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Executive Summary

Luzerne County Act 167 Phase II

Stormwater Management Plan



Submitted to:

Luzerne County Planning Commission

200 North River Street
Wilkes-Barre, PA 18711

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LUZERNE COUNTY STORMWATER MANAGEMENT PLAN

EXECUTIVE SUMMARY – INTRODUCTION

1. Introduction

This Stormwater Management Plan has been developed for Luzerne County, Pennsylvania to comply with the requirements of the 1978 Pennsylvania Stormwater Management Act, Act 167. This Plan is the initial county-wide Stormwater Management Plan for Luzerne County, and serves as a Plan Update for the portions or all of six (6) watershed-based previously approved Act 167 Plans including: Bowman’s Creek (portion located in Luzerne County), Lackawanna River (portion located in Luzerne County), Mill Creek, Solomon’s Creek, Toby Creek, and Wapwallopen Creek. This report is developed to document the reasoning, methodologies, and requirements necessary to implement the Plan. The Plan covers legal, engineering, and municipal government topics which, combined, form the basis for implementation of a Stormwater Management Plan. It is the responsibility of the individual municipalities located within the County to adopt this Plan and the associated Ordinance to provide a consistent methodology for the management of stormwater throughout the County.

The Plan was managed and administered by the Luzerne County Planning Commission in consultation with Borton-Lawson, Inc. The Luzerne County Planning Commission Project Manager was Nancy Snee. Plan development occurred over the course of three (3) years: the Phase I Scope of Study took place in 2007, and the Phase II Stormwater Management Plan took place in 2008 to 2010. Plan adoption at the County level occurred in July 2010.

2. Stormwater Management and Act 167

Effective stormwater management controls flooding, prevents soil and streambank erosion and sedimentation, promotes groundwater recharge, and improves the overall quality of the receiving streams. Prior to Act 167, stormwater control was viewed only on a site-specific basis. However, in recent years, understanding of runoff dynamics and spatial relationships across larger areas has indicated that stormwater management is more effective when evaluated on a watershed basis.

As stated in Act 167, the purpose and policy of the Act is to:

1. Encourage planning and management of stormwater runoff in each watershed which is consistent with sound water and land use practices.
2. Authorize a comprehensive program of stormwater management designated to preserve and restore the flood carrying capacity of Commonwealth streams; to preserve to the maximum extent practicable natural stormwater runoff regimes and natural course, current and cross-section of water of the Commonwealth; and to protect and conserve groundwater and groundwater recharge areas.
3. Encourage local administration and management of stormwater 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.

To fulfill the purpose and policy, stormwater management requires cooperation between state, county, and local officials. It involves sound planning, engineering, permitting, design, construction, operation, and maintenance of stormwater management facilities. This includes informing the public and local officials about effective stormwater management techniques, development of workable design standards and criteria, and the adoption of those standards within municipal ordinances.

This Plan addresses the requirements of the Pennsylvania Stormwater Management Act, Act 167. The information, criteria, and standards presented in this Plan will enable future development within Luzerne County to utilize stormwater Best Management Practices (BMPs) to properly manage stormwater runoff in the County.

All counties must, in consultation with their municipalities, prepare and adopt a stormwater management plan for each of their designated watersheds. Furthermore, the individual counties are responsible to review and revise such plans at least once every five years. Within six months following adoption and approval of an Act 167 Plan, each municipality is required to adopt or amend stormwater ordinances to be in conformance with the Plan. These ordinances regulate development within the municipality to be consistent with the Plan and the provisions of the Act.

An approved Act 167 Plan requires developers to manage the quantity, velocity, and direction of stormwater runoff in a manner that adequately protects the public health and safety. Developers or anyone performing a regulated activity must implement control measures that are consistent with the provisions of the Plan. The Act also provides for civil remedies for those aggrieved by inadequate management of accelerated stormwater runoff.

3. Goals of the Study

There is an increased statewide as well as local recognition that effective stormwater management requires a diversified multi-purpose approach. This Plan addresses a range of hydrologic consequences resulting from improper stormwater management by considering tributary timing and its effect upon streamflow and runoff volume, base flow augmentation, water quality control and ecological protection rather than simply focusing on controlling site specific peak flow. As stated above, stormwater management plans must be reviewed and revised every five years. The following goals of this study have been identified for this five-year planning cycle:

Goal 1: Develop a Stormwater Management Ordinance to be adopted by all municipalities within the County which provides consistent regulations and requirements throughout the County.

Goal 2: Develop linkages between stormwater management requirements for small projects (as defined by Ordinance Article III Section 302 and Ordinance Appendices B and D), and building permits and Unified Construction Code (UCC) inspections.

Goal 3: Require all regulated activities to control peak flow rates consistent with 100% post-construction to pre-construction/existing condition rate control at a minimum, and to a greater reduction in specified Stormwater Management Districts.

Goal 4: Require all regulated activities to control water quality through runoff volume reduction via groundwater recharge, streambank preservation, and other methods consistent with the National Pollutant Discharge Elimination System (NPDES) II regulations including measures outlined in the *Pennsylvania Stormwater Best Management Practices Manual* (Reference 2).

The purpose and goals of this Luzerne County Stormwater Management Plan are to provide reasonable regulations of activities to control runoff from new development, redevelopment projects, and other regulated activities in order to protect the health, safety, and welfare of the public. Once implemented, the Plan will aid in preventing future costly flood damages by preventing new sources of local uncontrolled runoff, and will improve water quality and groundwater recharge. The Plan will help municipalities and developers become more aware of comprehensive planning in stormwater control and will help maintain the quality of the rivers and water bodies of Luzerne County.

4. Objectives and Strategies for Stormwater Management

The goals for this planning cycle, listed above, were selected to achieve the first step in implementing the Plan on a county-wide level. With county and municipal adoption of this Plan and Stormwater Ordinance, the framework will be set to implement consistent stormwater management controls. This 5-year planning cycle will provide a reasonable time period to observe how the Plan standards and criteria function, which will assist with future modifications to the Plan as new data becomes available with the Plan in place.

The four (4) goals stated above were selected based on practicality of implementation through discussions with the Plan Advisory Committee (PAC) and County. A broader scope of objectives for future planning cycles was developed based on the investigations conducted in this Plan. These objectives and strategies to meet them are provided in Table 1.

Table 1. Objectives, Strategies, and Timeframes for Stormwater Management in Luzerne County.

Objectives for this 5-year Planning Cycle		
Objective	Strategy	Timeframe
Adopt this Plan and Stormwater Ordinance.	Municipalities that enforce their own SALDO ¹ shall adopt and enforce the Stormwater Ordinance. The County shall adopt the Stormwater Ordinance and administer for those municipalities that are under the County SALDO.	Adoption must occur within 6 months of DEP approval
Provide linkages between building permits, UCC ² inspections, and stormwater management for small projects as required in Ordinance Appendix C.1 and Ordinance Appendix E.	Municipalities shall designate a representative to review stormwater management worksheets for small projects in which DIA ³ is used as a BMP ⁴ . This representative may be the person who administers building permits, or the municipality's UCC inspector.	Coordinate this activity with Plan and Ordinance adoption – within 6 months of DEP approval
Develop a structure for the ownership and maintenance responsibilities for stormwater facilities.	Consistent with Act 247 Pennsylvania Municipalities Planning Code, municipalities may bond with the developer for up to 18 months until final inspection of the facility. After the bonding period, the municipality can either: <ol style="list-style-type: none"> 1. Require the ownership to remain with the developer; 2. Form a Homeowners Association to assume responsibility of the facility; 3. Accept the dedicated facility. 	Coordinate this activity with Plan and Ordinance adoption – within 6 months of DEP approval
Monitor the effect of this Plan on stormwater issues.	Inventory the severity of problem areas that have been identified in this Plan as new construction occurs and stormwater management controls are put in place as required by the Ordinance.	After new construction during the next 5 years
Objectives for Future Planning Cycles		
Objective	Strategy	Timeframe
Create a regional stormwater management board at the County level responsible for administering the Ordinance.	Provide a framework of potential entities such as the County Engineer and Flood Protection Authority, who could comprise the board. Identify means to allocate resources for the creation and continued use of the board.	2 planning cycles (10 years)
Retrofit existing stormwater management facilities to improve water quality functions.	Identify and inventory stormwater management facilities as to their stormwater control functions (i.e. peak rate only, dry detention basins, no water quality devices such as wetlands or forebays, etc.) Prioritize the facility inventory, and allocate resources for construction	4 planning cycles (20 years)

	retrofits. Construction retrofits can include outlet control structure modifications, vegetated basin bottoms and sides, sediment capture devices, forebays, and others ⁵ .	
Identify critical watersheds that were not previously studied in detail, and were not studied in detail in this 5-year planning cycle.	In addition to Abrahams Creek, Bowman's Creek, Hicks Creek, Lackawanna River, Mill Creek, Nescopeck Creek, Toby Creek, and Wapwallopen Creek, which have been studied in detail in previous planning efforts or this Plan, identify problem watersheds where modeling should be conducted to determine more stringent stormwater management criteria. Develop a watershed based Act 167 Planning effort for those watersheds to augment with this Plan.	2 planning cycles (10 years)

Note 1: Subdivision and Land Development Ordinance

Note 2: Unified Construction Code

Note 3: Disconnected Impervious Area

Note 4: Best Management Practice

Note 5: Reference the *Pennsylvania Stormwater Best Management Practices Manual* for a full list of retrofit options. (Reference 2)

Table 1 provides objectives for this 5-year planning cycle, and objectives for future planning cycles. Objectives for future planning cycles cannot be met in this Plan due to limited funding and resources. However, this Plan does provide a framework that will allow objectives for future planning cycles to be more easily achieved as funding and resources become available.

LUZERNE COUNTY STORMWATER MANAGEMENT PLAN

EXECUTIVE SUMMARY – GEOGRAPHIC SCOPE OF PLAN

Luzerne County, located in Northeast Pennsylvania, has a total of 76 municipalities (36 townships, 36 boroughs and four cities), as shown in Table II.1. The County is bordered by Wyoming County to the north, Lackawanna County to the northeast, a small portion of Monroe County to the east, Carbon County to the southeast, Schuylkill County to the south, Columbia County to the west, and Sullivan County to the northwest.

The Pennsylvania Department of Environmental Protection (PADEP) has designated 19 watersheds in the County. These watersheds and their drainage areas within the County are:

1. Abrahams Creek (17.4 square miles)
2. Black Creek (16.1 square miles)
3. Bowman's Creek (31.2 square miles)
4. Catawissa Creek (12.2 square miles)
5. Fishing Creek (1.3 square miles)
6. Harvey Creek (44.1 square miles)
7. Hicks Creek (3.9 square miles)
8. Hunlock Creek (32.6 square miles)
9. Huntington Creek (96.9 square miles)
10. Lackawanna River (20.0 square miles)
11. Lehigh River (116.4 square miles)
12. Mehoopany Creek (3.2 square miles)
13. Mill Creek (36.6 square miles)
14. Nanticoke/Newport Creeks (21.6 square miles)
15. Nescopeck Creek (166.5 square miles)
16. Solomon's Creek (18.2 square miles)
17. Susquehanna River (138.8 square miles – direct runoff)
18. Toby Creek (36.5 square miles)
19. Wapwallopen Creek (92.5 square miles)

Of the 19 watersheds listed above, six (6) have existing Act 167 Plans. These are:

1. Bowman's Creek
2. Lackawanna River (original Plan conducted by Lackawanna County)
3. Mill Creek
4. Solomon's Creek
5. Toby Creek
6. Wapwallopen Creek

For this Plan, the Abrahams Creek, Hicks Creek, and Nescopeck Creek watersheds were identified as critical for stormwater management. In 2003, an Act 167 Phase I Scope of Study had been prepared for the Nescopeck Creek watershed, and that watershed was therefore studied during this planning process to fulfill the Phase I items. The Abrahams Creek and Hicks Creek watersheds were selected for study due to severe stormwater problems. Hydrologic models had previously been developed by Borton-Lawson in 2008 as part of the *Stormwater Management Study for the Hicks Creek and Abrahams Creek Watersheds*. This allowed for specific standards and criteria for stormwater management to be developed for these watersheds.

LUZERNE COUNTY STORMWATER MANAGEMENT PLAN

EXECUTIVE SUMMARY – PERTINENT STANDARDS AND CRITERIA

Standards and criteria were developed to follow the DEP Model Ordinance, and incorporated existing Act 167 watershed plan criteria where those criteria were stricter. These standards and criteria make up Article III of the Stormwater Management Ordinance.

Section 301 of Article III contains general requirements which apply to the entire County as follows:

- A. For all regulated activities, submission of the Stormwater Management Permit Application provided in Ordinance Appendix B is required.
- B. For all regulated activities, unless preparation of a SWM Site Plan is specifically exempted in Section 302:
 - 1. Preparation and implementation of an approved SWM Site Plan is required.
 - 2. No regulated activities shall commence until the municipality issues written approval of a SWM Site Plan, which demonstrates compliance with the requirements of this Ordinance.
- C. SWM Site Plans approved by the municipality, in accordance with Section 406, shall be on site throughout the duration of the regulated activity.
- D. The municipality may, after consultation with DEP, approve measures for meeting the state water quality requirements other than those in this Ordinance, provided that they meet the minimum requirements of, and do not conflict with, state law including, but not limited to, the Clean Streams Law.
- E. For all regulated earth disturbance activities, erosion and sediment control BMPs shall be designed, implemented, operated, and maintained during the regulated earth disturbance activities (e.g., during construction) to meet the purposes and requirements of this Ordinance and to meet all requirements under Title 25 of the Pennsylvania Code and the Clean Streams Law. Various BMPs and their design standards are listed in the *Erosion and Sediment Pollution Control Program Manual (E&S Manual)*, No. 363-2134-008 (April 15, 2000), as amended and updated.
- F. For all regulated activities, implementation of the volume controls in Section 303 is required, unless otherwise exempted by Section 302.
- G. Impervious areas:
 - 1. The measurement of impervious areas shall include all of the impervious areas in the total proposed development even if development is to take place in stages.

2. For development taking place in stages, the entire development plan must be used in determining conformance with this Ordinance.
 3. For projects that add impervious area to a parcel, only the proposed impervious area on the parcel must be considered and summed to determine the plan preparation and approval requirements of this Ordinance.
 4. For redevelopment projects in which the existing site is disturbed, the entire proposed site is subject to the plan preparation and approval requirements of this Ordinance. Existing conditions are considered to be the existing site prior to disturbance, and 20% of the existing impervious area must be considered as meadow in good condition for all stormwater calculations. For redevelopment projects in which the existing site is already controlled by a stormwater management facility, the requirement to consider 20% of existing impervious area as meadow is waived, provided the existing facility meets the water quality, volume, and peak rate standards and criteria of this Ordinance.
- H. Stormwater flows onto adjacent property shall not be created, increased, decreased, relocated, or otherwise altered without written notification of the adjacent property owner(s). Such stormwater flows shall be subject to the requirements of this Ordinance.
- I. All regulated activities shall include such measures as necessary to:
1. Protect health, safety, and property;
 2. Meet the water quality goals of this Ordinance by implementing measures outlined in the *Pennsylvania Stormwater Best Management Practices Manual* (BMP Manual) to:
 - a. Minimize disturbance to floodplains, wetlands, and wooded areas.
 - b. Maintain or extend riparian buffers.
 - c. Avoid erosive flow conditions in natural flow pathways.
 - d. Minimize thermal impacts to waters of this Commonwealth.
 - e. Disconnect impervious surfaces by directing runoff to pervious areas, wherever possible.
 3. To the maximum extent practicable, incorporate the techniques for Low Impact Development Practices described in the BMP Manual.
- J. The design of all facilities over karst and mined areas shall include an evaluation of measures to minimize adverse effects.

- K. Infiltration BMPs should be spread out, made as shallow as practicable, and located to maximize use of natural on-site infiltration features while still meeting the other requirements of this Ordinance.
- L. Storage facilities, to the greatest extent possible and at the discretion of the Municipal Engineer shall completely drain both the volume control and rate control capacities over a period of time not less than 24 and not more than 72 hours from the end of the design storm.
- M. Storage facilities shall incorporate features to maximize the length of the flow path and increase the travel time through the facility.
- N. The design storm volumes to be used in the analysis of peak rates of discharge should be obtained from the Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 2, Version 3.0, U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Weather Service, Hydrometeorological Design Studies Center, Silver Spring, Maryland. NOAA's Atlas 14 can be accessed at: <http://hdsc.nws.noaa.gov/hdsc/pfds/>.
- O. For all regulated activities, SWM BMPs shall be designed, implemented, operated, and maintained to meet the purposes and requirements of this Ordinance and to meet all requirements under Title 25 of the Pennsylvania Code, the Clean Streams Law, and the Storm Water Management Act.
- P. Various BMPs and their design standards are listed in the BMP Manual.

Section 302 of Article III contains exemption criteria which apply to the entire County as follows:

- A. Regulated activities that create impervious areas or earth disturbance shall adhere to Table III.1 to meet the requirements of the Ordinance. The larger of the two areas determines the applicable requirements of the Ordinance (i.e. if only 500 sq. ft. of impervious area is proposed, but 15,000 sq. ft. of earth disturbance, the requirements follow row 3 of Ordinance Table III.1).

Ordinance Table III.1. Stormwater Management Requirements and Exemptions.

Proposed Impervious Area (sq. ft.)	Proposed Total Earth Disturbance (sq. ft.)	Exemptions	Stormwater Management Requirements	What is required to submit to municipality?*
< 1,000	< 5,000	Section 303, Section 304, and Article IV of this Ordinance	Ensure Section 301. General Requirements are met	N/A
1,000 to 5,000	5,000 to 10,000	Section 303, Section 304, and Article IV of this Ordinance	Disconnected Impervious Area (DIA) as in Ordinance Appendix C.1	Ordinance Appendix C.1 Worksheet and Sketch (or equivalent)
			OR	OR
5,000 to 10,000	10,000 to 20,000	Section 304 and Article IV of this Ordinance	Capture and control first 1 inch of runoff over proposed impervious areas as in Ordinance Appendix E	Ordinance Appendix E Worksheet and Sketch (or equivalent)
			Capture and permanently remove the first 2 inches of runoff over proposed impervious areas as in Section 303 B. of this Ordinance	Ordinance Appendix D Worksheet and Sketch (or equivalent)
> 10,000	> 20,000	None	All requirements of this Ordinance	SWM Site Plan

*In addition to the Stormwater Management Permit Application provided in Ordinance Appendix B.

- B. Agricultural activity is exempt from the rate control and SWM Site Plan preparation requirements of this Ordinance provided the activities are performed according to the requirements of 25 Pa. Code 102.
- C. Forest management and timber operations are exempt from the rate control and SWM Site Plan preparation requirements of this Ordinance provided the activities are performed according to the requirements of 25 Pa. Code 102.
- D. Exemptions from any provisions of this Ordinance shall not relieve the applicant from the requirements in Sections 301.A. through P.

Section 303 of Article III contains Volume Control criteria which apply to the entire County as follows:

The low impact development practices provided in the BMP Manual shall be utilized for all regulated activities to the maximum extent practicable. Water volume controls shall be implemented using the *Design Storm Method* in Subsection A or the *Simplified Method* in Subsection B below. For all regulated activities that require submission of a formal SWM Site Plan, both the *Design Storm Method* and the *Simplified Method* shall be calculated; the larger control volume based on the two calculations shall be controlled. Subsection C below provides

requirements for mined, karst, or other geologically limiting areas where infiltration shall not occur.

- A. The *Design Storm Method* (CG-1 in the BMP Manual) is applicable to any size of regulated activity. This method requires detailed modeling based on site conditions.
1. Do not increase the post-development total runoff volume for all storms equal to or less than the 2-year 24-hour duration precipitation.
 2. For modeling purposes:
 - a. Existing (predevelopment) non-forested pervious areas must be considered meadow or its equivalent.
 - b. 20% of existing impervious area, when present, shall be considered meadow in the model for existing conditions.
- B. When *Design Storm Method* CG-1 guidelines are not used, the *Simplified Method* (CG-2 in the BMP Manual) has been modified to accommodate 2” of permanently removed runoff volume. This method (provided below) is independent of site conditions and should be used if the *Design Storm Method* is not followed. For new impervious surfaces:
1. The first 2 inches of runoff from new impervious surfaces shall be permanently removed from the runoff flow (i.e., it shall not be released into the surface waters of this Commonwealth). Removal options include reuse, evaporation, transpiration, and infiltration.
 2. Wherever possible, infiltration facilities should be designed to accommodate infiltration of the entire permanently removed runoff; however, in all cases at least the first 0.5 inch of the permanently removed runoff should be infiltrated.
 3. Facilities, to the greatest extent possible and subject to the Municipal Engineer’s discretion, shall be designed to drain the permanently removed runoff volume in a period no less than 24 hours and no greater than 72 hours.
 4. Runoff volume in excess of 2 inches shall be safely conveyed to existing stormwater collection systems or streams, in the direction of the existing drainage course.
 5. This method is exempt from the requirements of Section 304, Rate Controls.
- C. Before infiltration is proposed on a site, site conditions shall be evaluated by a qualified design professional through subsurface investigation and testing to determine if site conditions are suitable to support proposed infiltration facilities to manage runoff. If it is determined that infiltration is not feasible due to physical constraints of the site, or will adversely impact the environment as demonstrated by the presence of acid mine drainage,

sinkhole formation, or other serious environmental issues, then the above volume controls must be achieved through surface BMP mitigation. Reference the BMP Manual for alternative mitigation measures that do not require infiltration.

Section 304 of Article III contains Rate Control criteria which apply to the entire County as follows:

- A. Areas not covered by a Stormwater Management District Map contained in Appendix F.1 of the Ordinance:

Post-development discharge rates shall not exceed the predevelopment discharge rates for the 1- through 100-year, 24-hour storms. If it is shown that the peak rates of discharge indicated by the post-development analysis are less than or equal to the peak rates of discharge indicated by the predevelopment analysis for 1- through 100-year, 24-hour storms, then the requirements of this section have been met. Otherwise, the applicant shall provide additional controls as necessary to satisfy the peak rate of discharge requirement.

- B. Areas covered by a Stormwater Management District Map contained in Appendix F.1 of the Ordinance:

For the 1- through 100-year storms, the post-development peak discharge rates will follow the applicable approved Stormwater Management District Maps. For any areas not shown on the Stormwater Management District Maps, the post-development discharge rates shall not exceed the predevelopment discharge rates.

- C. Areas designated as *District B-2 – Nescopeck Creek Watershed Only*:

1. If a mine reclamation project is proposed, the post-development discharge rates shall not exceed the predevelopment discharge rates for the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year storms. Predevelopment land cover conditions shall be considered forest in good condition.
2. Proposed land development projects shall apply the 60% release rate criterion for the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year storms. This applies to all sites, including those that have been previously reclaimed. Predevelopment land cover conditions shall be considered forest in good condition.

- D. Special Retention Area – *Hicks Creek Watershed Only*:

1. Any regulated activity being conducted in the Hicks Creek Watershed shall retain runoff from the site of the regulated activity for the 1- through 100-year, 24-hour storms. Site generated runoff shall be stored in a retention facility designed to store the total 100-year, 24-hour volume discharging from the project site. Undisturbed areas that discharge through the project site may bypass the retention facility.

2. The retention volume shall be released when conditions in the watershed permit, water levels in the Hicks Creek have subsided, the flap gate discharging the Hicks Creek to the Susquehanna River is open, and the Susquehanna River water elevations are receding.
3. Options for release are subject to the Municipal Engineer's discretion and include but are not limited to:
 - a. Manually operated valve structure.
 - b. Other structures which operate to dictate release based on downstream conditions.
4. Retention facilities shall be lined to prevent infiltration.

LUZERNE COUNTY STORMWATER MANAGEMENT PLAN

EXECUTIVE SUMMARY – COUNTY AND MUNICIPAL RESPONSIBILITIES

The Stormwater Management Plan preparation process was completed with the County adoption of the draft Plan and submission of the final Plan to PADEP for approval. This set in motion the mandatory schedule of adoption of ordinances needed to implement stormwater management criteria. The municipalities had six months from PADEP approval to adopt the necessary ordinance provisions.

a. DEP Approval of the Plan

Upon adoption of the Plan, the Plan was submitted to PADEP for approval. A draft of the Stormwater Management Plan and draft Model Ordinance was sent to PADEP prior to adoption of the Plan. The PADEP reviewed the Plan for consistency with municipal floodplain management plans, state programs that regulate dams, encroachments and other water obstructions, and state and federal flood control programs.

b. Municipal Adoption of Ordinance to Implement the Plan

The Act 167 Stormwater Management Plan Model Ordinance provided with this Plan is a single purpose stormwater ordinance that can be adopted by each municipality. All municipalities are required to adopt the model ordinance or amend existing ordinances to be consistent with the standards and criteria set forth in the Plan. If municipalities do not have the capabilities to review plans for consistency with the standards and criteria set forth in the Plan, it shall be the municipalities' responsibility to designate a representative organization that is capable of completing the review on the municipalities' behalf.

c. Level of Government Involvement in Stormwater Management

The existing institutional arrangements for the management of stormwater include federal, state, and county governments, as well as every municipality within the County.

The minimum objectives of this Plan and the minimum mandates of Act 167 can be accomplished without significant modification of existing institutional arrangements. Actions must be taken at the municipal level. Participation by the County in the technical review of stormwater management plans is necessary. There must be maintenance and operation of the computer model (as necessary), and compilation of data required for periodically updating the Plan to reflect actual conditions. State funded projects should be consistent with the standards and criteria in the Plan or have their own plan which is approved by the PADEP and which when implemented will not degrade the waters of the Commonwealth.

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 stormwater plan and the provisions of the Act. Act 167 requires that this be accomplished within six months of

the Plan's adoption and approval. Model Ordinance provisions will be distributed to all of the municipalities. The Luzerne County Planning Commission will be available upon request to assist municipalities in the adoption of the Model Ordinance provisions to fit particular municipal ordinance structures.

The primary County level activity will be the establishment of review procedures. The Model Ordinance calls for review of stormwater management plans by a qualified professional. Evidence that the appropriate state and federal agencies responsible for administering wetland regulatory programs have been contacted for land development sites containing regulated wetlands is also required. The purpose is to ensure that Plan standards have been applied appropriately and that downstream impacts have been adequately addressed. Procedures and capabilities for performing the review function exist within the governmental agencies.

d. County-Wide Coordination

An ideal structure for the management of stormwater on a county-wide basis would be a single entity at the County level of government. There are a variety of models for such an entity, ranging from assigning new responsibilities to a coordinated team of existing County departments to the creation of a regional stormwater management board. The reality of the situation, however, is with limited funding and resources such a board will be difficult to create and operate in Luzerne County. Therefore, stormwater management functions after the adoption of this Plan, must reside with the developer, the landowner, or the municipality.

Consistent with Act 247 Pennsylvania Municipalities Planning Code, there are two functions the County currently provides for all subdivision or land development projects:

- Encourage the best possible technical solutions in the most effective manner;
- The efficient and competent review of stormwater management components of development plans.

There are additional elements that must be performed after the construction of stormwater systems to ensure the proper functioning of the systems. These five (5) elements are:

- The continued maintenance of all elements of the system;
- The repair and replacement of system components as necessary;
- Continued monitoring and evaluation of the performance of the drainage system;
- Updating and revision of system requirements and standards as necessary;
- Responsible financial management including an equitable apportionment of operating and capital costs among the system's users and beneficiaries.

For subdivision and land development projects in a manner consistent with Act 247, the County or municipality requires the developer to provide bonding of up to 15% of the construction cost for up to 18 months until final inspection of all systems is completed. Beyond the bonding period, however, it is not feasible for the above elements to be the

County's responsibility. The available alternatives to perform these five (5) elements beyond the bonding period are:

- Municipalities amend their Subdivision and Land Development Ordinance (SALDO) to place the responsibility with the developer;
- Municipalities amend their SALDO to require formation of a Homeowners Association or other entity to assume responsibility;
- Municipalities accept dedication of the facility and assume full responsibility.

Municipalities are often unsure of the requirements and responsibilities associated with post-construction system monitoring and maintenance, and facilities can become neglected. As with failure to enforce and implement the requirements of this Plan and Stormwater Ordinance, failure to monitor and maintain stormwater facilities can result in the State withholding funding for any State program (e.g. Liquid Fuels, roads, etc.)

One feasible concept is that stormwater can be managed like a public utility and that the costs for planning, construction, operation and maintenance, monitoring and evaluation can be equitably shared by all of the system's users. A basic assumption underlying the concept of user financing of stormwater management is that damage caused by existing and potential stormwater runoff without controls affects the well being of the municipality. Therefore, it is in the public interest to undertake stormwater management.

Based on stormwater management experience elsewhere, users (including beneficiaries) can finance the full cost of stormwater management inexpensively and equitably. The cost to each user is calculated based on user's property characteristics. Because this method is based on a formula, it has the advantage of being objective in its application.

e. Action Items

The development of this Plan has provided a framework for proper stormwater management, a logical first step in the process of implementation of a stormwater management ordinance. It will prevent the worsening of existing stormwater problems and prevent the creation of new stormwater related problems as well. The step-by-step outline below presents a logical method to fulfilling the requirements of Act 167.

1. Adopt and enforce the stormwater management standards and criteria contained in the Model Ordinance which will require:
 - a. Municipal level adoption and enforcement;
 - b. Coordination with Subdivision and Land Development Ordinances (SALDO);
 - c. Designation of entity to perform Stormwater Management Site (SWM) Plan reviews (either the municipal engineer, or the County if SALDO is administered by the County);
 - d. Designation of entity to review worksheets for Disconnected Impervious Area (DIA) and calculations for small projects (entity may be linked with building permits or Unified Construction Code (USS) inspections.

2. Prioritize a list of storm drainage problems within the municipalities based on frequency of occurrence, potential for injury, and damage history.
 - a. Some municipalities have already prioritized stormwater problem areas, and these may be found in Volume II – Problem Area Analysis.
 - b. Municipalities that have not identified and prioritized stormwater problem areas should do so.
 - c. The function of the Stormwater Ordinance is not affected by the stormwater problem areas; the purpose of the prioritization is to identify the next steps to correct existing stormwater problems.
3. The potential solutions identified for the problem areas in this Plan are merely recommendations that can guide the next steps in correcting the problems. Therefore, a detailed engineering evaluation to determine the exact nature of the drainage problems within the municipalities in order to determine cost estimates and a recommended course of municipal action should be performed.
4. Analyze the potential for incorporating the implementation of recommended solutions regarding stormwater runoff in the annual municipal capital or maintenance budget.
5. Identify potential sources of funding. The four (4) most logical funding sources for correcting stormwater problems are:
 - a. PennVEST Program – The PennVEST Act of 1988, as amended, provides low interest loans to governmental entities for the construction, improvement or rehabilitation of stormwater projects including the transport, storage and infiltration of stormwater and best management practices to address nonpoint source pollution associated with stormwater. In order to qualify for a loan under PennVEST, the municipality or county:
 1. Must be located in a watershed for which there is an existing county adopted and PADEP approved stormwater plan with enacted stormwater ordinances consistent with the Plan, or
 2. Must have enacted a stormwater control ordinance consistent with the Act.
 - b. H2O PA Grant Program – The H2O PA Act, established by the General Assembly in July 2008, provides single-year or multi-year grants for flood control projects to the Commonwealth, independent agencies, municipalities, or municipal authorities. Eligible H2O PA projects are those which involve the construction, improvement, repair, or rehabilitation of all or part of a flood control system. Types of flood control projects may include channel improvements, compacted earth levees, concrete channels, concrete floodwalls, detention dams, non-structural measures, or any combination of

these project types. Major repairs or rehabilitation of an existing flood protection project would also be eligible.

- c. Growing Greener Program – The Environmental Stewardship and Watershed Protection Act commonly known as Growing Greener was passed into law in December 1999. It was the largest single investment of state funds in history to address Pennsylvania's critical environmental concerns of the 21st century. Eligible applicants must meet one of the following criteria or obtain a sponsor that meets one of the criteria:
 - i. Incorporated watershed association;
 - ii. County and Municipality;
 - iii. County Conservation District;
 - iv. Council of Governments; or
 - v. Other authorized organization that is:
 - 1. a tax exempt corporation under Section 501(c)(3) of the Internal Revenue Code and registered with the Pennsylvania Bureau of Charitable Organizations;
 - 2. an educational institution;
 - 3. a municipal authority.

- d. Private Developer or Homeowners Association Contribution Fund – This funding mechanism would place the burden of financing stormwater projects on the owner; this mechanism would be incorporated to a municipality's SALDO.

In addition to these funding sources, a variety of other funding options are available from state and federal agencies including DCNR, PADEP, U.S. Environmental Protection Agency (EPA), USDA, and others. A full list of these funding programs is provided in Appendix 3 – Potential Funding Sources, of this Plan.

f. Responsibilities of Landowners and Developers

Any landowner and any person engaged in the alteration or development of land that may affect stormwater runoff characteristics shall implement such measures consistent with the provisions of the applicable watershed stormwater 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 the maximum rate of stormwater runoff is no greater after development than prior to development activities; or
- 2. To manage the quantity, velocity and direction of resulting stormwater runoff in a manner that otherwise adequately protects health and property from possible damage.

DISCIPLINES

Architecture

Automation

Bridge Design

Drainage Design

Environmental

Electrical Design

Highway Design

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Land Development

Land Surveying

Mechanical Design

Structural Design

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