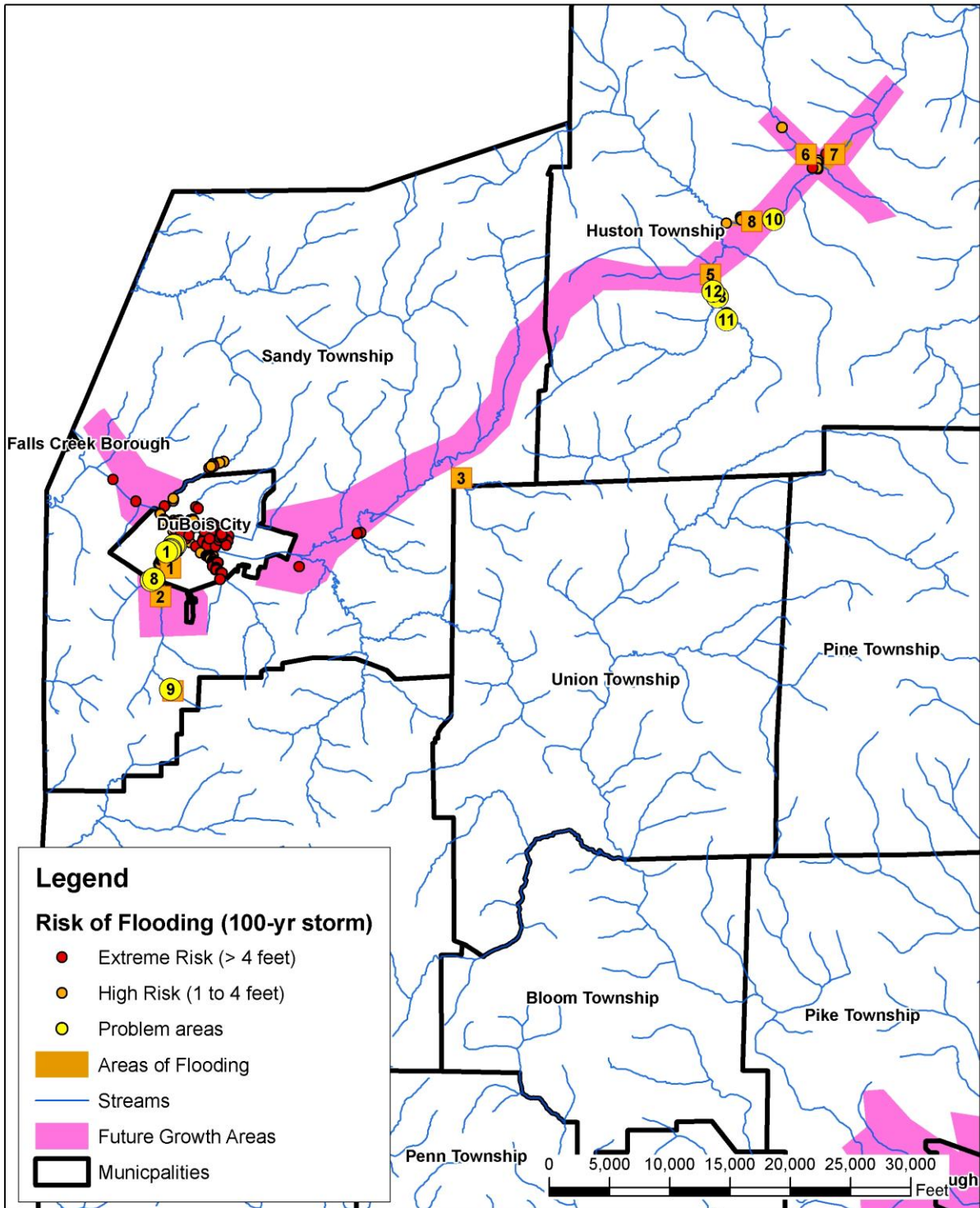


Figure 3. City of Dubois - Sandy Township -Huston Township Growth Area.

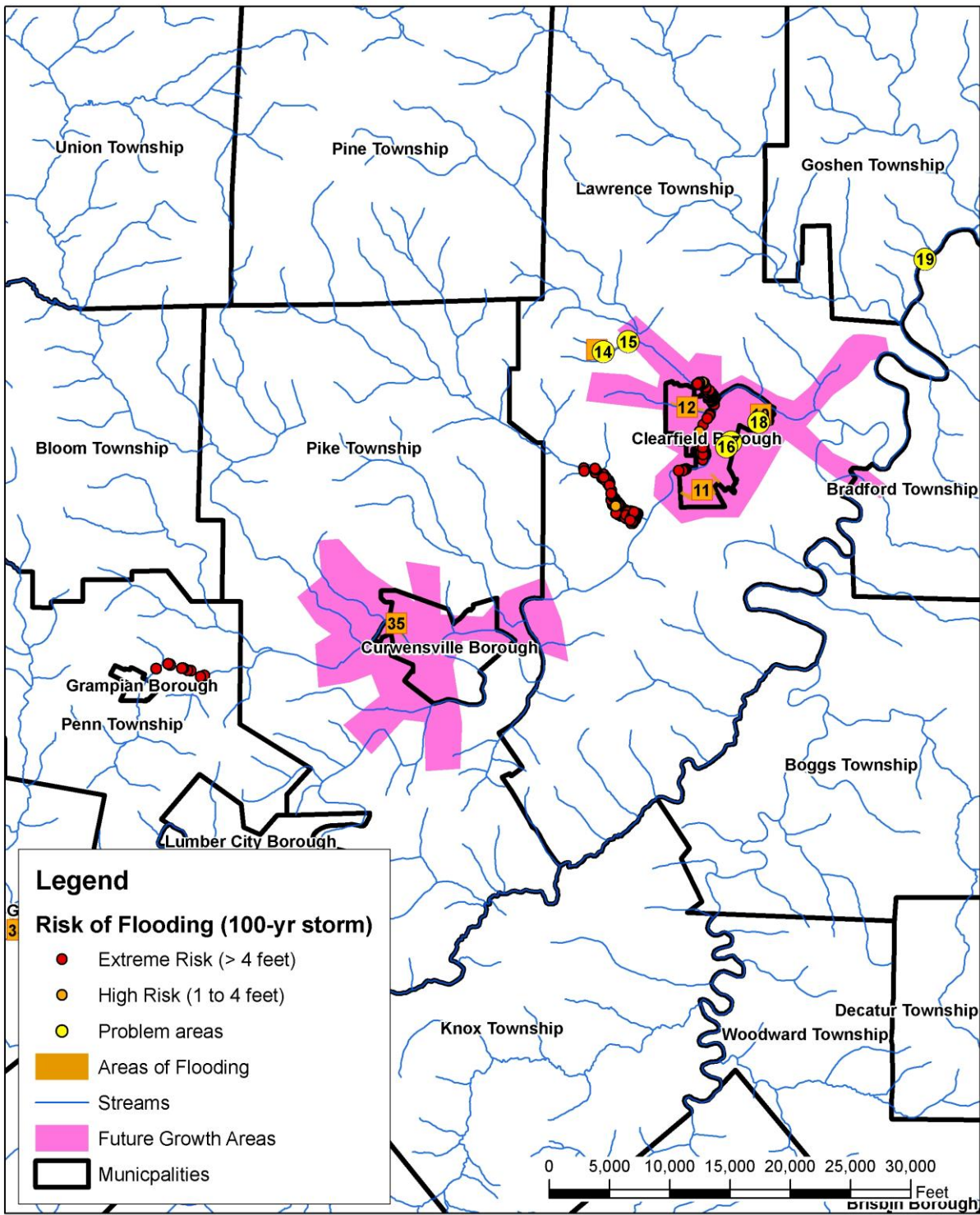


Figure 4. Curwensville Borough Growth Area and Clearfield Borough Growth Area.

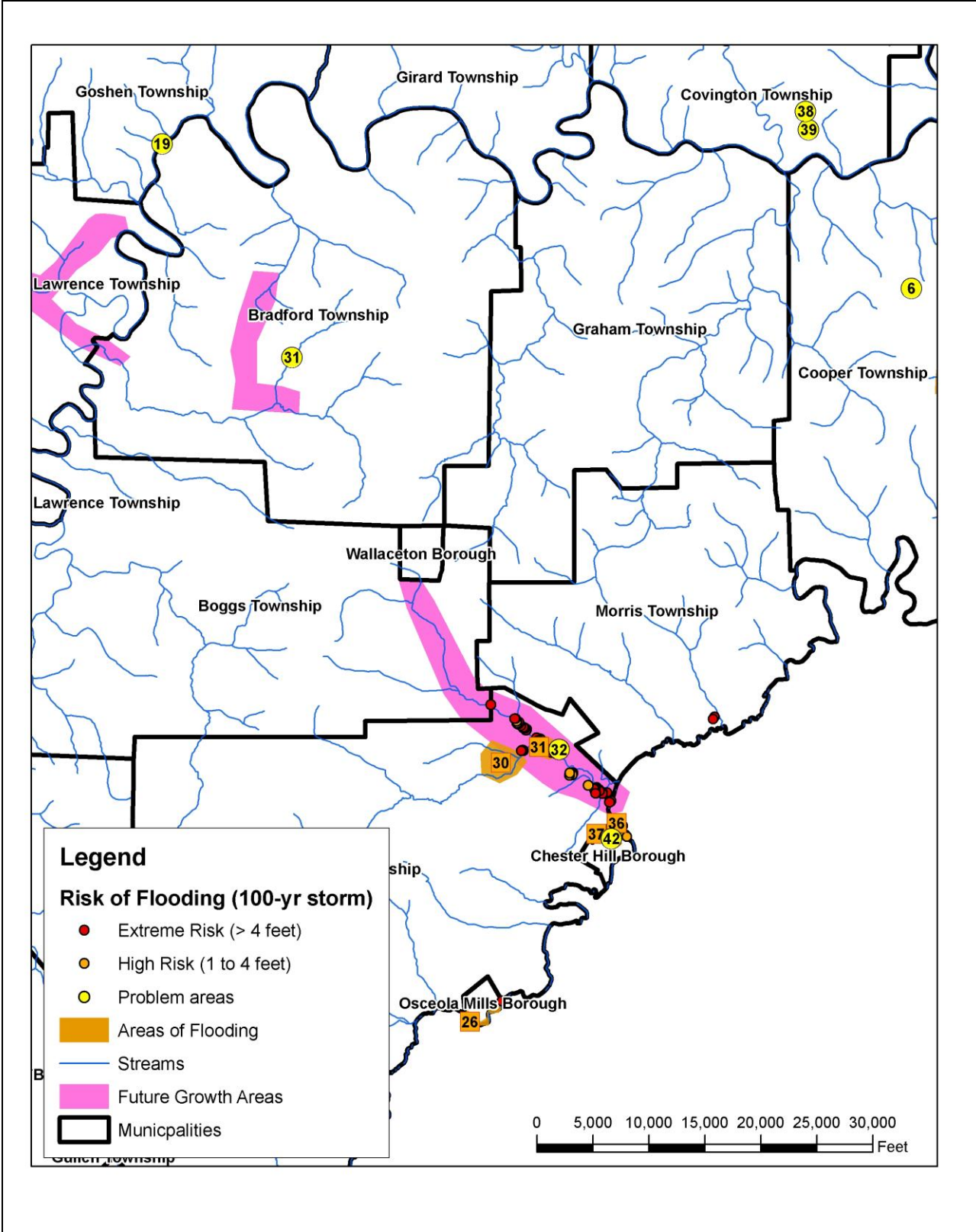


Figure 5. Decatur-Chester Hill Growth Area and Bradford Township Growth Area.

Field collected data will be integrated with published data and available drawings to perform a hydrologic/hydraulic analysis of existing conditions. The benefit of retrofitting stormwater facilities within problem areas to reduce stormwater release rates, and the impact of removing obstructions within the floodplain will also be analyzed.

In areas where field reconnaissance reveals that up-gradient conditions exacerbate stormwater issues, measures to mitigate these conditions will be assessed. For example, increased detention time in up-gradient development areas and revegetation of stripped or cleared areas may mitigate stormwater issues negating the need for expensive retrofits at lower gradient facilities.

The results of the problem area analysis will be discussed in the Phase II SMP. The outcomes of the analysis will be a list of proposed solutions.

5.0 Phase II Discussion.

This section provides a summary discussion of the proposed Phase II Scope of Work, municipal responsibilities as part of the Phase II Stormwater Management Plan (SMP) development, work plan, estimated schedule, and estimated project costs.

5.1 Phase II Scope of Work

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 SMP. Refer to Appendix F of this report for a detailed breakdown of the Phase II Scope of Work.

A summary of the specific tasks and subtasks included in the Scope of Work for Phase II is as follows:

Task A. Data Collection, Review, and Analysis

Subtask A.1 Data Collection

Subtask A.2 Municipal Ordinance (MO) Reviews/Evaluations

Subtask A.3 Data Preparation for Technical Analysis

Subtask A.4 Survey of Existing and Proposed Stormwater Facilities

Task B. Technical Analysis

Subtask B.1 Survey of Existing Watershed Runoff Characteristics

Subtask B.2 Evaluate Water Quality, Peak Flow, Stream Stability, and
Groundwater Recharge

Subtask B.3 Modeling

Subtask B.4 Goals, Objectives, and Compilation of All Technical Standards

Subtask B.5 Implementation of Technical Standards and Criteria

Subtask B.6 Regulations for Activities Impacting Storm Water Runoff

Subtask B.7 Problem Area and Obstruction Analysis and Solutions

Task C. PLAN Preparation and Implementation

Subtask C.1 Final Phase II Plan Preparation

Subtask C.2 MO Preparation

Subtask C.3 Plan Adoption

Task D. Public/Municipal Participation

Subtask D.1 Plan Advisory Committee

Subtask D.2 Act 167 Information Pamphlet

Subtask D.3 Municipal Implementation Workshop

Subtask D.4 Public Implementation Workshop

Detailed hydrologic studies of watersheds and sub watersheds is a key activity during Phase II. The determination of which watershed areas would be modeled during Phase II was made keeping several factors in mind. The main factors used were consideration of projected growth areas and identified problem areas. During Phase II, problem areas will be more thoroughly analyzed.

As a part of Phase II, a MO will be created which will include 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 MO will be the inclusion of regulations for activities impacting stormwater runoff. These regulations are not meant to discourage the activities, but instead to make sure that they are completed in a manner that meets antidegradation and flood management goals.

In addition, the regulations will help improve consistency of municipal stormwater requirements among municipalities in Clearfield County and with related state and federal requirements. Of particular importance will be incorporation of regulations that will protect the character and quality of County streams.

Two (2) noteworthy goals of the Phase II SMP will be

1. To manage development and its associated stormwater runoff so that flooding levels will not increase; and
2. To preserve the existing floodplain areas to minimize potential for property and infrastructure damage in future storm events.

5.2 Municipal Responsibilities after the Adoption of the PLAN

During the preparation of the PLAN, each municipality as well as other interested groups and the general public will have the opportunity to participate in its creation through the PAC. Therefore, the resulting completed PLAN will reflect the municipalities', and the public's input in addressing stormwater management consistent with Act 167 requirements.

After the SMP 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 MO will

be created in the PLAN to assist municipalities in implementing the standards and requirements of the PLAN.

5.3 General Work Plan

The following sections describe elements of the Phase II Work plan.

PHASE II GRANT AGREEMENT

Upon completion and submission of the Phase I Scope of Study (SOS) to PADEP, Clearfield 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 work. A 75 percent reimbursement procedure will be implemented between Clearfield County and PADEP during the Phase II project.

CONSULTANT

It is recommended that Clearfield 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, and an understanding of the municipal framework within the County, will benefit the County during the Phase II process.

QUESTIONNAIRE

A municipal questionnaire was distributed to all municipalities within the County at or shortly after the first WPAC meeting (09/18/2008) during Phase I. The questionnaire (see Appendix D) solicited information on problem areas, obstructions, and existing and proposed stormwater facilities. 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 were a factor in selecting sub-watersheds for modeling.

PLANNING ADVISORY COMMITTEE (PAC)

During the Phase I portion of this project, a PAC was formed. Many of the PAC members indicated their willingness to join the committee through the questionnaire. 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 PAC. 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 PAC meeting or that did not complete 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 PAC.

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

PAC TECHNICAL MEETING

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

PAC LEGAL MEETING

The PAC 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 PAC for this meeting. The purpose of the meeting will focus on implementation of the standards and requirements of the SMP 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 peak runoff rate controls for county watersheds. These controls 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 runoff volume control standards to ensure that existing waterways are not degraded. Control Guidance 1 (CG-1) and Control Guidance 2 (CG-2) from the 2006 Pennsylvania Stormwater BMP Manual will be used as a basis for these standards. Alternative guidance will also be developed for cases where infiltration BMPs cannot be used (for example, Brownfield sites and mined areas), and where consumptive use alternatives are not viable.

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

ROLES OF COUNTY AND CONSULTANT

The division of work and responsibilities between Clearfield 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 SMP. 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 SMP text and provide draft and final project mapping.

5.4 Schedule

A work schedule will be developed early in the Phase II process in conjunction with Clearfield 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 the following Table 37 below.

5.5 Estimated Phase II Costs

The estimated cost associated with completing the Phase II Work Plan is \$270,000. Table 38 provides a summary of total costs by task and fiscal year. Table 39 provides further cost details including manpower requirements by Task and work element.

Table 37. Phase II Preliminary Schedule

| Anticipated Date | Milestones |
|-------------------------|---|
| September 2009 | Begin contract for Phase II |
| October 2009 | 1 st PAC Meeting (Start-up meeting) |
| February 2010 | Task A. Data Collection Complete |
| March 2010 | 2 nd PAC Meeting (Review Data Collection Results) |
| June 2010 | Task B. Technical Analysis 35% Complete |
| June 2010 | 3 rd PAC Meeting (Review Technical Analysis and Modeling Approach) |
| September 2010 | Task B. Technical Analysis complete |
| October 2010 | 4 th PAC Meeting (Review Results of Technical Analysis and Modeling) |
| December 2010 | Task C. Plan Prep and Implementation (Technical Standards Draft) |
| January 2011 | 5 th PAC Meeting (Review Technical Standards) |
| May 2011 | Pre-Draft PLAN, Ordinance, and Exhibits Complete (Distribute to PAC & DEP) |
| June 2011 | 6 th PAC Meeting (Collect PAC Feedback and Comments) |
| September 2011 | Complete Draft PLAN (Update per comments) |
| November 2011 | 7 th PAC Meeting (Pre-Public Hearing Meeting) |
| February 2012 | Public Hearing |
| February 2012 | Commissioners Approval of PLAN |
| March 2012 | Submit Final PLAN to DEP |
| April/May 2012 | Municipal Implementation Workshop(s) |
| May/June 2012 | Public Implementation Workshop(s) |
| July 2012 | PADEP and Clearfield County Contract Expires |

Table 38. Phase II Total Cost Summary – Clearfield County Stormwater Management Plan

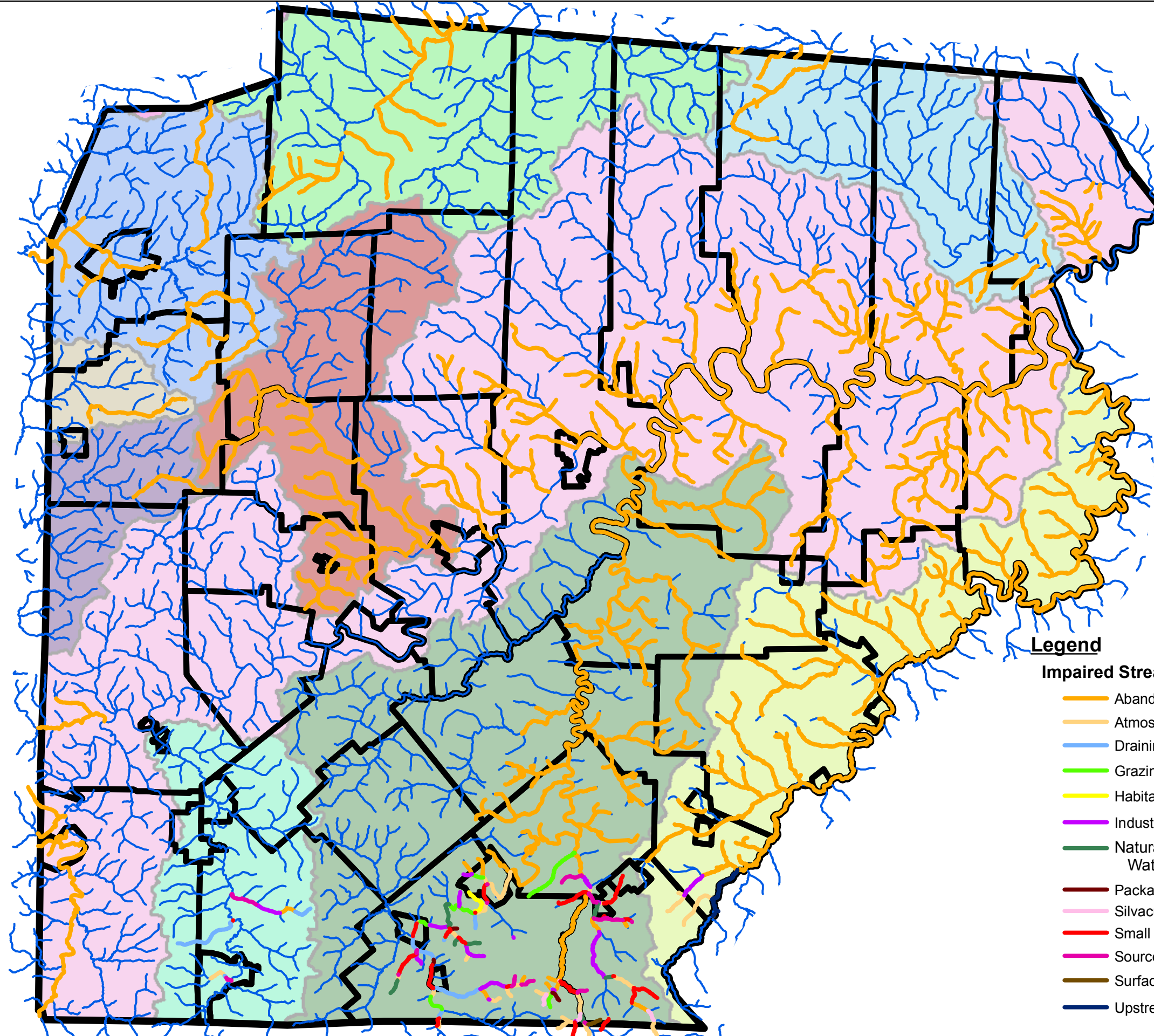
| Task | Direct Labor | Direct Expense | Total |
|--|---------------------|-----------------------|------------------|
| Task A Data Collection | \$ 39,400 | \$ 2,600 | \$ 42,000 |
| Task B Technical Analysis | \$ 73,100 | \$ 0 | \$ 73,100 |
| Task C Plan Preparation and Implementation | \$ 41,550 | \$ 5,750 | \$ 47,300 |
| Task D Public/Municipal Participation | \$ 50,600 | \$ 1,650 | \$ 52,250 |
| Project Management and Administration | \$ 54,650 | \$ 700 | \$ 55,350 |
| Phase II Project Totals | \$259,300 | \$10,700 | \$270,000 |
| Cost by Fiscal Year | | | |
| FY #1 | \$ 80,400 | \$ 2,600 | \$ 83,000 |
| FY #2 | \$120,000 | \$ 1,500 | \$121,500 |
| FY #3 | \$ 58,900 | \$ 6,600 | \$ 65,500 |
| Phase II Project Totals | \$259,300 | \$ 10,700 | \$270,000 |

Table 39. Phase II Cost Breakdown – Clearfield County Stormwater Management Plan

| TASK | County Planner | | Assistant County Planner | | Admin Assistant | | CountyTotal | | Consultant | | Total Project | |
|--|----------------|--------------------|--------------------------|--------------------|-----------------|-------------------|--------------------|--------------------|---------------------|--------------------|---------------|---------------------|
| | Hours | \$ | Hours | \$ | Hours | \$ | Hours | \$ | Hours | \$ | Hours | Cost |
| Task A Data Collection | | | | | | | | | | | | |
| Data Collection | 8 | \$288.00 | 80 | \$2,760.00 | 4 | \$80.00 | 92 | \$3,128.00 | 208 | \$20,170.00 | 300 | \$23,300.00 |
| Municipal Ordinance Review and Evaluation | 4 | \$144.00 | 60 | \$2,070.00 | 8 | \$160.00 | 72 | \$2,374.00 | 28 | \$2,745.00 | 100 | \$5,120.00 |
| Data Prep for Technical Analysis | 4 | \$144.00 | 60 | \$2,070.00 | 8 | \$160.00 | 72 | \$2,374.00 | 29 | \$2,830.00 | 101 | \$5,205.00 |
| Survey of Existing and Proposed SW Facilities | 4 | \$144.00 | 60 | \$2,070.00 | 4 | \$80.00 | 68 | \$2,294.00 | 36 | \$3,480.00 | 104 | \$5,775.00 |
| Direct Costs | | | | | | | \$200.00 | | \$2,400.00 | | | \$2,600.00 |
| Task A Total | 20 | \$720.00 | 260 | \$8,970.00 | 24 | \$480.00 | 304 | \$10,370.00 | 301 | \$31,625.00 | 605 | \$42,000.00 |
| Task B Technical Analysis | | | | | | | | | | | | |
| Analysis of Existing Watershed Runoff Characteristics | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 124 | \$12,190.00 | 124 | \$12,190.00 |
| Evaluation of Water Quality, Peak flow, Stream Stability, and Groundwater Recharge | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 40 | 3,960.00 | 40 | \$3,960.00 |
| Modeling | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 260 | 25,420.00 | 260 | \$25,420.00 |
| Goals, Objectives, and Compilation of Technical Standards | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 56 | 5,640.00 | 56 | \$5,640.00 |
| Implementation of Technical Standards | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 40 | \$3,960.00 | 40 | \$3,960.00 |
| Regulations for Activities impacting Storm Runoff | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 40 | \$3,960.00 | 40 | \$3,960.00 |
| Problem Area and Obstruction Analysis and Solutions | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 184 | \$17,970.00 | 184 | \$17,970.00 |
| Direct Costs | | | | | | | \$0.00 | | \$0.00 | | | \$0.00 |
| Task B Total | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 0 | \$0.00 | 744 | \$73,100.00 | 744 | \$73,100.00 |
| Task C Plan Preparation and Implementation | | | | | | | | | | | | |
| Plan Report Preparation | 24 | \$864.00 | 40 | \$1,380.00 | 24 | \$480.00 | 88 | \$2,724.00 | 230 | \$19,830.00 | 318 | \$22,554.00 |
| Plan Outline | 4 | \$144.00 | 10 | \$345.00 | 4 | \$80.00 | 18 | \$569.00 | 68 | \$5,855.00 | 86 | \$6,424.00 |
| Plan Adoption and Submission | 8 | \$288.00 | 32 | \$1,104.00 | 30 | \$600.00 | 70 | \$1,992.00 | 126 | \$10,580.00 | 196 | \$12,572.00 |
| Direct Costs | | | | | | | \$5,750.00 | | \$0.00 | | | \$5,750.00 |
| Task C Total | 36 | \$1,296.00 | 82 | \$2,829.00 | 58 | \$1,160.00 | 176 | \$11,035.00 | 424 | \$36,265.00 | 600 | \$47,300.00 |
| Task D Public/Municipal Participation | | | | | | | | | | | | |
| PAC Meetings (7) | 42 | \$1,512.00 | 70 | \$2,415.00 | 28 | \$560.00 | 140 | \$4,487.00 | 208 | \$18,568.00 | 348 | \$23,055.00 |
| Preparation of Pamphlet | 8 | \$288.00 | 30 | \$1,035.00 | 16 | \$320.00 | 54 | \$1,643.00 | 46 | 3,940.00 | 100 | \$5,583.00 |
| Public Hearing on Proposd Plan (1) | 10 | \$360.00 | 16 | \$552.00 | 10 | \$200.00 | 36 | \$1,112.00 | 44 | 3,820.00 | 80 | \$4,932.00 |
| Municipal Implementation Workshops (2) | 10 | \$360.00 | 20 | \$690.00 | 12 | \$240.00 | 42 | \$1,290.00 | 80 | 7,225.00 | 122 | \$8,515.00 |
| Public Implementation Workshop (2) | 10 | \$360.00 | 20 | \$690.00 | 12 | \$240.00 | 42 | \$1,290.00 | 80 | 7,225.00 | 122 | \$8,515.00 |
| Direct Costs | | | | | | | \$1,025.00 | | \$625.00 | | | \$1,650.00 |
| Task D Total | 80 | \$2,880.00 | 156 | \$5,382.00 | 78 | \$1,560.00 | 314 | \$10,847.00 | 458 | \$41,403.00 | 772 | \$52,250.00 |
| Project Management and Administration | | | | | | | | | | | | |
| General Admin and Coordination | 144 | \$5,184.00 | 288 | \$9,936.00 | 72 | \$1,440.00 | 504 | \$16,560.00 | 0 | \$0.00 | 502 | \$16,300.00 |
| Contract Initiation with DEP / county (+ Proj Set-up) | 20 | \$720.00 | 16 | \$552.00 | 8 | \$160.00 | 44 | \$1,432.00 | 8 | \$920.00 | 52 | \$2,350.00 |
| Quarterly Progress Reports | 96 | \$3,456.00 | 24 | \$828.00 | 24 | \$480.00 | 144 | \$4,764.00 | 48 | \$5,520.00 | 192 | \$10,284.00 |
| Quarterly Progress meetings | 72 | \$2,592.00 | 72 | \$2,484.00 | 72 | \$1,440.00 | 216 | \$6,516.00 | 192 | \$19,200.00 | 408 | \$25,716.00 |
| Direct Costs | | | | | | | \$0.00 | | \$700.00 | | | \$700.00 |
| Total | 332 | \$11,952.00 | 400 | \$13,800.00 | 176 | \$3,520.00 | 908 | \$29,272.00 | 248 | \$26,340.00 | 1,154 | \$55,350.00 |
| Grand Total Labor Costs | | | | | | | \$54,549.00 | | \$205,008.00 | | | \$259,300.00 |
| Grand Total Direct Costs | | | | | | | \$6,975.00 | | \$3,725.00 | | | \$10,700.00 |
| GRAND TOTAL | | | | | | | \$61,524.00 | | \$208,733.00 | | | \$270,000.00 |

Appendix A

Exhibits



Legend

Impaired Streams - General Cause

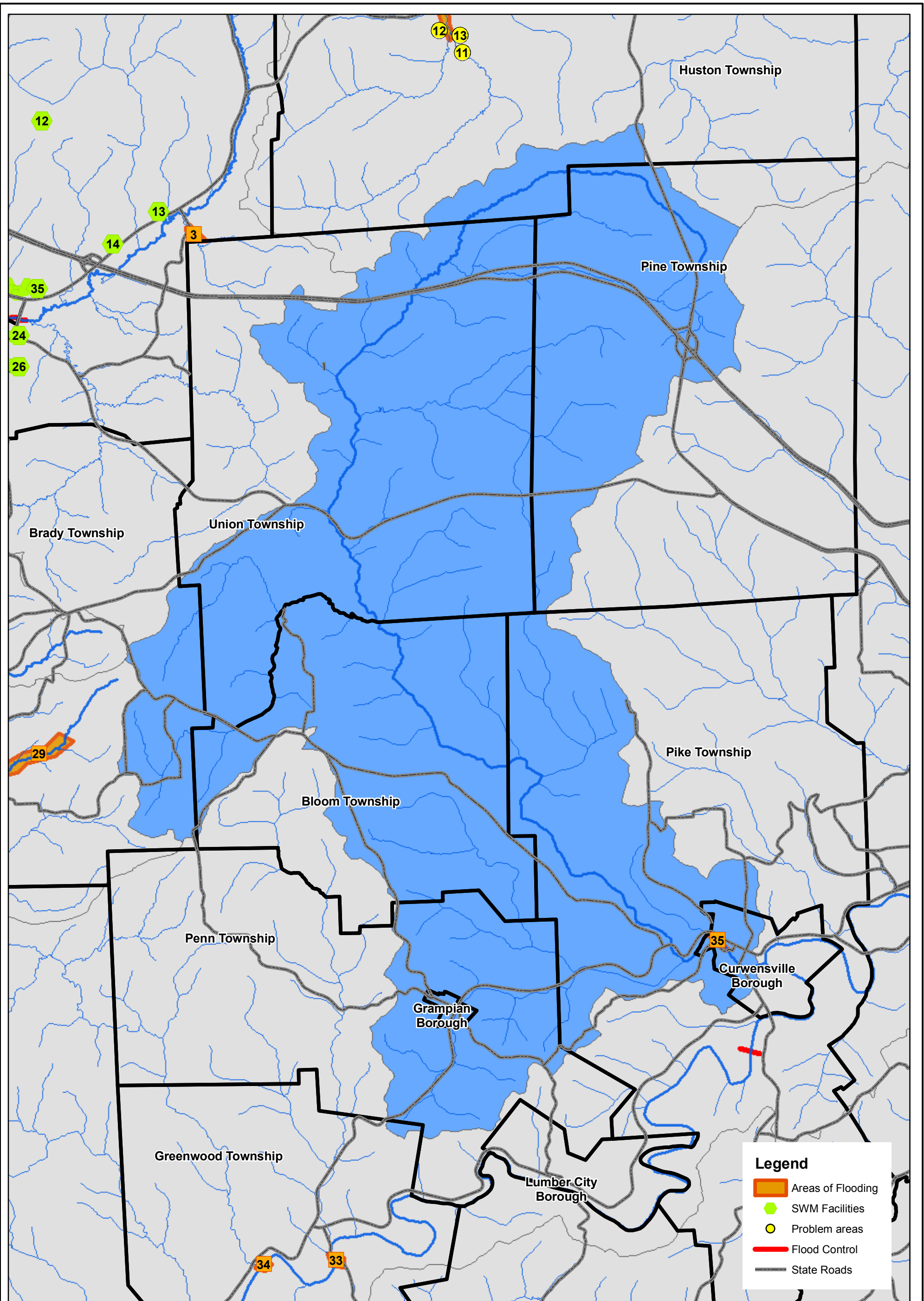
- Abandoned Mine Drainage
- Atmospheric Deposition - pH
- Draining or Filling
- Grazing Related Agric
- Habitat Modification
- Industrial Point Source
- Natural Sources - Water/Flow Variability
- Package Plants
- Silviculture
- Small Residential Runoff
- Source Unknown - Cause Unknown
- Surface Mining
- Upstream Impoundment

Clearfield County Stormwater Management Plan
Exhibit 1
Impaired Streams by Section 305(b) Report

2751 Park Center Boulevard
 Suite 2
 State College, PA 16801
 (814) 238-1170



(not to scale)



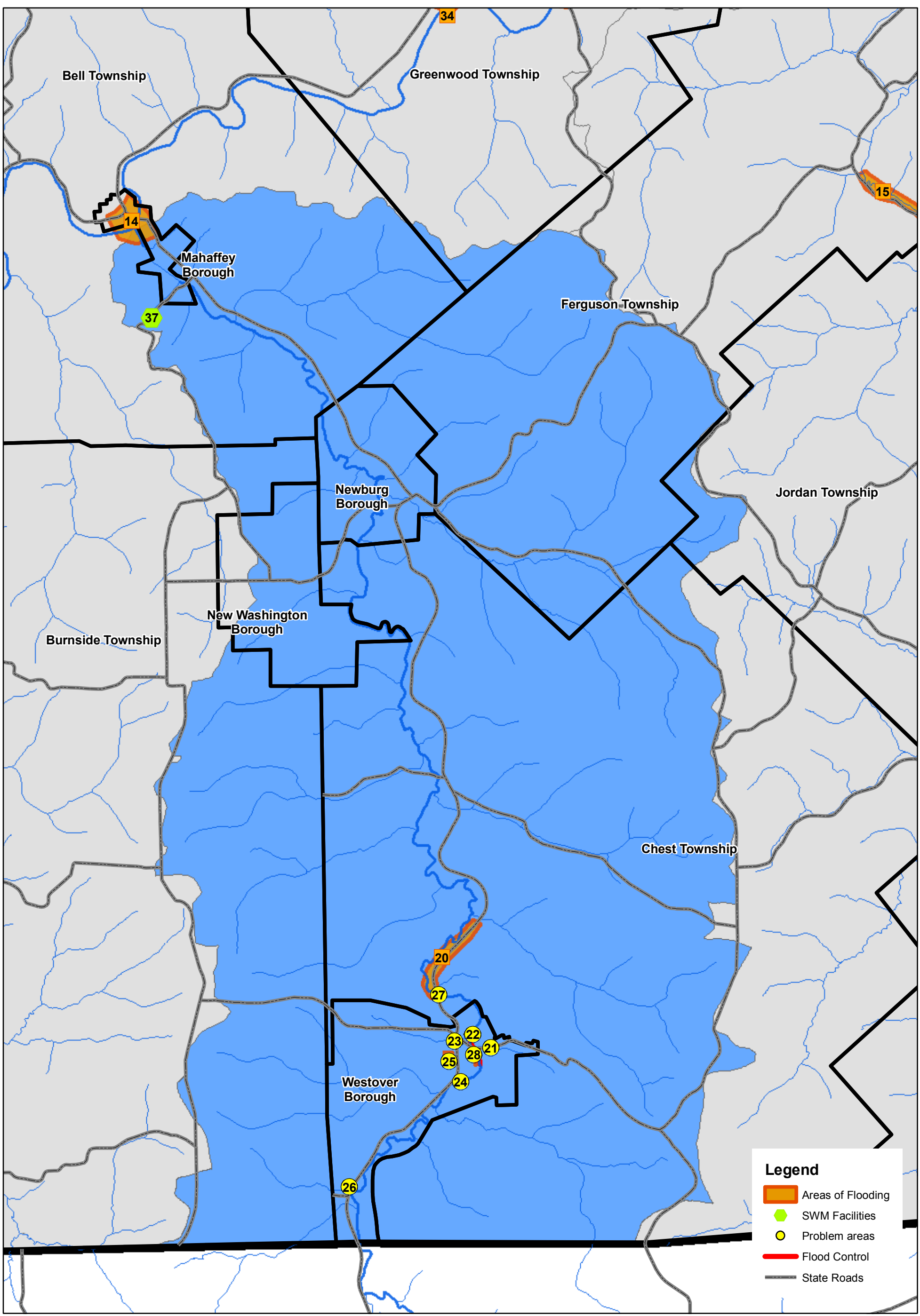
2751 Park Center Boulevard
Suite 2
State College, PA 16801
(814) 238-1170

**Clearfield County Stormwater Management Plan
Summary of Survey Information**

**Exhibit 2
Anderson Creek Watershed**



(not to scale)



Legend

- Areas of Flooding
- SWM Facilities
- Problem areas
- Flood Control
- State Roads

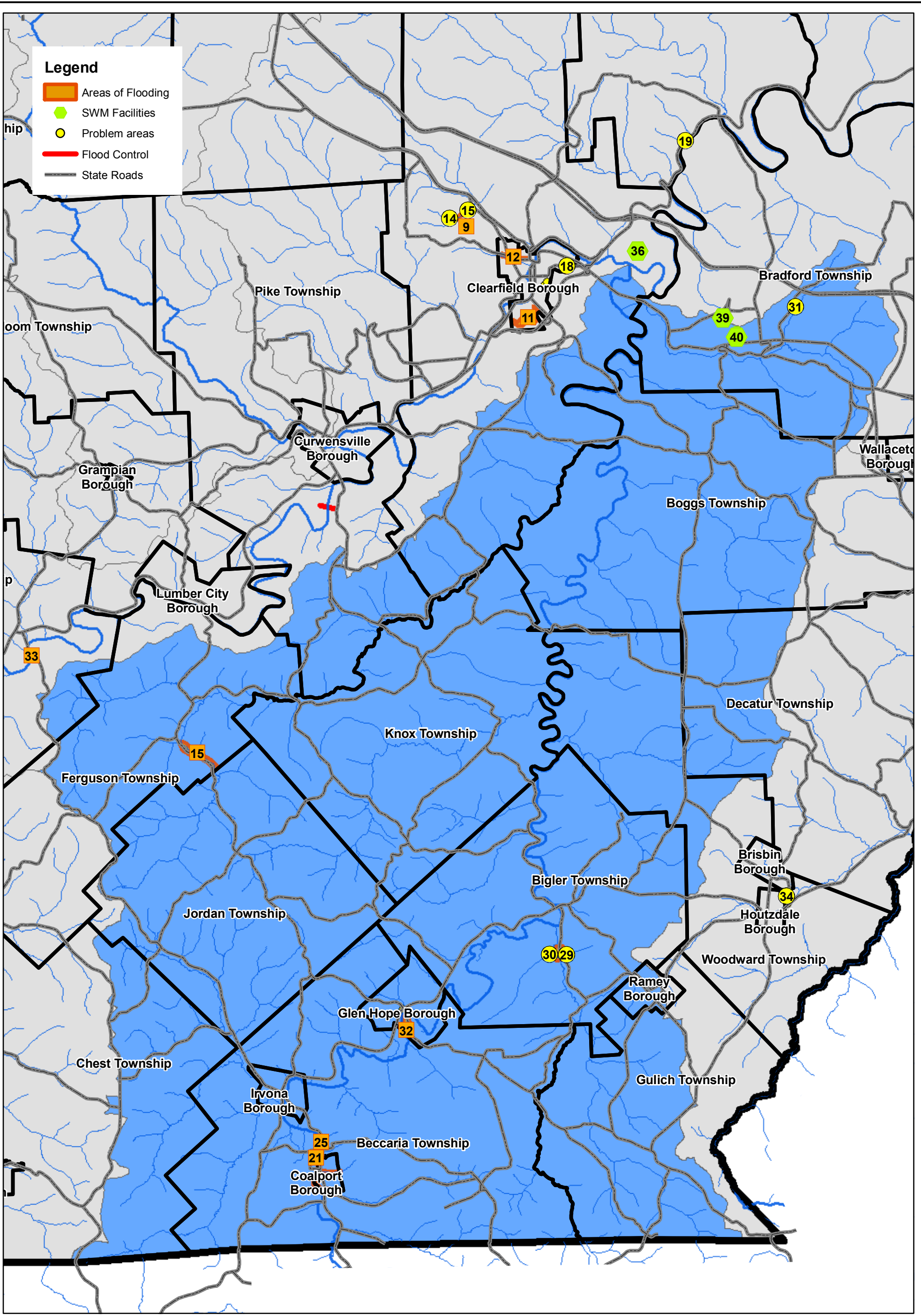


2751 Park Center Boulevard
Suite 2
State College, PA 16801
(814) 238-1170

**Clearfield County Stormwater Management Plan
Summary of Survey Information**

**Exhibit 3
Chest Creek Watershed**



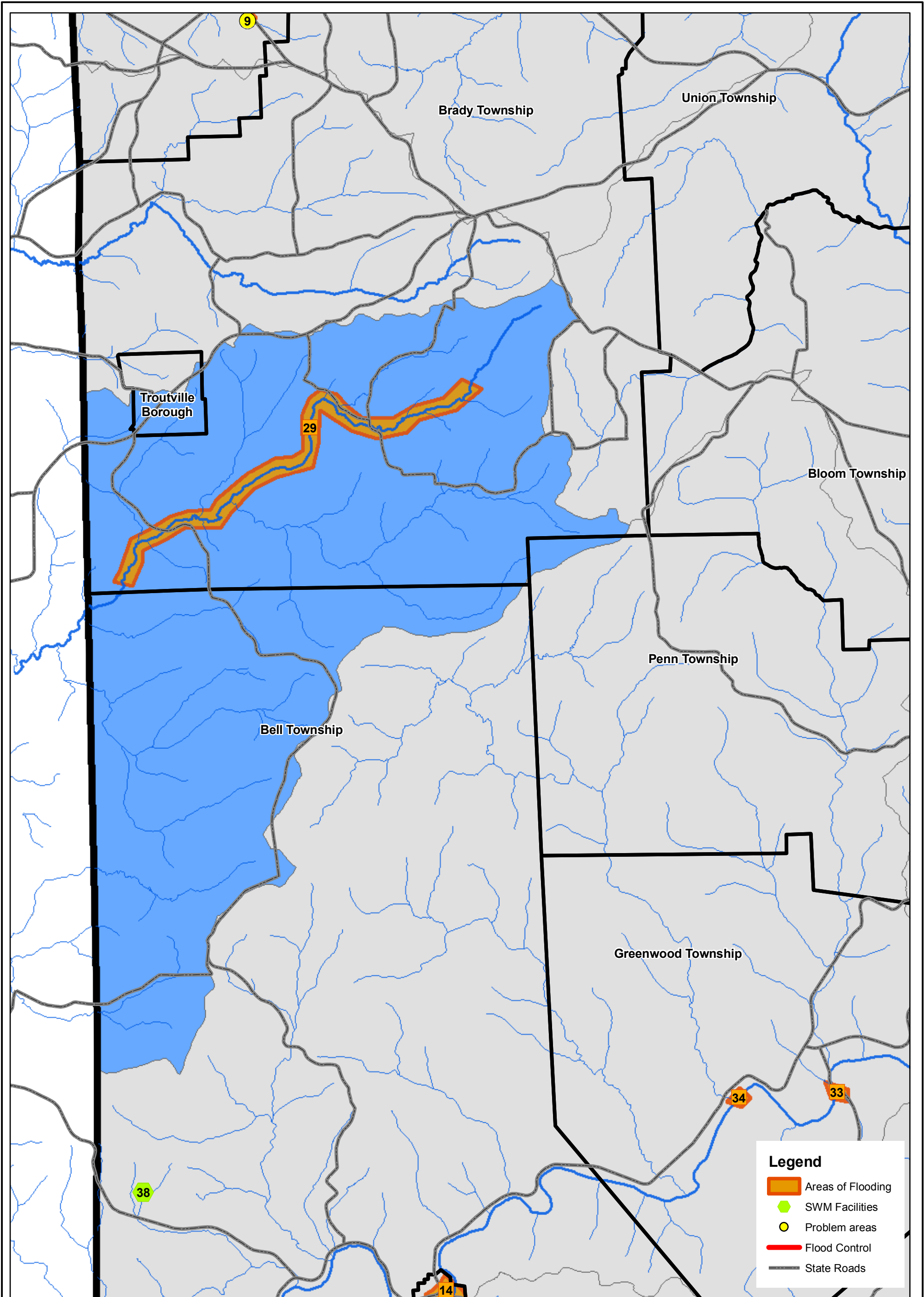


2751 Park Center Boulevard
Suite 2
State College, PA 16801
(814) 238-1170

Clearfield County Stormwater Management Plan
Summary of Survey Information
Exhibit 4
Clearfield Creek Watershed

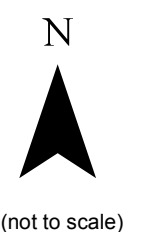


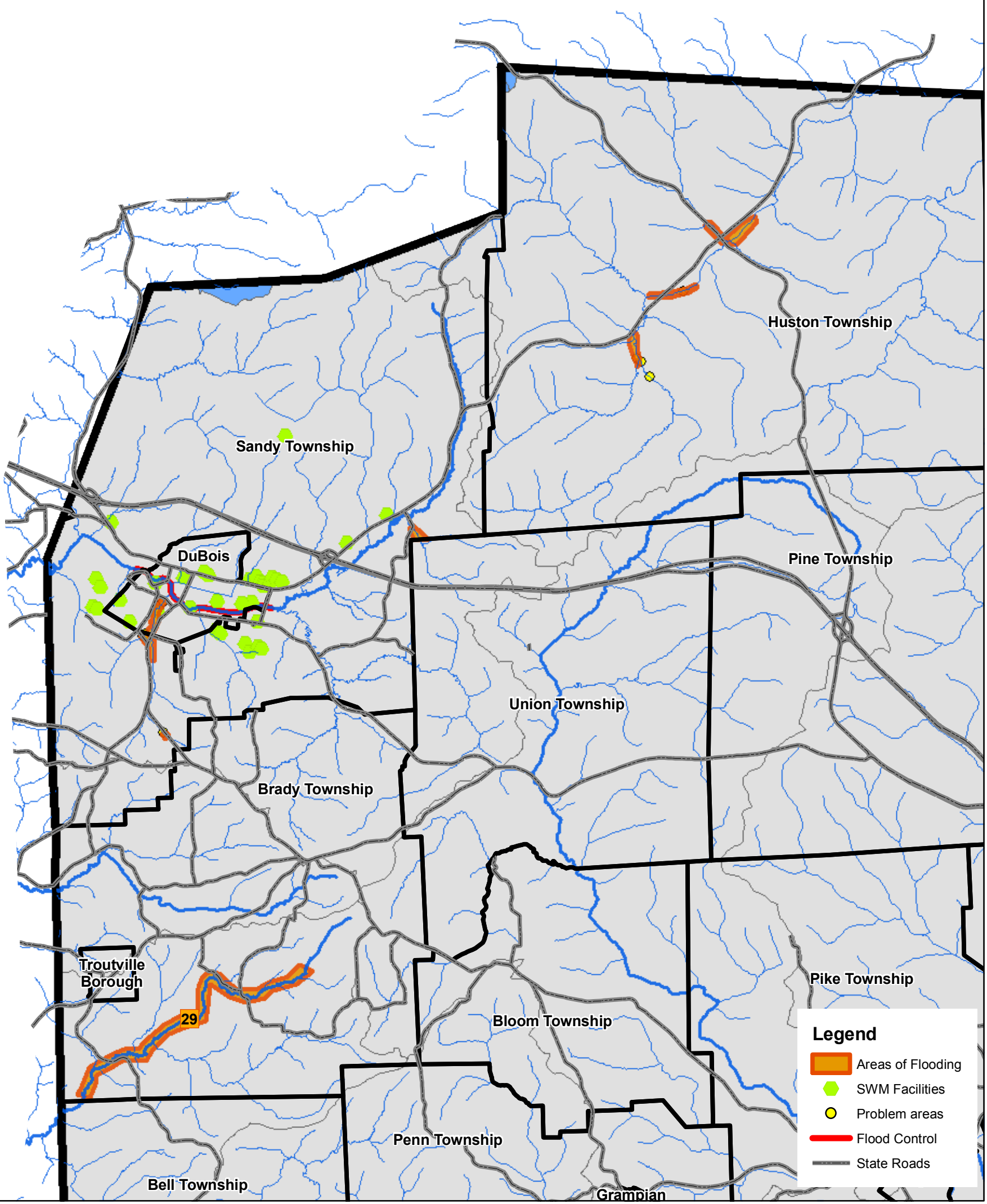
(not to scale)



2751 Park Center Boulevard
Suite 2
State College, PA 16801
(814) 238-1170

Clearfield County Stormwater Management Plan
Summary of Survey Information
Exhibit 5
E. Branch Mahoning Creek Watershed



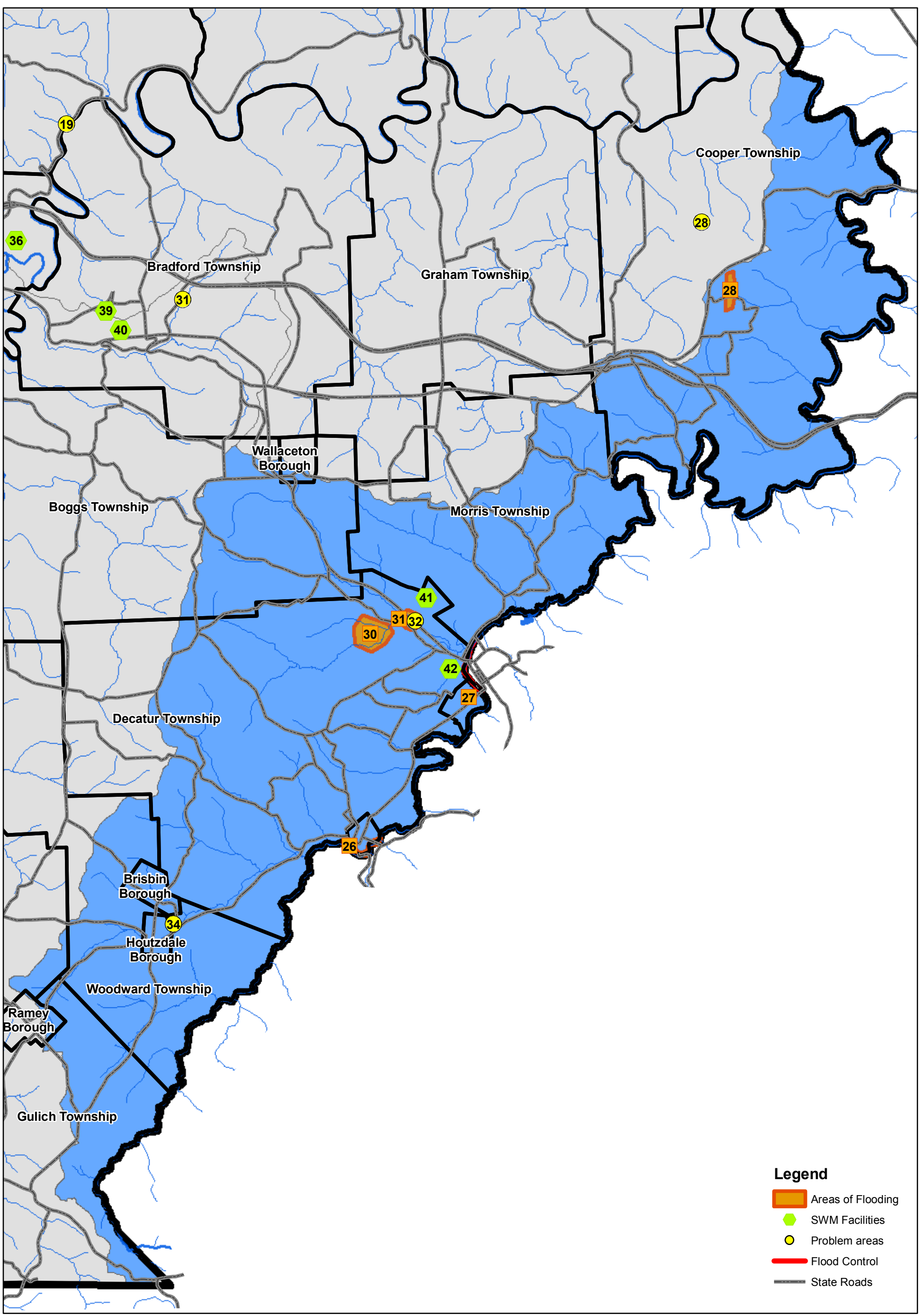


2751 Park Center Boulevard
Suite 2
State College, PA 16801
(814) 238-1170

**Clearfield County Stormwater Management Plan
Summary of Survey Information**

**Exhibit 6
Little Toby Creek Watershed**





- Legend**
- Areas of Flooding
 - SWM Facilities
 - Problem areas
 - Flood Control
 - State Roads

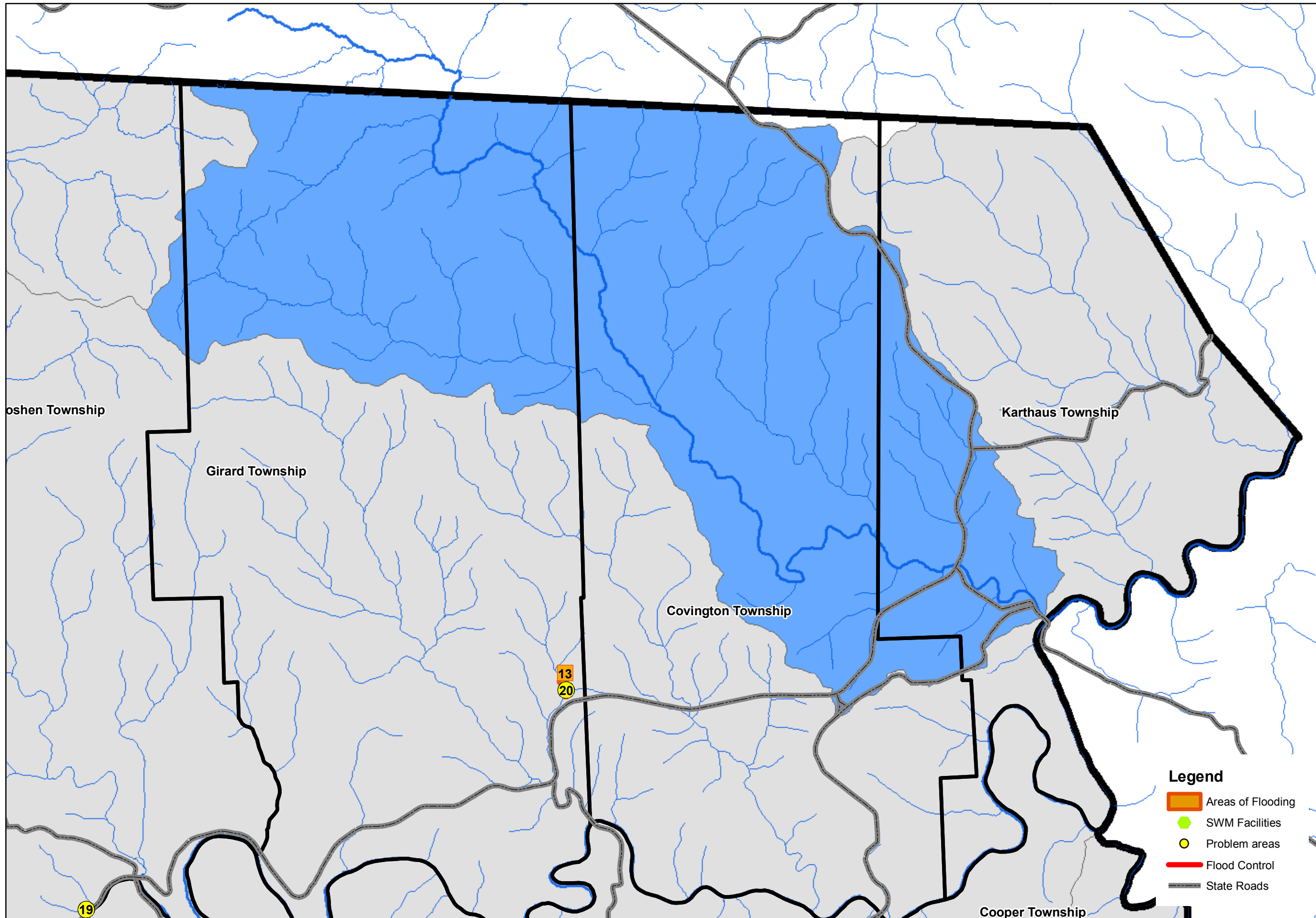


2751 Park Center Boulevard
Suite 2
State College, PA 16801
(814) 238-1170

**Clearfield County Stormwater Management Plan
Summary of Survey Information**

**Exhibit 7
Moshannon Creek Watershed**





(not to scale)






Clearfield County Stormwater Management Plan
 Summary of Survey Information

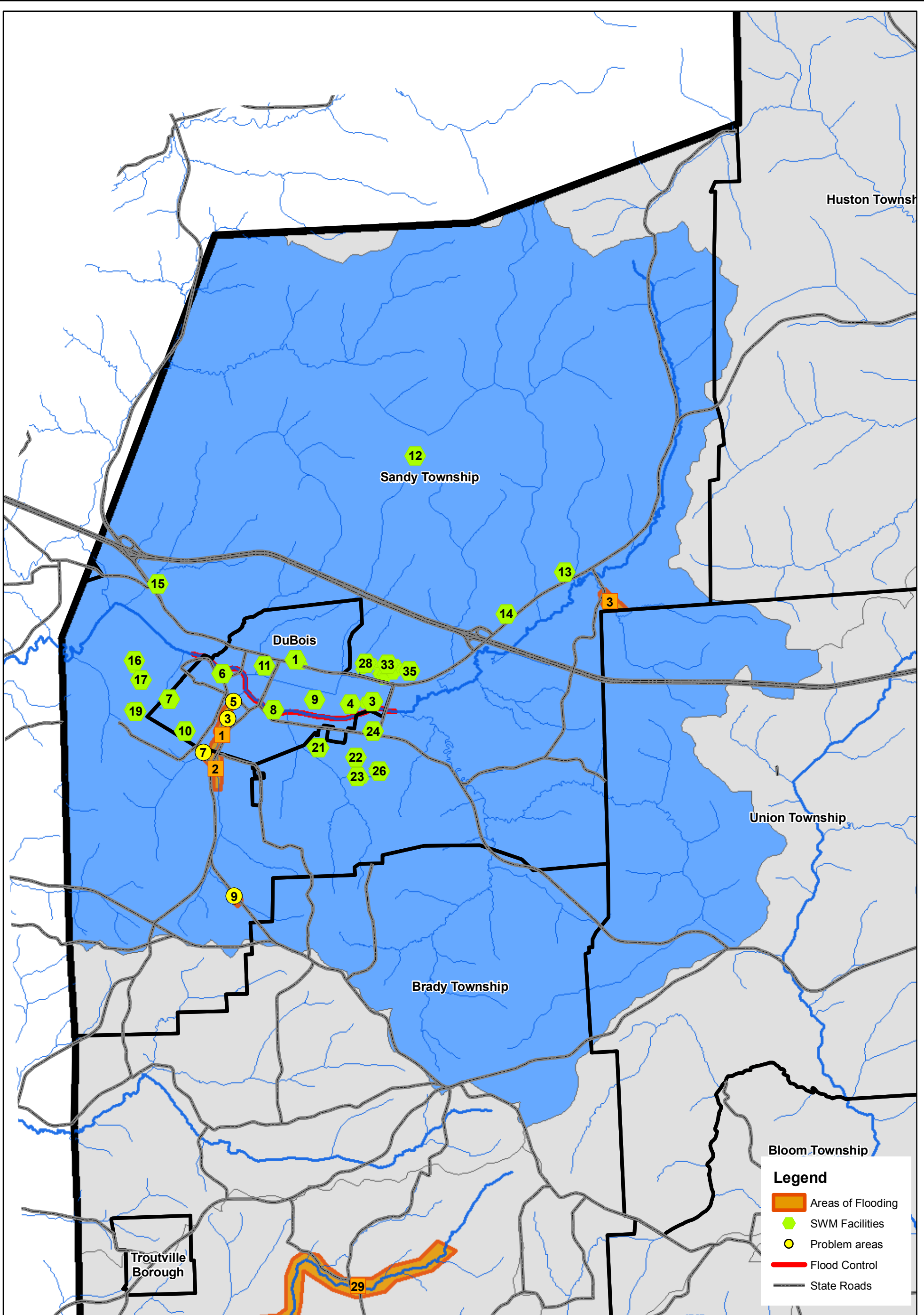
Exhibit 8
 Mosquito Creek Watershed

2751 Park Center Boulevard
 Suite 2
 State College, PA 16801
 (814) 238-1170



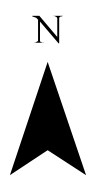
Legend

-  Areas of Flooding
-  SWM Facilities
-  Problem areas
-  Flood Control
-  State Roads

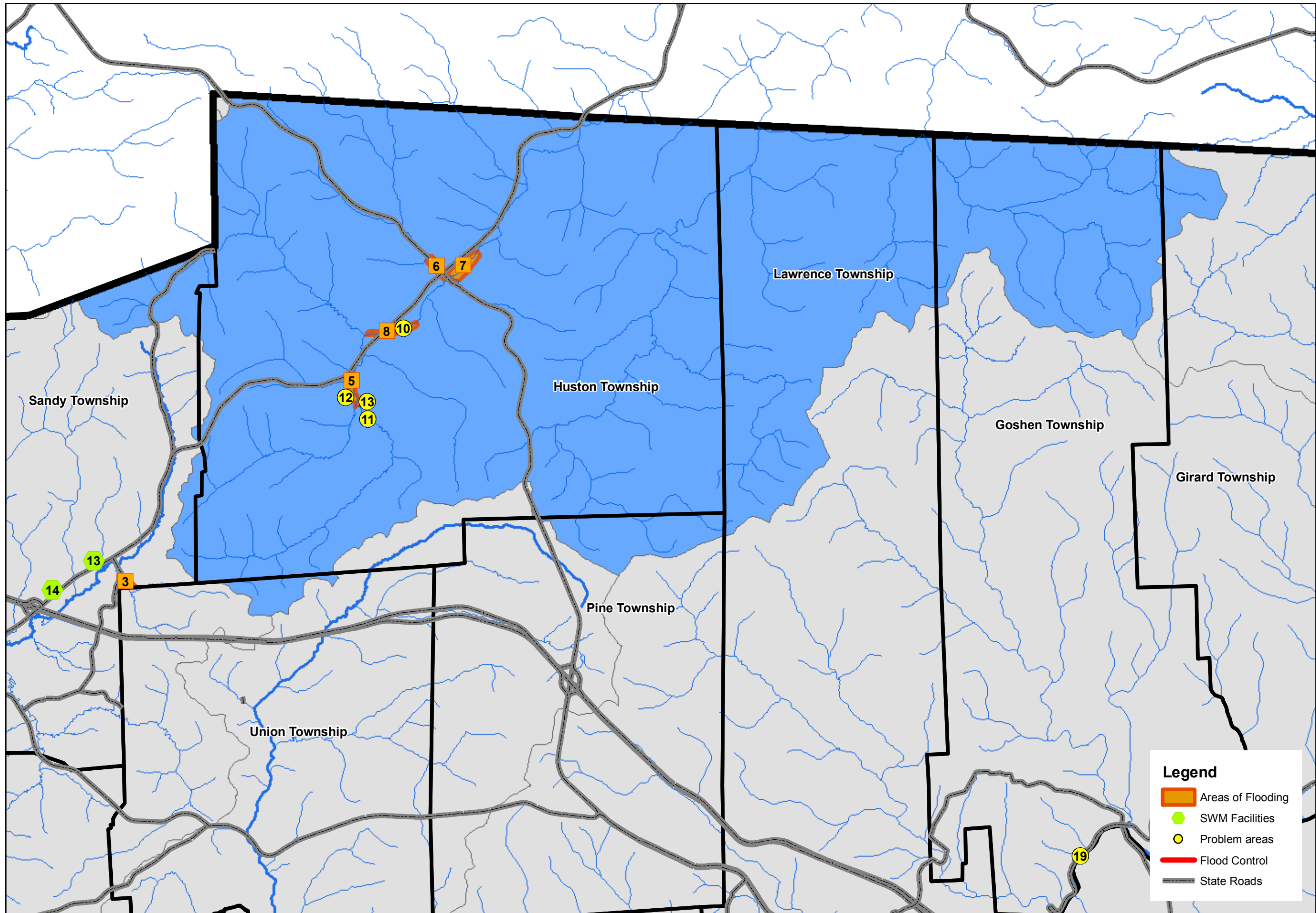


2751 Park Center Boulevard
Suite 2
State College, PA 16801
(814) 238-1170

**Clearfield County Stormwater Management Plan
Summary of Survey Information
Exhibit 9
Sandy Lick Creek Watershed**

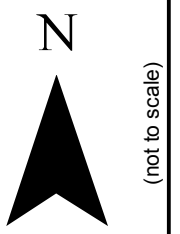


(not to scale)



Legend

- Areas of Flooding
- SWM Facilities
- Problem areas
- Flood Control
- State Roads



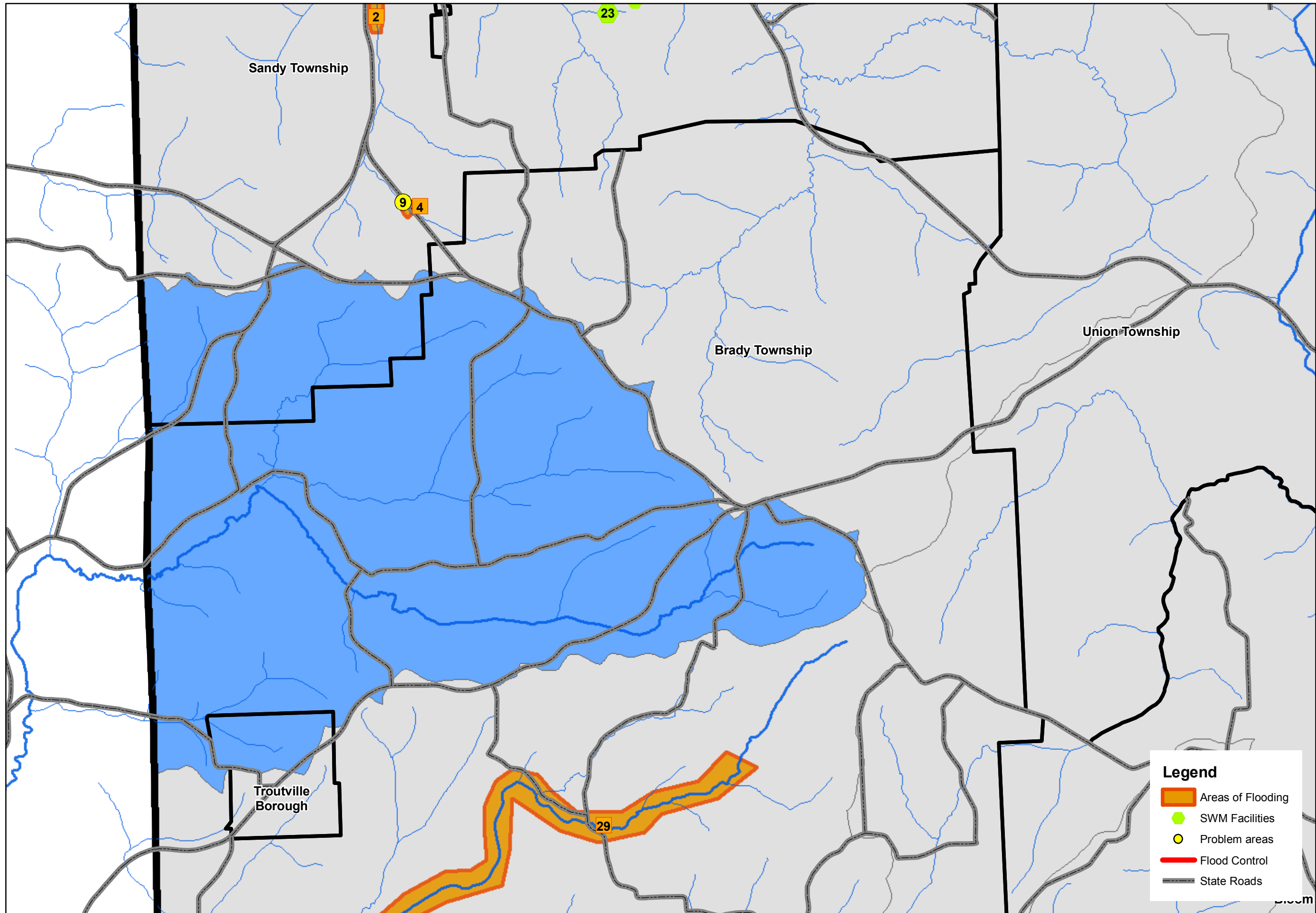
(not to scale)

Clearfield County Stormwater Management Plan
 Summary of Survey Information

Exhibit 10
 Sinnemahoning Creek Watershed

2751 Park Center Boulevard
 Suite 2
 State College, PA 16801
 (814) 238-1170





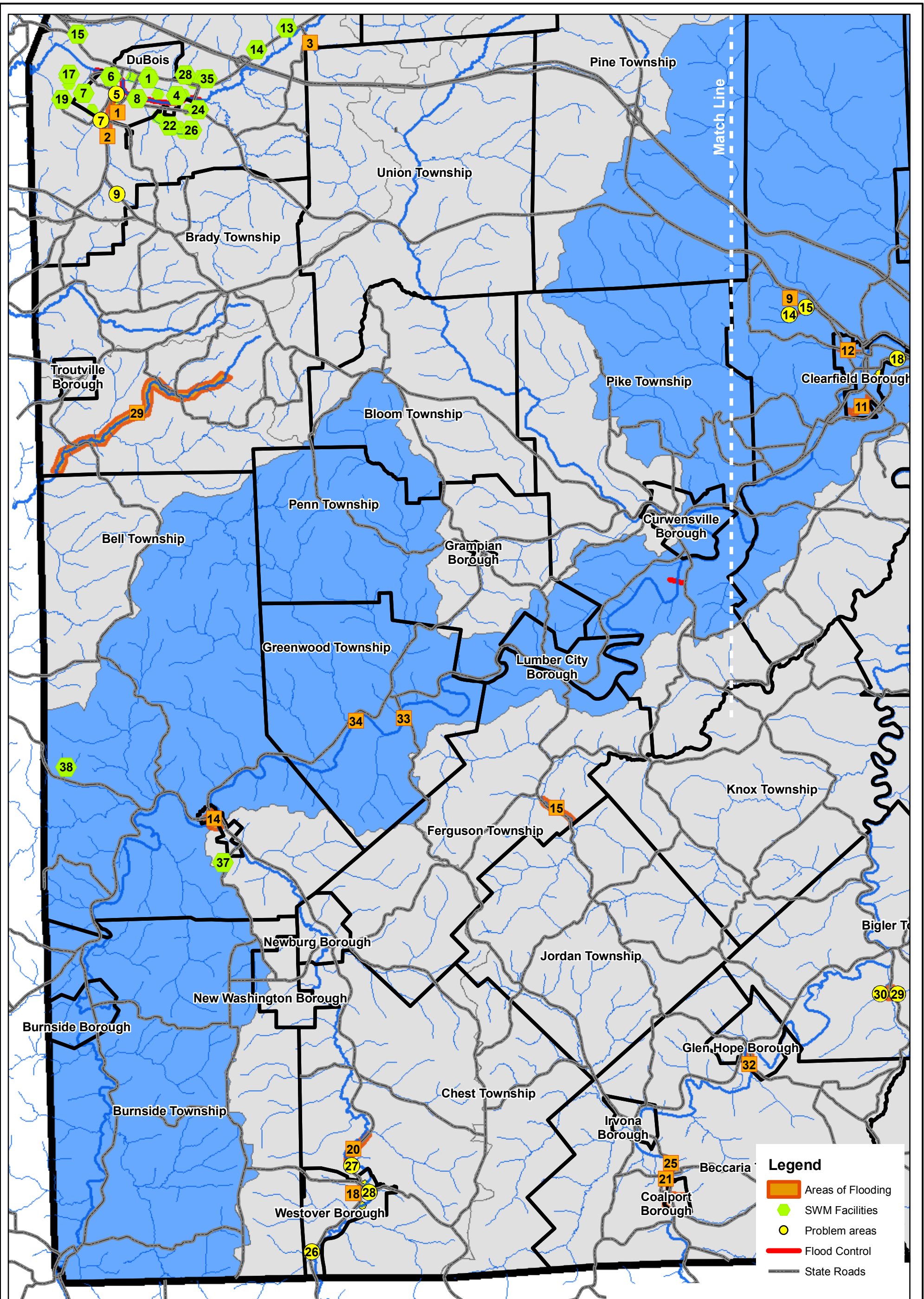
(not to scale)

Clearfield County Stormwater Management Plan
 Summary of Survey Information

Exhibit 11
 Stump Creek Watershed

2751 Park Center Boulevard
 Suite 2
 State College, PA 16801
 (814) 238-1170



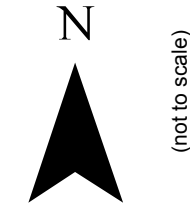
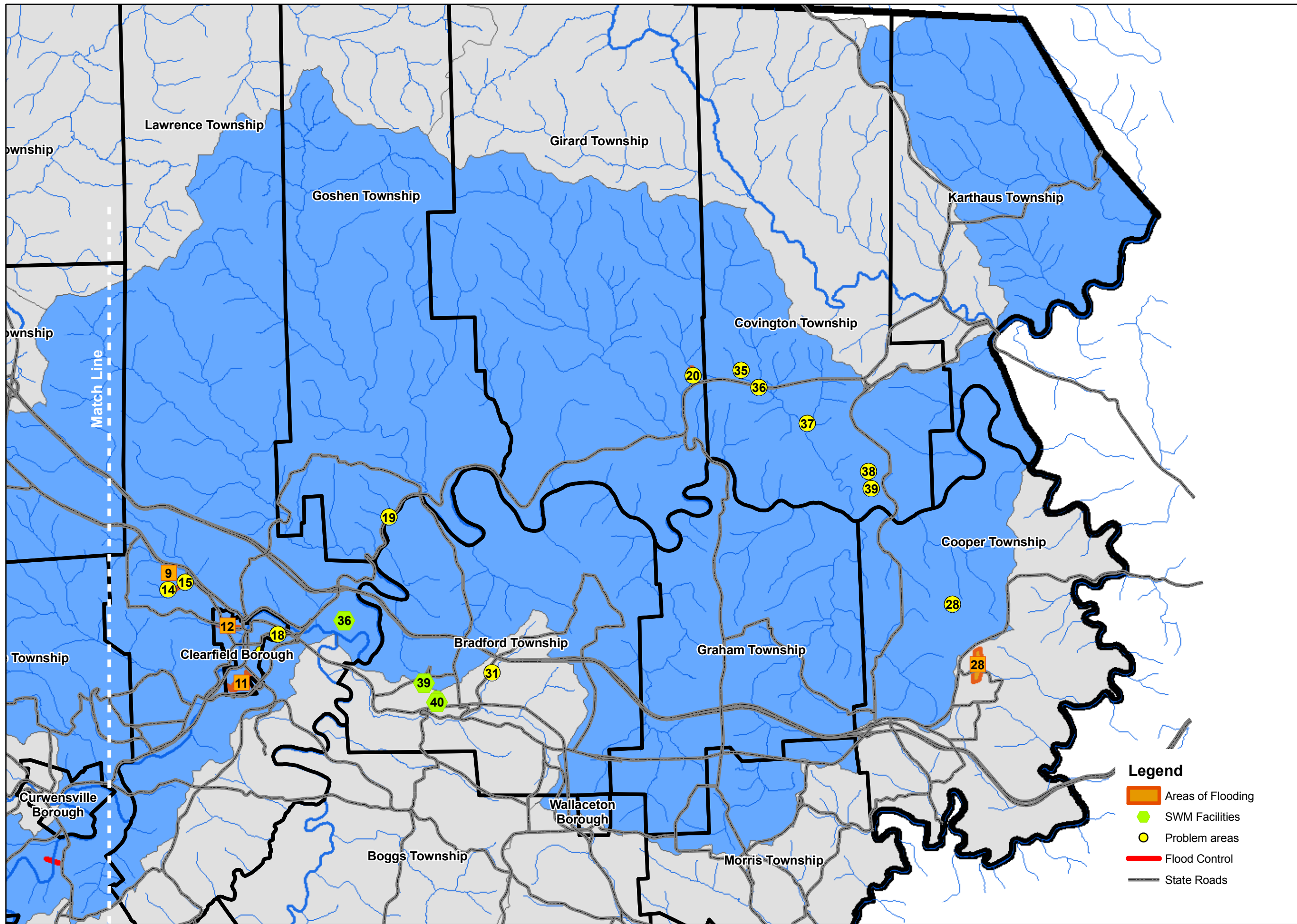


2751 Park Center Boulevard
Suite 2
State College, PA 16801
(814) 238-1170

Clearfield County Stormwater Management Plan
Summary of Survey Information
Exhibit 12
West Branch Susquehanna River
Watershed (west)



(not to scale)

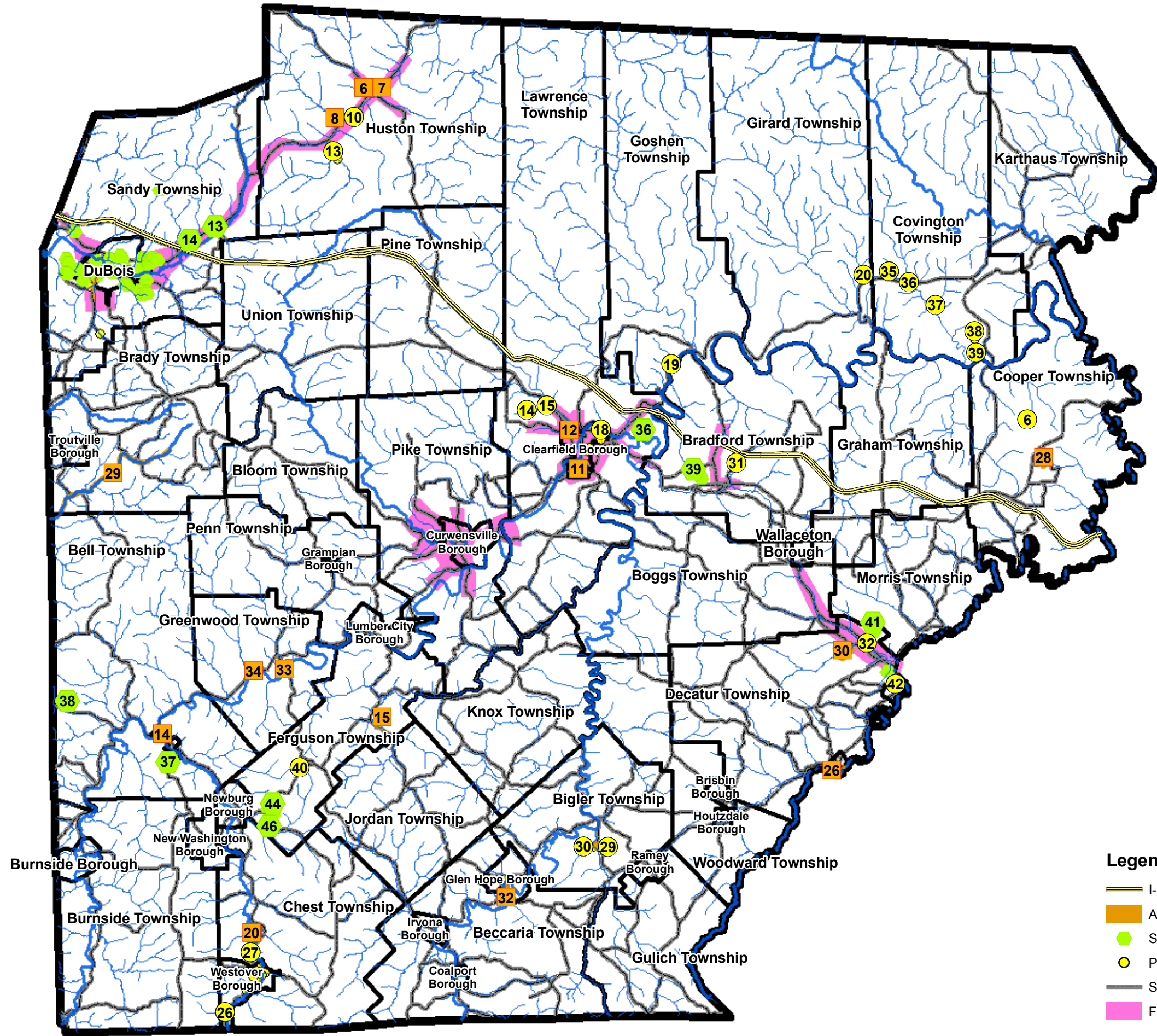


(not to scale)

Clearfield County Stormwater Management Plan
 Summary of Survey Information
 Exhibit 13
 West Branch Susquehanna River
 Watershed (east)

2751 Park Center Boulevard
 Suite 2
 State College, PA 16801
 (814) 238-1170





Legend

- I-80
- Areas of Flooding
- SWM Facilities
- Problem areas
- State Roads
- Future Growth Areas

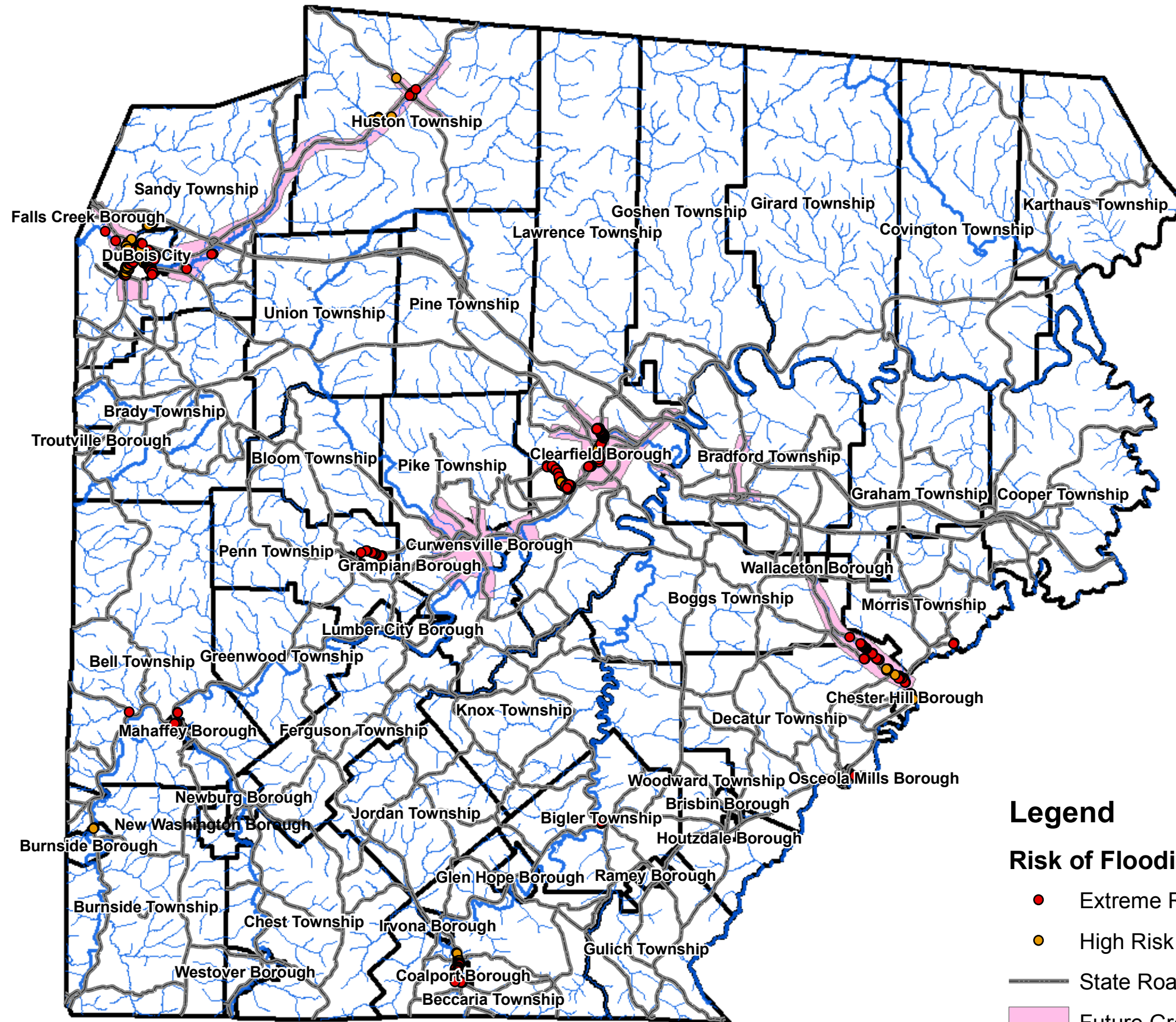


(not to scale)

Clearfield County Stormwater Management Plan
Summary of Survey Information
Exhibit 14
Future Growth Areas, and Municipal Survey
Identified Stormwater and Flooding Problem Areas

2751 Park Center Boulevard
 Suite 2
 State College, PA 16801
 (814) 238-1170





Legend

Risk of Flooding (100-yr storm)

- Extreme Risk (> 4 feet)
- High Risk (1 to 4 feet)
- State Roads
- Future Growth Areas



(not to scale)

**Clearfield County Stormwater Management Plan
Flood Hazard Mitigation Plan Data
Exhibit 15
Future Growth Areas and Flood Risk**

2751 Park Center Boulevard
Suite 2
State College, PA 16801
(814) 238-1170



Appendix B

PAC Members

Appendix B
Clearfield County Act 167 Plan
Plan Advisory Committee Members

| | Name | Representing |
|--|---------------------|-----------------------------------|
| | Joseph Ader | Coalport Boro |
| | Perry Bowser | Sandy Township |
| | Perry Bowser | Sandy Township |
| | Terry Bratton | Chester Hill Boro |
| | Gale Brink | Bigler Twp |
| | Dianne Byers | Bell Township |
| | Dianne Byers | Bell Twp |
| | Dick Castonguay | Sandy Township |
| | Dick Castonguay | Sandy Township |
| | Jeff Corcino | The Progress |
| | Michael Delfosse | Beccaria Twp |
| | Jane Elling | Bell Twp |
| | Scott Farrell | City of DuBois |
| | Jon Gallaher | Coalport Boro |
| | Ben Gilberti | Bradford Township |
| | William Lawhead | Lawrence Township |
| | Bill Lawhead | Lawrence Twp |
| | Dave Long | Pine Twp |
| | Debra McAfoose | Westover Boro |
| | James McCluskey | Bennett Branch Watershed |
| | David Miller | Mahaffery Boro |
| | William Oshall | Beccaria Twp |
| | Darrell Patton, Jr. | Huston Twp |
| | Jerry Pollock | Clearfield Co EMA |
| | Aaron Pontzer | Skelly & Loy |
| | Ida Reanis | Osceola Mills Borough |
| | Ken Rowe | Bennett Branch Watershed |
| | Donald Sheeder | Ferguson Twp |
| | Michael Spearing | Chester Hill Boro |
| | Paul Staniszewski | Troutville Boro |
| | Ken Undercoffer | Trout Unlimited |
| | Carl Undercofler | Emich Run/Lakeside Watershed |
| | Therese Westover | Westover Boro |
| | Paul Winslow | Coalport Boro |
| | Jodi Brennan | Clearfield County Planning Office |
| | Robert Thomas | Clearfield County Planning Office |

State Agency Representative
 Nancy Cisar, Pa DEP/CO

Appendix C
Minutes from PAC Meeting

Clearfield County Stormwater Plan Kick-off Meeting,

Sept 18, 2008, 7:00 at Clearfield Middle School

Attendees:

Perry Bowser, Sandy Township
Dick Castonguay, Sandy Township
Dianne Byers, Bell Township
Ben Gilberti, Bradford Township
Jason Fellon, Pa DEP, North Central office
Donald Sheeder, Ferguson Twp
Scott Farrell, City of DuBois
William Lawhead, Lawrence Township
Nancy Cisar, Pa DEP, Central office
Jodi Brennan, Clearfield County Planning Office
Robert Thomas, Clearfield County Planning Office
Scott Brown, Pennoni
Katie Blansett, Pennoni

The meeting was started by Jody Brennan of the Clearfield County Planning office with a brief introduction of the project and all individuals present introduced themselves and the municipality/organization they were representing.

Nancy Cisar of PA DEP central office gave a presentation introducing the stormwater planning process. She provided a historic background of the Act 167 stormwater program which originated following the severe flooding caused by Hurricane Agnes (1972) and Eloise (1975). Act 167 legislated a program of watershed based stormwater management planning. These planning initiatives were originally implemented in the late 1970's and early 1980's on a watershed by watershed basis. All Act 167 Storm Water Management Planning for each county is being performed under one county-wide grant agreement.

The overall goals and objectives of the Act 167 program are to

- (1) identify water and land used practices,
- (2) plan and manage sound stormwater solutions for these practices, and
- (3) administer the plan through local government bodies.

Nancy continued by identifying the watersheds in Clearfield Co for which Act 167 Plans had been undertaken; these included

- (1)Chest Creek (2002)
- (2)Mahoning Creek (2001), and
- (3)Sandy Lick Creek (1995).

Municipalities that adopted stormwater ordinances in response to these plans include:

- (1) Chest Creek
 - a. Chest Township
 - b. Ferguson Township
 - c. New Washington Borough
- (2) Mahoning Creek (none)
- (3) Sandy Lick Creek
 - a. Dubois City
 - b. Huston Township
 - c. Sandy Township
 - d. Union Township

Nancy indicated that the program requires municipalities to enact the ordinance within 6 months of the plan approval. DEP reimburses municipalities 75% of the cost to adopt and administer the stormwater ordinance. However, the reimbursement cannot occur until after the ordinance is adopted. Therefore, municipalities should keep good records of all costs associated with adoption and administration of an Act 167 stormwater ordinance so that all costs incurred prior to ordinance adoption can be included in the reimbursement. Nancy distributed a copy of the DEP forms that document municipal costs that must be completed for reimbursement. The 'APPLICATION FOR MUNICIPAL REIMBURSEMENT UNDER THE PENNSYLVANIA STORM WATER MANAGEMENT ACT (1978 ACT 167)' form number 3930-FM-WM0059 is also available on the DEP website.

Scott Brown of Pennoni followed with a presentation that provided additional details on the Act 167 Stormwater Plan process, and an overview of the problems associated with stormwater runoff. Scott indicated that the first stormwater regulations were focused on mitigating flooding, but have since progress to address peak rate, volume and water quality.

Scott discussed the impact that land development has on stormwater runoff: Following land development, a site will experience higher volumes of runoff, increased peak rates, and lower quality because of decreases in evapotranspiration, infiltration and retardance. Scott stressed the importance of soils in stormwater management, and explained that the effects of uncontrolled runoff include flooding, stream destabilization, reduced groundwater recharge and baseflow and water quality degradation.

Scott further explained how PA DEP was implementing it's stormwater policy through the Act 167 program, Municipal Separate Storm Sewer National Pollutant Discharge Elimination System Permitting Program (MS4 NPDES permits), and the post-construction NPDES Permit program. Through these three (3) programs PA DEP is promoting consistent local stormwater ordinances that comply with both Federal and State laws.

In addition, Scott explained that the Act 167 planning process involves 2 phases. Phase I is the scoping study in which municipal officials and county residents are asked

to identify existing stormwater problems and issues. It is important that Stakeholders from across the county (including municipal officials, watershed associations, builder/developers, planners, engineers, and other interested citizens and groups) be involved in this process to identify and help prioritize the most critical stormwater issues affecting the citizens of Clearfield County. Phase I will identify an action plan to address the identified problems. Given the county-wide nature of the planning process, it is anticipated that the action plan will include multiple steps or stages.

The goal of Phase II of the Act 167 Stormwater Planning process will be to conduct analysis as necessary to address the priority issues identified in Phase I. A key element will be to create watershed based stormwater management ordinances for all of Clearfield County which meet Federal and State regulatory requirements for peak, volume, and quality control.

Following Scott's presentation, the floor was opened to questions about the process and suggestions for items which should be included in the Plan. Major issues of concern that were identified and discussed are outlined in the following:

1. Need for Public education

- Comment: Public and supervisors need explanation of the regulations and the need for them.
- Response: Suggestions made to address this issue were:
 - ✓ Presentation at the Supervisor's Convention in the Spring of 2009
 - ✓ One or more public forums for Stakeholders to attend
 - ✓ Flyer or article in local papers

2. Permitting for the removal of stream debris is currently too restrictive. Can something be included to address this?

- Since this is being identified as a stormwater/flooding problem, the Plan can address it by
 - ✓ identifying areas where gravel removal is problematic and is needed to reduce flooding
 - ✓ Identifying permit requirements and application processes in the plan
 - ✓ Coordinating with DEP to try to reduce red tape required to perform routine maintenance to waterways for flood control.

3. Funding for stormwater projects, and ordinance adoption and administration

- The Plan can identify and list funding opportunities for stormwater projects.
- Problems will be prioritized so funding is used most efficiently.
- Municipalities can apply for 75% reimbursement of cost to adopt and administer stormwater ordinances resulting from the Plan; Plan will clearly outline the reimbursement process.
- Jodi Brennan agreed to check into funding opportunities and procedures for the continued administration and enforcement of stormwater ordinances following adoption.

- A question/concern was voiced whether stormwater problems identified in the Plan had to be fixed by local municipalities with or without financial assistance from the state or others. The response was that the Plan will list and prioritize stormwater issues and problems, but does not mandate that they be addressed. However, the Plan can be used as documentation of need when applying for funding.

4. Acid Mine drainage concerns

Acid mine drainage (AMD) is seen as a significant stormwater/water quality issue in Clearfield County. Staff from GTS Technologies are part of the project team and will use their extensive AMD experience to pose solutions to AMD problems in the county as a part of the Plan. We anticipate that they will have significant involvement in Phase II of the project.

Some localized areas of alkaline mine drainage were also identified as a problem in the County.

5. Will current exemptions from existing Act 167 plans remain in place?

Existing Act 167 Plans will be reviewed, and consideration will be given to including elements of these plans that are consistent with current laws in the model ordinances developed under this project.

The 5000 sq ft exemption from the Sandy Lick Act 167 was specifically identified. This exemption will be considered for inclusion in the County Plan.

6. All stakeholders need to be involved in the process

- It was suggested that we need to involve all stakeholders including Trout Unlimited.
- Every effort will be made to contact and involve all stakeholders including municipal officials, watershed groups, conservation district, trout unlimited, builder/developers, and any other interested groups or citizens.
- Efforts to reach stakeholder groups will include mailings, phone contact, e-mail, newspapers, etc.

7. Standards and BMP's that will be included in the Plan / model ordinance

- Appropriate stormwater standards (for peak, volume, and water quality control) will be developed and recommended during Phase II. Although these standards must meet State and Federal regulatory requirements, significant consideration will be given to the rural nature of the County, and unique characteristics of individual watersheds. The standards will be based on best available science using a common sense approach.
- At a minimum, the BMP's identified in the Pennsylvania Stormwater Best Management Practices Manual will be recommended. However, stormwater management strategies will not be limited to these BMP's; the plan and ordinance will be open to the use of other innovative management practices that are shown to meet stormwater management objectives.

- Standards will be designed to address potential impacts from future development. There is no law or requirement that mandates that new development address or mitigate the lack of stormwater controls associated with past development practices.

Clearfield County Stormwater Plan
Plan Advisory Committee Meeting
November 15, 2008, 7:30pm
Clearfield County Planning Commission Auditorium

Attendees:

Michael Delfosse, Beccaria Twp
William Oshall, Beccaria Twp
Paul W. Winslow, Coalport Boro
Debra McAfoose, Westover Boro
Therese Westover, Westover Boro
Perry Bowser, Sandy Township
Dick Castonguay, Sandy Township
Carl Undercofler, Emich Run/Lakeside Watershed
Darrell J Patton Fr, Huston Twp
Ken Rowe, Bennett Branch Watershed
Jerry Pollock, Clearfield Co EMA
Dave Long, Pine Twp
James McCluskey, Bennett Branch Watershed
Joseph J Ader, Coalport Boro
Jon Gallaher, Coalport Boro
David E Miller, Mahaffery Boro
Terry Bratton, Chester Hill Boro
Michael Spearing, Chester Hill Boro
Ida Reanis, Osceola Mills Borough
Paul Staniszewski, Troutville Boro
Gale Jack Brink, Bigler Twp
Dianne Byers, Bell Twp
Jane Elling, Bell Twp
Bill Lawhead, Lawrence Twp
Ken Undercoffer, Trout Unlimited
Aaron Pontzer, Skelly & Loy
Jeff Corcino, The Progress
Jodi Brennan, Clearfield County Planning Office
Robert Thomas, Clearfield County Planning Office
Scott Brown, Pennoni
Katie Blansett, Pennoni

The meeting was started by Jodi Brennan of the Clearfield County Planning office with a brief introduction of the project. Due to a location mix-up Nancy Cisar of the PA DEP was not present but Scott Brown of Pennoni filled in and gave her presentation.

This was the second Plan Advisory Council (PAC) meeting and the presentation material was essentially the same as the material discussed at the first meeting on 9/18/08. The following section (in italics) is a summary of the material presented from the first PAC meeting.

Nancy Cisar of PA DEP central office gave a presentation introducing the stormwater planning process. She provided a historic background of the Act 167 stormwater program which originated following the severe flooding caused by Hurricane Agnes (1972) and Eloise (1975). Act 167 legislated a program of watershed based stormwater management planning. These planning initiatives were originally implemented in the late 1970's and early 1980's on a watershed by watershed basis. All Act 167 Storm Water Management Planning for each county is being performed under one county-wide grant agreement.

The overall goals and objectives of the Act 167 program are to

- (4) identify water and land used practices,
- (5) plan and manage sound stormwater solutions for these practices, and
- (6) administer the plan through local government bodies.

Nancy continued by identifying the watersheds in Clearfield Co for which Act 167 Plans had been undertaken; these included

- (4) Chest Creek (2002)
- (5) Mahoning Creek (2001), and
- (6) Sandy Lick Creek (1995).

Municipalities that adopted stormwater ordinances in response to these plans include:

- (4) Chest Creek
 - i. Chest Township
 - ii. Ferguson Township
 - iii. New Washington Borough
- (5) Mahoning Creek (none)
- (6) Sandy Lick Creek
 - i. Dubois City
 - ii. Huston Township
 - iii. Sandy Township
 - iv. Union Township

Nancy indicated that the program requires municipalities to enact the ordinance within 6 months of the plan approval. DEP reimburses municipalities 75% of the cost to adopt and administer the stormwater ordinance. However, the reimbursement cannot occur until after the ordinance is adopted. Therefore, municipalities should keep good records of all costs associated with adoption and administration of an

Act 167 stormwater ordinance so that all costs incurred prior to ordinance adoption can be included in the reimbursement. Nancy distributed a copy of the DEP forms that document municipal costs that must be completed for reimbursement. The 'APPLICATION FOR MUNICIPAL REIMBURSEMENT UNDER THE PENNSYLVANIA STORM WATER MANAGEMENT ACT (1978 ACT 167)' form number 3930-FM-WM0059 is also available on the DEP website.

Scott Brown of Pennoni followed with a presentation that provided additional details on the Act 167 Stormwater Plan process, and an overview of the problems associated with stormwater runoff. Scott indicated that the first stormwater regulations were focused on mitigating flooding, but have since progress to address peak rate, volume and water quality.

Scott discussed the impact that land development has on stormwater runoff: Following land development, a site will experience higher volumes of runoff, increased peak rates, and lower quality because of decreases in evapotranspiration, infiltration and retardance. Scott stressed the importance of soils in stormwater management, and explained that the effects of uncontrolled runoff include flooding, stream destabilization, reduced groundwater recharge and baseflow and water quality degradation.

Scott further explained how PA DEP was implementing it's stormwater policy through the Act 167 program, Municipal Separate Storm Sewer National Pollutant Discharge Elimination System Permitting Program (MS4 NPDES permits), and the post-construction NPDES Permit program. Through these three (3) programs PA DEP is promoting consistent local stormwater ordinances that comply with both Federal and State laws.

In addition, Scott explained that the Act 167 planning process involves 2 phases. Phase I is the scoping study in which municipal officials and county residents are asked to identify existing stormwater problems and issues. It is important that Stakeholders from across the county (including municipal officials, watershed associations, builder/developers, planners, engineers, and other interested citizens and groups) be involved in this process to identify and help prioritize the most critical stormwater issues affecting the citizens of Clearfield County. Phase I will identify an action plan to address the identified problems. Given the county-wide nature of the planning process, it is anticipated that the action plan will include multiple steps or stages.

The goal of Phase II of the Act 167 Stormwater Planning process will be to conduct analysis as necessary to address the priority issues

identified in Phase I. A key element will be to create watershed based stormwater management ordinances for all of Clearfield County which meet Federal and State regulatory requirements for peak, volume, and quality control.

Scott finished his presentation by summarizing that the final outcomes of Phase I (the current project) will be the formation of the PAC and the development of the Scope of Work for Phase II. The Scope of Work will rely heavily on stormwater problems and issues identified in Municipal questionnaires input from the PAC meetings, and other information. Phase II will include further definition and classification of identified stormwater problems and issues, development of work plans and costs for mitigation of the identified problems, tabulation of potential funding sources, and the development of a model stormwater management ordinance to address future stormwater runoff from development activities within the County. Scott stressed that neither Phase I nor Phase II require identified problems to be fixed, but will provide support for solutions and funding.

Following Scott's presentation, the floor was opened to questions about the process and suggestions for items which should be included in the Plan. Major issues of concern that were identified and discussed are outlined below:

1. Who does the enforcement of the ordinance? Can the SEO be the enforcer or is an engineer required for enforcement?
 - Response from Scott: There is nothing in the law that dictates who should do enforcement. It could be done by the SEO, road crew, or anyone comfortable reading and understanding construction plans
4. If a municipality is currently conducting a stormwater study does the 75% reimbursement from DEP apply to that project?
 - Response from Jodi: Her understanding is that right now the DEP is focusing their funds to the Act 167 plan developments so studies not related will not be funded.
3. The existing EMA Hazard Mitigation Plan was identified as being a valuable resource and that plan will be reviewed in the development of the Phase II plan.
4. How will the ordinance developed for Clearfield County be different than the ones developed for other counties?
 - Response from Scott: There is some flexibility in the regulations. The applicable state law is contained in Title 25, Chapter / Section 93.4. This law is referred to as the Anti-Degradation Law. The regulatory guidance being promoted by PADEP is that by meeting the requirements in the Pennsylvania Stormwater Best Management Practices Manual, and the requirements of the PA Post Construction NPDES permit application, this regulation is met. However, there are times when the BMP Manual and NPDES Permit regulations may not be appropriate or attainable (for example, in mined areas and brownfields). In these cases demonstration of compliance with state Anti-degradation regulations will require other approaches. Phase II of this project will consider the unique characteristics of Clearfield County Watersheds, and develop standards that comply with state laws, but at the

same time appreciate the uniqueness and character of the water resource needs of the county.

In the end, there will probably be similarities between the Clearfield County Model Ordinance and other County Ordinances, but there will also be unique differences.

5. Flooding problems have already been identified but the municipalities have no funding to fix them
 - Response from Scott: One goal of the Plan developed in Phase II will be to research and identify funding sources for the stormwater and flood mitigation projects identified.
6. Will the ordinance be the same across the County or will it be different for different municipalities?
 - Response from Scott: The specifics of the ordinance will be decided in Phase II of the project. We anticipate that the ordinances will be similar, all providing standards for peak rate, water quality, and volume control. However there may be some differences in the standards depending on watershed characteristics.
7. What are the changes at FEMA that affect what a municipality must do to participate in the FEMA National Flood Insurance Program?
 - Response from Scott: FEMA requirements for NFIP participation and affects of the changes in the flood mapping will be addressed in the Phase II Plan.
8. What happens if a municipality is not interested in participating/adopting the ordinance?
 - Response from Scott: Once DEP approves the plan, state law dictates that the municipalities must adopt the ordinance within 6 months. Municipalities can chose not to participate in the planning process, but they don't have a choice when it comes to adopting the ordinance. All municipalities are encouraged to participate in the planning phase so they have input in what the final plan and ordinance will be.
9. What is the Army Corp of Engineers involvement in the project?
 - Response from Scott: The Corp has no jurisdiction over the development of the plan but they are a stakeholder because of the flood control structures located in the County.
10. What are water quality standards?
 - Response from Scott: The water quality standards are performance based rather than quantitative. The DEP assumes that implementing certain practices will have certain impacts on the quality of the water.
11. How will Chesapeake Bay Standards affect the plan?

- Response from Scott: The plan/ordinance will incorporate Chesapeake Bay standards to the extent that the DEP has incorporated them. However, water quality standards will not include requirements to meet specific numeric pollutant load or concentration standards like sewer treatment plants do.

12. How is drilling regulated/permitted and will it be addressed in the plan?

- Response from Scott: Drilling activities receive a temporary permit that is focused on Erosion and Sedimentation Controls rather than the NPDES Post-Construction Stormwater Management controls.
- A PAC participant provided the additional information that the drilling falls under the jurisdiction of the Bureau of Oil and Gas Management not the Bureau of Waterways and that the PA Fish and Boat Commission is involved in the permitting.
- This is an important, emerging issue in Clearfield and one that will be researched and investigated to determine if and how it should be addressed in the ordinance.

13. What is the timeframe for the ordinance?

- Response from Scott: Phase I, the Scope of Work, for Phase II should be finished in early 2009. Phase II which includes that Stormwater Management Plan and ordinance development would hopefully start during the summer and that project will last 1 to 2 years. There is then a review period at the DEP so it could be 2.5 to 3 years before the plan is finalized and an ordinance is ready for adoption..

14. There are problems in the County with water draining to already polluted streams. How will that be affected by the plan/ordinance?

- Response from Scott: The ordinance will only affect new development and not regulate or enforce change on existing problems. The level of pollution in existing waterways will be considered during development of regulatory standards in Phase II.

Appendix D
Blank Municipal Survey

Clearfield County Stormwater Issues Survey

October 2008

Municipality: _____

The purpose of this survey is to provide background data needed for the Clearfield County Stormwater Management Planning Effort. **Your participation through completing this survey is critical to the success of this project.** This project is being conducted by the Clearfield County Planning Office as Required by State Law (PA Act 167 of 1978). Upon completion, Please return the survey in the enclosed envelope to:

**Ms. Jodi Brennan, Director
Clearfield County Planning Department
650 Leonard Street – Suite 110
Clearfield, PA 16830-3243**

We are asking that these questionnaires be completed and submitted no later than November 12, 2008. They can be submitted at the PAC meeting scheduled for November 12th.

Municipal Plan Advisory Committee (PAC) Representative: _____

The individual identified above has been named as your municipalities representative to the Plan Advisory Committed. The named PAC member may designate another individual to serve as the Municipal Representative to the PAC. The name and contact information for a designated PAC representative should be provided below:

Designated Plan Advisory Committee Member:

Name: _____ Phone: _____ FAX: _____

E-Mail _____ Address: _____

Municipal Manager/Secretary:

Name: _____ Phone: _____ FAX: _____

E-Mail _____ Address: _____

Municipal Planner/Building Inspector:

Name: _____ Phone: _____ FAX: _____

E-Mail _____ Address: _____

Municipal Engineer:

Name: _____ Phone: _____ FAX: _____

E-Mail _____ Address: _____

Municipal Solicitor:

Name: _____ Phone: _____ FAX: _____

E-Mail _____ Address: _____

Select Primary Watersheds in Municipality (See attached Map)

(check appropriate boxes)

Anderson Creek

Chest Creek

Clearfield Creek

East Branch Mahoning Creek

Little Toby Creek

Moshannon Creek

Mosquito Creek

Sandy Lick Creek

Sinnemahoning Creek

Stump Creek

West Branch Susquehanna River

Please provide answers to the following questions:

1. Identify existing municipal ordinances by listing the ordinance number and date of adoption:

Zoning _____

Subdivision _____

Grading / Land Disturbance _____

Erosion and Sedimentation Control _____

Storm Water Management _____

2. List any significant stormwater-related problems. Identify the problem location on the attached township map. Include proposed solutions if any.

- 3. List any flooding problems and identify specific locations on the attached map (make multiple copies if necessary for clarity). Also list the source of the flooding if it is know, and weather this location is within a FEMA mapped floodplain.

- 4. Identify the location of any flow obstructions, such as bridges or culverts, that cause flooding or other drainage problems. Also describe the type of problem.

- 5. Identify the location of all existing storm sewer collection systems in the municipality on the attached township map (make multiple copies if necessary for clarity). Also identify the location storm sewer collection proposed in the next 10 years (other than ongoing land development projects). Is there mapping available for any existing storm sewer systems?

- 6. Identify the location of existing stormwater management facilities (detention basins, etc.) on the attached Municipal Map (make multiple copies if necessary for clarity).

- 7. Who maintains the stormwater management facilities that are installed by land developers to control stormwater runoff from land developments?

- 8. Identify the location (and name) of any existing flood control facilities (Federal or State) on the attached municipal map.

9. Describe the nature and pattern of recent and anticipated future development in the municipality. The following terms (or similar terms) should be used to describe the nature of development: Residential, commercial, single family with X acre lot size, multi-family (townhouse or other); anticipated number of dwelling units per year for residential units, and total building square footage for commercial development.

10. Are any engineering or planning studies available at the municipality that may assist this study? If so, please list below:

11. Is any stream flow data of water quality information available from the municipality that may assist this study? If so please list below:

12. Does your municipality have any plans or ideas with respect to pursuing any watershed or stream restoration projects that are or would be considered under Pennsylvania's Growing Greener Program.?

Name of Person Completing Survey:

Name: _____ Phone: _____ FAX: _____

E-Mail _____ Address: _____

Please return completed survey to:

**Ms. Jodi Brennan, Director
Clearfield County Planning Department
650 Leonard Street – Suite 110
Clearfield, PA 16830-3243**

We are asking that these questionnaires be completed and submitted no later than November 12, 2008. They can be submitted at the PAC meeting scheduled for November 12th.

Appendix E
Consolidation of Municipal
Surveys Responses

Appendix E

Consolidation of Municipal Surveys Responses

Note: Not all surveys were returned so this is not a complete inventory of municipal ordinances or stormwater-related problems

1. Identify existing municipal ordinances by listing the ordinance number and date or adoption:

- **Zoning**
 - Clearfield Borough – 1994
 - Curwensville Borough – Ordinances # 391 337
 - DuBois – 2007
 - Lawrence Township – 1993
 - Sandy Township – 1996
 - Woodward Township - 1998

- **Subdivision**
 - Bell Township – County SALDO
 - Boggs Township – 1993
 - Brady Township – County SALDO
 - Cooper Township – 2008
 - Covington Township - 1982
 - Curwensville Borough – Ordinance #450, Chapter 96 and 328
 - DuBois – 1995
 - Girard Township – 1999
 - Gulich Township – County SALDO
 - Huston Township – County SALDO
 - Lawrence Township – 1994
 - Sandy Township – 1997
 - Union Township – 1984
 - Woodward Township – 1998

- **Grading / Land Disturbance**
 - Curwensville Borough – Ordinance #450
 - DuBois - 1995

- **Erosion and Sedimentation Control**
 - Curwensville Borough – Ordinance #450
 - DuBois – 1995

- **Storm Water Management**

- Bell Township – 2003 (Chest Creek Act 167)
- Curwensville Borough – Ordinance #376 and 390
- DuBois – 1996
- Ferguson Township – 2003 (Chest Creek Act 167)
- Huston Township – 1996
- New Washington Borough – (Chest Creek Act 167)
- Sandy Township – 1996
- Union Township – 1996

2. List any significant stormwater-related problems. Identify the problem location on the attached township map. Include proposed solutions if any.

- **Brady Township** – some areas around East Branch Mahoning Creek floods
- **Chest Township** – Just natural runoff
- **Chester Hill Borough** – Rowland Street floods in heavy rain. Installed new stormwater inlets in 2008
- **Clearfield Borough** – Stinky Run, headwater enforcement to remove debris from stream bed, with continued enforcement of depositing debris into bed. This causes blockage of culvert thus stormwater to overflow causing flooding
- **Coalport Borough** – 90% of stormwater drains in the Borough need to be replaced
- **Cooper Township** – Firehouse Rd and TR 726 – Severe washout of roadway berm
 - Sylvan Grove Rd and TR-727 – flooding of roadway at culvert pipe location because of beavers blocking pipe
- **Decatur Township** – Laurel Run Tributary at Graham Station Road (recommended solution is to dredge creek)
- **Grampian Borough** – Davis Run still flooding due to the culverts are too small.
- **Glen Hope Township** – Flooding of Glen Hope Park
- **Houztdale Borough** – In general, the storm water collection system throughout the borough is very old and in need of upgrades/replacement. Catch basins are under sized and in a state of disrepair
- **Huston Township** – there is significant problem which leads to flooding from Winterburn area on Bennett Branch to Tyler area on Bennett Branch. Soil erosion happens in this whole area.
 - Another area from Mt. Pleasant area on Wilson Run to the middle of Penfield and Moose Run from opposite side toward Lady Jane.
 - There are some stormwater problems from Boy Scout Camp to Bennett Branch near Mountain Run where it intersects with SR 255 south of Penfield.
- **Lawrence Township** – Nelson Rd at unnamed Tributary to Woods Run
- **Osceola Mills Borough** – deteriorating pipes, stormwater lines
 - a recent sewer project separated the sewer from stormwater in the process of the sewer line being installed

- Some of our stormwater lines were damaged and we don't know where they are until we have a problem.
- **Sandy Township** – E&S and flooding in the Pentz Run area
- **Westover Borough** – the borough has flooding, flow restrictions, and drainage problems through the borough
 - A FEMA flood protection embankment was built however issues have arisen with it not being built to specs

3. List any flooding problems and identify specific locations on the attached map (make multiple copies if necessary for clarity). Also list the source of the flooding if it is know, and weather this location is within a FEMA mapped floodplain.

- **Beccaria Township**– Clearfield Creek north of Coalport Borough, area is in FEMA mapped floodplain and part of the area is in the Coalport flood control project
- **Bell Township** – McGees Mills intersection, SR 36 and US Route 219
 - Mahaffey Camp meeting grounds along US Route 219 and SR 36 south of Newburg
- **Bigler Township** – Banion Junction – township bridge in the floodplain
- **Brady Township** –areas around East Branch Mahoning Creek in FEMA mapped floodplain
- **Chest Township** – the only non-flood prone area is along route 36 along Chest Creek
- **Chester Hill Borough** –
- **Clearfield Borough** – Stinky Run between E 11th and E 12th Woodland Rd to Bigler Ave
 - Chester St and Spruce portions of Cumberland, Polk, Arnold Ave, S 6th
 - Orr's Run, W 7th Ave, Martin Street to Williams Street
- **Coalport Borough** – Clearfield Creek, Blain Run, Meyers Run
- **Curwensville Borough** – Flooding area – Anderson Ave, near the river bank. Road and homes along this area sometimes get flooded in real heavy rains.
 - Flood control project has been approved, should start project by 2010
- **Decatur Township** –Peebles Plaza
 - Rader Rd
 - Graham Station
- **DuBois** – Pentz Run is source of flooding. This stream is within a FEMA mapped floodplain
- **Ferguson Township** – Gazzam Run. No floodplain
- **Girard Township** – TR 648 Buck Run Road
- **Glen Hope Township** – Clearfield Creek – flooding of Glen Hope Park (is mapped floodplain)
- **Grampian Borough** – Davis Run due to the culverts are too small

- **Greenwood Township** – Redden Hill Rd at Bells Landing and Zorger Road at Curry Run flood if the Curwensville Dam is filled
- **Lawrence Township** – Nelson Road is not in a floodplain – there are several small culverts that become plugged with debris during heavy rain events
- **Osceola Mills Borough** – lower end of Osceola Mills Borough
- **Sandy Township** – Pentz Run Area – within 100 year floodplain – exiting development, stream channel sedimentation and obstructions
 - Sher-De-Lin Road at Flowing Well Road intersection – within 100 year floodplain
 - Metal Tech – within 100 year floodplain – undersized enclosures on private property, sedimentation in PennDOT ROW
- **Westover Borough** – Ashcroft Run Bridge, SR 36 Avenue 4 mile north of Sylvis Rd
 - Unnamed Trib under East Bridge Street (culvert too small)
 - No back flow valves for culverts in FEMA embankment
 - No drainage in park

4. Identify the location of any flow obstructions, such as bridges or culverts, that cause flooding or other drainage problems. Also describe the type of problem.

- **Bradford Township** – Dale Rd and Valley Fork Run, low road area with four 36” pipes water backs-up in very heavy rain
- **Chester Hill Borough** – 20.32 acres of wetlands
- **Clearfield Borough** – 2 locations of mine drainage
- **Coalport Borough** – 1 bridge has been removed and 2 bridges have been replaced in 2006-2007
- **Cooper Township** - TR 727 at Sylan Grove – culvert pipe gets blocked by beavers causing water to run over roadway
- **Decatur Township** – Bridge at TR 676, Graham Station Rd
 - 4’ and 3’ pipes on Rader Rd
 - Stormwater network which includes a PennDOT network at Peebles Plaza SR 322 & TR 138
- **DuBois** – Bridge – railroad over Pentz Run
 - Bridge – Franklin Street over Pentz Run
 - Bridge – W. Weber Ave over Pentz Run
 - Bridge – W. Washington Ave over Pentz Run
 - Building – Joe Fender over Pentz Run
- **Girard Township** – culvert
- **Glen Hope Township** – runoff from SR 729 onto SR 53
- **Goshen Township** – cross drains on SR 879 at Jerry Run Rd floods road at times
- **Grampian Borough** – As of December 2008, the terracotta pipes are over 50 years of age and are not up to the State Standard Collections

- **Houztdale Borough** – There is an obstruction just outside the Borough (east) on Beaver Run. Obstruction caused by tree branches, debris, etc.
- **Huston Township** – Winterburn area has two bridges that overflow number times and Ontario Street Bridge which sets slammed by high water there is a flood (Ivan). The new Munn Bridge stall can have flooding around the bridge
- **Sandy Township** – Bridge over tributary to Pentz Run of Forest Ave
 - Garage built over stream on Forest Avenue
 - Stream enclosures on private property between Kessler Road and SR 219
- **Troutville Borough** – PennDOT culverts occasionally plug. Routine maintenance by PennDOT resolves this matter.
- **Westover Borough** – steel railroad bridge over Chest Creek (channel constriction)
 - Ashcroft Run Bridge on SR 36 (channel constriction)
 - Unnamed Trib culvert East Bridge St (too small diameter)
 - SR 36 bridge over Chest Creek north of Borough (sediment deposition under bridge)
 - RJ Corman culvert near Westover Municipal Bldg, Tannery Rd and West Bridge St (culvert too small)

5. Identify the location of all existing storm sewer collection systems in the municipality on the attached township map (make multiple copies if necessary for clarity). Also identify the location storm sewer collection proposed in the next 10 years (other than ongoing land development projects). Is there mapping available for any existing storm sewer systems?

- **Bradford Township** – Wal-Mart warehouse and Con-Way Express
- **Chester Hill Borough** – we have Skelly & Loy working on our stormwater problems
- **Coalport Borough** – flood project
- **Decatur Township** – Existing at Peebles Plaza SR-322
 - Future – Grandview Terrace Development and Cornell expansion
- **Grampian Borough** – We only have maps that council began in the last five years.
- **Houztdale Borough** – There is no existing map of the storm water collection system
- **Huston Township** – existing sewer system from Tyler Area to Boy Scout camp of Mountain Run area
 - Future plans to Winterburn
- **Lawrence Township** – Lawrence Township Commerce Park – no mapping available for existing system
- **Osceola Mills Borough** – marked on attached plans

6. Identify the location of existing stormwater management facilities (detention basins, etc.) on the attached Municipal Map (make multiple copies if necessary for clarity).

- **Bell Township** – stripping operations on Bouch Rd, Bethlehem Hill Rd
- **Bradford Township** – Wal-Mart Warehouse
- **DuBois** – Penn State DuBois
 - DuBois Area High School
 - Dr. O’Bryon
 - Stoltz Toyota/Hyundai
 - V.F.W.
 - Rumbarger Estates
 - Liberty Marketplace
 - Paris Companies
 - DRMC
 - Meadow Lane Office Bldg
- **Decatur Township** – Cornell-Moshannon Valley Facility
- **Sandy Township** – K-Mart -2 ponds
 - The Commons Chopping Center – 3 ponds
 - Brusters - 1 underground
 - Spotts Music – 1 pond
 - Klaiber’s – 1 underground
 - Wal-Mart – 1 pond
 - DuBois Catholic School – 2 ponds
 - Christ the King – 2 ponds
 - DuBois Nursing Home – 1 pond
 - TESI STP – 1 underground
 - Tri County Church – 1 pond
 - Treasure Lake Interdenominational Church – 1 underground
 - KFC – 1 underground
 - Holiday Inn Express – 1 pond
 - ICP – 1 pond
 - Black Forest Cabinetry – 1 pond
 - Sylvan Heights – 2 ponds

7. Who maintains the stormwater management facilities that are installed by land developers to control stormwater runoff from land developments?

- **Bradford Township** – the developer
- **Chester Hill Borough** – the Borough
- **Coalport Borough**- have had no land development in the Borough

- **Cooper Township** – to date landowners
- **Decatur Township** – the developers
- **DuBois**- land developers
- **Houztdale Borough** –the Borough does not have an ordinance/resolution that defines these responsibilities
- **Huston Township** - Township, and Sewer and Water Authority
- **Lawrence Township** – Developers
- **Osceola Mills Borough** – Osceola Mills Borough or property owners
- **Sandy Township** – Property owners maintain facilities for private developments
 - Township maintains facilities for roads and residential developments which have been dedicated to the Township

8. Identify the location (and name) of any existing flood control facilities (Federal or State) on the attached municipal map.

- **Chester Hill Borough** – Moshannon Creek
- **Curwensville Borough** – Curwensville Flood Control Dam is located able Curwensville. The dam was installed to control down river area. The Curwensville Dam is a Federal project.
- **Decatur Township** – Moshannon Creek from SR 53 Chester Hill to 9th St Bridge, intersection of SR 53 and 9th street – Rush & Morris Townships
- **DuBois** – Sandy Lick Creek
- **Greenwood Township** – Curwensville Dam
- **Osceola Mills Borough** – Flood control canal
- **Pike Township** – Curwensville Dam on Pike TR 447
- **Sandy Township** – DuBois Flood Control Project along Sandy Lick Creek
- **Westover Borough** – FEMA flood protection embankment along Chest Creek

9. Describe the nature and pattern of recent and anticipated future development in the municipality. The following terms (or similar terms) should be used to describe the nature of development: Residential, commercial, single family with X acre lot size, multi-family (townhouse or other); anticipated number of dwelling units per year for residential units, and total building square footage for commercial development.

- **Beccaria Township** – Residential, single-family with 1 acre plus lot size
 - Anticipate 7 to 10 dwellings next year
- **Chest Township** – the only anticipated developed we expect is the installation of the Harmony Landfill

- **Cooper Township** – Residential and minor commercial
- **Decatur Township** – Most of our residential single family development would be spread throughout the Township. The concentrated growth areas, residential, retail, commercial, service and institutional endeavors are mostly in the Plaza area, Pleasant Hill, Gearhartville and Graham Station areas of the township
- **DuBois** – Residential and townhouse developments on the edges of the City limits – approximately 5 per year with ½ acre lot size
 - Commercial buildings along Beaver Drive and Hoover Ave – approximately 2 per year with 5 acres lot size
- **Goshen Township** – Orchard Club Development – 55 lots for homes, summer homes, camps from 2 to 70 acres
- **Greenwood Township** – We have only had 1 new home built in our township in each of the past 2 years. We don't anticipate any large amount of development in the future.
- **Gulich Township** – modest growth in residential units
- **Houztdale Borough** – No new residential or commercial development. Limited potential for new development in the Borough
- **Huston Township** – with addressing the stormwater problems and connecting the current problems of runoff, erosion, etc we could have some anticipated future development in the area
- **Lawrence Township** – residential development – most is ½ acre and up
 - Commercial and industrial develop – no idea of size
- Penn Township – We have had only a few single homes built in the past 10 years. No develop of any kind is anticipated.
- **Sandy Township** – The Sandy Township and DuBois area has experienced significant commercial and residential development in recent years. Though it is impossible to predict the future regarding developing, particularly now, the DuBois area and primary Sandy Township Area continue to have significant growth potential. This is due to the existing transportation infrastructure and the commercial and industrial base that exist in the area.
- **Troutville Borough** – Residential only, less than 1 per year
- **Woodward Township** – Residential homes, approximately 5 per year on 1 acre or less lots

10. Are any engineering or planning studies available at the municipality that may assist this study? If so, please list below:

- **Coalport Borough** – at state project for flood program
- **Cooper Township** – Township maps
- **Girard Township** – Geo Tech Engineering – Buck Run Road Culvert Replacement
- **Osceola Mills Borough** – Act 537 Plan, ORD sewer collection and wastewater treatment facility

- **Sandy Township** – Sandy Township, in conjunction, Falls Creek, Brady Township, and Huston Township are completing a regional Comprehensive Plan
 - An Enterprise Zone Plan is also available
- **Westover Borough** – A watershed assessment of Chest Creek

11. Is any stream flow data of water quality information available from the municipality that may assist this study? If so please list below:

- **Coalport Borough** - at state project for flood program
- **Huston Township** – data from the construction of the Munn Bridge in 2006 on engineer numbers
- **Lawrence Township** – Montgomery Run Watershed – check with Rachel at County Conservation District
- **Osceola Mills Borough** – ORD Sewer Authority
- **Sandy Township** – Flow measurement data is available for the Shaft #1 mine water discharge to Sandy Lick Creek (near the DuBois Mall).

12. Does your municipality have any plans or ideas with respect to pursuing any watershed or stream restoration projects that are or would be considered under Pennsylvania’s Growing Greener Program.?

- **Cooper Township** – watershed that serves Cooper Township Municipal Authority
- **Decatur Township** – have partnered with both the Moshannon Creek clean-up and the Morgan Run clean-up projects
- **Girard Township** – Deer Creek Watershed Association, Lee Hebel- Chairman
- **Houztdale Borough** – Restoration of Beaver Run through the Borough has been discussed but no formal planning
- **Huston Township** – Yes, this would be considered the best thing for Huston Township in the next five plus years for a project
- **Lawrence Township** – Montgomery Run
- **Osceola Mills Borough** – flood control wall
 - Cleaning Moshannon Creek
- **Sandy Township** – There is a pending project to remove iron from the Shaft #1 mine water discharge at the Mall. This same type of project is needed for the mine water discharging in the S. Main Street area.

Appendix F
Phase II
Scope of Work

APPENDIX F

Clearfield County Act 167 Stormwater Management Plan Phase II Scope of Work

In this scope of services, the following terminology shall apply:

- a. ACT 167 – The Pennsylvania Stormwater Management Act,
- b. PLAN - The Final Phase II Report and associated Model Ordinance
- c. COUNTY - The Clearfield County Planning Department and/or Clearfield County Commissioners
- d. DEPARTMENT – the Pennsylvania Department of Environmental Protection
- e. CONSULTANT – The engineering firm hired by Clearfield County to assist the county with this scope of work.
- f. AGREEMENT – The Phase II contract between Clearfield County and the Pennsylvania Department of Environmental Protection
- g. PAC – Plan Advisory Committee

The COUNTY shall prepare the PLAN in accordance with requirements of ACT 167 and the tasks outlined in this Appendix F. The Plan is to cover all areas within the County with an appropriate level of specific emphasis on the following Designated Watersheds:

- Anderson Creek
- Chest Creek,
- Clearfield Creek,
- East Branch Mahoning Creek,
- Little Toby Creek,
- Mahoning Creek,
- Moshannon Creek,
- Mosquito Creek,
- Sandy Lick Creek,
- Sinnemahoning Creek,
- Stump Creek, and
- West Branch Susquehanna River.

For the purpose of carrying out the work outlined herein, the Clearfield County Planning Department 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.

The Phase II Scope of Work includes Task A through D as follows:

PROJECT ADMINISTRATION

The COUNTY shall be responsible for the overall administration and management of all work outlined herein 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 includes the following work:

- administrative work required to initiate and execute the AGREEMENT between the DEPARTMENT and the COUNTY;
- initiate and execute selection of a CONSULTANT and, upon selection, to initiate contracts between the COUNTY and the CONSULTANT;
- laying out a framework for project coordination with all County municipalities;
- defining the framework for completing various elements of the PLAN;
- conducting quarterly progress and status meetings with the CONSULTANT and DEPARTMENT;
- preparation for and holding the Phase II start-up meeting between the DEPARTMENT, the COUNTY, and the DEPARTMENT;
- delineation of work between the County and the Department; and
- other activities as may become necessary for the preparation and submission of the Plan.

TASK A. DATA COLLECTION, REVIEW AND ANALYSIS

This task includes will involve the necessary data collection, review, and analysis necessary to complete the technical and institutional planning steps for the PLAN. The individual work elements associated with this task are outlined in the following subtasks:

Subtask A.1 Data Collection

This subtask involves the collection of data needed to conduct the analysis and evaluations necessary to complete the PLAN. The COUNTY will be responsible for all data collection identified under this task . The data will consist of information concerning existing conditions and anticipated future conditions in Clearfield County. Data collection activities will include soliciting information from PAC members including information from the questionnaire that was distributed to the municipalities during Phase I.

Data to be collected will include, but not necessarily be limited to the following items:

- Comprehensive land use plans;

- Existing municipal ordinances;
- Existing stormwater problem areas (as identified through the Municipal Questionnaire distributed during Phase I);
- Impaired stream reaches and established stormwater TMDL's as identified in PA DEP's impaired stream segment and TMDL data base;
- Previously identified solutions to identified stormwater problem areas and impaired stream reaches;
- Existing and proposed flood control projects (As identified during Phase I);
- Existing and proposed stormwater collection and control facilities, including identification of those areas to be served by stormwater collection and control facilities within a 10-year period);
- If available, estimates of the design capacity, costs, schedule, financing methods, and ownership and operation and maintenance responsibilities and arrangements;
- Identification of storm sewer outfall locations;
- Soils;
- Geology;
- Location of significant waterway obstructions (from the Phase I municipal survey, and input from PAC members);
- Topographic and other readily available mapping;
- Readily available aerial photographs;
- Previously completed engineering and planning studies (including previously completed Act 167 planning studies);
- Stream flow and rainfall gauge data and other water quality information (if readily available);
- FEMA Floodplain information.
- Other relevant federal and state regulations related to stormwater management (for example, timber harvesting, oil and gas well development, etc.);
- Readily available historic mine mapping,
- Readily available information on Brownfield or other contaminated sites within the county;
- Available information on source water protection areas within the county.

Necessary field investigation will be performed to gather and/or confirm the data. This task also includes review and evaluation of the data that is collected for consistency and usability in the PLAN.

Problem Areas and Obstructions Inspection and Data Collection

An investigation will be performed to evaluate the problem areas and obstructions identified in the Phase I Municipal Questionnaire, and propose conceptual solutions. These problem areas will be addressed through a combined effort including discussions with municipal officials and field observation.

An initial phone conference will be held with a municipal representative to get additional clarification and background on identified problem areas. This will assist in assessing the cause and extent of the problem, and will aid in planning for a field view of the problem area. A field view will then be conducted to observe local conditions and further assess the problem area. Some limited site measurements may be taken during the field view as outlined in the following.

Based on a preliminary assessment of flooding and problem areas identified in the Municipal Questionnaire responses received during Phase I, we anticipate the following level of effort for this work element:

- 28 phone conferences with Municipal officials to discuss problem areas.
- 48 site field views

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. County Planning staff will be responsible for this effort.

Anticipated Work Product

The anticipated work product under Task A.1 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 involves review and evaluation of municipal ordinances (including the Clearfield County Subdivision and Land Development Ordinance), and preparation of a municipal ordinance comparison matrix. The purpose of the ordinance review matrix is to display the current similarities and differences among the various ordinances used throughout the County, and to identify ordinance changes that will be required to implement elements of the PLAN. The matrix will also be used to define plan implementation and public education strategies. County Planning Staff will conduct the ordinance review.

Anticipated Work Product

The work product from this task will be a matrix of current stormwater management ordinance provisions for municipalities in Clearfield County.

Subtask A.3 Data Preparation for Technical Analysis

This task involves the work to transfer the data collected in Subtask B.1 into a geographic Information System (GIS) database for use during the technical analysis and map production phases of the project. Existing data layers from the Clearfield County County-wide GIS system will be used where available as indicated in the following tabulation. Information not currently in the Clearfield County GIS database will be compiled into new data GIS data layers. County staff will be responsible for this effort.

The GIS data layers necessary for technical analysis and mapping are as follows:

1. Base Mapping – Existing base mapping currently exist in the Clearfield County GIS database. This base mapping consists of LIDAR topographic mapping, 2006 aerial photography, roads, streams, municipal boundaries, streams and water features, text, etc. This information will be utilized to create base maps for technical analysis and presentation portions of the project.
2. Land Use/Land Cover Information – Current Aerial images, available County GIS land use files, and zoning maps will be collected and converted into the format required for hydrologic modeling based on NRCS land use classifications as defined in TR-55. Information on recent land development projects will also be compiled and added as necessary.
3. Future Land Use Conditions – Data from the 2006 update to the Clearfield County comprehensive plan and zoning information will be used to estimate future land use anticipated during a 10 year planning horizon.
4. Soils information – The county soil data layer from the County GIS system will be used to create a NRCS hydrologic soil Group overlay for use in hydrologic modeling activities.
5. Digital Elevation Data – Digital elevation data available in the county GIS system will be used to obtain elevation and slope information for detailed hydrologic modeling and other planning purposes.
6. Digital Raster Graphics – Current digital raster UGS topographic maps and digital ortho aerial images available in the County GIS system will be used to establish watershed and sub watershed boundaries, evaluate NRCS land use classifications, and to determine the location of significant obstructions and problem areas. These graphics will also be used as base maps for field discussion of problem areas with local municipal officials.
7. Wetlands – A wetlands data layer currently exists in the Clearfield County GIS System. This wetlands data will be used to assist in establishing stormwater critical resources within county watersheds.
8. Geology - The County GIS system includes a subsurface geology layer. Geologic features pertinent to county watersheds and stormwater analysis will be extracted for use and presentation in the in PLAN.
9. Obstructions – Significant obstructions identified during the planning process will be mapped on a GIS layer, and data or attributes (such as estimated capacity, etc) will be

attached or linked to the locations. This information will be used for presentation in the PLAN.

10. Problem Areas - Problem areas identified from the Municipal Survey will be mapped on a GIS layer, and data or attributes will be attached or linked to the locations as appropriate. This information will be used for presentation in the PLAN.
11. Flood Control Structures – Existing local, state, and federal flood protection and stormwater management facilities identified in Task A.1 will be mapped onto a GIS layer, and hydrologic and other data as appropriate will be linked to the locations. This data will be for use and presentation in the PLAN.
12. Stormwater Management Facilities – Existing stormwater management facilities as identified in Task A.1 will be mapped onto a GIS layer, for use and presentation in the PLAN.
13. Floodplains – The county GIS system includes a FEMA 100 year flood limit layer. This layer will be extracted and superimposed on an appropriate base map for use in the stormwater planning process and display in the PLAN.
14. Source Water Protection Areas - Data identifying the location of source water protection areas will be collected under task A.1. A GIS data layer will be created for this data.
15. Environmental Characteristics – Existing County GIS data layers defining biodiversity and landscape conservation areas will be extracted for use during stormwater planning efforts. If found to have a significant relationship to stormwater planning issues, this data will be displayed in the PLAN.

For all GIS mapping layers, a summary of data sources will be supplied (simplified metadata) including data type (coverage, shape file, image), source, projection, and year.

This task will also include delineation of watersheds and sub watersheds for technical analysis. PA DEP designated watersheds in Clearfield County and any necessary sub watersheds will be delineated by the CONSULTANT on a base map at a scale that results in a manageable map size and adequate detail. The delineation of sub watersheds will be based on the following:

1. The location of significant stormwater management problems, as identified by the PAC in the Municipal Questionnaire, during field reconnaissance, or from data compiled in previous studies and 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 development areas, or where significant development is anticipated and projected to occur.

This task will also include mapping of other relevant watershed planning information onto GIS data layers. This information will be compiled and mapped by County staff and will include:

1. Non-FEMA Floodplain areas – The approximate location of non-FEMA flood plain areas that are determined to provide significant stormwater management functions, if any.
2. Existing Storm Sewer Systems – Areas where significant storm sewer systems exist will be indicated generally on the final base map.
3. Proposed Storm Sewer and Stormwater Management Facilities – Stormwater conveyance and management facilities proposed within the 10-year planning period where known and confirmed by the municipal representatives.

Anticipated Work Product

The product of this subtask will be completed GIS watershed data layers and maps. The maps completed for this task will be preliminary in nature intended for use as during data analysis. Some of these maps will be formalized for inclusion in the PLAN as part of the final PLAN preparation effort in Task C.

Subtask A.4 Survey of Existing and Proposed Stormwater Facilities

This task involves a review of existing and proposed stormwater collection systems and their impact on storm water runoff. The extent of existing and proposed stormwater collection system will be determined based on review of the data collected under A.1. County staff will be responsible for all work under this subtask.

Existing impacts will be evaluated using field assessment of outfalls and downstream waterways. Outfall locations for existing systems will be identified, and a field assessment will be made of downstream waterway areas to determine impacts. Typical impact flags would include excessive flooding, erosion, sedimentation, or evidence of other stormwater related water quality impacts.

Specifically, the following work elements will be undertaken:

- During the problem area inspection (refer to description in Task A.1) the stormwater collection systems and their discharge points will be observed to identify any impacts existing systems are having on receiving streams;
- An attempt will be made to identify the design basis for investigated systems. This will include review of design plans and computations (if available). When design data is not available, an estimate of the year the system was installed will be made and design standards in effect at that time will be assumed for the design basis;
- When existing storm sewer systems are determined to be causing impacts to existing receiving waters, suggestions will be made for retrofitting the existing systems, and/or implementing standards and criteria for future development to reduce the identified impacts.

Designation of future areas to be served by stormwater collection and control facilities

This task involves the determination of areas to be served by stormwater collection and control system within a 10-year planning window. Identification of these areas will be based on existing needs, and growth projections from the Clearfield County Planning Commission. This work element will be performed in conjunction with the problem area inspection Task identified in Subtask A.1.

Specifically, the following work elements will be undertaken:

- Based on the problem area inspection conducted under Subtask A.1, and retrofit recommendations resulting from analysis Task B, areas that need to be served by additional stormwater collection and control facilities (including retrofit facilities) over the next 10 years will be identified;
- Identify who would have responsibility for development, operation, and maintenance of the proposed stormwater system enhancements (e.g., PennDOT, Municipality, others);
- Identify a concept level project scope for areas needing stormwater retrofits and improvements/expansion to stormwater collection systems.
- Identify an action plan for implementation of the stormwater system retrofits and improvements/expansions.
- Prepare preliminary cost and cost/benefit assessment for proposed system improvements;
- Prioritize projects based on cost and projected benefits, and make recommendations relative to the implementation of priority projects over the next 10 years;

The intent of the suggested stormwater system improvements, retrofits, and expansions outlined in this task is to assist municipalities with identification and prioritization of projects which will improve the control of storm runoff and flooding. Where possible, projects will be identified that can be implemented by watershed and other citizen associations.

Anticipated Work Product

The anticipated work product under Task A.4 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). This will include a narrative summary of areas to be served by stormwater facilities during the 10-year planning cycle, as well as graphic representation of these areas.

TASK B. TECHNICAL ANALYSIS

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

- Preserve and restore the flood carrying capacity of streams within Clearfield County;
- Preserve, to the maximum extent practicable, natural stormwater runoff regimes through implementation of methods that emphasize source control of surface runoff;
- Preserve, to the maximum extent practicable, the natural course, current, and cross section of county waterways;
- Protect and preserve ground waters and ground-water recharge areas;
- Maintain existing water quality as necessary to preserve the natural, economic, scenic, aesthetic, recreational and historic values of the environment within the county; and
- Manage over-bank and extreme flood events.

Technical standards will be established for meeting these objectives based on authorization provided under Pennsylvania Act 167, the Pennsylvania Clean Streams Law, The Federal Water Pollution Control Act, and the provisions of Pennsylvania State Code, Title 25, Chapter 93 (Water Quality Standards).

These objectives will be accomplished through the activities outlined under subtasks B.1 to B.7.

Subtask B.1 Survey of Existing Watershed Runoff Characteristics

This task involves data review and analysis to identify unique conditions or constraints that are significant to the protection of watershed resources within the county.

Specifically, the following work elements will be undertaken:

- Stream flow data and precipitation data will be plotted and reviewed to quantify runoff response characteristics. Analysis will be conducted on data for the following 7 stream gages identified for Clearfield County on DEP's website:
 - West Branch Susquehanna River at Karthaus
 - West Branch Susquehanna River at Hyde
 - West Branch Susquehanna River at Curwensville
 - West Branch Susquehanna River at Bower (Camp Corbly Road, Greenwood Township)
 - Rolling Stone Run near Rolling Stone in Cooper Township
 - Clearfield Creek downstream of confluence with Little Clearfield Creek
 - Little Clearfield Creek at confluence with Clearfield Creek.

Rainfall data from the five (5) climate stations in Clearfield County and three (3) from surrounding counties as reported in NOAA Atlas 14 will be used to correlate rainfall data with stream flow data. Double mass analysis will be used to determine if trends related development are observed.

- An annual hydrologic balance will be performed for a selected period using the data from each of the stream gages identified above. This balance will be used to establish characteristic average annual infiltration, surface runoff, recharge, and evapotranspiration within watersheds in Clearfield County. This information will be used to assist in establishing technical standards for the control of storm runoff within the County.
- Watershed physiographic characteristics, including soils, geology, topography, land cover, etc., will be reviewed to further characterize watershed stormwater response. This analysis will be used to characterize factors that influence natural runoff response (such as local infiltration, evapotranspiration, interflow mechanisms, etc.), and determine their spatial variability.

This analysis will also be used to identify stormwater critical areas, such as significant recharge areas, areas characterized by high evapotranspiration rates, flood storage areas (typically floodplains and wetlands), etc.

The purpose of this analysis is to identify unique conditions or constraints that may be significant to the establishment of standards for protecting watershed resources within the county. This analysis will be conducted on a watershed scale to be able to assess conditions or constraints which may be watershed specific.

Anticipated Work Product

The anticipated work product under Task B.1 will include data summaries, graphs and narratives documenting the results of the analysis, and defining watershed characteristics. This information will be organized in such a way as to be usable for both short and long term municipal and county stormwater planning (including updates).

B.2 Evaluate Water Quality, Peak Flow, Stream Stability, and Groundwater Recharge

This task involves the establishment of criteria and standards for stormwater runoff control that will be incorporated into the model ordinance. Specifically standards and criteria will be developed to control runoff from new development in accordance with PA DEP Stormwater Policy and regulatory requirements as encoded at Title 25, Chapter 93.4, Anti-degradation, of the Pennsylvania State Code. Guidance standards contained in the Pennsylvania Stormwater Best Management Practices Manual will be used as a benchmark. Standards will be established for the control of peak runoff rates, runoff volume, and water quality associated with storm water runoff. The goal of these standards will be to mitigate the potential impacts to flood frequency, flood magnitudes, stream stability, groundwater recharge, and receiving water quality resulting from development and other activities causing accelerated runoff.

Implementation of Runoff Rate Standards

Flow rate standards will be established to control potential impacts to surface runoff rates which can cause increased flood levels and stream instability. At a minimum, this standard will require that peak runoff rates not be increased by development or other activities within the county. More restrictive peak runoff rate standards may be established in flood problem areas if appropriate. The modeling and quantitative analysis under Task B.3 will be used to establish alternate peak rate standards if determined to be appropriate.

Implementation of Volume Standards

Volume control standards will be established to manage potential impacts to groundwater recharge and the hydrologic character of surface runoff from a land area. In accordance with guidance in the *Pennsylvania Stormwater Best Management Practices Manual*, and the *PA DEP Model Stormwater Ordinance*, both a design storm method, and a simplified method will be employed to manage runoff volumes in a way that will maintain groundwater recharge and not pose a threat to stream stability or water quality. In areas where nuisance flooding is known to be a problem, a more restrictive volume control standard may be set. Identifying the need for more restrictive volume control standards will come out of review of data and analysis related to

identified problem areas under Task B.7. In addition, modeling and quantitative analysis under Task B.3 will be used to establish the any appropriate volume control standards.

The design storm method will require engineering and computational analysis of a designated design storm to establish controlling runoff volumes. The simplified method will employ a significantly less rigorous computational analysis intended to minimize the time and cost associated with stormwater analysis for minor development activities. It is noted however, that both methods will be designed to adhere to State and Federal stormwater requirements.

There are areas within Clearfield County where the use of stormwater infiltration BMP's for runoff volume control would pose environmental or other hazards. These areas include subsurface coal mine areas, Brownfield areas, and other areas where the data analysis in Task A identifies that the use of infiltration BMPs may be limited or inappropriate. Alternative analysis approaches and procedures will be developed providing guidance for meeting state anti-degradation and clean stream laws in these situations. Modeling under Task B.3 will be used to assist in establishing these alternate analysis approaches.

Implementation of Water Quality Standards

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 standards (Title 25, Chapter 93.4 of PA State Code), PA Clean Streams Law, and the federal National Pollutant Discharge Elimination System (NPDES) requirements for construction activities. The water quality standards established here will storm runoff related water quality issues. Non storm runoff related water quality issues uncovered during this analysis will be flagged so they can be addressed outside of this PLAN.

Water quality control techniques that will be considered for incorporation into the PLAN requirements will include, but not be limited to:

- Riparian buffers,
- Steep slope protection,
- Low impact development techniques,
- Impervious cover restrictions,
- Floodplain protection,
- Bio-filtration, and
- Other appropriate stormwater best management practices.

The stormwater control methodologies developed under this subtask will be designed to be applicable for the new, post-construction stormwater management facilities, as well as stormwater retrofits designed to mitigate impacts from existing development.

Subtask B.3 Modeling

This task involves hydrologic modeling, and/or quantitative computations and evaluations to establish alternate peak rate or volume control standards in areas where it is determined to be appropriate. Areas and conditions under which alternate standards may be appropriate will first be established through consideration of analysis conducted under Subtasks B.1 and B.7. Specific activities under this task will include identification of development patterns within study areas; delineation of watersheds, sub-watersheds, and points of interest for watershed modeling or analysis; model calibration; and model runs. The work effort for each element is further described in the following paragraphs.

Identification of Development Patterns

Anticipated growth and development patterns will be estimated for the 10-year planning window. The County comprehensive plan and knowledge of past development patterns will be used as a basis for this projection.

Watersheds / Sub-watersheds for Modeling

Based on the development patterns and character above, watersheds and sub watersheds will be defined for modeling and analysis. Based on a preliminary assessment of problem areas, identified during Phase I, the following areas are anticipated modeling and/or analysis:

- Houston Township Growth Area
 - Portions of Bennett Branch, Sinnemahoning Creek and tributaries in the vicinity of Penfield and upstream along Route 255.
- Sandy Township and City of Dubois Growth Area
 - Sandy Lick from upstream of Falls Creek Borough, through Dubois and upstream; Previous Act 167 model of Sandy Lick will be used as basis of model.
- Curwensville Growth Area
 - Anderson Creek
 - Hartshorne Creek (West Branch Susquehanna River Watershed)
 - Minor Tributaries to West Branch Susquehanna River
- Clearfield/Lawrence Township Growth Area
 - Moose Creek (West Branch Susquehanna River Watershed)
 - Tributaries to West Branch Susquehanna River
- Bradford Township
 - Headwaters to Roaring Run (Clearfield Creek Watershed)
 - Headwaters to Milestone Run (West Branch Susquehanna River Watershed)
 - Headwaters to Abes Run (West Branch Susquehanna River Watershed)

- Wallaceeton to Chester Hill
 - Laurel Run (Moshannon Creek Watershed)
 - Minor Tribs to Moshannon Creek

Actual limits of sub watershed areas and points-of-interest will be established during this task. The outcomes from Task B.1 and B.7 may dictate a revised list of areas for modeling or additional analysis. It is noted that Hydrologic modeling is not anticipated for the West Branch of the Susquehanna River.

Model Development and Calibration

The NRCS TR-20, unit hydrograph model will be used for modeling and analysis. The TR-20 model employs a cover complex methodology (curve number) which is commonly used in stormwater analysis. Two models, one representing existing land use and cover conditions, and the other representing future development patterns will be developed for each watershed. Input data including rainfall information, drainage network layout, geometric and topographic data, travel times, land cover conditions, will be compiled and formatted as input for the models.

The existing condition watershed and sub-watershed models will be calibrated using available data to verify results. Calibration efforts will include the adjustment of model parameters to accurately simulate runoff conditions. Consideration will be given to calibration techniques including, but not limited to: use of available gauging information, comparison with rainfall and runoff information from similar watersheds, comparison with Flood Insurance Study information, regression analysis, etc.

Model Runs and Analysis

The calibrated models will be run for a series of 24-hour duration rainfall events for both existing and projected future conditions. The future conditions models will be used to test various peak rate and volume control standards and scenarios; assess the effectiveness of various retrofit BMPs in developed areas; and to assist in problem identification and assessment for constriction and flooding problem areas. To accomplish these tasks, multiple runs of each simulation will be required.

Subtask B.4 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 will 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, if any).
- 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" 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 will 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. Summarize and prioritize 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 an understanding 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 tabulation of funding opportunities, 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 Task D). Information available from PADEP and other sources will be distributed.

Subtask B.5 Implementation of Technical Standards and Criteria

This subtask will involve the identification of the necessary ordinance provisions for inclusion in the PLAN. The work includes modifications to the DEP Model Ordinance and /or recommendations for

updating existing municipal ordinances. This includes, but is 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 Clearfield 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 work product from Task B, subtasks B.1 through B.5 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.6 Regulations for Activities Impacting Storm water 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 Work Product

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

Subtask B.7 Problem Area and Obstruction Analysis and Recommendations

This subtask involves analysis, including hydrologic and hydraulic computations to establish recommendations for problem areas identified in the Phase I Municipal Questionnaire and as outlined in Subtask A.1. Analysis methods used here will be approximate. Their intent will be to reflect the magnitude of the problem and identify potential mitigation or retrofit approaches. The results of this analysis will also be used to identify any areas where special stormwater management standards may be appropriate (refer to Subtask B.3).

It is noted that, although the identification and analysis of problem areas here will result in recommendations and guidance for potential solutions to the identified stormwater issues, the Act 167 program will not provide funds to correct infrastructure problems, or implement conceptual solutions. The recommendations and other findings developed under this subtask will however be incorporated into the technical standards and criteria of the PLAN, into the Plan's Model Ordinance, and into priorities for implementation of action items. Through Implementation of the PLAN, these

recommendations and findings will assist in mitigating existing stormwater problems, and will prevent future problems from uncontrolled stormwater runoff.

Anticipated Work Product

The work product from this subtask will be the computational analysis and conceptual solutions proposed for each identified problem area. These solutions will be summarized for inclusion in the PLAN along with identified potential sources of funding.

TASK C. PLAN Preparation and Implementation

This task involves all work associated with preparation of the Phase II report (PLAN), including the Model Stormwater Management Ordinance, and activities associated with PLAN adoption.

Subtask C. 1 Final Phase II Report Preparation

Components of the previous task and input from PAC meetings (Task D) will be included or at least referred to in the PLAN. As an end product of the data collection and technical analysis phases, 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 the quality of surface waters within the County. 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 sub watersheds; 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 sub watersheds; 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.
- Technical criteria and standards governing the use of stormwater management controls throughout County. These technical criteria and standards will be based upon the results of the sub watershed modeling, the other technical evaluations undertaken in previous tasks. An important aspect of the technical components of the PLAN will be the delineation of sub watersheds with specific management strategies. This determination will be accomplished based upon an evaluation of the impact of land development and other activities on surface runoff characteristics in the County. BMP tables and data on their effectiveness and applicability will be presented or referenced where applicable.
- 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 are to be included in the PLAN. Proposed solutions will only be conceptual in nature, identifying the general approach and other issues associated with implementation of proposed solutions. Identification of sites for potential restoration and/or protection projects that would qualify for Pennsylvania's "Growing Greener" Funds will also be identified.
- Requirements and/or recommendations for control criteria and guidelines to prevent future problems due to new land development and other activities impacting storm runoff will be included. In addition, information relating to necessary inter-municipal arrangements for funding the recommended solutions to existing problems shall also be included.
- 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 mitigate identified problems.
- 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.
- 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 - Clearfield 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- Goals, Objectives, and Additional Recommendations

Section VIII - PLAN Implementation and Update Procedures

Section IX – References

Part II

Model Ordinance

Exhibits:

- Existing Land Use Base map.
- Future Land Use Base map.
- Sub watersheds used for hydrologic analysis
- Hydrologic soil groups, development patterns, and floodplains.
- Stream obstructions, flooding, and problem areas
- Existing and Future Stormwater Facility Areas

Anticipated Product

The product will be the final Phase II Report. The Phase II Report will be prepared in both digital and paper formats. We anticipate a need to produce up to 75 hard copies of the draft report for distribution to the Plan Advisory Committee members for review. This total includes 4 hard copies for submission to PA DEP. Digital copies will also be submitted to PA DEP. One hard copy of the Final Phase II Report with color exhibits will be published for each municipality, four copies for submission to PA DEPO, and additional copies to be placed in County Libraries. This will require production of 75 copies with color exhibits. The draft and final Phase II reports will also be made available digitally, with the final report will be posted on the Counties Web Site.

Subtask C.2 Model Ordinance Preparation

A Model Ordinance which includes the provisions and standards developed during Phase II will be developed. This Model Ordinance will be consistent in content with the Department of Environmental Protection Pennsylvania Model Stormwater Management Ordinance, but will include technical standards specific to Clearfield County and the analysis conducted in Task B. 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, and in quantities consistent with anticipated publication requirements outlined under Task C.1.

Subtask C.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.

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 Clearfield 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 following items:

1. Adopted PLAN, along with a digital version and GIS data layers;
2. Documentation of review by the official Planning agency and/or governing body of each municipality, Clearfield County Planning Commission, regional planning agencies (if any) (Section 6(c) of Act 167),
3. Public hearing notice and minutes (Section 8(a) of Act 167), and
4. 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 Clearfield County. Subsequent to the DEPARTMENT's approval of the PLAN, copies of the plan will be distributed as identified under subtask C.1. All backup material including hydrologic and hydraulic analyses of the sub watersheds will be retained at the COUNTY office for future reference and use during PLAN updates.

Anticipated Work 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 Exhibits.

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 that significantly affect stormwater management and flooding within the watersheds of the county.
3. An assessment of projected and alternative land development patterns in Clearfield 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 on flooding and stormwater runoff.
7. An assessment of alternative runoff control techniques and their efficiency in the individual sub watershed.
8. An identification of existing and proposed local, State, and Federal flood control projects located in Clearfield 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 Clearfield 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. Priorities for implementation of conceptual solutions to problems identified in watersheds.
13. Provisions for periodically reviewing, revising, and updating the PLAN.
14. Provisions as are reasonably necessary to manage stormwater such that land development or other activities in each municipality do not adversely affect health, safety, and property in other municipalities of Clearfield County and in drainage basins to which the watersheds are tributary.
15. Consideration for consistency with other existing municipal, county, regional, and state environmental and land use plans.

And the PLAN will identify

1. Impaired stream segments within the County's Watersheds.
2. The type and nature of impairment.
3. Conceptual strategies for mitigating stormwater related impairments.
4. Which identified problems will and which will not be addressed through implementation of the PLAN.

TASK D. Public/Municipal Participation

This task involves activities to facilitate public participation in the preparation and implementation of the PLAN. These activities include meetings and participation by the Plan Advisory Committee, development and distribution of an informational pamphlet, municipal implementation workshops, and public implementation workshops.

Subtask D.1 Plan Advisory Committee

A Plan Advisory Committee (PAC) will be established to provide an opportunity for dialogue with, and participation of, municipal and agency officials, and other interested groups and citizens. The PAC will consist of representatives from each municipality in Clearfield County, as well as the Clearfield County Conservation District, and other interested groups such as watershed associations and the general public. 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 tentative schedule for PAC meetings is identified in Table 1.

Anticipated Work Product

The anticipated work product from this task will include presentation materials for the meetings, conducting the meetings, and correspondence and meeting notes/minutes.

Subtask D.2 Act 167 Information Pamphlet

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

Anticipated Work Product

The anticipated work product from this task will be the pamphlet as well as distribution of the pamphlet.

Subtask D.3 Municipal Implementation Workshop

A Municipal Implementation Workshop will be developed and conducted to provide information to municipalities regarding their obligation to implement the PLAN. The workshop will cover procedures to adapt, enact, administer, and enforce the stormwater management ordinance as well as municipal obligations to implement other action items in the PLAN. The workshop will address availability of resources to implement the PLAN, establish fees for stormwater management, and other issues related to sources of funding. Alternatives for pooling resources including municipal authorities and intergovernmental cooperative agreements will be presented and discussed.

The municipal implementation workshops will be conducted within three months following DEP's approval of the plan as identified in Table 1.

Anticipated Work Product

The anticipated work product from this task will include presentation materials for the workshop, conducting the workshop, and correspondence and meeting notes/minutes resulting from discussions at the workshop.

Subtask D.4 Public Implementation Workshop

A public implementation Workshop will be developed and conducted within six (6) months following DEP's approval of the PLAN. The purpose of this workshop will be to go over goals and benefits of the plan and provide information on the responsibilities of residents and the general public to meet the PLAN's requirements.

Anticipated Work Product

The anticipated work product from this task will include presentation materials for the workshop, conducting the workshop, and correspondence and meeting notes/minutes resulting from discussions at the workshop.

Table 1. Meetings, Purpose, and Schedule

| PAC Meeting | Purpose of Meeting | Meeting Schedule |
|--------------------|---|---|
| 1 | Phase II Start-up Meeting – introduce the Phase II planning process. Emphasize the importance of full municipal involvement. Present summary of the data collection questionnaire from Phase I. | Beginning of Project |
| 2 | Review the project status, maps, institutional data (ordinances, etc), solicit input from municipalities, provide summary of stormwater problems. Identify areas that require detailed hydrologic modeling. | Subsequent to Task A |
| 3 | Technical issues for detailed models; Review model selection and set-up, initial modeling runs, calibration procedures, solicit input on technical standards, water quality issues. | Part Way into task B |
| 4 | Technical issues for detailed models; Review modeling results, present standards and criteria, discuss water quality issues and preliminary technical content for ordinances. | After Task B |
| 5 | Technical review of draft PLAN for areas that require detailed models: Review technical comments. (Draft PLAN sent to municipalities prior to meeting) | Subsequent to preparation of the Draft PLAN |
| 6 | General review of Draft PLAN: Gather general comments and feedback prior to finalization of the PLAN | |
| 7 | Pre-hearing meeting: Review comments and responses to comments. Summarize implementation. | Upon completion of the Draft Final Plan |
| Public Meeting | Conduct the hearing as required by Act 167 to present the PLAN to the public. | |
| Municipal Workshop | Municipal Implementation Workshop: Provide assistance to municipalities on implementation of the PLAN including adaptation, enactment, and implementation of the ordinances and other action items. | Within 3 months of DEP's approval of the PLAN |
| Public Workshop | Public Implementation Workshop: Provide introduction and overview of the PLAN to the public. | Within 6 months of DEP's approval of the PLAN |

Appendix G
PA Act 167
Storm Water Management
Act

**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
HARRISBURG, PENNSYLVANIA**

STORM WATER MANAGEMENT ACT



pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

**OFFICE OF WATER MANAGEMENT
BUREAU OF WATERSHED MANAGEMENT**

STORM WATER MANAGEMENT ACT
Act of Oct. 4, 1978, P.L. 864, No. 167

AN ACT

This is not the official version and we are not responsible for any errors in this publication. Any discrepancies between this version and the official version will be resolved in favor of the official version.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER MANAGEMENT

BUREAU OF WATERSHED MANAGEMENT
DIVISION OF WATERWAYS, WETLANDS AND
STORMWATER MANAGEMENT
P.O. BOX 8775
HARRISBURG, PA 17105-8775

STORM WATER MANAGEMENT ACT
Act of Oct. 4, 1978, P.L. 864, No. 167
AN ACT

Providing for the regulation of land and water use for flood control and storm water management purposes, imposing duties and conferring powers on the Department of Environmental Resources, municipalities and counties, providing for enforcement, and making appropriations.

TABLE OF CONTENTS

| | |
|-------------|---|
| Section 1. | Short title. |
| Section 2. | Statement of legislative findings. |
| Section 3. | Purpose and policy. |
| Section 4. | Definitions. |
| Section 5. | Watershed storm water plans and contents. |
| Section 6. | Municipal and public participation in watershed planning. |
| Section 7. | Joint plans and coordination of planning. |
| Section 8. | Adoption and amendment. |
| Section 9. | Review and approval by the department. |
| Section 10. | Failure to submit plan; mandamus. |
| Section 11. | Effect of watershed storm water plans. |
| Section 12. | Failure of municipalities to adopt implementing ordinances. |
| Section 13. | Duty of persons engaged in the development of land. |
| Section 14. | Powers and duties of the Department of Environmental Resources. |
| Section 15. | Civil remedies. |
| Section 16. | Preservation of existing rights and remedies. |
| Section 17. | Grants and reimbursements to municipalities and counties. |
| Section 18. | Appropriations. |
| Section 19. | Repealer and savings clause. |
| Section 20. | Effective date. |

The General Assembly of the Commonwealth of Pennsylvania hereby enacts as follows:

Section 1. Short title.

This act shall be known and may be cited as the "Storm Water Management Act."

Section 2. Statement of legislative findings.

The General Assembly finds that:

(1) Inadequate management of accelerated runoff of storm water 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 storm water, undermines flood plain management and flood control efforts in downstream communities, reduces ground-water recharge, and threatens public health and safety.

(2) A comprehensive program of storm water 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.

Section 3. Purpose and policy.

The policy and purpose of this act is to:

(1) Encourage planning and management of storm water runoff in each watershed which is consistent with sound water and land use practices.

(2) Authorize a comprehensive program of storm water management designated to preserve and restore the flood carrying capacity of Commonwealth streams; to preserve to the maximum extent practicable natural storm water runoff regimes and natural course, current and cross-section of water of the Commonwealth; and to protect and conserve ground waters and ground-water recharge areas.

(3) Encourage local administration and management of storm water consistent with the Commonwealth's duty as trustee of natural resources and the people's constitutional right to the preservation of natural, economic, scenic, aesthetic, recreational and historic values of the environment.

Section 4. Definitions.

The following words and phrases when used in this act shall have, unless the context clearly indicates otherwise, the meanings given to them in this section:

"Department." The Department of Environmental Resources of the Commonwealth of Pennsylvania.

"Municipality." A city, borough, town or township, or any county or other governmental unit when acting as an agent thereof, or any combination thereof acting jointly.

"Pennsylvania Municipalities Planning Code." The act of July 31, 1968 (P.L.805, No.247), as amended.

"Person." An individual, partnership, public or private association or corporation, firm, trust, estate, municipality, governmental unit, public utility or any other legal entity whatsoever which is recognized by law as the subject of rights and duties. Whenever used in any section prescribing or imposing a penalty, the term "person" shall include the members of a partnership, the officers, members, servants and agents of an association, officers, agents and servants of a corporation, and the officers of a municipality or county, but shall exclude any department, board, bureau or agency of the Commonwealth.

"Public utility service." The rendering of the following services for the public:

(1) gas, electricity or steam production, generation, transmission or distribution;

(2) water diversion, pumping, impoundment, or distribution;

(3) railroad transportation of passengers or property;

(4) operation of a canal, turnpike, tunnel, bridge, wharf or similar structure;

(5) transportation of natural or artificial gas, crude oil, gasoline or petroleum products, materials for refrigeration or other fluid substances by pipeline or conduit;

(6) telephone or telegraph communications; and

(7) sewage collection, treatment or disposal.

"Storm water." Drainage runoff from the surface of the land resulting from precipitation or snow or ice melt.

"Watershed." The entire region or area drained by a river or other body of water, whether natural or artificial.

"Watershed storm water plan." A plan for storm water management adopted by a county in accordance with section 5.

Compiler's Note: The Department of Environmental Resources, referred to in the def. of "department," was abolished by Act 18 of 1995. Its functions were transferred to the Department of Conservation and Natural Resources and the Department of Environmental Protection.

Section 5. Watershed storm water plans and contents.

(a) Within two years following the promulgation of guidelines by the department pursuant to section 14, each county shall prepare and adopt a watershed storm water management plan for each watershed located in the county as designated by the department, in consultation with the municipalities located within each watershed, and shall periodically review and revise such plan at least every five years. The department may, for good cause shown, grant an extension of time to

any county for the preparation and adoption of a watershed storm water management plan.

(b) Each watershed storm water plan shall include, but is not limited to:

(1) a survey of existing runoff characteristics in small as well as large storms, including the impact of soils, slopes, vegetation and existing development;

(2) a survey of existing significant obstructions and their capacities;

(3) an assessment of projected and alternative land development patterns in the watershed, and the potential impact of runoff quantity, velocity and quality;

(4) an analysis of present and projected 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 solutions;

(6) a review of existing and proposed storm water collection systems and their impacts;

(7) an assessment of alternative runoff control techniques and their efficiency in the particular watershed;

(8) an identification of existing and proposed State, Federal and local flood control projects located in the watershed and their design capacities;

(9) a designation of those areas to be served by storm water collection and control facilities within a ten-year period, an estimate of the design capacity and costs of such facilities, a schedule and proposed methods of financing the development, construction and operation of such facilities, and an identification of the existing or proposed institutional arrangements to implement and operate the facilities;

(10) an identification of flood plains within the watershed;

(11) criteria and standards for the control of storm water runoff from existing and new development which are necessary to minimize dangers to property and life and carry out the purposes of this act;

(12) priorities for implementation of action within each plan; and

(13) provisions for periodically reviewing, revising and updating the plan.

(c) Each watershed storm water plan shall:

(1) contain such provisions as are reasonably necessary to manage storm water such that development or activities in each municipality within the watershed do not adversely affect health, safety and property in other municipalities within the watershed and in basins to which the watershed is tributary; and

(2) consider and be consistent with other existing municipal, county, regional and State environmental and land use plans.

Section 6. Municipal and public participation in watershed planning.

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

(b) Each committee shall be responsible for advising the county throughout the planning process, evaluating policy and project alternatives, coordinating the watershed storm water plans with other municipal plans and programs, and reviewing the plan prior to adoption.

(c) Prior to adoption, each plan shall be reviewed by the official planning agency and governing body of each municipality, the county planning commission and regional planning agencies for consistency with other plans and programs affecting the watershed. All such reviews shall be submitted to the department with the proposed plan.

Section 7. Joint plans and coordination of planning.

Where a watershed includes land in more than one county, the department may require the affected counties to prepare, adopt and submit a joint plan for the entire watershed.

Section 8. Adoption and amendment.

(a) Prior to adoption or amendment of a watershed storm water plan, the county shall hold a public hearing pursuant to public notice of not less than two weeks. The notice shall contain a brief summary of the principal provisions of the plan, and a reference to the places within each affected municipality where copies may be examined or purchased at cost.

(b) Adoption or amendment of the plan shall be by resolution carried by an affirmative vote of at least a majority of the members of the county governing body. The resolution shall refer expressly to the maps, charts, textual matter and other materials intended to form the whole or part of the official plan, or amendment thereto, and the action shall be recorded on the adopted plan, part or amendment.

Section 9. Review and approval by the department.

(a) The department shall, in consultation with the Department of Community Affairs, review all watershed storm water plans and revisions or amendments thereto. It shall approve the plan if it determines:

(1) that the plan is consistent with municipal flood plain management plans, State programs which regulate dams, encroachments, and water obstructions, and State and Federal flood control programs; and

(2) that the plan is compatible with other watershed storm water plans for the basin in which the watershed is located, and is consistent with the policies and purposes of this act.

(b) Should the department neither approve or disapprove a watershed plan or amendment or revision thereto within 90 days of its submission to the department, the plan or amendment or revision shall be deemed to be approved.

(c) Any person aggrieved by a final decision of the department approving or disapproving a watershed plan or amendment thereto, may appeal the decision to the Environmental Hearing Board in accordance with the provisions of section 1921-A of the act of April 9, 1929 (P.L.177, No.175), known as "The Administrative Code of 1929," and the "Administrative Agency Law." ((c) repealed in part Oct. 5, 1980, P.L.693, No.142)

Compiler's Note: The Department of Community Affairs, referred to in subsec. (a), was abolished by Act 58 of 1996 and its functions were transferred to the Department of Community and Economic Development.

Section 10. Failure to submit plan; mandamus.

The department may institute an action in mandamus to compel counties to adopt and submit plans in accordance with this act. (10 repealed in part Oct. 5, 1980, P.L.693, No.142)

Compiler's Note: Section 504 of Act 164 of 1980 provided that section 10 is repealed insofar as it is inconsistent with Act 164.

Section 11. Effect of watershed storm water plans.

(a) After adoption and approval of a watershed storm water plan in accordance with this act, the location, design and construction within the watershed of storm water management systems, obstructions, flood control projects, subdivisions and major land developments, highways and transportation facilities, facilities for the provision of public utility services and facilities owned or financed in whole or in part by funds from the Commonwealth shall be conducted in a manner consistent with the watershed storm water plan.

(b) Within six months following adoption and approval of the watershed storm water plan, each municipality shall adopt or amend, and shall implement such ordinances and regulations, including zoning, subdivision and development, building code, and erosion and sedimentation ordinances, as are necessary to regulate development within the municipality in a manner consistent with the applicable watershed storm water plan and the provisions of this act.

Section 12. Failure of municipalities to adopt implementing ordinances.

(a) If the department finds that a municipality has failed to adopt or amend, and implement such ordinances and regulations as required by section 11, the department shall provide written notice of violation to the municipality.

(b) Within 60 days of receipt of the notice of violation, the municipality shall report to the department the action which it is taking to comply with the requirement or regulation.

(c) If within 180 days of receipt of the notice of violation, the municipality has failed to comply with such requirement or regulation, as determined by the department, the department shall notify the State Treasurer to withhold payment of all funds payable to the municipality from the General Fund. Provided, that prior to any withholding of funds, the department shall give both notice to the municipality of its intention to notify the State Treasurer to withhold payment of funds and the right to appeal the decision of the department within the 180-day period following notification. The hearing shall be conducted before the Environmental Hearing Board in accordance with the provisions of the act of April 9, 1929 (P.L.177, No.175), known as "The Administrative Code of 1929," and Chapters 5 and 7 of Title 2 (Administrative Law and Procedure), of the Pennsylvania Consolidated Statutes. If an appeal is filed within the 180-day period, funds shall not be withheld from the municipality until the appeal is decided.

(d) Any person, other than a municipality, aggrieved by an action of the department shall have the right within 30 days of receipt of notice of such action to appeal such action to the Environmental Hearing Board, pursuant to section 1921-A, act of April 9, 1929 (P.L.177, No.175), known as "The Administrative Code of 1929," and the provisions of Chapters 5 and 7 of Title 2 (Administrative Law and Procedure) of the Pennsylvania Consolidated Statutes.

Section 13. Duty of persons engaged in the development of land.

Any landowner and any person engaged in the alteration or development of land which may affect storm water runoff characteristics shall implement such measures consistent with the provisions of the applicable watershed storm water plan as are reasonably necessary to prevent injury to health, safety or other property. Such measures shall include such actions as are required:

(1) to assure that the maximum rate of storm water runoff is no greater after development than prior to development activities; or

(2) to manage the quantity, velocity and direction of resulting storm water runoff in a manner which otherwise adequately protects health and property from possible injury.

Section 14. Powers and duties of the Department of Environmental Resources.

(a) The Department of Environmental Resources shall have the power and its duty shall be to:

(1) Coordinate the management of storm water in the Commonwealth.

(2) Provide in cooperation with the Department of Community Affairs technical assistance to counties and municipalities in implementing this act.

(3) After notice and public hearing and subject to the requirements of subsection (b) of this section, publish guidelines for storm water management, and model storm water ordinances for use by counties and municipalities.

(4) Review, in cooperation with the Department of Community Affairs, and approve all watershed plans and revisions thereto.

(5) Cooperate with appropriate agencies of the United States or of other states or any interstate agencies with respect to the planning and management of storm water.

(6) Serve as the agency of the Commonwealth for the receipt of moneys from the Federal Government or other public or private agencies or persons and expend such moneys as appropriated by the General Assembly for studies and research with respect to planning and management of storm water.

(7) Conduct studies and research regarding the causes, effects and hazards of storm water and methods for storm water management.

(8) Conduct and supervise educational programs with respect to storm water management.

(9) Require the submission of records and periodic reports by county and municipal agencies as necessary to carry out the purposes of this act.

(10) After notice and hearing and with the approval of the Environmental Quality Board, designate watersheds for the purpose of this act.

(11) Do such other acts consistent with this act required to carry out the purposes and policies of this act.

(b) The guidelines for storm water management and model storm water ordinances shall be submitted to the General Assembly for approval or disapproval and shall be considered by the General Assembly under the procedures created for consideration of Reorganization Plan provided in the act of April 7, 1955 (P.L.23, No.8), known as the "Reorganization Act of 1955."

Compiler's Note: The Department of Community Affairs, referred to in subsec. (a), was abolished by Act 58 of 1996 and its functions were transferred to the Department of Community and Economic Development.

Compiler's Note: Section 502(c) of Act 18 of 1995, which created the Department of Conservation and Natural Resources and renamed the Department of Environmental Resources as the Department of Environmental Protection, provided that the Environmental Quality Board shall have the powers and duties currently vested in it, except as vested in the Department of Conservation and Natural Resources by Act 18 of 1995, which powers and duties include those forth in section 14.

Section 15. Civil remedies.

(a) Any activity conducted in violation of the provisions of this act or of any watershed storm water plan, regulations or ordinances adopted hereunder, is hereby declared a public nuisance.

(b) Suits to restrain, prevent or abate violation of this act or of any watershed storm water plan, regulations or ordinances adopted hereunder, may be instituted in equity or at law by the department, any affected county or municipality, or any aggrieved person. Except in cases of emergency where, in the opinion of the court, the circumstances of the case require immediate abatement of the unlawful conduct, the court may, in its decree, fix a reasonable time during which the person responsible for the unlawful conduct shall correct or abate the same. The expense of such proceedings shall be recoverable from the violator in such manner as may now or hereafter be provided by law. ((b) repealed in part Oct. 5, 1980, P.L.693, No.142)

(c) Any person injured by conduct which violates the provisions of section 13 may, in addition to any other remedy provided under this act, recover damages caused by such violation from the landowner or other responsible person.

Compiler's Note: Section 504 of Act 164 of 1980 provided that section 15 is repealed insofar as it is inconsistent with Act 164.

Section 16. Preservation of existing rights and remedies.

(a) The collection of any penalty under the provisions of this act shall not be construed as estopping the Commonwealth, any county, municipality or aggrieved person from proceeding in courts of law or equity to abate nuisances under existing law or to restrain, at law or in equity, violation of this act.

(b) It is hereby declared to be the purpose of this act to provide additional and cumulative remedies to abate nuisances.

Section 17. Grants and reimbursements to municipalities and counties.

(a) The Department of Environmental Resources is authorized to administer grants to municipalities and counties to assist or reimburse them for costs in preparing official storm water management plans and

actual administrative and enforcement and implementation costs and revisions to official plans for storm water management required by this act. Grants and reimbursements shall be made from and to the extent of funds appropriated by the General Assembly for such purposes, and shall be made in accordance to rules and regulations adopted by the Environmental Quality Board.

(1) The grant shall be equal to 75% of the allowable costs for preparation of official storm water management plans, administrative, enforcement and implementation costs incurred by any municipality or county.

(2) For the purposes of this section, such State grants shall be in addition to grants for similar purposes made to any municipality or county by the Federal Government: Provided, That the grants authorized by this section shall be limited such that the total of all State and Federal grants does not exceed 75% of the allowable costs incurred by the municipality or county.

(b) Nothing in this section shall be construed to impair or limit application of this act to any municipality or person, or to relieve any municipality or person of duties imposed under this act.

(c) If, in any fiscal year, appropriations are insufficient to cover the costs or grants and reimbursement to all municipalities and counties eligible for such grants and reimbursements in that fiscal year, the Department of Environmental Resources shall report such fact to the General Assembly and shall request appropriation of funds necessary to provide the grants authorized in this section. If such a deficiency appropriation is not enacted, any municipality or county which has not received the full amount of the grant for which it is eligible under this section shall be as a first priority reimbursed from appropriations made in the next successive fiscal year. (17 amended May 24, 1984, P.L.324, No.63)

Compiler's Note: Section 502(c) of Act 18 of 1995, which created the Department of Conservation and Natural Resources and renamed the Department of Environmental Resources as the Department of Environmental Protection, provided that the Environmental Quality Board shall have the powers and duties currently vested in it, except as vested in the Department of Conservation and Natural Resources by Act 18 of 1995, which powers and duties include those set forth in section 17.

Section 18. Appropriations.

The sum of \$500,000, or as much thereof as may be necessary, is hereby appropriated for the fiscal period beginning July 1, 1978, and ending June 30, 1979, to the Department of Environmental Resources for the purposes of administrative and general expenses in implementing the provisions of this act.

Compiler's Note: The Department of Environmental Resources, referred to in this section, was abolished by Act 18 of 1995. Its functions were transferred to the Department of Conservation and Natural Resources and the Department of Environmental Protection.

Section 19. Repealer and savings clause.

(a) All acts or parts of acts inconsistent herewith are hereby repealed to the extent of such inconsistency.

(b) The provisions of this act shall not affect any suit or prosecution pending or to be instituted to enforce any right or penalty or punish any offense under the authority of any act of Assembly or part thereof repealed by this act.

Section 20. Effective date.

This act shall take effect immediately.

For more information, visit
www.depweb.state.pa.us, keyword: Watershed Publications.

3930-BK-DEP0121 Rev. 11/2008

