GUIDANCE FOR VOLUNTARY LOCAL GOVERNMENT IMPLEMENTATION OF NONPOINT SOURCE POLLUTION CONTROL PROTECTING LOCAL STREAMS AND THE DELAWARE RIVER

DELAWARE
ESTUARY PROGRAM

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Pennsylvania Demonstration Project

Guidance for Voluntary Local Government Implementation of Nonpoint Source Pollution Control Protecting Local Streams and the Delaware Estuary

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DEVELOPING A PROGRAM TO CONTROL NPS POLLUTION

The Delaware Estuary Program, funded by the U.S. Environmental Protection Agency in cooperation with the States of Delaware, New Jersey, and Pennsylvania, is developing a Comprehensive Conservation and Management Plan (CCMP). The focus of this Plan is protecting and restoring the living resources, natural habitats and the related resources that support various needs in the Delaware Estuary region. Over the past five years, this program has researched many sources of pollution including permitted discharges, toxics, accidental spills and nonpoint source pollution.

Nonpoint source (NPS) pollution consists of the ubiquitous contaminants such as heavy metals, hydrocarbons, nutrients and bacterial contamination that runoff the land and roads and contaminate stormwater. These pollutants are estimated to account for more than half of the pollution that affects local streams, the surrounding environments and the Delaware Estuary. Some of these NPS pollutants can be fairly easily controlled with the assistance of local governments and existing local powers.

This is a guide for local government action in the Delaware Estuary region to limit the increase in nonpoint source or stormwater runoff pollution which results from new development and redevelopment projects. It is not generally realized how seriously streams are impacted by runoff pollution as a consequence of normal development. Because this is a gradual process, local governments usually neglect it until their once attractive streams have been environmentally degraded. If they act in time, however, local governments can stop this process of deterioration by a relatively simple program.

One aspect of the Delaware Estuary Program focused on what could be done to control NPS pollution. Efforts were directed at understanding the sources, the possible solutions (including better planning, zoning, and use of best management practices (BMPs), such as set-backs, buffer strips, and stormwater detention basins), as well as the potential institutional options for implementation, costs and acceptance of controls. The effort resulted in a "strategy" that was simple and could be implemented throughout the Delaware Estuary Region. In addition, the strategy was tested on three municipalities in Pennsylvania as part of a demonstration project. This was done with full cooperation by state, county and local agencies and an advisory committee. Specific BMP controls and ordinances were designed for the community demonstrations[1]. Control of this type of runoff pollution is recommended in order to protect the waters of the Delaware Estuary.

NONPOINT SOURCE POLLUTION

- A major source of pollution flushed-off land by stormwater
- Increased by land development and redevelopment
- Contains heavy metals, hydrocarbons, nutrients, pesticides, bacterial contamination, etc.
- Makes streams unfit for swimming and fishing
- Causes odors and creates health hazards
- Reduces the economic value of nearby properties

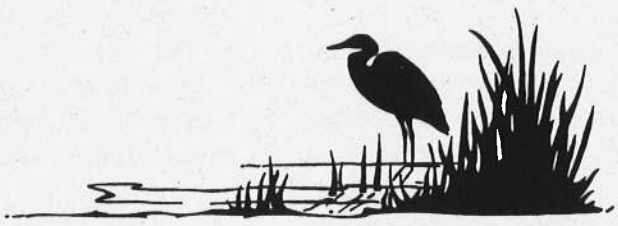
Because the environmental effects of this runoff pollution on receiving waters are cumulative, and substantially irreversible, and, because full implementation of the "Demonstration Study" program recommends coordinated action and legislation by the states of Delaware, New Jersey, and Pennsylvania, which obviously will take some time, communities may decide that the

[1] A complete description of the strategy, the demonstration study, and BMPs is contained in the report: Land Use Management and NPS Control for the Delaware Estuary: The Pennsylvania Demonstration Project (The Greeley-Polhemus Group, Inc., 1994).

recommended measures should be implemented as a matter of local option without waiting for authorizing state legislation. The effect of runoff pollution from new development is, in the long-run, so environmentally harmful to the local streams that it would be in the interest of the municipalities to control it, even if there were no effects to the Estuary. This guidance explains the components of the program; describes why it is important to municipalities; makes suggestions for planning and implementation; and describes sources of state support that may be available to help implement a community program. Two appendices provide examples of local ordinances that can provide effective control of NPS pollution from new development and redevelopment ("Suggested Amendments to a Subdivision and Land Development Ordinance for Nonpoint Source Pollution Control" and a "Model Ordinance for Nonpoint Source Pollution Control").

HOW THE PROGRAM WORKS

The Delaware Estuary region is environmentally crucial, with many fishery resources, migratory bird flyways, and park and wildlife protection areas. For years, Federal, state and local governments have implemented pollution control programs under the Clean Water Act. These programs have greatly reduced pollution of the Estuary from point sources, including treated wastes from sewage treatment plants and other permitted discharges such as industrial outfalls, that have reduced many sources of pollution to the Estuary. However, the population of the region outside of Philadelphia is growing rapidly, including housing, shopping centers, and commerce and industry in general. Projections show that NPS and other minor pollution sources accompanying this growth will inevitably degrade the water quality of the Estuary and spread pollution-generating activities along its banks. Fortunately, the situation is not yet out of control; but the added pollution from new development and redevelopment must be limited.



The Delaware Estuary "Demonstration Study" tested a strategy for local government control of NPS pollution from new development and redevelopment, primarily through improved land use planning and site development review authorities. The program proposes a simple matrix approach which will lead to one of four alternative conclusions for proposed new development or redevelopment.

- the facility is environmentally unacceptable and cannot be sited as proposed;
- the facility will require especially stringent (special) BMPs if it is to be allowed;
- the facility will require standard BMPs;
- the facility will require no controls designed to protect the Delaware Estuary.

This program includes two major components. First, narrow buffer strips would be used along river banks, wetlands and tributaries, within which very restrained development would be permitted. Second, new development and redevelopment projects would be required to be built with specific BMPs (consisting of devices to temporarily store stormwater runoff until the greater part of the particulate pollution it contains can be settled-out) or equivalent alternatives.

Buffer Strips

A high priority for protecting the Delaware Estuary and its associated wildlife habitat is buffer strips applied to areas immediately adjacent to the Estuary and tributaries. If such buffer strips around the shores are retained in natural vegetation, they will remove sediment and both

dissolved and particulate pollution from runoff. The reservation of such buffers reduces activities along the water's edge which might generate pollution, thereby preserving the natural habitat. Such buffers have a long, successful history and have been recommended and/or adopted in a variety of forms.

A distinction is necessary between buffer protection of wetlands and of other shorelines. Wetlands in the Delaware Estuary are extensive. Tidal wetlands are protected against encroachment by Federal law, and control is exercised by both state and Federal agencies. This control consists of a permitting process which may allow some construction on wetlands to proceed. In New Jersey, a 300-foot buffer strip is required by the state for tidal wetlands, as well as a buffer strip for non-tidal wetlands, which extends between 75 to 150 feet from exceptional value wetlands and 25 to 50 feet from intermediate value wetlands. Such buffers preferably include filter strips of vegetation.

The Delaware Estuary Program proposed buffer strip protection for the Estuary to the extent practicable. The intention is to establish a minimum width of buffer implementable in all three states which could be increased in appropriate situations. Buffers would be essentially site plan set-backs for any new development or major redevelopment, subject to exceptions for water-related activities, variances, rights-of-way, etc. Site regrading would require a properly designed, unfertilized grass strip buffer at least 20 feet wide. Minimum buffer widths were recommended including wetlands (50 feet); other shores (100 feet); large tributaries (100 feet); and small tributaries (50 feet). These correspond to the widths of buffers proposed by EPA under the Section 6217 program for Coastal NPS Pollution Control, except that EPA recommended 200-foot width buffers for large tributaries.

BMPs FOR REDUCING NPS POLLUTION

- Detention Basins
- Wet Ponds
- Stormwater Wetlands
- Infiltration Trenches & Basins
- Porous Pavement
- Sand Filters
- Grassed Swales
- Filter Strips

Best Management Practices (BMPs)

The BMP program recommended for reducing runoff pollution from development is technology-based. It is intended to make some improvement in reducing existing pollution of the Estuary and to prevent the further deterioration in water quality which, without this program, will inevitably occur. The program was designed mainly to minimize pollution to the Estuary itself, but within the areas where action is taken, it will help achieve other environmental objectives (i.e., local stream protection). First, it must be determined whether a given type of development will be permitted to be built in a given location; then guidance is used to identify the required BMPs (either "standard", the minimum protection, or "special," i.e., more stringent) to reduce the extent of pollution or to lessen its impact upon the receiving waters.

Analysts of stormwater management generally agree that regional or watershed planning will provide better results than piecemeal, site-by-site development which provides for each development site as it is built. However, the latter is the one generally used. In this approach, the developer, as a condition for obtaining approval of his proposal, is required to assume responsibility for remedial works designed to counter the accumulated flood flows and added stormwater pollution which will result from the construction. Better results can be achieved by

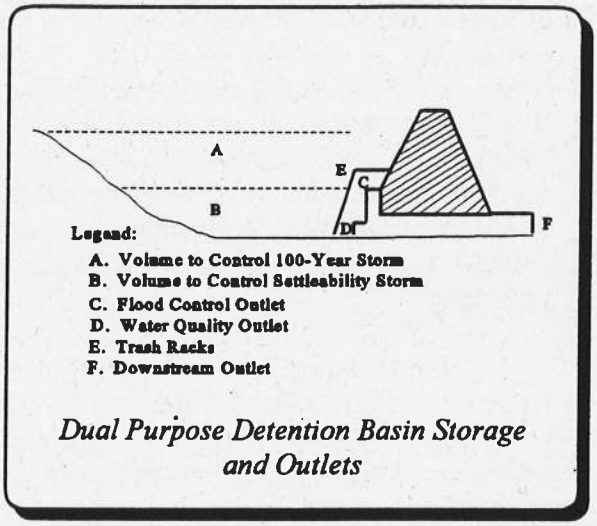
means of an integrated plan for the watershed as a whole; but this requires more planning arrangements, funding mechanisms and a sharing of responsibility. From the point of view of local government implementation, a site-by-site approach can provide an adequate answer.

In planning a stormwater management system, the necessary water quality controls may be imposed at site, through detention basins, or by a combination of both. For the detention facilities alone, the requirements are well-defined, whether a standard or a special degree of protection is required. Infiltration facilities which allow percolation of the water quality design storm are acceptable in place of detention basins, when not precluded by groundwater quality restrictions. Either standard or special NPS control at-site can be provided by site controls, such as filter strips and swales; but efficiency of removal depends upon design details. In such cases, an engineering analysis must be made for each site to assure that it will actually function as intended. The preventive aspects of site controls such as filter strips, roof drains, etc. may be combined with remedial work such as stormwater detention facilities so that the preventive aspects might justify reducing the detention requirement from "special" to "standard" or might compensate for a part of the site not draining into the detention facilities.

Detention Basins

In stormwater management, water quality control is usually obtained through dual-purpose detention basins designed first to reduce flood damages downstream and second, to reduce nonpoint source pollution from storm runoff. The underlying principle of dual-purpose detention (for either standard or special BMPs) is that the detention of flood flows for reduction of damages downstream and the retardation of stormwater for settlement of particulates can advantageously be combined in the same structure.

Storage of the runoff from storms of up to one year frequency, for example, (or 1¼ inches rainfall in two hours) with slow release over periods of 18 to 36 hours, in either dry (standard) or wet ponds (special, with infiltration), can reduce total contaminants by well over half, including lead, hydrocarbons and total suspended sediment, and can achieve somewhat lower, but still substantial, removal efficiencies for phosphates, bacteria and other contaminants. The following diagram shows the essential elements of a dual-purpose detention basin.



Dual Purpose Detention Basin Storage and Outlets

There are a few locations where, for local reasons, control of floods is not warranted, but NPS control is still necessary. In such cases, much smaller single-purpose water quality detention basins can be constructed, retaining only the flows from storms of lesser frequency (see B above).

It must be borne in mind that standard and special best management practices using detention basins relate to ordinary development with normal erosion control, and they are not sufficient for the more polluted kinds of industrial runoff. In such cases, source controls or treatment may also be needed. Recommended practices for particulate removal are not, of course, applicable to removal of nitrates.

Infiltration Trenches and Basins

A higher degree of removal of particulates can be provided by infiltration facilities. These are special BMPs with detention basins or wet ponds, a larger capacity, and with slow release over a 48-hour or longer period. Infiltration facilities may be of a variety of configurations, infiltration basins being the most common. Unless dealing with clear runoff (i.e., rooftops), they must incorporate means to maintain infiltration capacity. This can be done by a two-stage facility in which the sediment is allowed to precipitate out in a non-filtering first stage or by arrangements allowing infiltration into relatively steep sides of the basin. Alternatively, special arrangements can be made for periodic maintenance by cleaning out the bottom of the basins, but such maintenance must be assured on a permanent basis. Dry wells and infiltration trenches should only be used for runoff lacking sediment, such as rooftop drainage or thoroughly settled discharge from a retention facility.

Infiltration basins are excellent from the viewpoint of instream water quality, since no sediments are released downstream. However, experience with infiltration basins in coastal areas has not been very favorable. In some states, they have been considered to have relatively low reliability and high maintenance costs. Difficulty has been encountered in New Jersey coastal areas. In some cases, suitable soils are not found, and unless normal groundwater is at least four feet below the bottom of the basin, infiltration action is apt to be suspended due to mounding, resulting in insect problems and impaired retention. They are not effective in removing soluble substances, especially nitrates, but can be used as a special best management practice for NPS pollution in general.

Site Controls

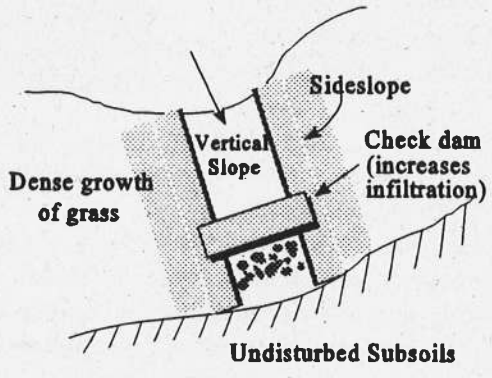
Site controls are generally those controls that attempt to reduce runoff rates and volume at or near the point where the rainfall hits the ground surface. They have the effect of reducing NPS pollution in runoff and are introduced through land use planning processes. The following types of site controls are common:

- Minimization of directly connected impervious area
- Swales and filter strips
- Porous pavement and paving blocks
- Infiltration devices, such as trenches and basins

Directly connected impervious area is the impermeable area that drains directly to a drainage system, such as a paved gutter, improved ditch, or pipe. To minimize this areas is an effective method of runoff quality control, because it delays the concentration of flows into the drainage system and maximizes the opportunity for rainfall to infiltrate, or sediment to settle-out, at or near the point at which it strikes the ground.

Swales, or grassed waterways, and filter strips are among the oldest stormwater control measures, having been used along streets and highways for many years. A swale is a shallow trench which has the following characteristics:

- the side slopes are flatter than three feet horizontally to one foot vertically;



Grassed Swale with Check Dam

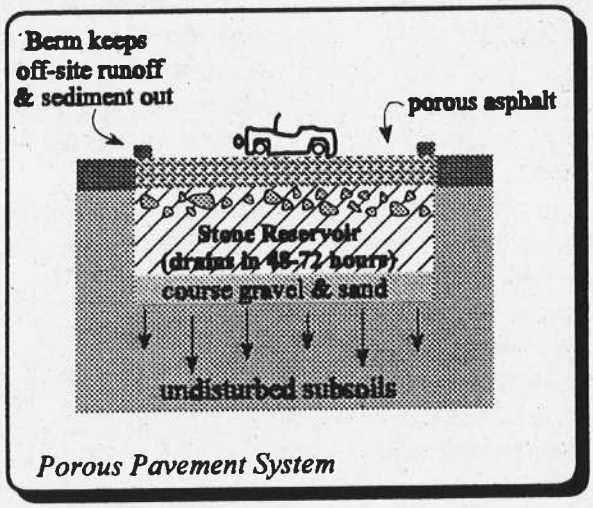
- it contains contiguous areas of standing or flowing water only following rainfall;

- it is planted with or contains vegetation suitable for soil stabilization, stormwater treatment, and nutrient uptake.

A filter strip is simply a strip of land of mild slope, usually 20 feet or more in width, across which stormwater from a street, parking lot, rooftop, etc., flows before entering adjacent receiving waters. Even distribution of flow is essential.

For small storms, both swales and filter strips remove pollutants from stormwater by first slowing the water and settling or filtering out solids as the water travels over the grassed area and secondly, allowing infiltration into the underlying soil. In general, the higher the flow rate, the lower the efficiency. Thus, low velocity and shallow depth are key design criteria.

Porous pavement and paving blocks can be used to provide infiltration on streets and in parking areas. However, porous pavement is only feasible on sites with permeable soils, fairly flat slopes, and relatively deep water-table and bedrock levels. In addition, batching and placement of the material requires special expertise in order to avoid clogging, which is a principal concern associated with porous pavement. Consideration should be given to the structural integrity of porous pavement under winter freeze-thaw conditions.



Porous Pavement System

BENEFITS OF NPS CONTROL

The voluntary initiation of this program by municipalities is dependent upon a perception by the community that the local benefits are sufficient to make it worthwhile.

Streams and other water bodies, if clean, are highly valued by everyone. Stream-side paths and parks are featured in many municipalities. In some areas, stream corridors are reserved for public use. However, close examination of urban streams usually reveals an environmentally degraded condition. Even when there are no major commercial or industrial facilities, the cumulative effects of developments are adverse. Street runoff is inherently polluted, largely with hydrocarbons and metals, but also with other materials which fall, spill or are thrown onto the pavement. Shopping centers and gas stations have very polluted runoff, even when kept apparently clean. Streams in fully developed areas are usually lacking in aquatic life, lack normal insect larvae and instead are inhabited by tubificid worms and blue-green algae, both indicators of pollution. If these streams flow into ponds or lakes, the receiving waters are clogged with sediment and overgrown with mats of algae and weeds due to eutrophication. Once a stream has become polluted in this manner, it is difficult if not impracticable, to clean it. These are not ideal environments for recreation and relaxation by the area's residents. Also, tourism is adversely impacted by degraded streams and lakes that offer little, if any, fishing, boating, swimming or other water-based recreation activities.

Many land developers set aside areas for ponds with the aim of enhancing the value of adjacent lots. Pollution in waterways affects the property value of surrounding properties. In New Jersey's Barnegat Bay area, study findings documented 15-20 percent reduction in nearby property values from polluted water. When stream walkways and bike paths are integrated with stream improvement programs, benefits to the

community include the (1) aesthetics, (2) enjoyment of the area's resources by residents and users, and (3) retail business associated with related needs including recreation equipment purchases (e.g., bicycles).

BENEFITS OF NPS POLLUTION CONTROL

- Protect sensitive environmental habitats and wildlife
- Protect public health
- Protect nearby property values
- Create aesthetic opportunities for recreation waling and bike paths
- Reduce downstream flooding

In wetland areas, marshes are valuable habitats for living resources, but they also produce often- unrecognized economic benefits. Marshes provide treatment for runoff wastes that would otherwise require expensive advanced treatment of wastewater by municipal treatment plants to achieve the same level of water quality. Without these marshes, wastes would go untreated into the Estuary and would further degrade water quality. The result would be more stringent and expensive treatment for municipal wastes to achieve the same level of water quality. Wetlands also provide buffers against storms and flooding and protect some properties from flood damage and erosion.[2]

An EPA survey of the Red Clay Creek, a tributary of the Christina River in Pennsylvania and Delaware, indicates that the detrimental effects of NPS pollution found elsewhere in heavily developed areas also exists in this region. The analysis distinguished between effects of the local sewage treatment plant and nonpoint pollution sources.

What most people do not realize is that this pollution in urban streams is mainly due to the current population and development. Although some pollution is due to illegal activities, numerous sources show that runoff pollution inevitably accompanies growth. Ordinary single-family housing produces considerably more runoff pollution than undeveloped land; but multiple-family residences produce much more, and commercial and industrial development, although more variable, generally produce several times as much runoff pollution. To the casual observer, the building of a gas station, a shopping center and a few stores in a sparsely settled neighborhood represents only normal economic growth A more complete view is that it also adds an increment of nonpoint source pollution, which, when development is complete, will contribute to the degradation of the pleasant streams and ponds of the neighborhood.

The imposition of BMP controls on runoff pollution by this program will not entirely eliminate the increase in nonpoint source pollution caused by developments, but it will greatly reduce it. Local officials should realize that the streams and ponds in their natural state have great environmental value, and that the imposition of BMP controls and buffer set-backs on new development is a small price to pay to retain this advantage for current and future generations.

SELECTION OF BMPS

The proposed approach is designed to determine the level of NPS pollution control that is needed based on the degree of harmfulness of the proposed development. A harmfulness index of stormwater runoff, classified by origin, may be summarized in the table that follows.

Unless demonstrated to be otherwise in specific situations, classifications 1-3 are in descending order of pollutant loading, the most intense being first. Of course, in cluster housing, the pollutant loading per acre for dense development is compensated for by reduced

[2] A more detailed explanation of wetland functions and economic values can be found in Assessment of Selected Delaware Estuary Economic and Natural Resource Values, The Greeley-Polhemus Group, Inc., January 1993.

Class of Harmfulness	
1	From industrial and waste management sources, multiple-family housing, commercial facilities such as gas stations and shopping centers, highways, urban areas, and single-family housing with lot sizes smaller than one-third acre per housing unit
2	From single-family housing developments, with lot size one-third acre or larger per housing unit, and runoff from lesser roads
3	Undeveloped land or unfertilized vegetation

acreage developed. In addition, there are other categories of NPS pollution which are highly variable in their pollutant loading, including agriculture and road salts. Within the category of agricultural use, certain land uses such as fertilizer storage and cattle feed lots probably deserve to be treated as Class 1, whereas normal pasture or wood lots are probably Class 3.

Selection of BMPs can be based on harmfulness of pollutants and area sensitivity, as shown here.

The classification of industries and waste management sources depends upon the circumstances. Some sources have such polluted runoff that even a classification of "1" is not adequate. In such cases, the ordinary BMPs for urban runoff will be insufficient. Source controls and/or treatment may also be required.

Class of Harmfulness	General Use	Areas of Special Sensitivity
Class 1	Special BMPs	Generally not allowed
Class 2	Standard BMPs	Special BMPs (if allowed)
Class 3	None	None

It is easy to point out that there are some special cases in which harmfulness varies somewhat depending upon the exact nature of the environment downstream. Nevertheless, for general classification purposes, the harmfulness index provides a useful guide to the environmental effects of any proposed land use when considered with respect to environmental sensitivity of the area affected downstream.

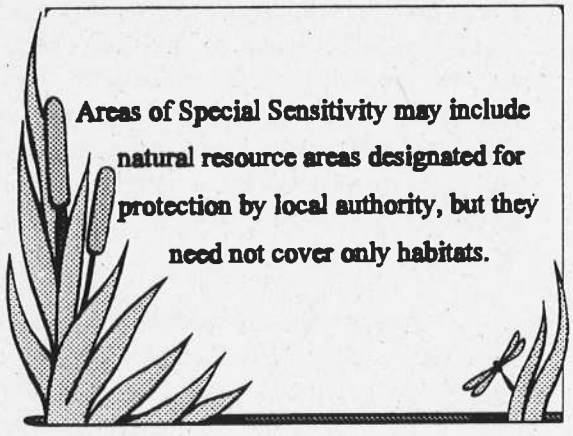
Most sensitive areas, such as wetlands and wildlife refuges, have building restrictions imposed by law. Where exceptions were allowed, special BMPs would be required (for example, if facilities are allowed to be built along the shores of the Estuary). In general, the protection required depends not only upon the location of a facility, but also whether its runoff flows into a sensitive area. Areas of special sensitivity may include natural resource areas designated for protection by local authority, but they need not cover only habitats. If a community has a plan or passes an ordinance establishing a local park or playground, or proposes protection of local resources, that action should be sufficient to require the appropriate level of BMPs for future development projects.

In the interest of protecting the Estuary, the BMP decision need require only the level of NPS protection to be determined, either standard or special. Considerable flexibility should be

allowed as to the specific means by which a given level of protection will be obtained, and other local concerns should be considered.

This program can be implemented as a voluntary program by concerned municipalities for control of private sector development and construction by the municipalities themselves, the counties and the Commonwealth. A similar program which requires removal of particulate pollution from NPS runoff from new development through the application of BMPs is now mandatory in Delaware. In New Jersey, while not mandatory throughout the state, a control program had been applied by over 60 municipalities as early as 1980.

The ideas in this program can be implemented locally with the guidance that is provided here. By adopting improved local ordinances, NPS pollution can be controlled from new development that will provide local as well as Estuary-wide environmental and economic benefits. Based on considerable experience in using BMPs in other states, this program will not be unduly burdensome to builders, and it will not impose any new burden on facilities already in existence.



PLANNING AND THE COMMUNITY'S ROLE

Once a municipality has decided to undertake a nonpoint source pollution control program on a voluntary basis, a number of matters must be investigated and preliminary steps taken before a final decision is made and implementation can begin. Because local circumstances vary widely, the program must be fully defined and steps taken to ensure full understanding before formal action is initiated. This guidance should be used to develop a program to meet the specific needs of the community. The following six-step procedure provides ideas on how to proceed. The intent is to finally pass a local ordinance based on the examples provided in this guide that will define the specific NPS control requirements.

1 Step One: Getting Started - Deciding How Far to Go

Municipalities have the legal authority to control new development and set standards that relate to public health, safety and environmental quality. Municipalities control land use through comprehensive plans, zoning and site development review procedures. In order to achieve NPS water quality protection for local streams and ultimately the Delaware Estuary, a local ordinance will be required that can be either (1) a modified version of existing subdivision and land development ordinance, or (2) a specific single-purpose ordinance directed at control of NPS pollutions or (3) possibly some other arrangement that is compatible with other existing community land use management ordinances or plans. Two examples of ordinances that could be used are provided in the appendix.

Because implementing environmental protection measures implies benefits and costs, the process of developing a community strategy should involve all of the players. Ultimately, the plan will require developers to implement new design standards and management requirements

STEP 1: GETTING STARTED

- Discuss the need for local NPS pollution control
- Consider the values of your local streams
- Do a streamwalk to see why controls are needed
- Set-up a Coordinating/Advisory Committee
- Conduct a workshop
- Discuss ideas with Soil Conservation Districts and County Planners
- Make a decision to proceed

such as buffer strips and BMPs. These requirements will impose costs on the development process; the results of better environmental planning will benefit the community.

Before development can commence, the developer will be required to make a plan and submit it for approval. The planning process is intended to permit interaction and to be flexible in terms of the design alternatives that can be utilized. The example ordinances provide ideas on how requirements and procedures would be structured including need for inspections, compliance, appeal, fees, etc.

The additional costs to developers who already are involved in planning for drainage, and landscaping may be minor. However, there are many benefits for the developer. This process establishes an environmental ethic that provides assurances of protection of the environment and property values of new home-buyers and sets a rationale that will apply to all developers.

As a result, the planning process for developing an effective municipal NPS control strategy will require an open discussion of the need for environmental protection and an implementing ordinance. A coordinating committee should be established that includes a balance of environmental and developer interests, and municipal officials.

In communities where an environmental commission exists, it should have input. However, in some communities, the environmental commission may represent a minority position and active leadership by the commission might alienate other groups. So, care must be taken, and a balanced group is essential to success. Committee members should be open to innovative approaches and have time to devote to the problem.

A workshop should be conducted to explain the full significance of nonpoint source pollution and the technical aspects of the BMPs recommended. This should be coordinated with the local Soil Conservation District and County Conservation District, since these officials of that agency have related responsibilities and expertise. It would also be useful to have persons present who are familiar with the process as applied in other states. The workshop should review existing community ordinances, county programs and state assistance programs for a strategy that takes advantage of existing programs and available resources.

Stream walks are recommended to inspect waterways in their natural condition as well as to witness examples of degraded urban streams. A small group including community leaders and informed persons can be invaluable in setting the stage for needed controls. An example of a degraded urban stream should be witnessed, and walks should be taken when weather is moderate

and the water is not too high. A stream walk in a developed area is usually a revealing experience, illuminating the extent of dumping of trash and waste oil in the streams; showing pipes carrying apparently polluted flows; noticing the odors; and, if someone with requisite expertise is present, identifying the damage to fish and wildlife. Although water quality testing during storm events will usually not be feasible, in most urban areas visual indications are sufficient to indicate stream degradation.

Based on these efforts, the coordinating committee should make recommendations for community action.

STEP 2: MUNICIPAL AND COUNTY ROLES

- Obtain County Planning Department Information on watersheds, growth projections, sewer and water plans, sensitive areas, etc.
- Review Comprehensive plans, zoning, site development review procedures, etc.
- Work with the County to develop a strategy
- Is stormwater management planned? A joint approach is best!
- Get the public involved...discuss the ideas.

Step Two: Municipal and County Roles

Stormwater management and nonpoint source pollution control have long been a concern of state and Federal governments including the Clean Water Act, the Coastal Zone Act Reauthorization Amendments of 1990, and the Pennsylvania Stormwater Management Act of 1978. Success of these programs depends on a regional/watershed review of resources management and municipal decision-making to combine management measures, land use planning, and local implementation.

The focus of this strategy is on local implementation at the municipal and county-levels, which will require an interaction with county planning officials to provide this regional or watershed perspective, knowledge of growth and to assist in the planning and technical aspects of a successful municipal program.

To guide and facilitate the NPS control program, a review and update of the applicable comprehensive plan will usually be necessary.

This should include provisions to minimize future growth of pollution-causing activities adjacent to streams and sensitive areas. Planned extensions of municipal services such as water and sewers should also be reviewed in order to avoid creating conditions favorable to future development in areas which would be better left undeveloped.

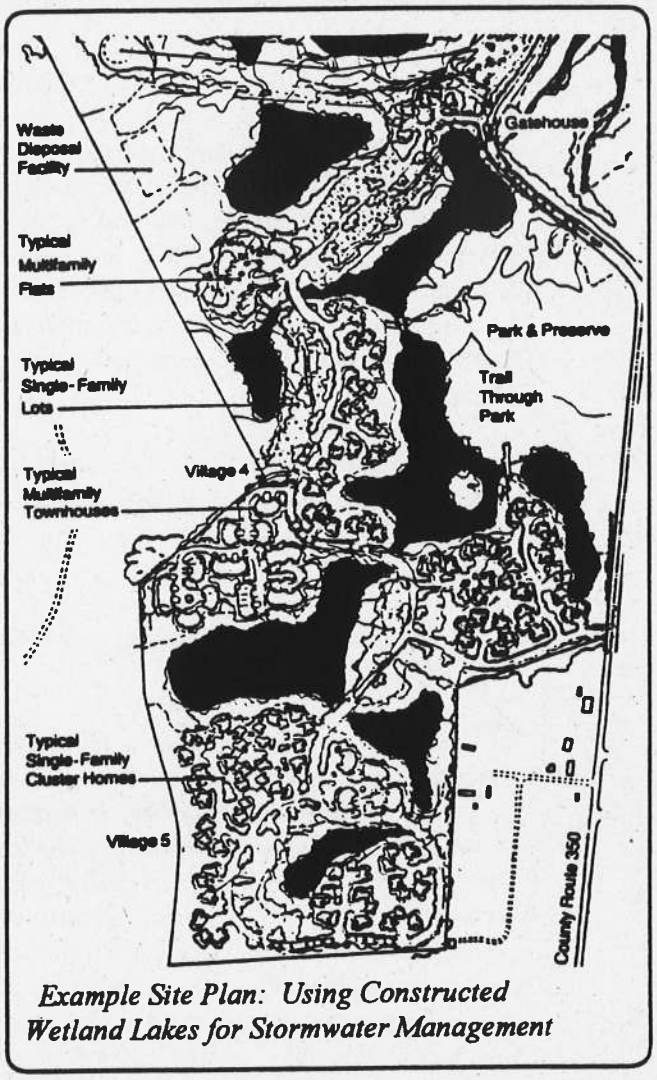
Land use decisions tend to be far-reaching. Each such decision must weigh a landowner's interest (which is usually obvious) against the future of the municipality and the region (which seems, by comparison, remote). The strategy outlined here requires an increased priority to preventing future NPS pollution as compared to the immediate cash interest of the landowner. A continued and consistent public interest will be necessary for full effectiveness.

Primarily directed at controlling accelerated runoff (flooding) due to development, the Pennsylvania Stormwater Management Act of 1978 has no requirements for improving the water quality of the runoff itself. Implementation of stormwater management by municipalities is encouraged by guidelines and model ordinances, but is limited by the availability of funds. As a vehicle for implementing NPS pollution controls, municipalities' powers over zoning are sufficient to control the location of pollution-causing

development within certain areas. Also, the requirement that new development or redevelopment should incorporate BMPs is not specifically mentioned in the Municipalities Planning Code, but is implied in Section 603 (c)(2), under provisions for conditional uses, provided that expressed standards and criteria are included in the zoning ordinance. A review of the local ordinances will be necessary to assure that the BMPs are included in the appropriate form. General consistency of the program to the county comprehensive plan will also have to be assured.

The local powers of land use control discussed above are stated independently of control over agriculture. However, coordination with Conservation Districts and other agricultural agencies is essential. In many areas, agricultural activities are a major source of runoff pollution and technicians and experts involved in soil erosion control activities are frequently the best source of advice concerning the various alternative BMPs that may be accepted as equivalent measures of nonpoint source pollution control.

For each municipality, it must also be determined whether implementation of stormwater management plans in portions of the municipality is underway, or is imminent. From an engineering viewpoint, it is relatively inexpensive to add water quality provisions to the detention facilities provided to reduce flood impacts. The Delaware Estuary Program proposes the addition of water quality provisions to plans for stormwater management; and, where there is no stormwater management, the implementation of BMPs for water quality detention provisions for development or redevelopment.



Example Site Plan: Using Constructed Wetland Lakes for Stormwater Management

3 Step Three: Planning and Selection of BMPs

Deciding what BMP methods will be used to control NPS pollution is the most technical part of the planning process. Buffer strips (a type of BMP) are widely used to protect streams and wetland areas. They are strips of land bordering the waterbodies that are retained in their natural vegetation. They provide habitat for wildlife and will remove sediment and both dissolved and particulate pollution from runoff.

A protective buffer strip should be planned that would be properly designed, graded and unfertilized. Essentially, this area would constitute site plan set-back for any new developments or major redevelopments. Minimum buffer widths are recommended:

- wetlands 50 feet
- other shores 100 feet

- large tributaries 100 feet
- small tributaries 50 feet

Currently, programs are evolving to protect the Delaware Estuary, local streams and wetlands. It would be a good idea to check with the Pennsylvania Department of Environmental Resources to verify recommended set-backs.

Selection of "standard" and "special" BMPs will be required for all new development and any major redevelopments. This selection process will be specific for each new development or redevelopment plan that is offered by developers and will depend on factors that affect the "class of harmfulness" of the land use, the proposed location of the development site development characteristics, and the sensitivity of the surrounding environment.

How dangerous to the environment is the proposed development? What is the proximity of the development to the protected waterbody? And, how much additional surface water pollution loading will the development contribute to the area? These are the key questions that a residential, commercial or industrial developer, including developers of public projects, such as roads, will have to address.

The community's strategy will be to give developers sufficient guidance that can be applied in a flexible manner to allow an integrated solution to site lay-out, density of development, water quality, stormwater control, landscaping, impervious cover, etc. This will allow the developer to meet the community's needs (to protect the water resources and natural habitats) in the most cost-effective way.

The concepts of "class of harmfulness" and selection of "standard" and "special" BMPs, suggest the flexibility that is available in proposing these stream protection criteria. Some types of land use are potentially harmful to the environment because their runoff is characteristically polluted. Gas stations are an example, as is runoff from highways. Density of development generally is a significant factor in defining the degree of harmfulness. Guidance should propose that these types of land use would be excluded from locations that would impact surface water quality.

SELECTION OF BMPs

- Define use of buffer strips
- Define classes of harmfulness
- Develop procedure for applying "standard" and "special" BMPs
- Establish criteria for design and use of BMPs.
- Plan for needed inspections and maintenance

Potentially polluting land uses, such as these, may be designated to areas more remote from surface waters. Although all parts of the region within a watershed contributes to some extent to NPS pollution, the more remote areas contribute very little. As a result, "standard" and "special" BMPs can be used in a flexible manner with locational decisions to best control site NPS pollution. The degree of use of impervious cover is also a factor that needs to be considered. Export of pollutants from a site will increase as the degree of impervious cover increases.

Some Examples of Annual Storm Pollutant Export for Selected Values of Impervious Cover are presented here to show the effect of impervious surface for various land use categories. These examples show that NPS pollution in pounds per acre per year increases rapidly as impervious cover increases.

Once the details of the community's strategy to protect its streams and related natural habitats is clear, the ideas should be presented to the public.

EXAMPLES OF ANNUAL STORM (NPS POLLUTION) EXPORT FOR SELECTED VALUES OF IMPERVIOUS COVER[1]

Land Use[2]	Site Impervious	Total Phosphorus[3]	Total Nitrogen	BOD 5-DAY	Extractable Zinc	Extractable Lead
			Pounds/Acre/Year			
Rural Residential	0	0.11	0.8	2.1	0.02	0.01
	5	0.20	1.6	4.0	0.03	0.01
	10	0.30	2.3	5.8	0.04	0.02
Large Lot Single Family	10	0.30	2.3	5.8	0.04	0.02
	15	0.39	3.0	7.7	0.06	0.03
	20	0.49	3.8	9.6	0.07	0.04
Medium Density Single Family	20	0.49	3.8	9.6	0.07	0.04
	25	0.58	4.5	11.4	0.08	0.05
	30	0.68	5.2	13.3	0.10	0.05
	35	0.77	6.0	15.2	0.11	0.06
Townhouse	35	0.77	6.0	15.2	0.11	0.06
	40	0.87	6.7	17.1	0.12	0.07
	45	0.97	7.4	18.9	0.14	0.07
	50	1.06	8.2	20.8	0.15	0.08
Garden Apartment	50	1.06	8.2	20.8	0.15	0.08
	55	1.16	8.4	22.7	0.16	0.09
	60	1.25	9.6	24.6	0.18	0.09
High Rise Light Commercial/ Industrial	60	1.26	9.6	24.6	0.18	0.09
	65	1.35	10.4	26.4	0.19	0.10
	70	1.44	11.1	28.3	0.21	0.10
	75	1.54	11.8	30.2	0.22	0.11
	80	1.63	12.6	32.0	0.23	0.11
Heavy Commercial Shopping Center	80	1.63	12.6	32.0	0.23	0.11
	85	1.73	13.3	33.9	0.25	0.12
	90	1.82	14.0	35.8	0.26	0.13
	95	1.92	14.8	37.7	0.27	0.13
	100	2.00	15.5	39.2	0.28	0.14

1. P= 40 inches; Pj = 0.9, RV = 0.05 = 0.009 (I); C= Suburban values; A= 1 acre, based on the "Simple Method."

2. Rural Residential: 0.25 - 0.50; Dwelling Units (DU)/acre; Large Lot Single Family: 1.0 - 1.5 DUs/acre; Medium Density Single Family: 2 - 10 DUs/acre; Townhouse and Garden Apartment 10 - 20 DUs/acre

3. These values are for new development sites only. For older urban areas, central business districts, sites with highways, or areas outside of the middle Atlantic Region, a more appropriate "C" value would be used.

Source: Metropolitan Council of Governments, "Controlling Urban Runoff," July 1987.

Step Four: Preparing an Ordinance

Ordinances take longer to prepare and adopt than is usually expected. In this case, administrative procedures must be changed and funding arrangements made. The coordinating committee should exercise leadership in steering the program through the implementation process. Changes required will vary with the provisions already in effect in the particular municipality, but will generally include the comprehensive plan, zoning ordinance, subdivision and land development ordinance, and any ordinance that may cover stormwater management and runoff control.

The model ordinances presented in Appendices 1 and 2 are adapted from the Pennsylvania Department of Environmental Resources Stormwater Management Guidelines & Model Ordinances. They are intended to aid Pennsylvania municipalities in implementing a nonpoint source (NPS) pollution control strategy. Diverse needs, circumstances and requirements of the approximately 2,600 Pennsylvania municipalities mean that no one model ordinance could possibly cover all situations. A model ordinance addressing NPS control is presented as one option. Also, model ordinances concerning NPS pollution control can be implemented as amendments to existing zoning, stormwater management, or subdivision and land development ordinances. In addition, an ordinance can be enacted as part of an ordinance package, with sections adopted by reference as amendments to other ordinances.

While the model ordinances presented can be of considerable help to local municipalities in constructing their own ordinances, modifications will be necessary to reflect the character and unique situation of the municipality as well as the degree of development present. These models are for guidance only. Municipalities should contact the County Planning Commission and the County Conservation District for advice as to specific provisions necessary in their ordinances.

The ordinance and supporting subdivision review procedures should be reviewed with the coordinating committee and then presented to the public.

Step Five: Implementation

Once an ordinance and related procedures have been finalized and adopted by the community, the community will begin administering the NPS pollution control program. The ordinance will specify the procedures, and the community offices that will be responsible for implementation.

If the community is prepared in advance, the process of implementation can be easily administered. The most important area of concern will include guidance for developers. The community should make compliance for them a routine procedure.

Handouts, brochures, and educational materials should be available for the developers that describe the purpose and procedures of the program as well as the planning and engineering, and methods that are acceptable to the community and the Pennsylvania Department of Environmental Resources. Workshops could be used to educate developers and property owners of changes in the community's Comprehensive Plan, the technical requirements, and the administrative procedures.

If the community attempts to make control of NPS pollution a logical step in the existing review procedures for new development or redevelopment, implementation will work smoothly and will impose minimal costs on developers. Prior planning and preparation will be essential to a successful program.

6 Step Six: Sources of Financing and Other Assistance

Municipalities wishing to minimize environmental degradation of their community by adopting a voluntary program do not have to act alone. The Commonwealth of Pennsylvania offers various programs and services to municipalities, which could support them in implementing a nonpoint source pollution control strategy. These programs are offered through the Department of Community Affairs (DCA) as well as the Department of Environmental Resources, and can be separated into programs (grants, loans, etc.) and services (technical, management, planning, etc). These sources of funds can be utilized for acquiring sensitive areas and open space to prevent development and consequent NPS pollution or for services focused on planning and management to control development and NPS pollution in a local community. Fully exploring these possibilities during the planning phase may minimize costs and impacts within the municipality.

The Department of Community Affairs offers several funding sources to municipalities that voluntarily take action to reduce NPS pollution. Strengthening the comprehensive planning process throughout Pennsylvania is an objective of the State Planning Assistance Grant (SPAG) Program. It encourages effective, local activity to plan municipal growth and hopes to further the mission of a sound, comprehensive planning process in relation to municipal management and decision-making. Aimed primarily at communities preparing their first comprehensive plans, the program provides an opportunity for municipal leaders to deal with the problems they face and take the important steps in developing strategies to resolve them, especially in the areas of community conservation and economic development. Direct grants to municipalities are provided through this program that supports comprehensive community development planning activities consistent with state and Federal development objectives. Special studies covered by the program include growth management review and protecting prime agricultural land from development pressures.

SOURCES OF ASSISTANCE

- Pennsylvania State Planning Assistance Grants (Financial)
- Pennsylvania Recreational Improvement and Rehabilitation Act (Financial)
- Pennsylvania Land and Water Conservation Fund (Financial)
- Pennsylvania Department of Community Affairs (Planning Assistance)
- Pennsylvania Department of Environmental Resources (NPS, Stormwater Management, Section 6217 Assistance)
- Delaware Estuary Program (Technical Assistance)
- U.S. Environmental Protection Agency (Philadelphia Regional Office)

In the Recreational Improvement and Rehabilitation Act (RIRA) Program, two of the four types of projects eligible for funding that are relevant to NPS control are Acquisition Projects and Technical Assistance Grant Projects. Acquisition projects involve the purchase of land for public park, recreation or open space areas and can include acquiring land for buffer areas at existing park and recreation sites; preserving critical wildlife habitats, including wetlands; and protecting scenic open space resources. Technical Assistance Grant Projects provide funds for comprehensive studies of park and open space resources and needs, feasibility studies, natural areas inventories, and master site plans. The objective of both of the activities is the support of local economic development by funding projects which promote or complement conservation actions within a community or region.

The Land and Water Conservation Fund (LWCF) Program provides 50 percent matching grants to local governments to undertake two kinds of projects. The first involves acquisition of land and water areas for public outdoor recreation use and open space preservation. Areas may be acquired for preservation of natural, scenic or unique resources such as wetlands, forests and sites of geological or biological significance. The second type of project is concerned with the development and rehabilitation of public parks and outdoor recreation areas and facilities. Support facilities such as roads, parking lots and landscaping improvements are eligible for funds.

In addition to grants and programs, the Pennsylvania DCA offers various services to municipalities that may be used in addressing local NPS pollution concerns. It assists local government officials, planning agencies and zoning hearing boards in planning and managing community development and growth. Typical activities include helping county and local governments with preparation of land use controls, such as zoning ordinances and subdivision regulations; planning procedures and land use issues; and monitoring, reviewing and commenting upon proposed amendments to Pennsylvania's Municipalities Planning Code.

While DCA provides self-help information and technical details, it cannot enact, administer or enforce any land use ordinance. These actions must be taken by local government officials. Zoning and subdivision ordinances may be voluntarily submitted by a municipality for staff review and analysis. Technical assistance is offered to keep the ordinances consistent with state law and current planning practices. Advice is provided on land use issues and technical assistance is available to all levels of local government, including regional or multi-county planning agencies. Through application of evolving land use techniques, conflicts between incompatible land uses are reduced and community values such as protection of environmental or agricultural resources are preserved.

The Municipal Training Division of DCA was established to provide training programs for Pennsylvania municipal, community development and environmental agency officials and employees. The division works with other department bureaus, state and Federal agencies, and community-based organizations to promote effective management and administration at the local level and sound use of Federal and state programs. Training is offered in broad areas of local government structure and operations, community development and environmental protection. In addition to seminars, on-site training is offered to meet the particular needs and problems of specific municipalities and agencies. Support services available include an annual needs survey (to evaluate municipal and community problems), regional community planning workshops (to promote sound community planning), and the Pennsylvania Municipal Planning Education Institute (to provide basic planning instruction to municipal planning commissions).

Other sources of planning and technical assistance are available from the Pennsylvania Department of Environmental Resources, the Delaware Estuary Program, and the U.S. Environmental Protection Agency. These team members are committed to protecting the Delaware Estuary and the local streams that are important to you.

Conclusions

If the planning and preliminary phases have been well conducted, a considerable amount of coordination will already have been initiated with various local officials and a generally favorable public attitude will have been created. There are three basic considerations to bear in mind. First, we want the program to work. It must be planned so as to exercise a real control over runoff pollution from new development and redevelopment. Second, it must be acceptable to the public. Any disadvantage to some individuals must be perceived as less important than benefits

to the municipality. Third, the program must be affordable. Costs imposed on development as well as administrative costs must be kept to a minimum.

A successful program will benefit all.

REFERENCES

Greeley-Polhemus Group, Inc., The. Assessment of Selected Delaware Estuary Economic and Natural Resource Values. January 1993.

Greeley-Polhemus Group, Inc., The. Comparison of Economic, Environmental Trends and Policy: Inland Bays, Delaware, Barnegat Bay New Jersey, and Assawoman Bay, Maryland, Summer 1983.

Greeley-Polhemus Group, Inc., The. Land Use Management and NPS Control for the Delaware Estuary: The Pennsylvania Demonstration Project. November 1993.

Greeley-Polhemus Group, Inc., The. Delaware Estuary Program Land Use Management Inventory and Assessment Report. December 1990.

Pennsylvania Department of Community Affairs. A Resource Directory of Community Affairs Programs and Services. August 1992.

Pennsylvania Department of Community Affairs. Pennsylvania Municipalities Planning Code (Act of 1968, P.L. 805, No. 247 as reenacted and amended), Tenth Edition, May 1991.

Pennsylvania Department of Environmental Resources, Bureau of Land and Water Conservation. Erosion and Sediment Pollution Control Manual (Pennsylvania).

Pennsylvania Department of Environmental Resources, Bureau of Land and Water Conservation. Erosion and Sediment Pollution Control Plan Development Checklist and Worksheets (Pennsylvania).

Pennsylvania Department of Environmental Resources, Bureau of Dams and Waterway Management. Stormwater Management Guidelines & Model Ordinances. May 1985.

Stormwater Management Act. October 4, 1978. PL684, No. 167, 32 PS680 et. seq.

U.S. EPA, Region III. A Survey of the Biological Integrity and Toxicity of Red Clay Creek. December 1991.

APPENDIX 1:

Suggested Amendments to A Subdivision and Land Development Ordinance for Nonpoint Source Pollution Control

Appendix 1:
Suggested Amendments to A Subdivision and Land Development Ordinance for Nonpoint Source Pollution Control

Amendments to Existing Ordinances. An existing Community Subdivision and Land Development Ordinance provides one potential source for protecting local water resources from NPS pollution. The following language has been developed that provides examples of the purpose and technical requirements that can be added to an existing ordinance for controlling new development and redevelopment and thereby reduce NPS pollution. Because local ordinances vary considerably from one community to the next, the following sections address: "purpose", "definitions", "procedures", "preliminary plan requirements", "design criteria", "final plan requirements", "guarantee of improvements", "inspections", and "fees."

ARTICLE I
GENERAL PROVISIONS

A subdivision and land development ordinance will usually contain a section under the general provisions heading which lists the purposes of the ordinance. This section can be amended to include the following purposes which apply to nonpoint source (NPS) pollution control.

SECTION 1.0 PURPOSE

A. To plan and manage polluted runoff in each watershed by regulating subdivisions, land development, and mobile home parks.

B. Utilize and preserve the desirable existing natural ecological systems and environmental attributes of the community.

C. Encourage recharge of groundwaters and their protection from contamination.

D. Maintain the existing flows and quality of streams and water courses in the municipality, Commonwealth and Delaware Estuary.

E. Preserve and restore the environmental and natural resource attributes of the Delaware Estuary.

F. Provide for proper maintenance of permanent stormwater and NPS pollution control structures which are constructed in the municipality.

ARTICLE II
DEFINITIONS

A subdivision and land development ordinance will contain a listing of definitions. The listing should be expanded to include terms pertaining to NPS pollution control such as the following.

Accelerated Erosion. The removal of the surface of the land through the combined action of man's activities and natural processes at a rate greater than would occur because of the natural processes alone.

Best Management Practice. Either a structural or nonstructural requirement imposed in the interest of controlling runoff pollution.

Buffer Strip. A designated reserved area adjacent to streams within which building is restricted and adjacent to which special controls over runoff pollution are imposed in the interest of reducing pollution of the stream or of the Delaware Estuary.

Cistern. An underground reservoir or tank for storing rainwater.

Conservation District. The Conservation District serving _____ County.

Culvert. A pipe, conduit or similar enclosed structure including appurtenant works which carries surface water.

Design Storm. The magnitude of precipitation from a storm event measured in probability of occurrence (e.g., 50-year storm) and duration (e.g., 24-hour), and used in computing stormwater management control systems.

Detention Basin. A basin designed to retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate. A detention basin can be designed to drain completely after a storm event, or it can be designed to contain a permanent pool of water.

Erosion. The removal of soil particles by the action of water, wind, ice, or other geological agents.

Groundwater Recharge. Replenishment of existing natural underground water supplies.

Impervious Surface. A surface which prevents the penetration of water into the ground.

Infiltration Structures. A structure designed to direct runoff into the ground, e.g., french drains, seepage pits, seepage trench.

Municipality. _____ (City, Borough, Township), _____ (County), Pennsylvania.

Peak Discharge. The maximum rate of flow of water at a given point and time resulting from a storm event.

Runoff. That pollution which is carried by runoff from any facility or development.

Sediment. Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by water.

Special Best Management Practices. Practices including more effective provisions than standard practices applied for the control of runoff pollution.

Standard Best Management Practices. Those practices ordinarily applied for the control of runoff pollution. Technical criteria required for standard and special best management practices (BMPs) can be found in Land Use Management and NPS Control for the Delaware Estuary: The Pennsylvania Demonstration Project, The Greeley-Polhemus Group, Inc., 1994.

Stormwater Management Plan. The plan for managing stormwater runoff adopted by _____ _____ County as required by the Act of October 4, 1978, P.L. 864, (Act 167), and known as the "Stormwater Management Act."

Swale. A low-lying stretch of land which gathers or carries surface water runoff.

Watershed. The area from which runoff drains into a designated water course.

ARTICLE III
PREAPPLICATION PROCEDURES

In order for the applicant to prepare the NPS pollution control portion of his subdivision or land development plan, the applicant must first determine the applicable NPS pollution criteria in his/her proposed project area. Some municipalities will have different areas with different sets of NPS pollution control criteria. See Article V of this amendment. Before writing this section of your ordinance, you must have a clear understanding as to what services your county conservation district can provide. A memo of understanding between your municipality and the conservation district can be used to spell out these services.

SECTION 3.0. Prior to preparation of any plan, the applicant is urged to consult the County stormwater management or NPS pollution control plan and the specific criteria contained in Article V of this Ordinance.

SECTION 3.1. Applicants are urged to consult the Conservation District for assistance. The applicant is also urged to submit a sketch plan with a narrative description of these measures.

ARTICLE IV
PRELIMINARY PLAN

Preliminary plan requirements should be amended to include the following items pertaining to NPS pollution control.

SECTION 4.0 PRELIMINARY PLAN REQUIREMENTS

The following information shall be included in the preliminary plan.

A. Runoff calculations for the proposed project.

B. A narrative and pictorial description of proposed stormwater and/or NPS pollution control measures and devices.

C. Maps showing:

1. Current boundaries, all existing and proposed easements, the location of the proposed subdivision, land development, or mobile home park within the designated watershed (consult the stormwater management plan for the watershed boundaries).

2. The location of the municipality with respect to the Delaware Estuary and/or its location on a tributary to the Delaware Estuary.

3. The one hundred (100) year floodplain.

4. Streams, swales, and drainage patterns (existing and proposed).

5. The location and extent of streamside buffer strips for reducing pollution caused by new development or re-development activities.

6. Stormwater and NPS pollution control measures and devices (temporary and permanent).

7. Areas subject to special deed restrictions affecting stormwater management or NPS pollution control.

8. Locations of drinking water wells and groundwater recharge areas.

9. Contours of existing and proposed development elevations at intervals of two (2) feet. In areas of steep scopes (greater than 15%), 5-foot contour intervals may be used.

ARTICLE V
DESIGN CRITERIA FOR COUNTY-DESIGNATED AREAS

Section 5.0 contains a listing of the different NPS pollution control areas located within the municipality. This is only necessary where the county stormwater management or NPS pollution control plan stipulates different criteria for different areas within the municipality. The municipality may consider different methods of creating these NPS pollution control areas such as:

1. *By reference to the county stormwater management or NPS pollution control plan*

2. *By use of amendments to an existing zoning ordinance*

3. *By the authority contained in Act 167*

In the event that your municipality is faced with this problem, your municipal solicitor should advise you on the most appropriate method. Section 5.1 contains the stormwater management and/or NPS pollution control criteria which are based on the county plan. General and specific criteria are listed by area. Listing of criteria by area is necessary only where the county plan stipulates the need for such areas.

SECTION 5.0 STORMWATER AND/OR NPS POLLUTION CONTROL AREAS

A. The municipality is hereby divided into stormwater and/or NPS pollution control areas which shall be designated as follows:

(Listing of areas)

The location and boundaries of the stormwater and/or NPS pollution control areas are shown on an official map which is available for inspection from the municipal secretary and in the County stormwater management plan.

B. When any proposed subdivision, land development, or mobile home park is located in more than one stormwater or NPS pollution control area, stormwater may not be transferred from an area with stricter management criteria to an area with less strict criteria, unless the need for such a transfer is identified in the county stormwater and/or NPS pollution control plan, the regional water quality management plan, or the state water plan.

SECTION 5.1 DESIGN CRITERIA FOR COUNTY-DESIGNATED AREAS

A. General Criteria

1. The stormwater and/or NPS pollution control plan must consider all the stormwater and/or NPS polluted runoff flowing over the project site.

2. All stormwater and NPS pollution runoff detention controls shall be designed by a person qualified and/or experienced in the design of such structures.

3. The method used in calculating stormwater/NPS pollution runoff shall be the method designated in the County stormwater management or NPS pollution control plan.

B. Specific Criteria

1. Stormwater rate and quality (if specified)

a. _____ Area - (specific criteria)

b. _____ Area - (specific criteria)

c. _____ Area - (specific criteria)

2. Erosion and Sedimentation - All activities shall be conducted in such a way as to minimize accelerated erosion and resulting sedimentation. Measures to control erosion and sedimentation shall at a minimum meet the standards of the _____ County Conservation District and Chapter 102 (Erosion Control) of Title 25, Rules and Regulations of the Pennsylvania Department of Environmental Resources.

C. Delaware Estuary Criteria, NPS Control

In some cases, existing stormwater management or NPS pollution control plans may require provisions for control of runoff pollution which does not meet modern standards. In such cases, consideration should be given to increasing such provisions in order to meet criteria recommended below.

The basic standards for nonpoint source pollution control are as follows. [Some modification of previously existing standards may be adopted if the result is equivalent]. Provisions shall be made by means of best management practice for reduction of particulate pollution in runoff. Standard best management practices, which remove the greater part of particulate pollutions shall be used generally. Facilities which characteristically create a high degree of such pollution, or which are located in or closely adjacent to environmentally sensitive areas, shall be required to provide special best management practices.

ARTICLE VI
FINAL PLAN

Final plan requirements can be amended to include the following items. It is important to insure that some entity be responsible for the maintenance of permanent control facilities. Municipalities can assume this responsibility or can require the applicant to set-up a private arrangement for this purpose. When financial guarantees are being required, it is important to have them reviewed by your municipal solicitor before approval.

SECTION 6.0 FINAL PLAN REQUIREMENTS

A. All information pertaining to NPS pollution control from the preliminary plan along with any changes.

B. All required permits (or letters of intent to issue such permits pending final municipal approval) from the Department of Environmental Resources, Pennsylvania Department of Transportation, Public Utility Commission, or any other agency if appropriate.

C. An accurate survey showing current conditions, boundaries, all deed restrictions, easements and rights-of-way.

D. The ownership and maintenance responsibilities for all stormwater and/or NPS pollution control devices. The identify of the responsible individual, corporation, association, or other specific entity and the specific maintenance responsibility must be detailed.

Where the applicant is proposing the dedication of permanent stormwater or NPS pollution control facilities to the municipality, such request must include:

1. Easements to all facilities.

2. A financial guarantee (acceptable to the municipality) to insure that the control facilities are properly installed and functioning satisfactorily.

ARTICLE VII
GUARANTEE OF IMPROVEMENTS

The financial guarantee section should be amended to include all temporary and permanent stormwater management or NPS pollution control improvements. The applicant should not be released from all of the portions of the guarantee until all improvements or portions thereof are inspected and found to be properly

installed. Your municipal engineer and solicitor should advise your municipality as to when this action should be taken.

ARTICLE VIII
INSPECTION OF NPS POLLUTION CONTROL FACILITIES

The municipality has an obligation to insure that any NPS pollution control measures being required under this ordinance are properly carried-out. The only way that this can be done is through inspection. If adequate provisions for inspection do not already exist in your subdivision and land development ordinances, an appropriate inspection schedule to insure proper installation of the controls should be included.

The applicant should not be released from any guarantee until all controls are inspected and found to be properly installed.

ARTICLE IX
FEES

The fee schedule can be amended to reflect any increased costs resulting from the review of the NPS pollution control portion of the ordinance.

APPENDIX 2:

Model Ordinance for Nonpoint Source Pollution Control

Appendix 2:
Model Ordinance for Nonpoint Source Pollution Control

Comprehensive Single Purpose Ordinance. The following model ordinance has been developed for use by Pennsylvania municipalities as a possible method for controlling nonpoint source (NPS) pollution of local waterbodies and of the Delaware Estuary on streams not adequately covered by county stormwater management or NPS pollution control plans.

The ordinance is designed to regulate the quality of stormwater leaving a parcel of land to provide for the review of stormwater management/NPS pollution control plans, the issuance of land disturbance permits and the collection of fees, and to insure the maintenance of environmentally sound local water resources.

In the event that there is no existing stormwater management ordinance or NPS pollution control plan, two options are open. First, the municipality can take the opportunity to adopt a stormwater management program, incorporating runoff pollution control provisions as described below. Alternatively, the municipality can adopt a single-purpose runoff pollution control ordinance. This is done by following the provisions of this model ordinance, except for omitting the limitation of rate of runoff.

The provisions contained in this model are explained by sections. Emphasis is placed where choices on specific provisions are to be made by the municipality. Any alternatives listed are not to be construed as the only possible alternatives available. **Municipalities must tailor their ordinance to suit their own needs while still meeting overall criteria.** It is suggested that the Conservation District representative and the county planning agency be consulted for assistance in suggesting appropriate provisions for inclusion in the municipal ordinance.

SUGGESTED NONPOINT SOURCE POLLUTION CONTROL ORDINANCE

ARTICLE I
GENERAL PROVISIONS

In constructing an ordinance it is necessary to include an opening section which indicates the purpose and applicability of the ordinance.

SECTION 101. STATEMENT OF FINDINGS

Section 101 is a statement of the findings and the need for control measures.

The governing body of the municipality finds that:

A. Inadequate management of polluted runoff of stormwater resulting from development throughout a watershed increases environmental degradation of local water resources, contributes to erosion and sedimentation, undermines environmental management and efforts to control and maintain adequate water quality in downstream communities, reduces the quantity and quality of groundwater recharge, and threatens public health and safety.

B. A comprehensive program to control runoff pollution, including reasonable regulation of development and activities causing accelerated erosion, is fundamental to the public health, safety and welfare and

the protection of the people of the municipality and all the people of the Commonwealth and the Delaware Estuary area, their resources and the environment.

SECTION 102. PURPOSE

Section 102 is a statement of what is to be accomplished by the ordinance.

The purpose of this Ordinance is to promote the public health, safety and welfare by minimizing the damages described in Section 101(A) of this Ordinance by provisions designed to:

A. Control polluted runoff and erosion and sedimentation problems at their source by regulating activities which cause such problems.

B. Utilize and preserve the desirable existing natural ecological systems and environmental attributes of the community.

C. Encourage recharge and protection from contamination of groundwaters.

D. Maintain the existing flows and quality of streams and water courses in the municipality, Commonwealth and Delaware Estuary.

E. Preserve and restore the environmental and natural resource attributes of the Delaware Estuary.

F. Provide for proper maintenance of permanent stormwater and NPS pollution control structures which are constructed in the municipality.

SECTION 103. STATUTORY AUTHORITY

Section 103 contains the authority enabling your municipality to regulate stormwater management and/or NPS pollution control activities. Consult your solicitor for the appropriate citations.

The municipality is empowered to regulate these activities by the authority of the Act of October 4 1978, P.L. 864 (Act 167), the "Storm Water Management Act" and the **(appropriate municipal code).**

SECTION 104. APPLICABILITY

Section 104 contains a suggested listing of land disturbance activities to be covered by the ordinance. It is very important to list and clearly define what activities you intend to regulate. Individual activities meeting specified criteria may qualify for exemption from plan submission and permitting requirements, as discussed in Section 402 and 502.

The following activities are included within the scope of this ordinance:

A. Land development

B. Subdivision

C. Earthmoving involving _____ or more acres

D. Agricultural operations

E. Construction of new or additional impervious or semi-pervious surfaces (driveways, parking lots, etc.)

F. Construction of new buildings or additions to existing buildings

G. Forest management operations

H. Nursery operations

I. Diversion or piping of any natural or man-made stream channel

J. Installation of stormwater systems or appurtenances thereto

K. Mining operations

SECTION 105. REPEALER

Section 105 is included to avoid inconsistency or conflict with any existing municipal ordinance. Before including this provision, as written, you may want to investigate which other ordinances will be affected.

Any ordinance of the municipality inconsistent with any of the provisions of this Ordinance is hereby repealed to the extent of the inconsistency only.

SECTION 106. SEVERABILITY

Section 106 is included so that if any portion of the ordinance is declared invalid by the courts, the remaining portion can continue to be enforced.

Should any section or provisions of this Ordinance be declared invalid by a court of competent jurisdiction, such decision shall not affect the validity of any of the remaining provisions of this Ordinance.

SECTION 107. COMPATIBILITY WITH OTHER PERMIT AND ORDINANCE REQUIREMENTS

Section 107 is included to reinforce the fact that this ordinance does not relieve the applicant of the responsibility to meet the requirements of your other applicable codes or ordinances.

Permits and approvals issued pursuant to this Ordinance do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act or ordinance. If more stringent requirements concerning regulation of stormwater/NPS pollution control or erosion and sedimentation control are contained in the other code, rule, act or ordinance, the more stringent regulation shall apply.

ARTICLE II
DEFINITIONS

Any words or phrases which are important to the substance of your ordinance, which are not in common usage, or which may be unclear or subject to interpretation should be clearly defined. In this model, the definitions of land development and subdivision are taken from the Pennsylvania Municipalities Planning Code.

Accelerated Erosion. The removal of the surface of the land through the combined action of man's activities and natural processes at a rate greater than would occur because of the natural processes alone.

Best Management Practice. Either a structural or nonstructural requirement imposed in the interest of controlling runoff pollution.

Buffer Strip. A designated reserved area adjacent to streams within which building is restricted and adjacent to which special controls over runoff pollution are imposed in the interest of reducing pollution of the stream or of the Delaware Estuary.

Cistern. An underground reservoir or tank for storing rainwater.

Conservation District. The Conservation District serving _____ County.

Culvert. A pipe, conduit or similar enclosed structure including appurtenant works which carries surface water.

Design Storm. The magnitude of precipitation from a storm event measured in probability of occurrence (e.g., 50-year storm) and duration (e.g., 24-hour), and used in computing stormwater management control systems.

Detention Basin. A basin designed to retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate. A detention basin can be designed to drain completely after a storm event, or it can be designed to contain a permanent pool of water.

Developer. A person or persons, partnership, association, corporation or other entity, or any responsible person therein or agent thereof, that undertakes the activities covered by this ordinance.

Diversion Terrace. A channel and a ridge constructed to a predetermined grade across a slope, and designed to collect and divert runoff from slopes which are subject to erosion.

Drainage Easement. A right granted by a landowner to a grantee, allowing the use of private land for stormwater management purposes.

Erosion. The removal of soil particles by the action of water, wind, ice, or other geological agents.

Forest Management Operations. All activities connected with growing and harvesting of forest products including the site preparation, cultivation and logging of trees, and the construction and maintenance of roads.

Groundwater Recharge. Replenishment of existing natural underground water supplies.

Impervious Surface. A surface which prevents the penetration of water into the ground.

Infiltration Structures. A structure designed to direct runoff into the ground, e.g., french drains, seepage pits, seepage trench.

Land Development. (i) the improvement of one lot or two or more contiguous lots, tracts or parcels of land for any purpose involving (a) a group of two or more buildings, or (b) the division or allocation of land or space between or among two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups or other features; (ii) a subdivision of land.

Land Disturbance. Any activity involving grading, tilling, digging or filling of ground, or stripping of vegetation, or any other activity which causes land to be exposed to the danger of erosion.

Municipality. _____ (City, Borough, Township), _____ (County), Pennsylvania.

Nursery. A tract of land on which trees and plants are raised or stored for transplanting and sale.

Peak Discharge. The maximum rate of flow of water at a given point and time resulting from a storm event.

Runoff. That pollution which is carried by runoff from any facility or development.

SCS. Soil Conservation Service, U.S. Department of Agriculture.

Sediment. Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by water.

Sediment Basin. A barrier, dam, retention or detention basin designed to retain sediment.

Seepage Pit/Seepage Trench. An area of excavated earth filled with loose stone or similar material and into which surface water is directed for infiltration into the ground.

Semi-Pervious Surface. A surface such as stone, rock, concrete or other materials which permits some vertical transmission of water.

Soil-Cover Complex Method. A method of runoff computation developed by SCS, and found in its publication "Urban Hydrology for Small Watersheds," Technical Release No. 55, SCS, January 1975.

Special Best Management Practices. Practices including more effective provisions than standard practices applied for the control of runoff pollution. Technical criteria required for standard and special best management practices (BMPs) can be found in Land Use Management and NPS Control for the Delaware Estuary: The Pennsylvania Demonstration Project, The Greeley-Polhemus Group, Inc., 1994.

Standard Best Management Practices. Those practices ordinarily applied for the control of runoff pollution.

Storm Sewer. A system of pipes or other conduits which carries intercepted surface runoff, street water and other wash waters, or drainage, but excludes domestic sewage and industrial wastes.

Stormwater Management Plan. The plan for managing stormwater runoff adopted by _____ _____ County as required by the Act of October 4, 1978, P.L. 864, (Act 167), and known as the "Stormwater Management Act."

Subdivision. The division or redivision of a lot, tract or parcel of land by any means into two or more lots, tracts, parcels or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, transfer of ownership or building or lot development: provided, however, that the division of land for agricultural purposes into parcels of more than ten acres, not involving any new street or easement of access, shall be exempt.

Swale. A low-lying stretch of land which gathers or carries surface water runoff.

Zone of Influence. Portion of the Delaware Estuary drainage defined as requiring priority attention to preventing increases in runoff pollution.

ARTICLE III
STORMWATER MANAGEMENT AND/OR NPS POLLUTION CONTROL REQUIREMENTS

SECTION 301. GENERAL REQUIREMENTS

Section 301 contains general criteria for stormwater management and/or NPS pollution control including a listing of possible control methods or techniques.

A. Rainfall frequency data. (available from U.S. Department of Commerce, National Weather Service and Pennsylvania Department of Environmental Resources, Research Publication Number 70).

Listing of Data

B. Maintenance of natural drainageways. All natural streams, channels, swales, drainage systems and/or areas of surface water concentration shall be maintained in their existing condition unless an alteration is approved by the municipality. All encroachment activities shall comply with the requirements of Chapter 105 (Water Obstructions and Encroachments) of Title 25, Rules and Regulations of the Pennsylvania Department of Environmental Resources.

C. Methods of stormwater runoff and NPS pollution detention and control. The following is a list of detention and control methods which may be utilized in stormwater management and/or NPS pollution control systems, if appropriate. The choice of control techniques is not limited to the ones appearing on this list.

1. Detention basins
2. Roof-top storage
3. Parking lot and street ponding
4. Seepage pits, seepage trenches or other infiltration structures
5. Porous pavement and concrete lattice block surfaces
6. Grassed channels and vegetated strips

7. Cisterns and underground reservoirs
8. Routed flow over grass
9. Decreased impervious area coverage

The use of other control methods which meet the criteria in this section will be permitted when approved by the municipal engineer. Various combinations of methods should be tailored to suit the particular requirements of the type of development and the topographic features of the project area.

D. Design - The applicant is urged to consult the publications listed in the appendix to this Ordinance for aid in design of control methods. The appendix is *not* a part of this Ordinance.

SECTION 302. STORM WATER MANAGEMENT/NPS POLLUTION CONTROL DISTRICTS

Section 302 is included to identify different areas or "Storm Water Management/NPS Pollution Control Districts." This is necessary only *when the county plan stipulates different storm water management or NPS pollution control criteria for different areas of your municipality.*

A. In order to implement the provisions of the County storm water management and/or NPS pollution control plan, the municipality is hereby divided into storm water management/NPS pollution control districts which shall be designated as follows:

(Listing of Districts)

The location and boundaries of the storm water management/NPS pollution control districts are shown on an official map which is available for inspection from the municipal secretary.

B. When a project or land disturbance activity is located in more than one storm water management or NPS pollution control district, storm water may not be transferred from a district with stricter storm water management or NPS pollution control criteria to a district with less strict criteria, unless the need for such a transfer is identified in the County storm water management or NPS pollution control plan, the regional water quality management plan, or the state water plan.

SECTION 303. CRITERIA

Section 303 contains the actual storm water management/NPS pollution control criteria. The specific criteria for each storm water management and/or NPS pollution control district would be listed separately. Please note that this is only necessary where the county plan identifies the need for different districts. In all other cases, only one set of criteria will be necessary.

The example given for the rate of runoff in this model ordinance is for no increase in the rate of runoff during and after development. Lesser controls involving good management practices to adequately protect health and property may be substituted if permitted in the county plan. The example also includes a section for special water quality criteria. **This will not be necessary in most cases.** *When necessary, these criteria will be identified in the county plan.*

Erosion and sedimentation control is an important aspect of storm water management/NPS pollution control since the deposition of sediment in water courses increases flood levels, reduces the water carrying capacity of watercourses and destroys the biological balance in streams. It is important that municipalities involve

themselves in reviewing this aspect since DER does not review plans or require erosion and sedimentation permits for developments of less than 25 acres.

Consult your county planning agency and conservation district representative for guidance when constructing this portion of your ordinance.

A. Stormwater rate

1. _____ District - There shall be no increase in the rate of storm water discharge from any activity covered by this Ordinance than would have occurred from the land prior to the activity, using (**condition**) as the prior condition.

B. Erosion and Sedimentation - All land disturbance activities shall be conducted in such a way as to minimize accelerated erosion and resulting sedimentation. Measures to control erosion and sedimentation shall, at a minimum, meet the standards of the Conservation District and Chapter 102 (Erosion Control) of Title 25, Rules and Regulations of the Pennsylvania Department of Environmental Resources.

C. Stormwater quality - Provision shall be made by means of best management practice for reduction of particulate pollution in runoff. Standard best management practices, which remove the greater part of particulate pollutions shall be used generally. Facilities which characteristically create a high degree of such pollution, or which are located in or closely adjacent to environmentally sensitive areas, shall be required to provide special best management practices.

ARTICLE IV
PLAN REQUIREMENTS

In order to assess whether the developer will meet the requirements of your NPS pollution control plan, a plan submission should be reviewed by your municipal engineer.

SECTION 401. GENERAL REQUIREMENTS

Section 401 contains the general requirement for plan submission. It is important to require this plan prior to any subdivision or land development approval, the issuance of any permit, or the commencement of any work activity. Where subdivision or land development planning is required, the NPS pollution control plans should be considered concurrently.

Prior to the final approval of subdivision and/or land development plans, or the issuance of any permit, or the commencement of any land disturbance activity, the owner, subdivider, developer or his agent shall submit a NPS pollution control plan to the municipality for approval.

SECTION 402. EXEMPTIONS

Section 402 contains exemptions for activities that are **usually** *insignificant in their runoff pollution impact, or which are being carried out under a plan prepared by your county conservation district, or which are following other conservation plans which will meet the requirements of your county NPS pollution control*

plan. Exemptions to eliminate the duplication of planning efforts are desirable. This list, however, must be tailored to suit the needs of your county plan. Some possible exemptions are shown. **Although these activities are exempt from the plan preparation requirements of the model NPS pollution control ordinance, they must otherwise manage runoff pollution in the manner specified in the ordinance. The agency who prepares the plan should not be the agency who approves the plan.**

The following activities are specifically exempt from the plan preparation provisions of this Ordinance.

A. Land disturbances affecting less than _____ square feet of ground surface.

B. Land disturbance associated with existing one and two family dwellings.

C. Use of land for gardening for home consumption.

D. Agriculture when operated in accordance with a conservation plan or erosion and sedimentation control plan prepared by the Conservation District.

E. Forest management operations which are following the Department of Environmental Resources' management practices contained in its publication "Soil Erosion and Sedimentation Control Guidelines for Forestry" and are operating under an erosion and sedimentation control plan.

SECTION 403. PLAN CONTENTS

Section 403 contains the actual requirements of the plan. As written, this section contains requirements for a very detailed plan. **This section must be tailored to suit your planing needs, as determined by your county plan.**

The following items, where appropriate, shall be included in the plan:

A. General

1. General Description of project

2. General description of erosion and sedimentation controls

3. General description of storm water and NPS pollution controls, both during and after development

4. Expected project time schedule, including anticipated start and completion dates

5. Training and experience of person(s) preparing the plan

B. Map(s) of the project area showing:

1. The location of the project relative to highways, municipalities or other identifiable landmarks.

2. Existing contours at intervals of two (2) feet. In areas of steep slopes (greater than 15%), five-foot contour intervals may be used.

3. Streams, lakes, ponds or other bodies of water within the project area, or which will be affected by runoff from the project (such as the Delaware Estuary).

4. Other physical features, including existing drainage swales and areas of natural vegetation to be preserved.

5. Locations of proposed underground utilities, sewers and water lines.

6. Locations of drinking water wells and groundwater recharge areas.

7. An overlay showing soil types and boundaries.

8. Proposed changes to land surface and vegetative cover

9. The location and extent of streamside buffer strips for reducing pollution caused by new development or re-development activities.

10. Areas to be cut or filled.

11. Proposed structures, roads, paved areas and buildings

12. Final contours at intervals of two (2) feet. In areas of steep slopes (greater than 15%), five-foot contour intervals may be used.

C. Erosion and sedimentation controls

1. The staging of all earthmoving activities must be described, including cuts and fills, streets, underground utilities, sewer and water lines, buildings, driveways, parking areas, recreational areas, other structures, etc.

2. The type, location and extent of all erosion and sedimentation control measures must be shown on a map and described, including all calculations, assumptions and criteria used in designing the controls, and a schedule for their implementation.

D. NPS pollution controls

1. All storm water and runoff pollution controls must be shown on a map and described, including:

   a. Groundwater recharge methods such as seepage pits, beds or trenches, when these structures are used, the locations of septic tank infiltration areas and wells must be shown.

b. Other control devices or methods such as roof-top storage, semi-pervious paving materials, grass swales, parking lot ponding, vegetated strips, detention or retention ponds, storm sewers, etc.

c. Schedule for installation of the control measures and devices.

2. All calculations, assumptions and criteria used in the design of the control device or method must be shown.

E. Maintenance Program - A maintenance program for all storm water and/or NPS pollution control facilities must be included. This program must include the proposed ownership of the control facilities and detail the financial responsibility for any required maintenance.

SECTION 404. PLAN SUBMISSION

Section 404 contains any additional requirements needed for plan submissions.

A. The plan shall be accompanied by the requisite fee, as set forth in Article VII of this Ordinance.

B. _____ copies of the completed plan must be submitted.

SECTION 405. PLAN APPROVAL

Section 405 contains the routing and time constraints for plan review and approval. These items must be tailored to suit your municipality's individual situation. If your municipality has an existing subdivision and land development ordinance, or a stormwater management plan, the review of the NPS pollution control ordinance can be handled in one of two ways so that conflicts and unnecessary delays are avoided. (1) This review can be done concurrently with the plan review under the existing stormwater management or subdivision and land development ordinance, or (2) the subdivision and land development or stormwater management ordinance can be amended to include, by reference, the pertinent portions of this Ordinance.

NPS pollution control plans for subdivisions and land development or relating to stormwater management practices would then be included in that review process while any other land disturbance activities would still be covered by the plan review procedures in this Ordinance.

Before writing this section of your ordinance, you must have a clear understanding as to what services your county planning commission and conservation district can provide. A memo of understanding between your municipality and the county planning commission and conservation district can be used to spell out these services.

A. The municipality shall forward a copy of the plan to the county planning commission and the conservation district for review.

B. The municipal engineer and planning commission shall review the plan and comments from the conservation district and county planning commission and shall recommend whether the plan be approved or disapproved.

C. The municipality shall notify the applicant within _____ days from receipt of a complete plan submission of its decision.

D. A disapproval shall contain the reasons for disapproval and a listing of the plan deficiencies.

E. Failure of the municipality to render a decision within the _____ day time limit shall be deemed an approval.

SECTION 406. MODIFICATION OF PLANS

Section 406 requires a resubmittal of plans where a major modification is required to an existing plan. Your municipal engineer will exercise professional judgement in deciding when this will be required.

A modification to an approved NPS pollution control plan which involves a change in control methods or techniques, or which involves the relocation or redesign of control measures, or which is necessary because soil or other conditions are not as stated on the approved application (as determined by the municipal engineer), shall be approved under the procedures contained in Section 405 of this Ordinance. The municipal engineer shall notify the applicant when such plan modification is required.

ARTICLE V
PERMIT REQUIREMENTS AND PROCEDURES

In order to exercise the necessary control over stormwater management and runoff pollution control activities and to provide a mechanism for collection of fees; a permitting system is needed.

SECTION 501. PERMIT REQUIREMENTS

Section 501 contains the general requirement for the stormwater management, NPS pollution control or land disturbance permit.

SECTION 502. EXEMPTIONS

Section 502 contains exemptions for activities that are usually *insignificant in their NPS pollution importance, or which are being carried out under a plan prepared by your conservation district or which are following other conservation plans which will meet the requirements of your county runoff pollution control plan. This list must be tailored to suit the requirements of your county plan.* As in Section 402, although these activities are exempt from the permit requirements of the model NPS pollution ordinance, they must otherwise manage runoff pollution in the manner specified in the ordinance.

The following activities are specifically exempt from the permit provisions of this Ordinance:

A. Land disturbances affecting less than _____ square feet of ground surface.

B. Land disturbance associated with existing one and two family dwellings.

C. Use of land for gardening for home consumption.

D. Agriculture when operated in accordance with a conservation plan or erosion and sedimentation control plan approved by the Conservation District.

E. Forest management operations which are following the Department of Environmental Resources' management practices contained in its publication "Soil Erosion and Sedimentation Control Guidelines for Forestry" and are operating under an erosion and sedimentation control plan.

SECTION 503. LAND DISTURBANCE ACTIVITIES AS PART OF A SUBDIVISION OR LAND DEVELOPMENT

Section 503 can be included to coordinate the NPS pollution control or land disturbance permit issuance with existing subdivision or land development approvals.

The applicant shall obtain the required land disturbance permit after obtaining the required plan approval as specified in Article IV of this Ordinance. This land disturbance permit will be issued by the municipality concurrently with final subdivision and land development approval.

SECTION 504. OTHER LAND DISTURBANCE ACTIVITIES

Section 504 can be included to cover permit issuance in all other cases.

The applicant shall obtain the required land disturbance permit after obtaining the required plan approval as specified in Article IV of this Ordinance. This land disturbance permit will be issued by the municipality when the plan is approved.

SECTION 505. MODIFICATION OF PLANS

Section 505 provides a mechanism to handle major modifications of plans. A new permit would be required under this circumstance.

A modification to an approved NPS pollution control plan, when required under Section 406 of this Ordinance, shall require a new land disturbance permit. The permit shall be issued following approval of the revised plan.

SECTION 506. APPLICATION FOR PERMIT

Section 506 provides a mechanism for the developer to apply for the required permit. By attaching this application to the plan submission, your municipality can collect fees at the beginning of the process and coordinate plan review and permit issuance.

All applications for permits required by this Ordinance shall be made on forms supplied by the municipality. Such application shall provide a brief description of the runoff pollution controls and the land disturbance activity. This application shall become part of the plan submission required by Article IV of this Ordinance.

SECTION 507. EXPIRATION AND RENEWAL

Section 507 can be included to allow for the automatic expiration of permits which have not been acted upon for a period of time. Two years is recommended as a reasonable period for maintaining active permits. In deciding whether to renew an expired permit, the municipality should consider whether conditions in the area, or requirements of the NPS pollution control plan have changed. The applicant must only resubmit the permit application form for consideration. No additional plan submittal or engineering review would be required.

A. All land disturbance permits shall expire _____ months from the date of issuance unless construction is commenced prior to this date.

B. A renewal of an expired land disturbance permit may be issued by the municipality following a resubmittal of the permit application form, and its approval by the municipal engineer.

C. The refusal of the municipality to reissue an expired land disturbance permit shall contain the reasons for such refusal.

SECTION 508. SUSPENSION AND REVOCATION

Section 508 provides an administrative remedy for enforcing the provisions of this Ordinance in a project which is operating under a valid permit. A suspended permit may be reinstated when conditions warrant. A revoked permit cannot be reinstated. A new permit would be required to continue work on the project.

A. Any permit issued under this Ordinance may be suspended or revoked by the municipality for:

1. Non-compliance with or failure to implement any provision of the permit.

2. A violation of any provision of this Ordinance or any other applicable law, ordinance, rule or regulation relating to the project.

3. The creation of any condition or the commission of any act during construction or development which constitutes or creates a hazard or nuisance, or which endangers the life or property of others.

B. A suspended permit shall be reinstated by the municipality when:

1. The municipal engineer has inspected and approved the corrections to the runoff pollution control measure(s), or the elimination of the hazard or nuisance, and /or

2. The municipality is satisfied that the violation of the ordinance, law, or rule and regulation has been corrected.

C. A permit which has been revoked by the municipality cannot be reinstated. The applicant may apply for a new permit under the procedures outline in this Ordinance.

ARTICLE VI
INSPECTIONS

SECTION 601. SCHEDULE OF INSPECTIONS

Section 601 contains a suggested schedule of inspections of the NPS pollution control measures by your municipal engineer. This is a comprehensive inspection schedule and reflects a high degree of control. We have attempted to identify significant phases in the construction of a project for this purpose. Inspection is the only way you can be assured that the approved plan is being properly implemented. Inspection schedules must be tailored to your needs and your manpower resources.

A. The municipal engineer or his designee shall inspect all phases of development of the site including, but not limited to:

1. Completion of preliminary site preparation including stripping of vegetation, stockpiling of topsoil, and construction of temporary stormwater management and erosion control facilities.

2. Completion of rough grading, but prior to placing topsoil, permanent drainage or other site development improvements and ground covers.

3. During construction of the permanent runoff pollution control and/or stormwater facilities at such times as specified by the municipal engineer.

4. Upon completion of permanent NPS pollution control and/or stormwater management facilities, including established ground covers and plantings.

5. Upon completion of any final grading, vegetative control measures or other site restoration work done in accordance with the approved plan and permit.

B. No work shall begin on a subsequent stage until the proceeding stage has been inspected and approved by the municipal engineer.

C. It is the responsibility of the permittee to notify the municipal engineer _____ hours in advance of the completion of each identified phase of development.

D. Any portion of the work which does not comply with the approved plan must be corrected by the permittee within _____ hours. No work may proceed on any subsequent phase of the NPS pollution control plan, the subdivision or land development or building construction until the required corrections have been made.

E. If at any stage of the work, the municipal engineer determines that the soil or other conditions are not as stated or when in the approved application, he may refuse to approve further work and the municipality may revoke existing permits until a revised plan is submitted and approved, as required by Section 406 of this Ordinance.

ARTICLE VII
FEES AND EXPENSES

SECTION 701. GENERAL

Section 701 of this model gives your municipal governing body the authority to set fees by resolution in order to cover the cost of enforcing the ordinance. Fee schedules must be reasonable.

Land disturbance permit fees covering costs to the municipality for plan reviews, permit issuance and inspections shall be established by resolution of the municipality's governing body. No permit to begin any work on the project shall be issued until the requisite fees have been paid.

SECTION 702. MODIFICATION OF PLANS

Section 702 can be included simply to specify that additional fees are to be paid for additional work in processing modifications to plans.

If it is determined that a modification to the existing NPS pollution control plan is required under Section 406 of this Ordinance, a new land disturbance permit shall not be issued until the additional fees have been paid by the applicant.

SECTION 703. EXPENSES COVERED BY FEES

Section 703 lists the expenses covered by the fee schedule, and is as comprehensive as possible. Tailor this section to suit your needs. *Your municipality may find many of these items are basic administrative costs which wouldn't properly be charged to developers.*

The fees payable by an applicant shall at a minimum cover:

A. The review of the runoff pollution control plan

B. The site inspection

C. The inspection of required controls and improvements during construction

D. The final inspection upon completion of the controls and improvements required in the plan.

E. Any additional work required to enforce the permit provisions, correct violations, and assure the completion of stipulated remedial actions.

ARTICLE VIII
FINANCIAL GUARANTEES AND MAINTENANCE

This is one of the most important components of the model ordinance. It is essential (1) that the developer be obligated to install all the required runoff pollution controls as specified in the approved plan, (2) that there be some party with responsibility to maintain the permanent NPS pollution control structures. Without these provisions, the prior efforts to insure proper control of NPS pollution could be wasted.

SECTION 801. PERFORMANCE GUARANTEES

This section specifies the types of performance guarantees acceptable to your municipality which will insure installation of the required runoff pollution controls. It is important to (1) require each guarantee before approval of the subdivision or land development or the issuance of any land disturbance permit, (2) to have each guarantee reviewed by your solicitor. The applicant should not be released from the guarantee until all control measures are completed and found to be satisfactory by your municipal engineer.

SECTION 802. MAINTENANCE GUARANTEES

This section specifies the types of maintenance guarantees acceptable to your municipality for those facilities which you intend to accept maintenance responsibility. These guarantees are designed to protect the municipality in the event that the facilities are not properly installed and do not function satisfactorily, and would be in effect for a specified length of time. Each of these guarantees should be reviewed by your solicitor.

SECTION 803. MAINTENANCE BY PRIVATE ENTITY

Section 803 requires a contractual agreement with private entities who are to assume responsibility for maintenance of permanent runoff pollution controls. It is suggested that municipalities inspect all permanent control facilities deemed critical to the public welfare annually and after each major storm event.

In cases where permanent control facilities are owned by a private entity (such as a homeowner's association), such entity shall be responsible for maintenance. In this case a legally binding agreement between the entity and the municipality shall be made providing for maintenance of all permanent control facilities, and allowing inspection by the municipality of all such facilities deemed critical to the public welfare at any reasonable time.

SECTION 804. MAINTENANCE BY INDIVIDUAL LOT OWNERS

Section 804 specifies maintenance of NPS pollution control systems on individual lots where the lot owner is to be the party responsible for maintenance. In order to specify this maintenance responsibility, it is suggested that a description of the control system and the terms of the required maintenance be recorded with the deed to the property. This section also includes a mechanism to insure these control systems are properly maintained in the event of the property owner's negligence.

A. When NPS pollution control measures are located on an individual lot, and when they are the responsibility of that landowner to maintain, a description of the facility or system and the terms of the required maintenance shall be incorporated as part of the deed to the property.

B. If the municipality determines at any time that any permanent runoff pollution control facility has been eliminated, altered or improperly maintained, the owner of the property shall be advised of corrective measures required and given a reasonable period of time to take necessary action. If such action is not taken by the property owner, the municipality may cause the work to be done and lien all costs against the property.

ARTICLE IX
ENFORCEMENT AND PENALTIES

SECTION 901. RIGHT-OF-ENTRY

Section 901 insures that representatives of your municipality have the right-of-entry on to private property to investigate or inspect for anything connected with this Ordinance.

Upon presentation of proper credentials, duly authorized representatives of the municipality may enter at reasonable times upon any property within the municipality to investigate or ascertain the condition of the subject property in regard to any aspect regulated by this Ordinance.

SECTION 902. NOTIFICATION

Section 902 provides an administrative enforcement mechanism which seeks to give the alleged violator adequate "notice" so that he has the opportunity to voluntarily comply with the provisions of the ordinance before being subject to its penalties. Most violations can be resolved in this manner without resorting to time consuming court actions.

In the event that an owner, subdivider, developer or his agent fails to comply with the requirements of this Ordinance, or fails to conform to the requirements of any permit issued thereunder, the municipality shall provide written notification of violation. Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of these violation(s). Upon failure to comply within the time specified, the owner, subdivider, developer or his agent shall be subject to the penalty provisions of this Ordinance (Section 903) or other penalty provisions contained in the subdivision and land development ordinance, where applicable.

SECTION 903. PENALTIES

Section 903 imposes penalties for unresolved violations of the ordinance. The specific penalties can be tailored to suit your needs. Important features of this section include the provision which allows each day to be considered a separate violation, and the inclusion of injunctive and mandamus remedies.

Anyone violating the provisions of this Ordinance shall be guilty of a misdemeanor, and upon conviction shall be subject to a fine of not more than $_____ for each violation, recoverable with costs, or imprisonment of not more than _____ days, or both. Each day that the violation continues shall be a separate offense.

In addition, the municipality may institute injunctive, mandamus or any other appropriate action or proceeding at law or in equity for the enforcement of this Ordinance. Any court of competent jurisdiction shall have the right to issue restraining orders, temporary or permanent injunctions, mandamus, or other appropriate forms of remedy or relief.

ARTICLE X
APPEALS

In order to provide an aggrieved party with the due process of law they are entitled to, an appeal procedure is included.

SECTION 1001. APPEAL TO MUNICIPALITY'S GOVERNING BODY

Any person aggrieved by any action of the municipality or its agency may appeal to the municipality's governing body within _____ days of that action.

SECTION 1002. APPEAL TO COURT

Any person aggrieved by any decision of the municipality's governing body may appeal to the County Court of _____ within _____ days of that decision.