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# New Jersey Stormwater Management Implementation

A case study of  
**Hamilton Township**  
**Mercer County**

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Prepared by the  
**Delaware Riverkeeper Network**

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May 2010

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## Executive Summary

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The [New Jersey Municipal Stormwater Regulation Program](#), born of the Federal Clean Water Act, was designed to protect our valuable water resources and the communities they serve. The Program refers to the [New Jersey Stormwater Management Rules](#) (N.J.A.C. 7:8) to provide guidance on the proper detention, treatment and infiltration of stormwater generated by land development. There are serious consequences resulting from improper administration of the Program and the Rules including: erosion, sedimentation and pollution, reduced water quality in neighborhood streams and habitat destruction, harm to parks and other recreational areas, environmental injustice issues due to increased flooding in neighborhoods, damage to infrastructure including culverts and bridges, and other community damages. The impacts are **real** and **costly** to government and private landowners; they are largely irreversible, jeopardize public safety, reduce property values and alter the quality of life in downstream communities. Although a single development project may seem an insignificant contributor to water pollution or flooding, cumulatively, non-compliant projects have resulted in high costs both environmentally and fiscally.

The Delaware Riverkeeper Network has produced this Report to expose the inadequacy of the current municipal stormwater review system. The Report brings to light numerous shortcomings of the Municipal Stormwater General Permit in its capacity of assuring proper implementation of the program as it is currently implemented and demonstrates that the program is ineffectual in its mission to protect our water resources and the communities they serve. Given the current sensitivity to environmental justice issues, these failings and the effects they have on urban and downstream communities are all the more disquieting. The intent of this Report is to identify and engender the necessary changes, and to secure the necessary enforcement of the Municipal Stormwater Regulations Program and Stormwater Management Rules in the municipal review process by the New Jersey Department of Environmental Protection (NJDEP).

The Delaware Riverkeeper Network engaged with a number of stormwater experts to review a variety of projects approved in the Township of Hamilton, Mercer County, New Jersey. Each project was examined for completeness, accuracy and whether the stormwater system honored the intent of New Jersey's Stormwater Management Rules. The results of this review are sobering. The twelve projects presented in this report were reviewed for compliance using a standard 100-point scale grading system to measure compliance with the Rules. Grades ranged from 25 to 79 percent, with an average compliance grade of 42 percent. With regard to the use of nonstructural stormwater management strategies — a primary goal of the program — the average compliance grade was a dismal 13 percent.

While this report focused on inadequate reviews conducted by Hamilton Township land use boards, the Delaware Riverkeeper Network believes, based on similar reviews and experience, that non-compliance is not at all limited to this single municipality. There is ample evidence throughout the State, in other counties and other towns, that the Municipal Stormwater Regulations Program review process is not working and implementation of the Stormwater Rules is lax, at best.

Further, it is the Delaware Riverkeeper Network's understanding that municipalities will be given additional responsibilities by the NJDEP with regard to Stormwater Rules review when a pending municipal pilot program, currently consisting of twenty municipalities, is expanded to the remainder of the State. The findings in this Report make clear that fundamental changes are necessary to the Municipal Stormwater Regulations Program before additional authority and responsibility is given to municipalities if we are to assure that all municipalities uphold the intent of the Clean Water Act. At this point it seems clear the NJDEP and its pilot program must implement the recommendations contained in this Report before the program is allowed to move forward.

The streams and rivers flowing through New Jersey communities are a vital for the health, safety and future of our communities. They are an irreplaceable source of freshwater for drinking; they support the fish and wildlife that are important ecologically and economically to our communities as well as being an important food source for many; they provide us the healthy recreation that allows us to better enjoy our lives, families and friends; they provide the foundation for healthy environments that support ecotourism, fishing and other activities that are the base of many local economies. Protecting the natural flows of our streams and rivers protects our communities from flood damages and droughts. It is vital we protect our natural waterways for the health and benefit of all; proper implementation of New Jersey's stormwater program is essential to our success.

The Delaware Riverkeeper Network therefore recommends that changes be made at all levels of the Stormwater Review process to eliminate the current proliferation of non-compliant projects with specific, enforceable and appropriate penalties to assure compliance. Changes in the administration of the Municipal Stormwater Regulations Program are vital not only to protect our important water resources from pollution but also to protect downstream communities from flooding and its often devastating effects.

Our specific recommendations are detailed under the Recommendations section of this report found on page 19.

***Glossary of Acronyms and Terms***

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BMP	Best Management Practices
LID	Low Impact Development
NJDEP	New Jersey Department of Environmental Protection
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NSPS	Nonstructural Stormwater Management Strategies Point System
RSIS	Residential Site Improvements Standards
TSS	Total Suspended Solids

## New Jersey Annual Reporting and Review

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A product of the United States Environmental Protection Agency's Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) was introduced in 1972 to protect our nation's water resources from pollution. The NPDES program, overseen by the United States Environmental Protection Agency (USEPA) and authorized states, regulates a number of areas including livestock operation, sewer overflows and stormwater discharges.

Stormwater management is an important aspect of the program; stormwater from developed areas carries a significant amount of pollution during the "first flush" of a storm. During this first flush, runoff from parking lots, roadways, roofs and other surfaces collects oil, brake dust and other surface and airborne pollutants. Even greater areas of compacted landscaped areas, including suburban lawns, shed pollutants in the form of nutrient-rich fertilizers and chemicals. These pollutants are then carried untreated, via overland flow or storm sewers, to area waterways. Growing areas of impervious surface in commercial and residential areas prevent stormwater from percolating into the ground, hindering both the natural process of pollutant removal by soil microbes and recharge to underground aquifers. Pollutant removal is a key element of the NPDES program, as is flood mitigation through onsite detention and groundwater recharge.

**First Flush:**  
The initial surface runoff from a rainstorm, carrying up to 90% of all contaminants, including bacteria; hydrocarbons and heavy metals

Concerns over the proper management of stormwater have proliferated in New Jersey in recent years not only because our understanding of the implications of mismanagement has grown, but also because development in the State has proliferated. New land development has sprawled outward from older urban areas, transforming previously undeveloped "greenfield" areas into growing expanses of impervious surface. Stormwater-related problems due to this intense land development — and their resultant costs, both environmental and financial — have mushroomed in importance.

It is in this context and in response to the USEPA's NPDES Phase II Rules, published in December 1999, that the NJDEP initiated the Municipal Stormwater Regulation Program in February 2004, overseen by the Division of Water Quality, Bureau of Nonpoint Pollution Control. At the same time, the NJDEP promulgated the Stormwater Management Rules, initially overseen by the Division of Watershed Management. The [Residential Site Improvement Standards](#) (RSIS), N.J.A.C. 5:21, which establish technical standards that include streets and parking, water supply, sanitary sewers and stormwater management, were amended to include the provisions of the Stormwater Management Rules in Subchapter 7. In December 2008, nearly all of the stormwater functions of the NJDEP were assigned to the Bureau of Nonpoint Pollution Control, including the management of the Stormwater Management Rules.

New Jersey's Stormwater Management Rules specify mandatory standards to control stormwater from development and re-development, and those standards are detailed in the New Jersey Stormwater Best Management Practices Manual. The Municipal Stormwater General Permit was created to ensure that stormwater Best Management Practices (BMPs) were being followed for all municipal functions and land development projects approved after the program went into effect, in February 2004. Through the permit program, municipalities report annually to the State on their program's efficacy with regard to upholding and enforcing the intent of the NPDES program.



In the last five years, the State of New Jersey and its municipalities have significantly improved their stormwater management rules and ordinances in an effort to reduce stormwater impacts. In 2004, new statewide stormwater program regulations were enacted including the N.J.A.C. 7:8 Stormwater Management Rules and N.J.A.C. 7:14A Chapter 25 Municipal Stormwater Regulations Program. These newer State regulations reflected significant advances in the understanding of stormwater, its causes, and its prevention and mitigation through BMPs, expanding management to include the essential elements of runoff peak rate, groundwater recharge, water quality and public safety all in a nonstructural context. New Jersey's Stormwater Management Rules thoroughly acknowledge the importance of preventive nonstructural BMPs, as well as the full range of mitigative structural BMPs in its program. The Municipal Stormwater Regulations Program requires that all municipalities adopt ordinances which, at a minimum, satisfy the State requirements. **Enforcement of New Jersey's Stormwater Management Rules at the local level is critical since land use decisions are made by each municipality.**

Nonstructural stormwater management strategies are not specifically defined in the New Jersey Stormwater Management Rules; instead the following strategies are identified in Section 7:8-5.3 of the Rules:

**Nonstructural stormwater management strategies incorporated into site design shall:**

1. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
2. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
3. Maximize the protection of natural drainage features and vegetation;
4. Minimize the decrease in the "time of concentration" from pre-construction to post-construction. "Time of concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the drainage area to the point of interest within a watershed;
5. Minimize land disturbance including clearing and grading;
6. Minimize soil compaction;
7. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
8. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas; and
9. Provide other source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into stormwater runoff. These source controls include, but are not limited to:
  - i. Site design features that help to prevent accumulation of trash and debris in drainage systems;
  - ii. Site design features that help to prevent discharge of trash and debris from drainage systems;
  - iii. Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and
  - iv. When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules.

*State auditors never materially verify whether a municipality is upholding the Stormwater Management Rules.*

Through the Stormwater Regulations Program Annual Report and Certification, each municipality reports to the NJDEP regarding the municipality's compliance with the Program by answering a series of questions. Important in a self-reporting system, the State has the authority to audit each municipality to ensure the proper actions are being taken and the municipality is, in fact, compliant. Significantly and unfortunately, State audits do not include reviews of municipally approved projects for compliance with the Rules. Instead, auditors complete the audit through a review of the

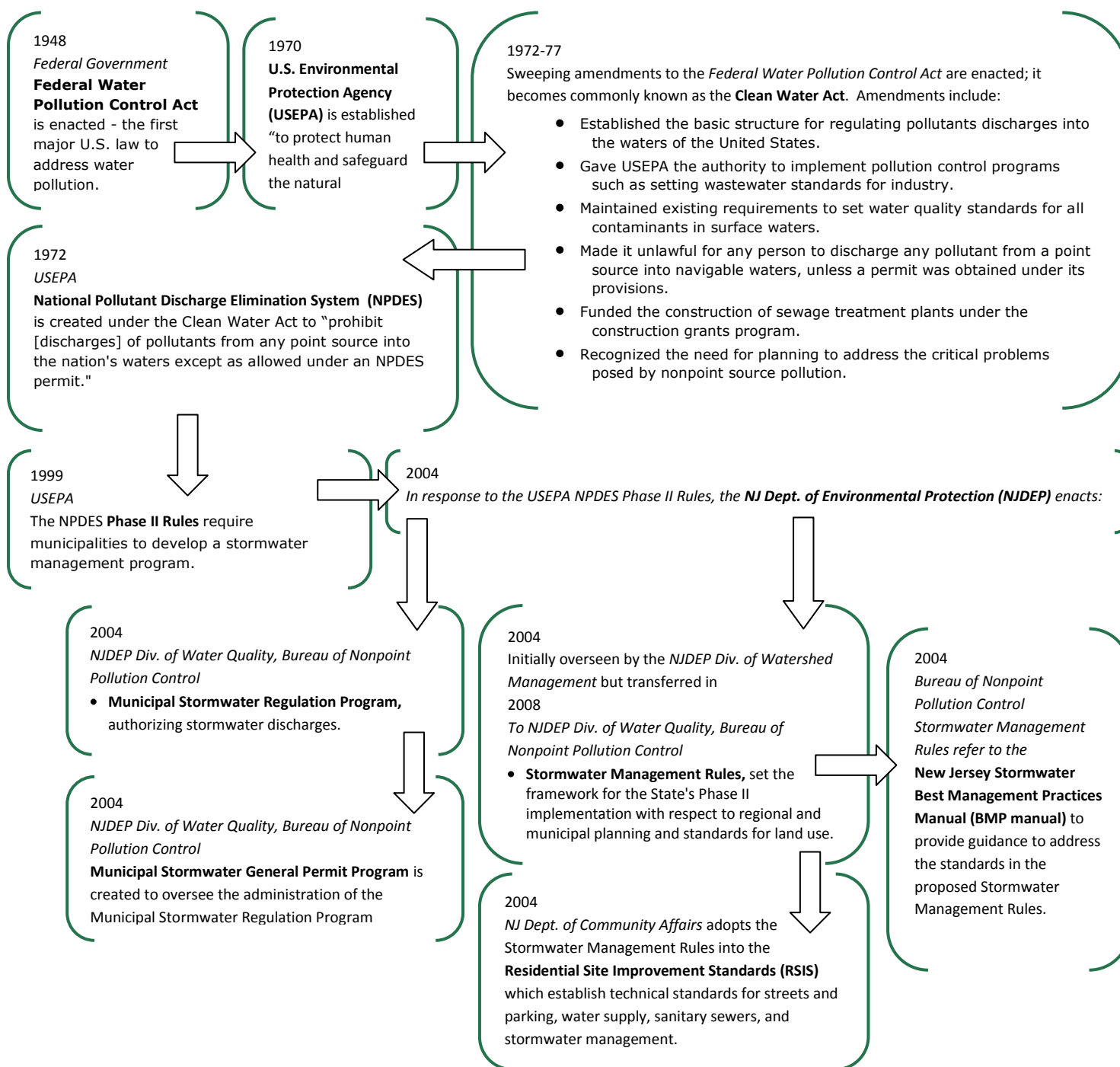
municipality's self-report and interviews with municipal employees – *never materially verifying a report's contents by ascertaining whether the municipality's staff correctly interpreted and upheld the Stormwater Management Rules.*

The pursuit of long-term success in New Jersey's stormwater management programs calls for the ongoing review, modification and refinement of program elements. The NJDEP Stormwater BMP Technical Committee examines whether program standards adequately protect our land and water resources, including whether individual requirements are either too severe or not stringent enough. Unfortunately, their review does not include a full program evaluation of whether State requirements are being properly implemented by municipalities *in the field*, including whether land development projects approved by municipalities reflect the State's improved approach to stormwater management. Finally, the program's success depends on whether the state has the resources and the resolve to monitor and enforce compliance by the municipalities.

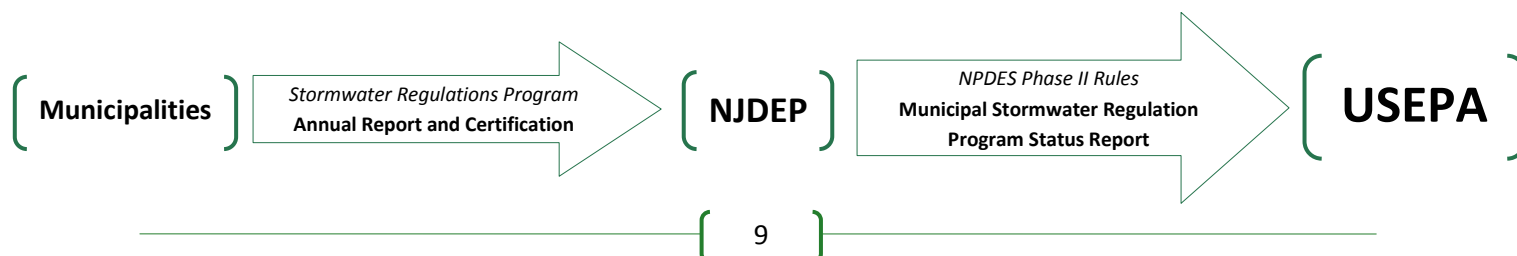
The NJDEP synthesizes the results from each municipality's Annual Report and Certification into a single report to indicate the State's overall compliance with the NPDES Program. The NJDEP released its [\*Municipal Stormwater Regulation Program Status Report Summary 2004–2008\*](#) which shows nearly flawless performance for all of the State's municipalities. The Delaware Riverkeeper Network, through its evaluation of the findings in this report, sees the status of the Municipal Stormwater Regulations Program very differently.



## How It Works



## The National Pollutant Discharge Elimination System (NPDES) Oversight Process



## Hamilton Township Annual Reporting and Review

Hamilton Township in Mercer County is one of New Jersey's largest townships, with a total area of 40 square miles and an estimated population of 90,400 people in 2008. The Township encompasses a number of somewhat distinct communities as suburbs of the State capital, Trenton. A patchwork of land uses exists within Hamilton's boundaries, from densely developed commercial districts to agricultural lands, with the bulk of the Township containing medium- and low-density residential development. The stormwater runoff generated by the Township travels in part via the Assunpink Creek and its tributaries through Trenton to its confluence with the Delaware River. Significantly, the Assunpink Creek has a well-known history of chronic flash flooding.

### **Flash Flood:**

A sudden local flood of great volume and short duration.

<http://wordnet.princeton.edu/>

A *Flash Flood* gives short notice and moves so fast that it is particularly dangerous to people and property in its path.

<http://www.fema.gov/>

Hamilton Township is no exception to the high performance reported in the NJDEP *Municipal Stormwater Regulation Program Status Report Summary 2004–2008*; in its Tier A Municipal Stormwater General Permit Annual Report and Certifications 2005–2008, the Township answers “yes” each year to the following questions:

*Are you ensuring that any residential development and redevelopment projects that are subject to the Residential Site Improvement Standards for stormwater management comply with the design standards in the Stormwater Management Rules at N.J.A.C. 7:8-5?*

*Are you reviewing projects as part of your site plan and sub-division approval process to ensure that they comply with your municipality's effective municipal stormwater control ordinance(s)?*

Despite Hamilton Township's affirmation of the above statements, the Delaware Riverkeeper Network's review of the Township's stormwater review process has revealed widespread inaccuracies and apparent neglect on the parts of both the project applicants and the Township, specifically in the Township's review process. In each of the projects we reviewed, the Township engineer, often with support from land use board engineering consultants, failed to identify multiple omissions, flawed assumptions or miscalculations on the part of the submitting design engineer. During our preliminary document review it became apparent that vital documents including the Stormwater Management Report, containing the most basic and fundamental information necessary for project approval, were often never presented to the Township. An informed and consequently accurate interpretation of these projects was not even possible by the Township Planning Board or Zoning Board of Adjustment.

Clearly, the Township Planning and Zoning Boards do not appear to have a solid understanding of their responsibility to uphold and enforce the State's Stormwater Management Rules. Each of the Township-approved projects reviewed for this report failed to completely fulfill the New Jersey Stormwater Management Rules' requirements.

Hamilton Township has continued its poor practices despite ongoing efforts of community and environmental groups to bring to the attention of the Boards the shortcomings of a number of projects' stormwater systems through independent project reviews presented directly to the Boards. Even when the Planning Board was presented with specific evidence that the Hamilton Station project was non-compliant, the Board through its Resolution of Memorialization "specifically... reject[ed] the contention that the Applicant does not comply with and satisfy all prior and present NJDEP Stormwater Regulations."

The evidence of the project's failure to comply with the NJ Stormwater Regulations was contained in an independent review conducted by a licensed professional engineer with career specialization in stormwater and floodplain management; it was presented to and summarily rejected by the Board despite the review's twenty-six points of contention with the project's stormwater management system. In multiple instances, community and environmental groups have resorted to litigation in order to protect the communities they serve. Some of the projects in this report have been litigated in the courts with cases reversed or remanded back to the land use board for Stormwater Management Rules administration and compliance reasons.

### Whose Job is it Anyway?

New Jersey Planning and Zoning Boards have long been unclear on their jurisdiction over stormwater reviews. The NJDEP further confuses the matter by issuing letters confirming its review and approval of projects although the NJDEP has no authority to approve stormwater projects under the Municipal Land Use Law, local ordinance and RSIS.

For the Care One project, the NJDEP issued a letter to the applicant's engineer confirming its review and determination that the project "...is design[ed] to meet the groundwater recharge, stormwater quality, and stormwater quantity standards..." A subsequent "confirmation" letter was issued ten days later stating that "...the Department approved Care One's stormwater management plan..." and that the letter's author "understand[s] that this letter will be submitted to the Hamilton Township zoning board to prove that the Department approved the stormwater management plan for this project."

Armed with these letters, and before expert witnesses could testify as to whether the Care One stormwater plan was in compliance, the developer applicant successfully argued to the Board that there was no need for further inquiry into this issue because the NJDEP had approved the project — despite the fact that ***the NJDEP has no local authority to approve stormwater projects under RSIS.***

This fact was borne out in the case of Christopher Estates, where the court found that the Planning Board had not performed its duty to review and approve the stormwater design. The court concluded that the Phase II Stormwater "...regulations do not provide for [NJ]DEP review to determine such compliance. Instead, it is the responsibility of the municipal land use agency to determine compliance with the Phase II regulations."

The rejection of professional review in the Hamilton Station case occurred five years after the State's Stormwater Management Rules took effect at the municipal level through the RSIS. It is clear that the passage of time has not improved the understanding or the administration of the Rules enacted through the municipal ordinance and RSIS. This is despite the active efforts of local non-profits, including through third-party review, to educate the Township land use boards.

The 2007 and 2008 Hamilton Township Annual Report and Certifications state that 120 and twenty-five projects, respectively, were subject to the Stormwater Management Rules through RSIS. Evidence presented in this report strongly suggests that these projects were very likely also noncompliant with the Rules.

## Our Review Process

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The Delaware Riverkeeper Network has conducted a review of stormwater program implementation to inform and assist New Jersey and the EPA in achieving long-term success in the State's stormwater management program. To undertake this study, the Delaware Riverkeeper Network engaged with consultants that are respected subject matter experts, each possessing extensive technical experience in stormwater management. These consultants were asked to examine a number of projects in the Township of Hamilton, New Jersey, for completeness and accuracy, and ultimately to determine whether the stormwater system for each project honored the requirements and intent of New Jersey's Stormwater Management Rules.

Project consultants include:

- [Princeton Hydro](#), LLC, Ringoes, New Jersey
- [Emerald Environmental Solutions](#) (formerly J and E Consulting), Pennington, New Jersey
- [Meliora Environmental Design](#), Kimberton, Pennsylvania
- [CH2M Hill, Inc.](#) (purchased Cahill Associates, Inc. in November 2008), Philadelphia, Pennsylvania

At the beginning of the review process, the Delaware Riverkeeper Network directed Cahill Associates, Inc. (Cahill) to evaluate land development projects and their stormwater components under the Stormwater Management Rules in Hamilton Township, Mercer County. This study was launched to evaluate how this typical Tier A New Jersey municipality (equivalent to [EPA Municipal Separate Storm Sewer System \[MS4\]](#) community) was implementing its stormwater management program with regard to development approvals.

In the initial review, Cahill faced a number of difficulties, not the least of which was the inability of the Township to produce the necessary documents for a complete review of the projects of interest. Even after multiple requests by Cahill and the Delaware Riverkeeper Network, the Township was unable to produce the necessary documents. Of the fourteen projects chosen for review, ten were unable to be evaluated due to lack of proper documentation. In many instances, vital documents including the Stormwater Management Report, Environmental Impact Statement (if not waived in the approval process) and Subsurface and Geotechnical Evaluations were unable to be obtained.

A continuation of the review was lead by Princeton Hydro, LLC, and sub-contractor Emerald Environmental Solutions to produce this document. Princeton Hydro and Emerald Environmental Solutions contributed comprehensive reviews of each of the projects, with Emerald Environmental Solutions providing in-depth computations and model simulations for five sites, which were synthesized into this report. CH2M Hill, Inc., and Meliora Environmental Design have provided peer review of the document. Project summary information, application number and approval dates were attained from each project's Resolution of Memorialization.

The Delaware Riverkeeper Network reviewed the results of these studies to identify recommendations that can be put into action (most of them immediately, and others with minimal effort) to improve the oversight of stormwater management implementation in New Jersey at the local level. These recommendations focus on municipal-level implementation with audit and enforcement by the NJDEP. By acting on the recommendations below, New Jersey will move its stormwater management program toward long-term success and have a stronger likelihood of achieving its goals of protecting citizens and valuable land and water resources. Failure to act on these recommendations will ensure a program that fails to fulfill the mandate and legal obligations of the Clean Water Act and continues to compromise and jeopardize the health and safety of New Jersey communities, including the State Capitol of Trenton.

## Results of this Report

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The results of this Report are sobering. Detailed reviews with, in some cases, corrections to calculations and modeling, have shown that Hamilton Township projects frequently fail to comply with the suite of goals and requirements in the Stormwater Management Rules, whether they are promulgated through the Residential Site Improvement Standards or through local ordinance.

Most disturbing is the lack of attention paid to, and non-compliance with, the nonstructural stormwater management strategies, a central tenet of the Rules. The Rules specify:

*7:8-5.3 Nonstructural stormwater management strategies*

*(a) To the maximum extent practicable, the standards in N.J.A.C. 7:8-5.4 and 5.5 shall be met by incorporating nonstructural stormwater management strategies at N.J.A.C. 7:8- 5.3 into the design. The persons submitting an application for review shall identify the nonstructural strategies incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management strategies identified in (b) below into the design of a particular project, the applicant shall identify the strategy and provide a basis for the contention.*

***The overall compliance grade for the reviewed Hamilton Township projects was an “F” at 42%.***

Although it is a common practice for land developers to maximize the amount of ratable area when designing a site, and in so doing to marginalize or compromise stormwater management features, it appears the Township itself was unconcerned with this practice. It is disturbing that the Township, whose primary directive is to protect the health and safety of its citizens, regularly permitted this practice to the detriment of the wider community and the City of Trenton downstream. For example, while some projects are in areas where limited space for nonstructural stormwater strategies may make it difficult to require them, the Township allowed projects

like Sawmill Estates, sited on a large parcel in a rural setting, to omit nonstructural stormwater management features. Nonstructural stormwater features are an integral facet of the Rules and their inclusion is central to the effective implementation of the program. As can be gleaned by reading the following project summaries and looking at individual project matrices and the summary matrix found in Appendix B, satisfaction of the nonstructural stormwater management strategies is woefully poor. On average, overall compliance of the reviewed projects with the Stormwater Rules was 42%, with an average compliance of 13% with regard to the use of nonstructural stormwater management strategies — a primary directive of the program.

Other parameters measured in this analysis are also disappointing. Misinterpretation of the Rules, incorrect usage of data and apparent carelessness are evident in the lack of compliance with groundwater recharge and runoff quality and quantity, each also a central principle of the Rules. In many cases, it appears that the submitting project engineers were often ignorant, and sometimes purposely negligent, of the Rules’ design and calculation standards and requirements. Close examination of some of the projects suggest that calculations may have been “massaged” by the project engineer in order to return favorable results. For example, Christopher Estates used a Runoff Curve Number (RCN) of 61 — a number provided, as required, by the TR-55 Manual — in the calculation of areas. However, a RCN of 59.5 was later used in the hydrological analysis — a number that does not exist in the TR-55 Manual; it is unclear where this lower number originated but it is clear that by using it, the calculations just barely satisfied the peak flow reduction requirements.

Where the Township review should have reduced or eliminated technical errors and the implementation of inadequate stormwater management systems, it appears that the Township's engineer was also ignorant of the Rules or negligent in his responsibility for upholding them.

In multiple Resolutions of Memorialization for project approvals, the Hamilton Township land use boards state that the "applicant shall comply with all requirements of the Stormwater regulations" without specifications or further review to ascertain if or how those requirements would be met and without a mechanism put in place to assure compliance. This highlights the Township's lack of concern for the Stormwater Management Rules and, more important, that the Rules are not given the proper attention the Municipal Stormwater Regulations Program demands. There seems a pervasive strategy to use a statement that projects must comply with the law as a replacement for ensuring that non-compliant projects in fact do comply with the law.

The Planning and Zoning Board members, municipal and applicant engineers, attorneys and applicants are all neglecting the important and primary goals of the Stormwater Management Rules. By failing to thoroughly assess projects and prevent non-compliant stormwater systems from being implemented, the Township is not in compliance with its Municipal Stormwater General Permit and, by extension, the federally mandated Clean Water Act.

The NJDEP audit and review processes should have served to identify and correct these failings. In addition to documenting the Township's failings, this report reveals the shortcomings of the NJDEP in performing the vital task of auditing the Township's program implementation. Mistakes made by the NJDEP investigator on the Township's Compliance Evaluation and Assistance Inspections were repeated over multiple years, suggesting that the report itself was simply duplicated annually without thought or review. Most troubling, the State's review process is incapable of revealing and correcting these shortfalls in the system.

The following easily recognized error was repeated in both the 2007 and 2008 Compliance Evaluation and Assistance Inspections:

*Question: "Is the Municipality enforcing the stormwater control ordinance(s) as required by the permit? [N.J.A.C. 7:14A-25.6]"*

*Answer: The inspector states that the Township is "In Compliance" and adds the note that this is "enforced through Hamilton Health Department."*

Stating that the Municipality is enforcing its stormwater control ordinances through its Health Department is a wholly inappropriate answer to this question, under any circumstances, since the Health Department has no oversight or enforcement of stormwater reviews in the land use approval process. This response demonstrates the inspector's lack of knowledge about simple elements of the review and this section of the Program.

As demonstrated in each of the project reviews conducted for this report, the core requirements of the Rules were not upheld by the Township. This is despite the efforts of the Delaware Riverkeeper Network, Save Hamilton Open Space, the Pond Run Watershed Association, the Sierra Club, and other non-profit groups active in the community to bring this issue to the attention of the Township. These groups have expended tremendous resources in an effort to assure the Stormwater Management Rules are adhered to in order to protect the surrounding communities and their water resources.



In all cases, their efforts have been poorly received - in some circumstances received with notable hostility - by the Township and no attempt has been made by the Township to change its review process. Some of the projects in this report have been litigated in the courts with cases reversed or remanded back to the land use board for Stormwater Management Rules administration and compliance reasons. This should have clearly demonstrated to the Township that better reviews and actions were required, and that enhanced receptivity to the input of the community groups is more than warranted.



*“ ...the township planning board failed to determine if the plan... met regulations established by the [NJDEP]. ”*

Failure to protect our water resources and the communities they serve produces both tangible and intangible harms. The economic costs are undeniable: increasing flood damages, growing needs for emergency response, loss of property, damage to infrastructure, and environmental degradation are all costly consequences of improper stormwater management. Additionally, deferred costs from failing stormwater systems are passed to the communities that contain them because the municipality must assume responsibility for failed systems. Equally important, the unseen costs of emotional distress, loss of work days for both flood victims and flooded communities, loss of quality of life and loss of safety — both perceived and real — are far-reaching and often difficult to reverse.

Although this report highlights the shortcomings of only a single township’s review process, the Delaware Riverkeeper Network believes that these shortcomings are endemic throughout the State. Compounded, the resultant impacts are **real** and costly to government and private landowners; they are largely irreversible, jeopardize public safety, reduce property values and alter the quality of life in downstream communities **across the State**. The Municipal Stormwater Regulations Program is unable to assure proper implementation of even their most basic elements and thus are ineffectual in achieving the goal of protecting water resources and the communities they serve. In the current political climate, which is sensitive to environmental justice issues, these failings are all the more disquieting. Because it is downstream from Hamilton Township, the City of Trenton suffers from the poor stormwater management implementation of its upstream neighbor with dramatically devastating results.

Often misperceived as a financial burden to developers, an impediment to profitable development and an unfunded mandate by the municipality, Stormwater Best Management Practices are often not enforced by a township, whether for short-term economic gain or because of political favoritism. The resultant costs of a failing system are passed on to the wider community, which includes the township itself, through municipal maintenance of the system or, worse, through the reduced quality of life or imperiled safety of its residents.

It is the Delaware Riverkeeper Network’s assertion that it is first the municipalities’ legal, ethical and moral responsibility to uphold the Stormwater Management Rules through their review process in order to protect and serve their residents, surrounding ecosystems and downstream communities, and second the State’s responsibility to audit and enforce the Municipal Stormwater Regulations Program for the same reason. If these agencies are negligent in their duty to prevent development that endangers residents, who then is to be held responsible?

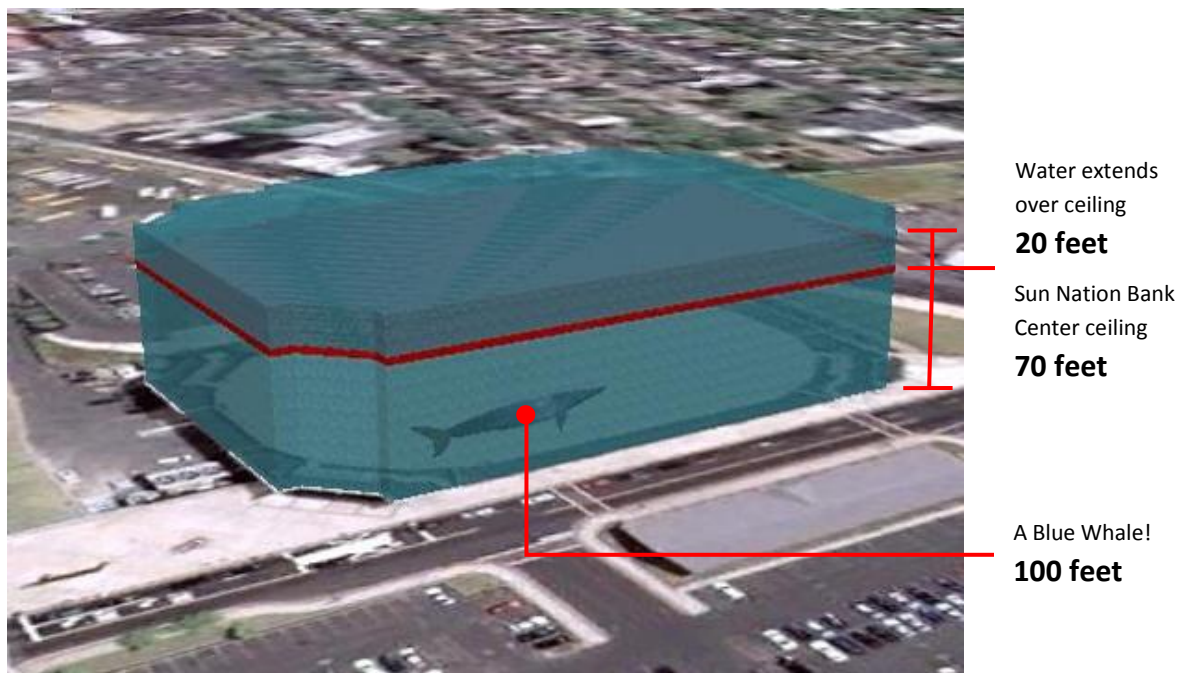
## How much water?

The Stormwater Rules require sites to maintain groundwater recharge or infiltration for the 2-year storm. In our detailed evaluation of four case studies in this report, it was found that only one project recharged more than required while three recharged less than required. Since all but one of the twelve project reviewed in this report failed in meeting the general standards, an average ratio of 1:12 was used to show the ratio of project compliance to failure using the sample set to extrapolate the average volume not infiltrated for each project.

This average was then applied to Hamilton Township's reported 120 projects in 2008 and 25 projects in 2009 for projects reviewed under the municipal ordinance and RSIS. The volume of water not recharged by these projects is estimated at 71,000,000 gallons per year. This volume would **overflow** Trenton's Sun National Bank Center by twenty feet.

The amount of water sent downstream each year would  
**overflow** the Sun National Bank Center  
**by 20 feet!**

*That's enough water to easily accommodate a  
**100 foot long blue whale!***



## Context of this Report

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Urbanization of Hamilton Township has resulted in pervasive watershed flooding and degradation. This is especially apparent in the Assunpink Creek watershed, much of which lies in Hamilton Township, with its outlet in the City of Trenton. Since the mid-1960s, the United States Department of Agriculture – Natural Resource Conservation Service (NRCS), with partners that included the NJDEP, Mercer and Monmouth Counties, Hamilton Township, and the Freehold and Mercer County Soil Conservation Districts, has been battling the repetitive flooding of the Assunpink Creek and its tributaries, with special attention paid to Pond Run.

While early action by the USDA-NRCS looked at modifications to farming practices, it was coupled with structural measures in the early to mid-1970s to address the development changes in the watershed and large flood events occurring at that time. This resulted in four floodwater retarding structures and four multipurpose dams and over two miles of concrete-lined channel replacing the natural channel of Pond Run.

Hamilton Township still has medium flood vulnerability, as reported in the 2008 *A Multi-Jurisdictional Flood Mitigation Plan for the Non-tidal, N. J. Section of the Delaware River Basin*, a plan spearheaded by the New Jersey Office of Emergency Management, the Delaware River Basin Commission and the New Jersey Department of Environmental Protection. In this plan, Hamilton Township shows interest in mitigation actions that include structure acquisitions, elevation of utilities, and flood warning systems. Hamilton Township noted in the plan that, “In addition [to watershed flood control structures and stream channelization], culverts under the D&R canal have been reconstructed to increase flow capacity.” Hamilton Township lists as Flood Mitigation Goals:

*Flood damage prevention enforcement through township codes and ordinances, and;*

*Continue and expand Hamilton’s participation in the Community Rating System*

This report demonstrates that, although it reports that it is “vigorously enforces the Phase II Stormwater Regulations” consistent with the high priority goal in the Multi-Jurisdictional Flood Mitigation Plan, Hamilton Township is not enforcing its Stormwater Management Ordinance and the RSIS. Such a deviation from the standards in the local ordinance jeopardizes the Community Rating System credits awarded by the Federal Emergency Management Agency.

Economic stress and other consequences of poor stormwater management enforcement by Hamilton Township are not limited to its jurisdiction; the downstream City of Trenton, with “high” flood vulnerability, suffers from the inaction of the municipality. The Assunpink Creek flows through the center of Trenton, and the City is at the mercy of its upstream neighbor for much of its increase in flooding over natural levels. According to the *City of Trenton, New Jersey, Natural Hazard Mitigation Plan*, “The most significant natural hazard to which the City of Trenton is exposed is clearly flooding.” The Plan notes that the majority of the flood-prone areas of the City along “...the Assunpink Creek tend to be commercial or industrial....” and threaten the viability of the City’s businesses due to the frequency of Assunpink Creek’s flooding “...even during relatively ordinary rainfalls.” The Plan states that the flooding “...has happened so often recently that the problem has gone past the level of nuisance,” and furthermore that “many areas adjacent to the Assunpink Creek flood almost annually....”

A report titled *Geomorphic Assessment, Pond Run at Veterans Park* by Princeton Hydro for the Pond Run Watershed Association concludes that Pond Run upstream of the flood control reservoir in Hamilton Park is destabilized with stream downcutting and widening. While habitat deterioration is clearly evident, sediment accumulation within the flood control reservoir results in lost flood storage volume and this continues to

reduce benefits of the project through time. A flood control structure is not a replacement for distributed stormwater management throughout the Assunpink Creek watershed.

Because of the continuing flood threats, Hamilton Township and the City of Trenton have reached out for assistance from the US Army Corps of Engineers (USACE) and the State of New Jersey. Sponsored by Hamilton Township, the USACE is embarking on a feasibility study for the Assunpink Creek between the City of Trenton limits upstream to Interstate 295 to address flooding and environmental degradation. Subsequent to the partial collapse of a buried portion of the Assunpink Creek in the City of Trenton, the USACE is engaged in an Ecosystem Restoration Project by daylighting the defined “recovering urban stream.” Local sponsorship is by the City of Trenton; however, local match funding is being provided by the NJDEP.

Hamilton Township residents are best served by receiving State of New Jersey and Federal assistance in conjunction with the municipality’s enforcement of the local ordinance and RSIS. Treating the additional runoff from new development or redevelopment at the source will reduce costly treatment at the watershed level. This downstream treatment is taxing to individual homeowners, business owners, the State of New Jersey and the Federal Government. Implementation of rules must be a prerequisite to outside assistance for Hamilton Township or any other public body.

### Hurricane Katrina propels Jackson's justice quest at EPA

Former NJ environmental chief seeks  
equality for minorities

[Katrina’s] toll on [Lisa] Jackson's childhood house and on New Orleans, particularly the Ninth Ward where she was raised, has intensified her quest for what's known as **environmental justice**. That means involving and getting fair treatment for the poor and minorities, who often endure the greatest exposure to environmental hazards but are outside the mainstream movement trying to find solutions.

The Associated Press  
January 7, 2010

## Recommendations

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1. Make clear to municipal land use board members that they have sole jurisdiction to perform stormwater reviews and that no NJDEP permit or other agency approval replaces this responsibility. Approval must not be based on a condition of meeting the RSIS or local ordinance at a later date.
2. Ensure municipal land use board members are properly educated on the Stormwater Management Rules and emphasize their responsibility to uphold them.
3. Require a listing of all known flooding and stormwater problem areas in a municipality and their downstream areas be assessed as an element of project review.
4. Add mitigation language to municipal ordinances and Master Plan to ensure that mitigation measures are required of projects when relief is granted from stormwater requirements. Municipal land use board members must understand mitigation policy and administration.
5. Require stormwater certification for engineers administrated through the NJDEP. The complexity of the specialty demands proper training, identification of professionals and ways to ensure professional standards.
6. Require true audits of the current permit program to be conducted by both the NJDEP and USEPA; reporting entities must be held accountable for implementing the Phase II rules and the Clean Water Act as this is an activity regulated by the Municipal Stormwater Regulations Program.
7. Require State inspectors to periodically conduct random post-construction assessments of projects.
8. Institute appropriate penalties for repeat violation of a municipal stormwater permit including permit modification or suspension of the permit; establish a third-party body, such as the county, to be responsible for stormwater reviews during that time. Compliance citations and penalties should be coupled with education to improve future performance.
9. Institute an appeals process, administered through the NJDEP, to facilitate the review of contentious projects outside of the court system. Provide citizens a clear and defined process to petition for NJDEP intervention and oversight prior to and at the conclusion of the municipal decision making process.
10. Prevent the expansion of the NJDEP Stormwater Pilot Program to all municipalities — with its associated increase of responsibility of sole stormwater review authority for land use permits — until the program has been improved and enforcement has been refined. A detailed audit of projects reviewed during the period of the pilot program should be conducted.
11. Establish a system to eliminate pressure on township review engineers to approve non-compliant stormwater systems. Currently, the pressure of maintaining an engineer's future "employability" by the development community appears to influence review results.
12. Create a relationship between the NJDEP, the Association of New Jersey Environmental Commissions (ANJEC) and municipal Environmental Commissions; coordination of these entities can facilitate checks and balances at the local level.
13. Establish a relationship between the case managers of the Municipal Stormwater Regulations Program and the municipal land use board members, not just the stormwater coordinator for the municipality.
14. Require the Municipal Stormwater Regulations Program Annual Report and Certification to be signed by an elected official, stormwater manager and the chair of each municipal land use body certifying that each is responsible for upholding all municipal permit requirements. Enact municipal and individual penalties for misrepresentation of program implementation including fines, loss of license, and loss of the ability to implement the program at the municipal level.
15. Make FEMA Community Rating System program credit points contingent on the proper enforcement of the Stormwater Management Rules since failure to comply with the Stormwater Regulatory Program contributes to flooding, adding a disproportionate financial burden to FEMA flood insurance programs.



## Project Review Summaries

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In the digital format of this document:

Click on the image for an interactive map of the sites or (control+click) on site name to be brought to the project review.



Christopher Estates p.24



Sawmill Estates p.25



Waterview Center p.26



Deer Path Pavilion p.27



Hamilton Estates p.28



Brandywine Woods p.29



Palagano Property p.30



Square Properties p.31



Twin Ponds p.32



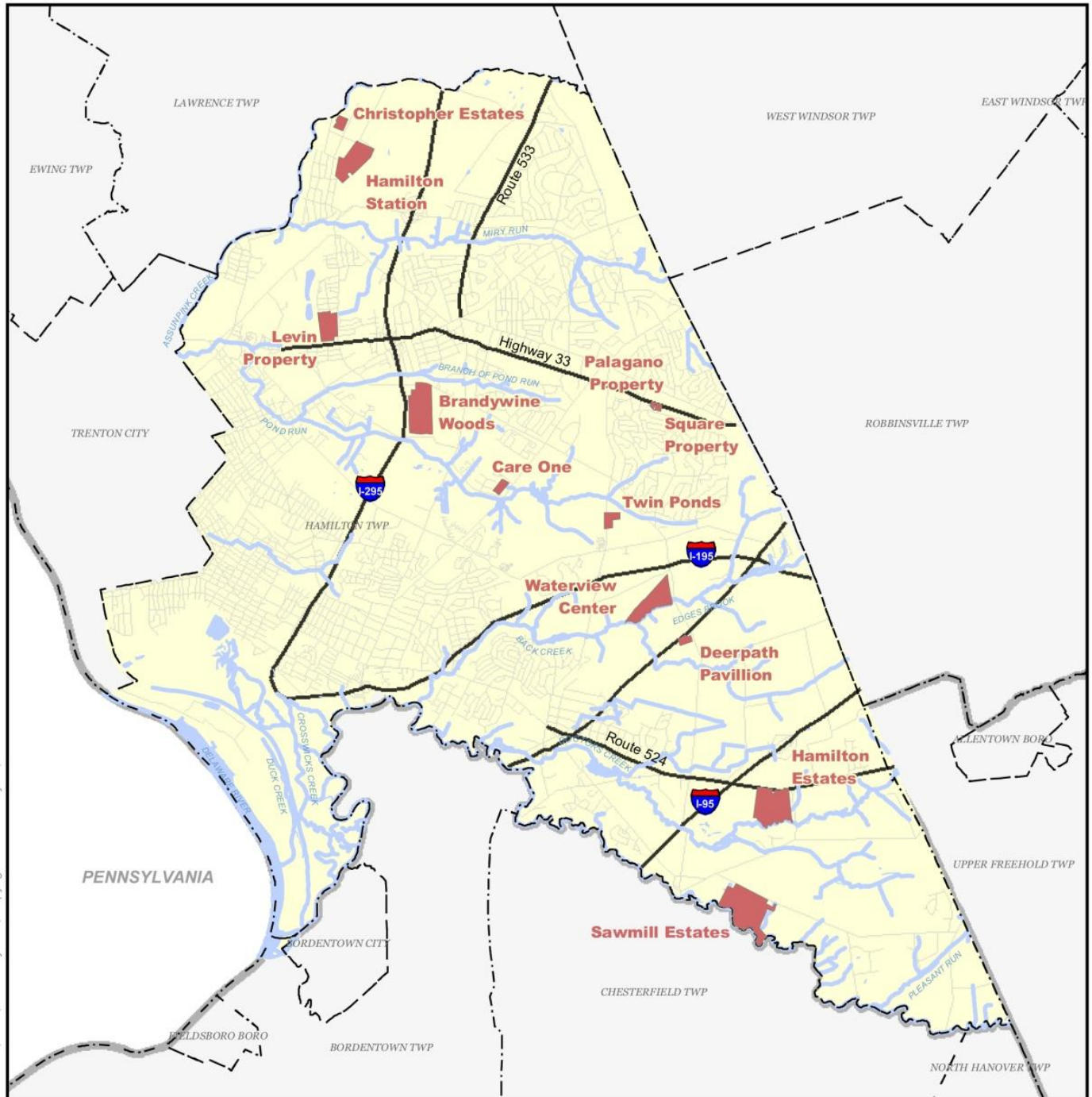
Hamilton Station p.33



Care One p.34



Levin Property p.35



### INDIVIDUAL PROJECT LOCATIONS

HAMILTON TOWNSHIP  
STORMWATER REPORT  
DELAWARE RIVERKEEPER NETWORK  
MERCER COUNTY, NEW JERSEY

#### LEGEND

- |                          |                     |
|--------------------------|---------------------|
| — Roads                  | — Streams           |
| — Highways               | ■ Project Location  |
| - - - Municipal Boundary | ■ Lakes             |
| ■ County Boundary        | ■ Hamilton Township |

PRINCETON HYDRO, LLC.  
1108 OLD YORK ROAD  
P.O. BOX 720  
RINGOES, NJ 08551

#### SOURCES:

- County and municipal boundaries, streams, and lakes obtained from NJDEP GIS website.
  - Roads and highways obtained from NJDOT website.
- Map Projection: State Plane New Jersey (feet) NAD83

0 3,750 7,500 Feet



### NEW JERSEY COUNTY MAP





*What Our Grades Mean*

We graded each of the projects reviewed for conformance with the Stormwater Rules.

The grades are based on a 100-point scale. That means a 57% score represents a project that is 57% in compliance with the Stormwater Rules — not very impressive, for sure.

**Remarkably, all but one of the projects reviewed received a failing grade, with six of eleven projects scoring less than 40%.**

A thorough analysis of our grading system is available in Appendix B of this report — the Project Matrices and Summary Matrix — detailing each project's compliance with individual rules, and including a summary of all the projects reviewed.

*Christopher Estates*

Reviewed and approved by the Hamilton Township Planning Board

Application Number: 01-03-016B

Approval Date: February 10, 2005

PROJECT SUMMARY

The Christopher Estates development plan would create sixteen single-family residences, a new roadway and cul-de-sac and associated facilities located on an 8.78 acre lot. In the pre-existing condition, the site uses included meadow, woods, shrubs and several accessory structures that supported an agricultural use for the site. The stormwater management system is designed to convey runoff from most of a larger drainage area and portions of a smaller drainage area to an infiltration/detention basin.

REVIEW FINDINGS

- Neither a LID Checklist nor a NSPS Spreadsheet Analysis was submitted, and it was not demonstrated that nonstructural stormwater strategies were used to the greatest extent practicable, as required.
- The site's infiltration basin was not designed following the BMP Manual's design guidelines so it cannot be stated with certainty that the recharge facility will function as intended, particularly in regard to infiltration rates and water quality treatment, two of the most significant requirements of the Rules.
- Failure to field-verify soil permeability and incorrect assumptions about soil permeability combined with miscalculated infiltration rates make it unclear whether the basin's infiltration rates are in conformance with the Rules. Mercer County Mosquito Control has documented breeding of mosquitoes in the basin and has treated the water repeatedly. See memo included in Appendix E.
- Because no test pits were performed within the basin, as required, the required 2-foot separation to groundwater was not verified.
- The plans do not note that compaction must be avoided in the basin area, nor is there a note requiring that the basin area be tilled prior to placing the sand layer. Compaction in the area of the basin would result in lower permeability rates and the required infiltration would not occur.
- The engineer did not route the pervious and impervious areas separately. This error has the effect of underestimating the peak flows in the post-developed condition for some of the storm events, which may show a lesser peak flow reduction demand than is necessary.
- The design engineer used incorrect land cover types for the hydrological analysis, despite the correct data being available on the site survey and aerial photos, leading to an underestimation of the peak flows post-development, which may show a lesser peak flow reduction than is necessary.
- Mistaken assumptions in the hydrological analysis and calculations underestimated post-development peak flows. Once these assumptions and calculations are corrected, the project does not meet the peak flow reductions for the 2-, 10- or 100-year storms, a central tenet of the Rules.

CONCLUSION

Multiple incorrect assumptions have produced a project design that fails to provide for nearly every major requirement of the Stormwater Management Rules. It appears in some instances that the design engineer purposely used incorrect assumptions, though the correct information is readily available, in order to skew the numbers to the client's advantage.

*Sawmill Estates*

Reviewed and approved by the Hamilton Township Planning Board

Application Number: 04-04-038

Approval Date: February 10, 2005

PROJECT SUMMARY

The applicant received preliminary approval for a major subdivision to divide a 93.2 acre farm lot to create twenty-seven residential lots, each with a minimum area of 80,000 square feet and served by individual well and septic systems. The stormwater management for the project is treated by a single detention basin.

REVIEW FINDINGS

- Neither a LID Checklist nor a NSPS Spreadsheet Analysis was submitted and no attempt was made to use nonstructural techniques.
- In the Resolution of Memorialization for preliminary approval, the Board states that the “applicant shall comply with all requirements of the [regulations].”
- No information was provided to establish whether the bottom of the basin’s sand layer is the required two feet minimum above the seasonal high groundwater, and no information was provided regarding depth to bedrock. No soil testing in the immediate vicinity of the basin for permeability was conducted.
- No calculations were provided to determine whether the “no-net change in recharge” requirement of the new stormwater regulations has been satisfied.
- There are no calculations showing that the basin infiltrates the water quality storm within 72 hours. This has ramifications not only with regard to the basin’s performance but also with regard to mosquito breeding.
- The design does not meet the peak flow reduction requirement for the 2-year storm.
- No consideration was given on the plans for how to prevent soil compaction in the large basin during installation; compacted soils will greatly alter actual infiltration rates.
- There is no discussion of whether the basin fulfills water quality requirements.
- The project engineer failed to address important structural issues in the proposed twenty-three-foot-high embankment used to create the basin.

CONCLUSION

This project made no attempt to use LID and Nonstructural BMPs, a central goal and tenet of the Stormwater Management Rules. In addition, there is a sizable lack of data to demonstrate compliance with a number of other design requirements mandated in the Rules.

**Waterview Center**

Reviewed and approved by the Hamilton Township Zoning Board

Application Number: 05-10-104

Approval Date: April 11, 2006

PROJECT SUMMARY

Waterview Center is a two-phased development consisting of 300,000 square feet of office space contained in four multi-story buildings. The stormwater management system includes vegetated swale conveyance from portions of the parking areas to inlets and then to the wet basins. Roof runoff is conveyed by roof drains that are directly connected to the storm sewer system. All of this piped runoff is directed to one of the two wet basins that are located near and partially within the 100-year floodplain for Edge's Brook.

REVIEW FINDINGS

- Calculations showing compliance with the NSPS were based on flawed assumptions; when corrected, the project fails to achieve the required points.
- The applicant fails to meet the groundwater recharge requirement by stating "[soil] *conditions make infiltration unsupportable... Therefore, no calculations are provided.*" However, the project's Geotechnical Report indicates that no permeability tests were done. The Engineer's Report shows that runoff volumes increase by 222 percent for Phase One and 247 percent for full build out.
- No mitigation measures were required of the applicant to ameliorate the above-mentioned area of non-compliance, despite the fact that Hamilton Township has a mitigations plan in place.
- No water quality calculations are provided in the Engineer's Report making it impossible to conclude that water quality requirements for TSS removal are being met.
- The existing runoff volumes and peak flows were modeled incorrectly and some of the hydrologic calculations were based on an incorrect soil type. These errors would overestimate the existing runoff volumes and peak flows and could result in less peak flow reduction than is required.
- The engineer did not route the pervious and impervious areas separately as required, leading to the underestimation of peak flows in the post-developed condition which results in less peak flow reduction than is required.
- The Stormwater Management Facilities Maintenance Plan does not provide sufficient maintenance instructions for the pervious pavement areas and no maintenance instructions or user manuals have been included in the plan for the aeration devices that will be installed in the wet ponds.

CONCLUSION

False and contradictory assumptions, incomplete documentation, and incorrect calculations make this a particularly salient example of how an egregiously unsupported and inaccurate Stormwater Management Plan can be accepted by the Township. Particularly troubling is the acceptance of site soil conditions as impermeable even though the Geotechnical Report plainly states that no permeability tests were done. The lack of water quality calculations is also of concern; no request seems to have been made by the Township for this information.

**Deer Path Pavilion**

Reviewed and approved by the Hamilton Township Planning Board

Application Number: 03-07-069C

Approval Date: April 12, 2007

PROJECT SUMMARY

The applicant received revised preliminary and final site plan approval for the purpose of replacing the existing Harry's Army Navy store with 15,510 square feet of new retail space, adding 21,967 square feet of retail space and 1,000 square feet of office space (Phase II) to an existing shopping center known as Deer Path Pavilion. The property is located at Crosswicks-Hamilton Square Road, Hamilton Township, Mercer County, New Jersey.

The design includes pervious pavement parking areas and bike paths, a groundwater recharge bed, and two existing extended detention basins. Under the application, one of these basins would be modified (elongated), while the other would have its outlet structure reconfigured.

REVIEW FINDINGS

- Neither a LID Checklist nor a NSPS Spreadsheet Analysis was submitted and it was not demonstrated that nonstructural stormwater strategies were used to the greatest extent practicable, as required.
- Curve Numbers used for post-development "green" areas (good condition) appear overly optimistic because they do not account for likely compaction of these areas during construction, meaning groundwater recharge amounts will be lower than calculated.
- Soil permeability tests were performed, revealing rates of around 1.4 in/hr. A rate of 0.7 in/hr was used for design purposes — soils consist in part of clay loam and silty clay. Typically, a minimum rate of 0.5 in/hr is desired for infiltration BMPs so there is little margin of error in the design and construction.
- There is very little information on the hydraulic design of the pervious pavement and groundwater recharge system, leaving their performance in question.
- The sub-base for pervious pavement is more shallow than typically specified, and portions of the pervious pavement and groundwater recharge system appear to be on fill; infiltration systems should generally not be placed on fill. These atypical design elements call into question the ultimate performance of the systems.
- Extended detention basins include concrete low-flow channels, which may cause runoff from small storms to flow directly through the basins with little quality control.
- Peak rates have not been demonstrated to be reduced to the required levels for the 2- and 10-year storms.
- An excessive sediment loading rate on the recharge bed could lead to premature failure.

CONCLUSION

Although this project incorporates some BMPs, the execution of these design elements is in question. Though not specifically required under the Township stormwater ordinance, many elements of the stormwater design are not in conformity with current engineering practices and recommendations, which could affect their performance. In general, there is a lack of important information in support of the proposed stormwater management design. Also, there is no apparent consideration of nonstructural land development stormwater management practices.

*Hamilton Estates*

Reviewed and approved by the Hamilton Township Planning Board

Application Number: 04-08-090A

Approval Date: April 12, 2007

PROJECT SUMMARY

The project consists of twelve single-family residential units proposed to be constructed on a 63.5 acre agricultural tract bordered by Doctor's Creek. The site contains a finger of wetlands connected to a ditch that carries flows to an onsite pond. This pond also receives a large portion of the runoff flows from the eastern portion of the property. Runoff from the southwestern portion of the property flows to a wetlands area adjacent to the pond and from there it drains to the Doctor's Creek.

To a great extent, the site disturbance is limited to the perimeter portions of the tract leaving a large portion of the interior intact. Much of the runoff will be conveyed to a detention basin that is fitted with a Manufactured Treatment Device. The outfall structure directs the basin's flows to the existing onsite pond.

REVIEW FINDINGS

- Hydrological calculations were performed using a unit hydrograph that is inconsistent with the NRCS requirements and the Rules.
- The pervious and impervious areas were not routed separately for the post-developed drainage areas labeled Sections 1-3. This has the effect of underestimating the peak flows after development. Although a revised analysis indicates that when this mistaken assumption is corrected the peak flow reductions are still met for all three storm events, this project still has not met the requirements of this section of the Rules.
- The design engineer considered only one of the three soils on site in his calculations, contrary to the Rules requirements. It should be noted, however, that because the site's Type A and wetland soils are largely undisturbed, it is likely that a revised analysis would yield adequate peak flow reductions.
- No soil investigations were performed in the area of the detention basin. Site soil surveys indicate that it is unlikely that the basin will have the required 2-foot separation between the basin bottom and the groundwater level, and therefore, the functioning of the basin cannot be assured.

CONCLUSION

The proposed stormwater management system is not in compliance with the RSIS due to three incorrect assumptions in the calculations: failure to route the pervious and impervious areas separately, failure to perform calculations for each site soil type, and use of an incorrect methodology to perform calculations. The lack of soil investigation in the area of the detention basin leads to speculation whether the design meets the groundwater separation requirement.

Significantly, despite these improper modeling assumptions, the required peak flow reductions are met for all three storm events, the required TSS removal rate is achieved, groundwater recharge is enhanced and nonstructural stormwater management strategies have been utilized to the greatest extent practicable. This project demonstrates that the Hamilton Township Planning Board has witnessed a more thorough application.

*Brandywine Woods*

Reviewed and approved by the Hamilton Township Planning Board

Application Number: 06-01-004

Approval Date: July 26, 2007

PROJECT SUMMARY

The Brandywine Woods development project consists of 300 residential units to be constructed on a 64.6 acre tract. There are large areas of wetlands, several ditches and numerous ponds located on the rear half of the property. Most of the runoff from a smaller portion of the site will be directly routed to an infiltration basin with overflows from the larger storm events discharging into a wet pond. Flows from the larger portion of the development site will bypass the infiltration basin and flow directly into the wet basin. With the exception of two small bypass areas, all of the runoff from the impervious areas is directly connected to the storm sewer system.

REVIEW FINDINGS

- No LID Checklist was submitted and the developer failed to demonstrate it has used nonstructural stormwater management strategies to the greatest extent practicable.
- The developer's estimation of the runoff in both the existing and post-developed condition is incorrect for multiple reasons; once these assumptions are corrected, as remodeled for this report, the stormwater runoff and groundwater recharge calculations fail to meet the Rules requirements for peak flow reductions and water quality treatment.
- The developer greatly overestimated the peak discharge for existing conditions in multiple calculations, allowing greater post-development peak flows that appear to meet the Rules. Revised calculations show that the peak flow reductions will not be met for the 2- and 100-year storm events.
- The groundwater recharge requirement has not been met for this project. Permeability rates shown for a test pit dug in the area of the proposed infiltration basin are substantially slower than the minimum required by the Rules due to the presence of clayey soils. It is unclear how the range of values was determined as no field or laboratory testing was performed.
- No Stormwater Maintenance Plan was found in the Township file although a plan is referenced in a memo as needing to be amended; it could not be determined with certainty whether this portion of the Rules has been met.
- The water quality criteria of 80 percent TSS removal for the entire developed area has not been met for this project.

CONCLUSION

This project seems to have made no attempt to comply with the intents of the Rules, including use of Low Impact and Nonstructural Stormwater Strategies, reduction of project impacts, and infiltration requirements. Also, miscalculations and omissions in data affect a number of submitted calculations, which inaccurately represent the plan as meeting a number of Rules requirements. Although one page of the Geotechnical Report and the entire Stormwater Maintenance Plan were missing, it appears the Township did not make an effort to receive these items before approval was issued.



*Palagano Property*

Reviewed and approved by the Hamilton Township Planning Board

Application Number: 06-07-062

Approval Date: July 26, 2007

PROJECT SUMMARY

The applicant was given preliminary and final approval to construct a 14,234 square foot single-story retail center at 1709 New Jersey Route 33. The original proposed stormwater system included a single sand-bottom infiltration basin surrounded by a 6-foot-high retaining block wall. Concerns noted by the applicant prompted an alteration of the design to an underground detention basin at the front and rear of the property and a conservation easement to protect a rear forested area of the property.

REVIEW FINDINGS

- No LID Checklist was submitted and the developer failed to demonstrate it has used nonstructural stormwater management strategies to the greatest extent practicable. All stormwater management proposed was structural in nature.
- Despite the existence of a mature wooded lot on site, the site development was maximized.
- There is no Letter of Interpretation (LOI) submitted for an adjacent tract. The LOI is significant with respect to the buffer requirements that extend into this property (after Hamilton Township vacates Bisbee Avenue).
- The critical nature of the site should have triggered an Environmental Impact Statement requirement but the staff and Board did not require it.
- Due to the concerns of neighbors about worsening of flooding in basements, the Board required the applicant to model groundwater movement and assess the seasonal high water table and submit findings to the Board.
- It is unclear how the applicant arrived at a revised total impervious coverage of 59.95 percent — just 0.05 percent under the maximum. Because the required AutoCAD files were not submitted, it was not possible for the Township or this review to verify this information.
- The applicant's engineer used a composite analysis of impervious and pervious, which is not consistent with the Rules.
- There is no capacity analysis for the area where the new storm sewer ties into the existing, despite the requirement that the applicant's engineer show "...that he has examined the drainage plan and found that the interests of the township and of neighboring properties are adequately protected."
- The Subsurface Detention/Retention System receives untreated runoff despite the Rules requirement that "all runoff to a subsurface infiltration basin must be pretreated."

CONCLUSION

This project's lack of a number of required application elements combined with unacceptable design elements and incorrectly performed calculations demonstrate that a deficient application can still receive Township approval. The wide-ranging nature of the report's shortcomings underscores the need for the Township to more clearly understand all aspects of the Rules to better ensure compliance.

*Square Properties*

Reviewed and approved by the Hamilton Township Planning Board

Application Number: 06-07-066

Approval Date: August 9, 2007

PROJECT SUMMARY

The applicant was given preliminary and final site plan approval and variance relief for sign location to construct a two commercial buildings - one 20,850 and the other 7,812 square feet. Abutting residential properties, the project was strongly contested by the existing neighbors over concerns that the filling of a wetland on site would create flooding in the adjacent homes.

REVIEW FINDINGS

- The project proposes to fill two wetlands on site that intercept virtually all of the existing runoff. The design engineer then admits that the project will not meet the required peak flow rate reduction due to the lack of runoff in the predevelopment condition.
- The design fails the Non-Structural Point System, even when the engineer falsely takes credit for two strategies not proposed in the design. The report goes on to state the design is compliant with two of the nine required goals simply "...in the context of the owner's constitutional guaranteed right to improve his property" despite the fact that those goals were not attempted to be met.
- All impervious areas are connected, despite the municipal ordinance directing otherwise. The engineer compounds this failing by using an inferior method to model the pre- and post-development conditions to produce favorable calculation results.
- Over half the site contains woodlot on B soils; despite this, the design calculations assume that all of the existing woodlot soils are of a single, less permeable soil group. The fill soil is then assumed to be in the B soil group with the effect of showing much less change from the existing to developed conditions. However, it is extremely unlikely that the compacted fill, no matter what soil type, will generate less runoff than the undisturbed woodlot.
- No test pit and infiltration testing was performed at the location of the underground basin, as required. Soil testing performed does not meet the BMP manual Appendix E testing requirements. Additionally, the engineer utilized incorrect soil permeability assumptions.
- The seasonal high groundwater table was established using an unapproved method. In addition, there is no reference to the water table at the two wetland areas proposed to be filled.
- The water entering the drywells is not pretreated, likely resulting in premature clogging of the facility. Additionally, the engineer states "Over time, the sand at the bottom of the underground [infiltration] basin will trap sediment and fine particles, which will reduce the infiltration from the basin" - compromising long-term groundwater recharge.

CONCLUSION

The design does not meet peak rate reduction, groundwater recharge and non-structural stormwater management strategies. Despite the project's numerous design faults and admitted deficiencies - making this an excellent example of a project needing mitigation - the Township did not require any mitigation in its review and approval. More disturbing is the project engineer's irrelevant comment stating that two of the nine required non-structural strategies were not met due to "the owner's constitutional guaranteed right to improve his property" - defiant of the rights of the surrounding and downstream communities.

*Twin Ponds*

Reviewed and approved by Hamilton Township Zoning Board

Application Number: 05-02-011B

Approval Date: September 11, 2007

PROJECT SUMMARY

Twin Ponds is a multi-use development project consisting of two commercial and retail buildings totaling 17,000 square feet and four three-story apartment buildings. This 10.9 acre site consists primarily of agricultural fields and a small portion of woods. After development, stormwater runoff will be pretreated with sand filters and directed to three underground detention systems. Also proposed are two ornamental ponds that provide a small amount of stormwater management. The outflows from the basins and overflows from the ponds are conveyed to an outlet structure near the wooded rear portion of the site.

REVIEW FINDINGS

- No LID Checklist was submitted and the developer failed to demonstrate it has used nonstructural stormwater management strategies to the greatest extent practicable.
- The project fails to meet the groundwater recharge requirements.
- No required permeability tests were performed and no infiltration rate has been determined for the soils under the infiltration basin as required; no proof is presented that the basins will drain as necessary.
- The soil test pit was not excavated deeply enough to verify that the infiltration basin bottom will be two feet above the Seasonal High Water Table as required.
- Several miscalculations and incorrect estimates concerning soils data lead to the serious underestimation of post-development peak flows.
- A corrected hydrological analysis demonstrates that the peak flow reductions will not be met for the 2- and 100-year storm events making it likely that one or more of the detention basins or ponds are undersized. In the 100-year storm event, two facilities receive flows that exceed their capacity.
- There are no specific detention basin construction details provided; therefore, size and storage volumes of the basins cannot definitively be determined.
- The “pre-treatment” sediment removal system for the sand filters has not been certified as required, making it necessary for the sand filter to receive regular sediment-removal maintenance. Maintaining the sand filter calls for removing the entire sand layer and reconstructing the system with clean sand, requiring the parking lot above the system to be excavated and replaced as well. No maintenance instructions were provided for the sand filter as required.

CONCLUSION

The plans fail to provide for a long list of the central requirements of the Rules, creating a serious concern that this system will perform adequately. Two of the facilities are likely to overtop during large storm events, resulting in a lack of peak rate reduction. In addition, the TSS removal system is either unlikely to receive the required regular maintenance and thus will fail, or it will require exorbitantly expensive maintenance procedures.

*Hamilton Station*

Reviewed and approved by the Hamilton Township Planning Board

Application Number: 04-09-107A

Approval Date: April 16, 2009

PROJECT SUMMARY

The applicant received preliminary and final site plan approval to construct five four-story apartment buildings, twenty-nine two-story townhomes, two clubhouses each with a pool, pergola, and patio areas, and 1,129 parking spaces on 47.17 acres. The development is served by three detention basins and one underground water quality detention basin.

REVIEW FINDINGS

- There are very limited nonstructural and LID strategies incorporated into the proposed design. One nonstructural strategy credited is in fact structural; one LID strategy listed fails to recharge groundwater as claimed; and although another LID strategy takes credit for vegetated low-flow channels, the channels are concrete-lined on the detail sheet.
- The applicant failed to protect water quality by filling wetlands on the site, failing to minimize impervious area by providing more parking area than required, and failing to disconnect flow over impervious surfaces.
- The design will create higher peak runoff, requiring larger structural measures than provided to reduce the peak discharge.
- The Soil and Erosion Control Plans are underdeveloped and fail to adequately protect the existing pond, basins, onsite buffers and offsite water courses.
- Increases in peak flows from the Approved design to the Amended design call into question the contention that the Amended design will have less impact than the Approved design.
- The Subsurface Detention/Retention System receives untreated runoff despite the Rules stating “all runoff to a subsurface infiltration basin must be pretreated.”
- The calculations fail to prove that the project’s basins meet the required water quality standards.
- The design surpasses the allowable flow for the post-construction 100-year storm at Point of Analysis A and Existing Area 1.
- The design proposes a retaining wall to create the basin, violating the Safety Standards for Stormwater Management Basins. Other basin design elements are either designed incorrectly or violate Dam Safety Standards. The Stormwater Management Maintenance Plan fails to require that dam inspection reports be forwarded to Hamilton Township’s engineer.

CONCLUSION

The above review findings are a highly-condensed summary of a list of twenty-six items demonstrating that the submitted design is not in compliance with the Rules. In fact, there are so many inaccuracies and omissions in the submitted stormwater report that it is difficult to determine whether the project engineer was simply ignorant of the stormwater rules or deliberately deceptive in the engineer’s report in order to gain approval for a substandard project. Equally disturbing is the fact that this project passed review by the Township engineer and, ultimately, the Township Planning Board.

*Care One*

Reviewed and denied by the Hamilton Township Zoning Board

Application Number: 99-01-005B

Denial Date: November 16, 2009

PROJECT SUMMARY

The applicant was denied a use variance and site plan approval with bulk variances for a 62,259 square foot addition to an assisted living facility. The application was denied for a number of reasons. However, despite expert testimony to the contrary, the project's stormwater management system was specifically deemed by the Board to be "appropriate pursuant to the required standards for purposes of the use variance approval".

REVIEW FINDINGS

- There are very limited nonstructural and LID strategies incorporated into the proposed design. Also, the project required a number of variances, which make it inconsistent with LID strategies.
- The design claims exemption of detention requirements for small drainage areas, which are not supported by the Rules. There is no water quality treatment at these same locations.
- The applicant's engineer did not incorporate all of the site soil groups present for existing and proposed conditions, affecting pre- and post-development calculations.
- The manufactured treatment device is designed to be on-line not off-line as required by the NJDEP and stipulated in the Township Ordinance. Resuspension of collected pollutants is likely.
- The design proposes a long retaining wall to create the basin, violating the Safety Standards for Stormwater Management Basins by making it difficult for someone to get out of the basin or for a rescue to be performed.
- The Operation and Maintenance Manual addresses the care for a dry detention basin; the site's high groundwater table means the basin will be a wetland basin, requiring a higher standard of care. Several items important to the proper function and safety of the basin are not addressed.
- The engineer did not include the contributions of the existing wetland (to be filled) in the reduction of pre-development offsite runoff; this omission is responsible for underestimating post-development peak runoff and volume.
- Onsite soil testing logs are in error with regard to the depth to seasonal high groundwater. The logs state that mottling is evident at depths that are shallower than the required isolation distance.
- Test pits were not dug to the required depths and in the proper locations; wetland scientist borings show the basin is too close to groundwater levels to perform as the engineer states.
- The engineer does not describe the sequence of the project to ensure stormwater management is maintained during the filling of the existing basin and construction of the proposed basin.

CONCLUSION

The very limited use of LID and nonstructural strategies combined with faulty assumptions and soil test interpretations for the designed basin mean that the stormwater design is wholly noncompliant. In addition to the public safety issue of the basin's retaining wall, which is located along a pedestrian access way, the failure of the basin to function as advertized will lead to long-term maintenance and performance issues. The Township's approval of this design suggests a lack of understanding of the Rules as well as a lax attitude in reviewing submitted data.

*Levin Property*

Reviewed and denied by the Hamilton Township Planning Board

Application Number: 03-12-128

Denial Date: May 6, 2004

PROJECT SUMMARY

The project proposed the construction of a 201,612 square foot shopping center. The design presented to the Planning Board specified infiltration basins onsite; however, the design submitted to the NJDEP proposed clay-lined basins, which won't function as infiltration systems as required by the Rules. The Planning Board apparently did not see this change in design and, with the recommendation of the Hamilton Township Engineer, relinquished its stormwater review to NJDEP. Since the Planning Board incorrectly abandoned its review, the below comments are applicable to what was submitted to NJDEP.

REVIEW FINDINGS

- There is no documentation in the Drainage Report on how the exfiltration rate of 5.130 in/hr was determined. With plans showing clay lining, this rate is entirely exaggerated, as clay exfiltration rates are in the range of 0.04 to 0.20 in/hr, effectively eliminating the infiltration function of the basins.
- The Groundwater Recharge Analysis is based on a larger surface area that includes the surface of the upper side slopes; the area should be reduced to the area of the bottom of the basin or at the BMP Effective Depth. This point is somewhat moot as the basins are clay-lined and will most likely recharge very little water.
- Separate calculations were not provided for areas with different soil types as required. This point is, again, somewhat moot as the basins are clay-lined and will most likely recharge very little water.
- With all basins clay lined, it is also difficult to ascertain whether the design meets the water quality requirements.
- There are scattered areas around the site that are not clay lined and look to be areas proposed for infiltration, but these areas were not analyzed in the Drainage Report. It is unclear whether these areas alone would be able to meet the water quality requirements.
- Calculations for the three basins were based on a different bottom of the basin elevation than was noted on the plans. In addition, the pipe discharges into the basins are at elevations that would mean that the water will back up into the pipe and not enter the facility.
- The report fails to demonstrate that the elevations of the calculated groundwater mounding are lower than adjacent development.

CONCLUSION

The report's calculations neglect to account for the impact of clay linings in all of the project basins. This is a significant oversight because the clay lining will negate groundwater recharge and each basin's water quality benefits. Discrepancies between the report and plan set mean that any benefits demonstrated by the report will not be realized in the real world because the project will be constructed using the plans, not the report.

## APPENDICES

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## ***Appendix A - Technical Individual Project Reviews***

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This Appendix is available online at:

<http://delawareriverkeeper.org/index.aspx>

*Click on the **Resources** tab and select **Reports**  
from the drop-down menu, then select:*

**Category: Stormwater**

**Sub-Category: Hamilton Township, NJ**

- Hamilton Twp. NJ Final Report Brandywine Woods
- Hamilton Twp. NJ Final Report Christopher Estates
- Hamilton Twp. NJ Final Report Hamilton Estates
- Hamilton Twp. NJ Final Report Twin Ponds
- Hamilton Twp. NJ Final Report Waterview Center
- Hamilton Twp. NJ Review Care One
- Hamilton Twp. NJ Review Christopher Estates
- Hamilton Twp. NJ Review Hamilton Station
- Hamilton Twp. NJ Review Levin Property
- Hamilton Twp. NJ Review Palagano Property
- Hamilton Twp. NJ Review Sawmill Estates
- Hamilton Twp. NJ Review Square Properties
- Hamilton Twp. NJ Review Twin Ponds

## ***Appendix B - Project Matrices and Summary Matrix***

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This Appendix is available online at:

<http://delawariverkeeper.org/index.aspx>

*Click on the **Resources** tab and select **Reports**  
from the drop-down menu, then select:*

**Category: Stormwater**

**Sub-Category: Hamilton Township, NJ**

➤ [Hamilton Twp. NJ Compliance Matrix](#)

### ***Appendix C - Hamilton Township Annual Report and Certifications***

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This Appendix is available online at:

<http://delawareriverkeeper.org/index.aspx>

*Click on the **Resources** tab and select **Reports**  
from the drop-down menu, then select:*

**Category: Stormwater**

**Sub-Category: Hamilton Township, NJ**

- [Hamilton Twp. NJ Annual Reports 2004 through 2008](#)

### ***Appendix D - New Jersey Department of Environmental Protection Inspection Reports***

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This Appendix is available online at:

<http://delawareriverkeeper.org/index.aspx>

*Click on the **Resources** tab and select **Reports**  
from the drop-down menu, then select:*

**Category: Stormwater**

**Sub-Category: Hamilton Township, NJ**

➤ [Hamilton Twp. NJ Compliance Evaluations 2005-2009](#)

### ***Appendix E - Mercer County Mosquito Control Report***

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This Appendix is available online at:

<http://delawareriverkeeper.org/index.aspx>

*Click on the **Resources** tab and select **Reports**  
from the drop-down menu, then select:*

**Category: Stormwater**

**Sub-Category: Hamilton Township, NJ**

➤ [Hamilton Twp. NJ Mosquito Control Report](#)

## ***Appendix F - Resolutions of Memorialization***

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This Appendix is available online at:

<http://delawareriverkeeper.org/index.aspx>

*Click on the **Resources** tab and select **Reports**  
from the drop-down menu, then select:*

**Category: Stormwater**

**Sub-Category: Hamilton Township, NJ**

- Hamilton Twp. NJ Resolution Brandywine Woods
- Hamilton Twp. NJ Resolution Care One
- Hamilton Twp. NJ Resolution Christopher Estates
- Hamilton Twp. NJ Resolution Deer Path
- Hamilton Twp. NJ Resolution Hamilton Estates
- Hamilton Twp. NJ Resolution Hamilton Station
- Hamilton Twp. NJ Resolution Levin Property
- Hamilton Twp. NJ Resolution Palagano Property
- Hamilton Twp. NJ Resolution Sawmill Estates
- Hamilton Twp. NJ Resolution Square Properties
- Hamilton Twp. NJ Resolution Twin Ponds
- Hamilton Twp. NJ Resolution Waterview Center



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