MUNICIPAL STORMWATER

MANAGEMENT PLAN (MSWMP)

This MSWMP is Prepared for:

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BOROUGH OF MILFORD MUNICIPAL STORMWATER MANAGEMENT PLAN

Table of Contents

CHAPTER TITLE **Page No.**

Table of Contents continued...

APPENDIX

Page No.

Figures:

1.0 INTRODUCTION

1.1 Description of an MSWMP

The Municipal Stormwater Management Plan (MSWMP) is a management guideline that documents strategies for the Borough of Milford (hereinafter, the "Borough"), in addressing stormwater-related impacts within the Borough. The criteria for this MSWMP is a requirement under the State of New Jersey's Department of Environmental Protection (NJDEP) Rules and Regulations, N.J.A.C. 7:14A-25, "*Municipal Stormwater Regulations*". This MSWMP contains all the required elements described in N.J.A.C. 7:8, "*Stormwater Management Rules*", and addresses groundwater recharge, stormwater quantity, and related impacts, by incorporating stormwater design and performance standards for all new "major" developments within the Borough (defined as projects that disturb more than one acre of land or create more than 0.25 acre of impervious coverage). These Standards are intended to minimize the adverse impacts of stormwater runoff, affects of water quality/water quantity, and handling the loss of groundwater recharge, which provides for the "Base Flow" in receiving waterbodies. The MSWMP also describes long-term operation and maintenance measures for existing and future stormwater management facilities.

1.2 Omission of Low Impact Analysis

This initial MSWMP does not include an evaluation of the Borough's Master Plan, Ordinances, or other Planning Documents for recommendation of modifications to design criteria that include "low-impact" development techniques. Since the Borough has a combined total of less than one (1) square mile of the vacant (or "agricultural" lands), they are exempt from completing this assessment, which would otherwise be due on or before February 2, 2006. The Borough, at their option, may choose to amend their MSWMP to incorporate this assessment at a later date.

1.3 Omission of Build-Out Analysis

This initial MSWMP Plan does not include a "projected" or "build-out" analysis, assuming full development under existing Zoning (projected land use) criteria. Since the Borough has a combined total of less than one (1) square mile of the vacant (or "agricultural" lands), they are exempt from completing this assessment, which would otherwise be due on or before February 2, 2006. The Borough, at their option, may choose to amend this MSWMP to incorporate this assessment at a later date.

1.4 Omission of Mitigation Plan

Under the initial MSWMP, a "Mitigation Plan" is not included. As such, the Borough recognizes that it would not be able to grant variances or exemptions from the design and performance standards under N.J.A.C. 7:5, until such time as the MSWMP is amended to incorporate a specific mitigation strategy. Until or unless a "Mitigation Plan" is developed, the Borough will require all new development that is subject to these Regulations to provide all required stormwater "Best Management Practices" (BMPs) on-site.

2.0 MSWMP GOALS

2.1 Goals of the MSWMP – The Goals of the MSWMP are to:

- Reduce flood damage, including damage to life and property.
- Minimize, to the extent practical, any increases in stormwater runoff from any new development.
- Reduce soil erosion from any development or construction project.

- Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures.

- Maintain groundwater recharges.

- Prevent, to the greatest extent feasible, an increase in non-point pollution.

- Maintain the integrity of stream channels for their biological functions, as well as for drainage.

- Minimize pollutants in stormwater from new and existing development to restore, enhance, and maintain the chemical, physical and biological integrity of the waters of the State, to protect public health, to safeguard fish and aquatic life and scenic and ecological values and, to enhance the domestic, municipal, recreational, industrial and other uses of the water.

- Protect public safety through the property design and operation of stormwater basins.

2.2 Implementation of the MSWMP Goal

To achieve these goals, this Plan outlines specific stormwater design and performance standards for new development. Additionally, the Plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the Plan to ensure long-term effectiveness of stormwater management facilities. The Plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

3.0 STORMWATER DISCUSSION

Land development can dramatically alter the hydrologic cycle (**See Figure C-1**) of a site and, ultimately an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evaportranspiration.

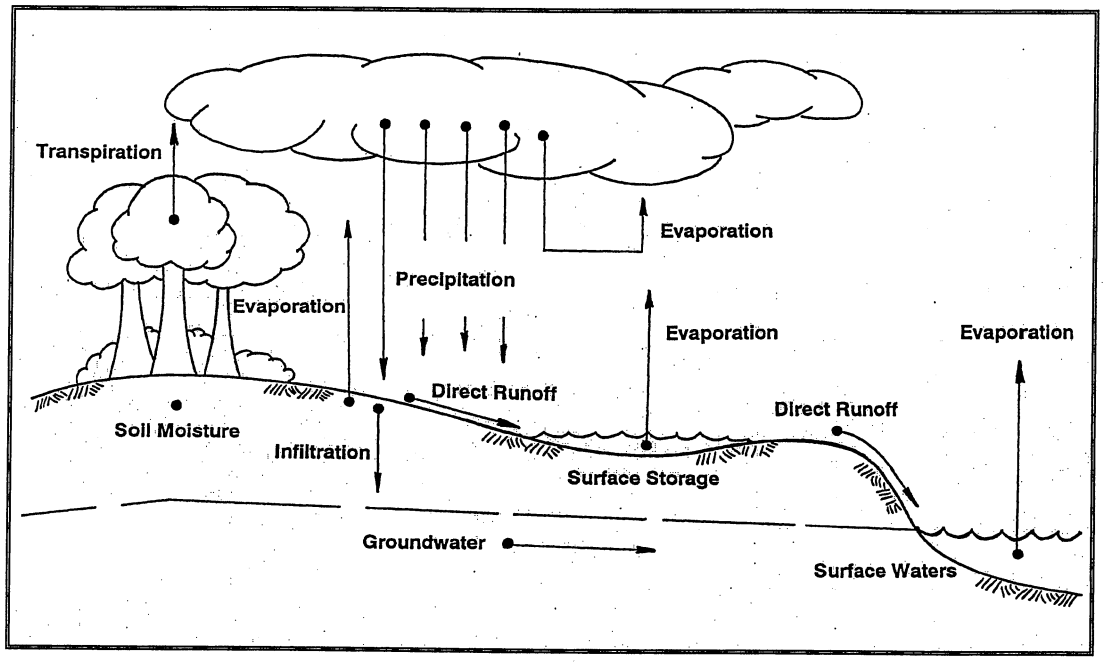


Figure C-1, Hydrologic Cycle

Development can remove this beneficial vegetation and replace it with lawn or impervious coverage, thereby reducing the site evaportranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site. Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response

of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravated existing downstream flooding and erosion problems and, increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream. Increases in impervious area can also decrease opportunities for infiltration which, in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

In addition to increase in runoff peaks, volumes, and loss of groundwater recharges, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens, and nutrients.

In addition to increased pollutant loading, land development can adversely affects water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins, can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as trout. Development can remove trees along stream banks that normally provide shading, stabilization and leaf litter that falls into streams and becomes food for the aquatic community.

4.0 BACKGROUND

The Borough encompasses an area of 1.15 square miles, located in the western portion of Hunterdon County. The Borough's predominant land use is single-family residential development with some commercial development along Bridge Street and Water Street. The largest undeveloped areas are located in Rural Residential District (1.0 unit per 2.0 acres, density) in the northwest, northeast and southeast sections of the Borough. There is a large tract of land on Hunterdon County Route 519, with frontage along the Delaware River, containing an abandoned industrial operation (Paper Mill) and has recently been designated as a "Redevelopment District" by the Borough.

The existing land use features within the Borough are shown on **Figure C-6** and the Borough's Zoning is shown on **Figure C-8**. An overall photographic view of the Borough is shown on **Figure C-10**.

According to the 2000 Census, the Borough has a population of 1,195 residents. This represents a 6.3% decrease in population over the 1990 Census. Given the limited areas of developable property, the Hunterdon County Planning Board projects a total population at build-out of 1,442 residents. Any future residential development on the abandoned Paper Mill tract, which has been designated for redevelopment, may alter this projection.

The Borough of Milford is located along the Delaware River. The Borough is bounded on the east and north by Holland Township. The Borough's southern boundary with Alexandria Township is formed (in part) by an unnamed tributary to the Delaware River. Topographic conditions throughout the Borough are shown on **Figure C-3**. The various streams and rivers within the Borough are shown on **Figure C-2**, with the State designated surface water quality classifications shown on **Figure C-2(A).** The various streams contain portions of Hydrologic Unit Code (HUC) areas designated as No. 02040105170010; No. 02040105170020; and No. 02040105170030. These HUC-14 areas are shown in **Figure C-7**.

The Milford Creek flows in a southerly direction through the center portion of the Borough. Its tributary, the Hakihokahe Creek (a.k.a. – Quequacommisacong Creek) flows in a southwesterly direction and connects with the Milford Creek to the west of Water Street, near the intersection of Old York Road. Both streams have Category One Classifications, which requires the preservation of undisturbed areas within a 300-foot buffer as a "Special Water Resource Protection Area" (SWRPA). This condition requires that any subsequent land development in these drainage basins comply with the NJDEP's Regulations relating to the SWRPA. In addition to the rivers and streams that run through the Borough, there are a number of wetland areas that provide flood storage, removal of pollutants and flora/fauna habitat. These wetland areas along with the SWRPA areas associated with the Milford Creek and Hakihokahe Creek are shown in **Figure C-9**.

The Borough is also subject to flooding from the Delaware River and the referenced drainage ways which traverse and border the Municipality. Major floods have occurred on the Delaware River on October 1903, August 1995 and May 1972. In August 1955, the flooding was considered the most devastating and costly event however, reoccurring floods (including those resulting from a major ice jam along the Delaware River in 1996), continue to represent sources of potential damage to private and public infrastructure along the River and its tributaries. The Borough has also experienced significant stream bank erosion, especially along the Milford Creek. This erosion is due to excessive stream velocities during a flood condition. The Borough has attempted to stabilize some of the stream embankment in areas adjoining public infrastructure and through public property.

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the State's waterways. Monitoring the effects of stormwater pollution on the health of our waterways enables us to determine the best strategies to improve water quality for residents locally and throughout the State. There are over 800 AMNET sites throughout New Jersey. These sites are sampled for benthic macroinvertebrates (biological indicators of stream health) by NJDEP, on a five-year cycle. Streams are classified as non-impaired, moderately impaired or, severely impaired, based on the AMNET data. The data is used to

generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to the benthic macroinvertebrate community dynamics in the waterways. Based on the AMNET data, the waterbodies within the Borough are classified as "non-impaired". The closest AMNET site is located on the Milford Creek, at its crossing with Bridge Street (No. AN0077). There is also an AMNET monitoring site located upstream on the Hakihokahe Creek in Holland Township. This station also shows a "non-impaired" classification of the waterway.

The Borough provides a public water system, supplied by groundwater by two wells, located near the intersection of Old York Road and Water Street (County Route 519), and near the southern end of Carpenter Street. These wells, along with the "NJ GS Well Head Protection Areas", are shown on **Figure C-5**. The "Well Head Protection Area" delineations were established in response to the Safe Drinking Water Act Amendments of 1986 and 1996, as part of the Source Water Area Protection Program (SWAP). The delineations are the first step in defining the sources of water to a public supply well. Within these areas, potential contamination will be assessed and appropriate monitoring will be undertaken as part of subsequent phases of the NJDEP, SWAP Program. The preservation of the Borough's public water supply requires the protection of groundwater recharge areas. The ability of various areas of the Borough to recharge groundwater is shown on **Figure C-4**.

5.0 DESIGN & PERFORMANCE STANDARDS

The Borough will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5, to minimize the adverse impacts of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving waterbodies. The design and performance standards will include the language of maintenance of stormwater management measures consistent with the Stormwater Management Rules at N.J.A.C. 7:8-5.8, "Maintenance Requirements", and language for safety standards, consistent with N.J.A.C. 7:7-6, "Safety Standards for Stormwater

Management Basins". The ordnances will be submitted to the County for review and approval within 24 months of the effective date of the Stormwater Management Rules (on or before February 2, 2006).

The Stormwater Management Ordinance will establish minimum stormwater management requirements and controls for major developments and reduce the amount of non-point source pollution entering waterways. The ordinance will guide new development that is proactive and minimally impacts natural resources. Specifically, the Stormwater Management Ordinance shall:

- Reduce artificially-induced flood damage to public health, life and property;
- Minimize increased stormwater runoff rates and volumes;
- Minimize the deterioration of existing structures that would result from increased rates of stormwater runoff;
- Induce water recharge into the ground wherever suitable infiltration, soil permeability and favorable geological conditions exist;
- Prevent an increase in non-point source pollution;
- Maintain the integrity and stability of stream channels for their biological functions, as well as for drainage, the conveyance of floodwater, and other purposes;
- Control and minimize soil erosion and the transport of sediment;
- Minimize public safety hazards at any stormwater detention facility constructed, pursuant to subdivision or site plan approval;

- Maintain high water in all streams and other surface water bodies;

- Protect all surface water resources from degradation; and

- Protect groundwater resources from degradation.

This Plan and the adopted ordinance(s) in no way abrogates any other ordinance, rule or regulation, statute or other provision of law imposed by local, county, state or federal entities. Wherever any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation or other provision of law, whichever provisions are more restrictive or impose higher standards, shall prevail.

During construction, the Borough inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed.

6.0 PLAN CONSISTENCY

The Borough is not within a Regional Stormwater Management Planning Areas and no TMDLs have been developed for waters within the Borough, therefore, this Plan does not need to be consistent with any regional stormwater management plans (RSWMPs) nor any TMDLs. If any RSWMPs or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated accordingly to meet any required consistency.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C 5:21. The Borough will utilize the most current update of the RSIS in the stormwater management review of all "major developments". The Borough SWM Ordinance will require that all new "major" development projects (residential and non-residential) be designed in accordance with the Stormwater Design Standards of the RSIS.

The Borough's Stormwater Management Ordinance will require that all new development and redevelopment plans comply with New Jersey Soil Erosion and Sediment Control Standards. During construction, Borough inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the local Soil Conservation District.

7.0 NON-STRUCTURAL STORMWATER MANAGEMENT STRATEGIES

This initial MSWMP does not include an evaluation of the Borough's Master Plan, Ordinances, or other Planning Documents for recommendations of modifications to design criteria that include "low-impact" development techniques. Since the Borough has a combined total of less than one (1) square mile of the vacant (or "agricultural" lands), they are exempt from completing this assessment, which would otherwise be due on or before February 2, 2006. The Borough, at their option, may choose to amend their MSWMP to incorporate this assessment at a later date.

8.0 LAND USE / BUILD-OUT ANALYSIS

This initial MSWMP Plan does not include a "projected" or "build-out" analysis, assuming full development under existing Zoning (projected land use) criteria. Since the Borough has a combined total of less than one (1) square mile of the vacant (or "agricultural" lands), they are exempt from completing this assessment, which would otherwise be due on or before February 2, 2006. The Borough, at heir option, may choose to amend this MSWMP to incorporate this assessment at a later date.

9.0 MITIGATION PLANS

Under the initial MSWMP, a "Mitigation Plan" is not included. As such, the Borough recognizes that it would not be able to grant variances or exemptions from the design and performance standards under N.J.A.C. 7:5, until such time as the MSWMP is amended to incorporate a specific mitigation strategy. Until or unless a "Mitigation Plan" is developed, the Borough will require all new development that is subject to these regulations to provide all required stormwater "Best Management Practices" (BMPs) on-site.

10.0 RECOMMENDED STORMWATER CONTROL ORDINANCES

The Borough proposes to adopt a Stormwater Control Ordinance that generally follows the "*Model Stormwater Control Ordinance for Municipalities*", which is published in the New Jersey Stormwater Best Management Practices (BMPs) Manual, under Appendix 'D'. A copy of this "sample ordinance" is reproduced as follows:

New Jersey Stormwater Best Management Practices Manual

April 2004

A P P E N D I X D

Model Stormwater Control Ordinance for Municipalities

Important note: *This sample ordinance is provided to assist municipalities in the development of municipal stormwater control ordinances and the incorporation of design and performance standards into municipal stormwater management plans. It is provided for information purposes only. It is important that current regulations are carefully reviewed before any portion of this draft ordinance is adopted.*

This model ordinance does not include a section on fees. The Department expects that the review of development applications under this ordinance would be an integral part of the municipal review of subdivisions and site plans. As a result, the costs to municipalities of reviewing development applications under this ordinance can be defrayed by fees charged for review of subdivisions and site plans under N.J.S.A. 40:55D-8.b.

Notes are provided in italics throughout this model stormwater control ordinance, and are not intended to be adopted as part of the ordinance.

Section 1: Scope and Purpose

A. Policy Statement

Flood control, groundwater recharge, and pollutant reduction through nonstructural or low impact techniques shall be explored before relying on structural BMPs. Structural BMPs should be integrated with nonstructural stormwater management strategies and proper maintenance plans. Nonstructural strategies include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site or from being exposed to stormwater. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated quantity or amount of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.

Note: Municipalities are encouraged to participate in the development of regional stormwater management plans, and to adopt and implement ordinances for specific drainage area performance standards that address local stormwater management and environmental characteristics.

B. Purpose

It is the purpose of this ordinance to establish minimum stormwater management requirements and controls for "major development," as defined in Section 2.

C. Applicability

1. This ordinance shall be applicable to all site plans and subdivisions for the following major developments that require preliminary or final site plan or subdivision review:

   a. Non-residential major developments; and

   b. Aspects of residential major developments that are not pre-empted by the Residential Site Improvement Standards at N.J.A.C. 5:21.

2. This ordinance shall also be applicable to all major developments undertaken by [*insert name of municipality*].

A county water resource association created under N.J.S.A 58:16A-55.5, if the ordinance or resolution delegates authority to approve, conditionally approve, or disapprove municipal stormwater management plans and implementing ordinances.

"Department" means the New Jersey Department of Environmental Protection.

"Designated Center" means a State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

"Design engineer" means a person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but not necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

"Development" means the division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, by any person, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural lands, development means: any activity that requires a State permit; any activity reviewed by the County Agricultural Board (CAB) and the State Agricultural Development Committee (SADC), and municipal review of any activity not exempted by the Right to Farm Act , N.J.S.A 4:1C-1 et seq.

"Drainage area" means a geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

"Environmentally critical areas" means an area or feature which is of significant environmental value, including but not limited to: stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; and well head protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department's Landscape Project as

domestic treatment works. "Pollutant" includes both hazardous and nonhazardous pollutants.

"Recharge" means the amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

"Sediment" means solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

"Site" means the lot or lots upon which a major development is to occur or has occurred.

"Soil" means all unconsolidated mineral and organic material of any origin.

"State Development and Redevelopment Plan Metropolitan Planning Area (PA1)" means an area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the state's future redevelopment and revitalization efforts.

"State Plan Policy Map" is defined as the geographic application of the State Development and Redevelopment Plan's goals and statewide policies, and the official map of these goals and policies.

"Stormwater" means water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities, or conveyed by snow removal equipment.

"Stormwater runoff" means water flow on the surface of the ground or in storm sewers, resulting from precipitation.

"Stormwater management basin" means an excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management basin may either be normally dry (that is, a detention basin or infiltration basin), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

"Stormwater management measure" means any structural or nonstructural strategy, practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal non-stormwater discharges into stormwater conveyances.

these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.

2. The standards in this ordinance apply only to new major development and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new major development to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.

Note: Alternative standards shall provide at least as much protection from stormwater-related loss of groundwater recharge, stormwater quantity and water quality impacts of major development projects as would be provided under the standards in N.J.A.C. 7:8-5.

Section 4: Stormwater Management Requirements for Major Development

A. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with Section 10.

B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department' Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlnebergi* (bog turtle).

C. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 4.F and 4.G:

1. The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;

2. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and

2. Nonstructural stormwater management strategies incorporated into site design shall:

a. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;

b. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;

c. Maximize the protection of natural drainage features and vegetation;

d. 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 watershed to the point of interest within a watershed;

e. Minimize land disturbance including clearing and grading;

f. Minimize soil compaction;

g. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;

h. Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;

i. 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. Such source controls include, but are not limited to:

(1) Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Section 4.E.3. below;

(2) Site design features that help to prevent discharge of trash and debris from drainage systems;

(3) Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and

(4) When establishing vegetation after land disturbance, applying fertilizer in accordance with the

additional or larger storm drain inlets that meet these standards;

(2) Where flows from the water quality design storm as specified in Section 4.G.1 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:

(a) A rectangular space four and five-eighths inches long and one and one-half inches wide (this option does not apply for outfall netting facilities); or

(b) A bar screen having a bar spacing of 0.5 inches.

(3) Where flows are conveyed through a trash rack that has parallel bars with one-inch (1") spacing between the bars, to the elevation of the water quality design storm as specified in Section 4.G.1; or

(4) Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at N.J.A.C. 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.

4. Any land area used as a nonstructural stormwater management measure to meet the performance standards in Sections 4.F and 4.G shall be dedicated to a government agency, subjected to a conservation restriction filed with the appropriate County Clerk's office, or subject to an approved equivalent restriction that ensures that measure or an equivalent stormwater management measure approved by the reviewing agency is maintained in perpetuity.

5. Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at www.njstormwater.org.

F. Erosion Control, Groundwater Recharge and Runoff Quantity Standards

as gas stations and vehicle maintenance facilities; and

(b) Industrial stormwater exposed to "source material." "Source material" means any material(s) or machinery, located at an industrial facility that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.

(4) The design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems and other subsurface structures in the vicinity or downgradient of the groundwater recharge area.

c. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Section 5, complete one of the following:

(1) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two, 10, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;

(2) Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the two, 10, and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This

stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollution Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. The water quality design storm is 1.25 inches of rainfall in two hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table 1. The calculation of the volume of runoff may take into account the implementation of non-structural and structural stormwater management measures.

Table 1: Water Quality Design Storm Distribution

Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840
20	0.0500	85	1.1170
25	0.0750	90	1.1500
30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1.2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

2. For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Section 7, or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Section 7. TSS reduction shall be calculated based on the removal rates for the BMPs in Table 2 below. Alternative removal rates and methods of calculating removal rates may be used if the design engineer provides documentation

5. Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and structural measures that optimize nutrient removal while still achieving the performance standards in Sections 4.F and 4.G.

6. Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Section 7.

7. In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.

8. Special water resource protection areas shall be established along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:

a. The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:

(1) A 300-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided. (2) Encroachment within the designated special water resource protection area under Subsection (1) above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or

d. A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to Section 4.G (8) has been approved by the Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to G.8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in G.8.a.(1) above. In no case shall a stream corridor protection plan allow the reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.

e. Paragraph G.8 does not apply to the construction of one individual single family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before February 2, 2004, provided that the construction begins on or before February 2, 2009.

Section 5: Calculation of Stormwater Runoff and Groundwater Recharge

A. Stormwater runoff shall be calculated in accordance with the following:

1. The design engineer shall calculate runoff using one of the following methods:

a. The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Section 4 - Hydrology and Technical Release 55 - Urban Hydrology for Small Watersheds; or

b. The Rational Method for peak flow and the Modified Rational Method for hydrograph computations.

2. For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction condition of a site or portion thereof is a

supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at http://www.state.nj.us/dep/njgs/; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587.

Section 6: Standards for Structural Stormwater Management Measures

A. Standards for structural stormwater management measures are as follows:

1. Structural stormwater management measures shall be designed to take into account the existing site conditions, including, for example, environmentally critical areas, wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone).

2. Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure as appropriate, and shall have parallel bars with one-inch (1") spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Section 8.D.

3. Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.

4. At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.

Conservation Committee or any of the Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625; (609) 292-5540;

2. The Rutgers Cooperative Extension Service, 732-932-9306; and

3. The Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey, 08625, (609) 292-5540.

Section 8: Safety Standards for Stormwater Management Basins

A. This section sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. This section applies to any new stormwater management basin.

Note: The provisions of this section are not intended to preempt more stringent municipal or county safety requirements for new or existing stormwater management basins. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management basins to be retrofitted to meet one or more of the safety standards in Sections 8.B.1, 8.B.2, and 8.B.3 for trash racks, overflow grates, and escape provisions at outlet structures.

B. Requirements for Trash Racks, Overflow Grates and Escape Provisions

1. A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:

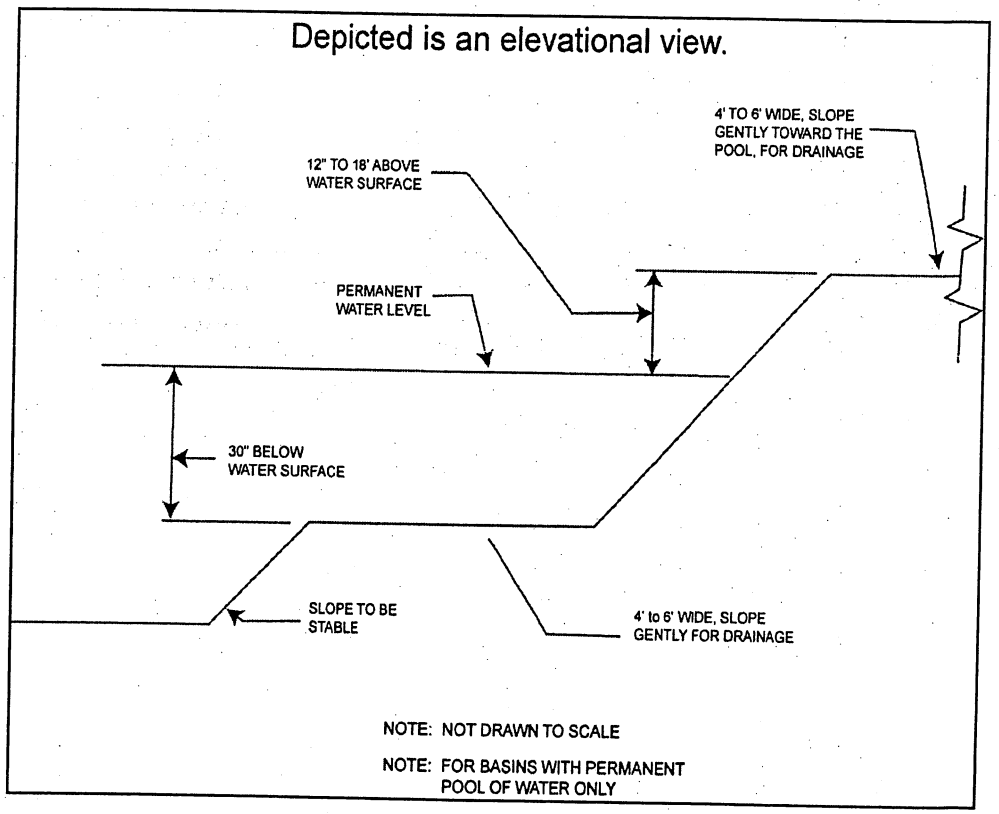
ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See Section 8.D for an illustration of safety ledges in a stormwater management basin.

c. In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3 horizontal to 1 vertical.

C. Variance or Exemption from Safety Standards

1. A variance or exemption from the safety standards for stormwater management basins may be granted only upon a written finding by the appropriate reviewing agency (municipality, county or Department) that the variance or exemption will not constitute a threat to public safety.

D. Illustration of Safety Ledges in a New Stormwater Management Basin



Section 9: Requirements for a Site Development

and significant natural and manmade features not otherwise shown.

2. Environmental Site Analysis

A written and graphic description of the natural and man-made features of the site and its environs. This description should include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site. Particular attention should be given to unique, unusual, or environmentally sensitive features and to those that provide particular opportunities or constraints for development.

3. Project Description and Site Plan(s)

A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high ground water elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.

4. Land Use Planning and Source Control Plan

This plan shall provide a demonstration of how the goals and standards of Sections 3 through 6 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.

5. Stormwater Management Facilities Map

The following information, illustrated on a map of the same scale as the topographic base map, shall be included:

a. Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.

b. Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway

Section 10: Maintenance and Repair

A. Applicability

1. Projects subject to review as in Section 1.C of this ordinance shall comply with the requirements of Sections 10.B and 10.C.

B. General Maintenance

1. The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.

2. The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.

3. Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.

4. If the person responsible for maintenance identified under Section 10.B.2 above is not a public agency, the maintenance plan and any future revisions based on Section 10.B.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.

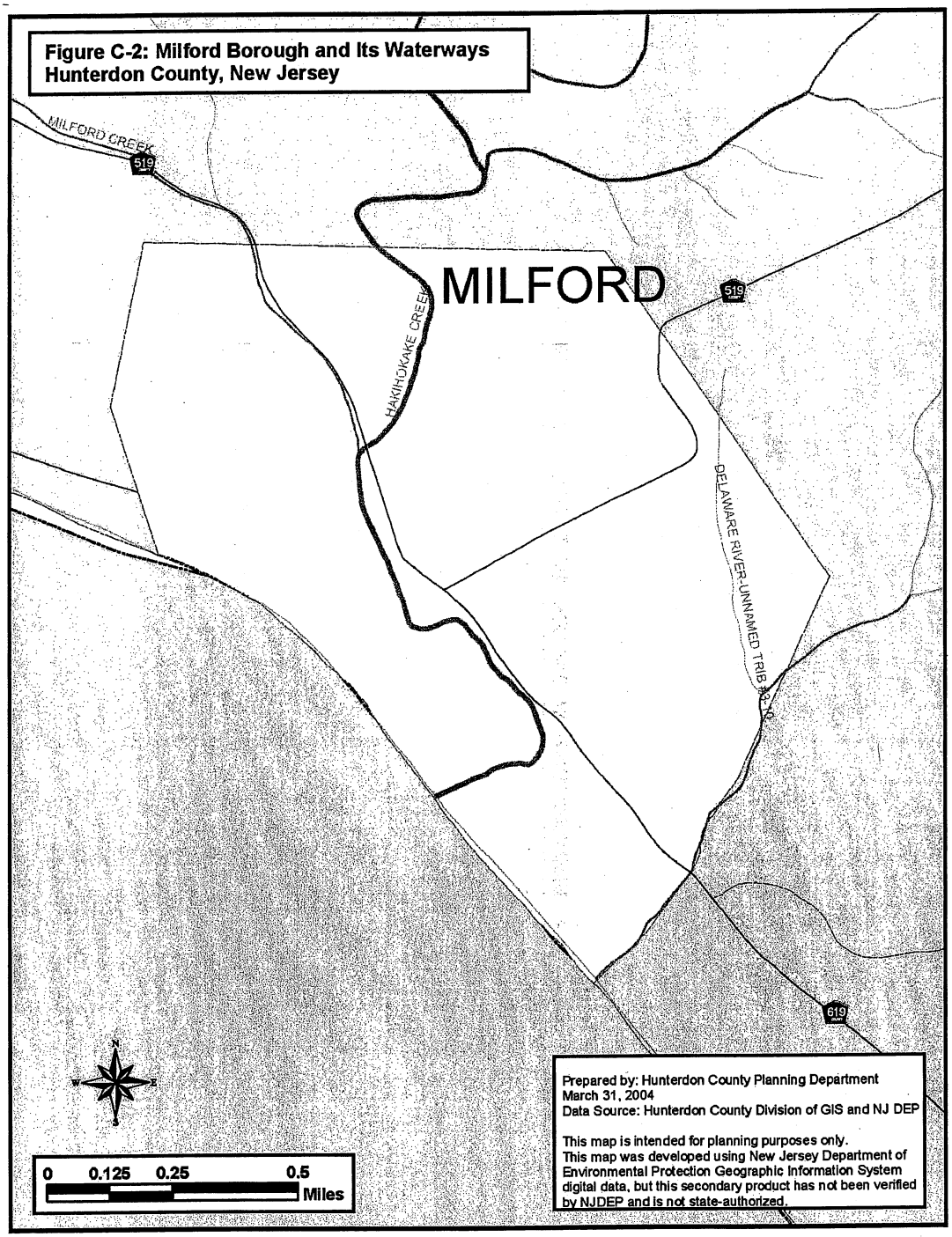
5. Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded

designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost thereof to the responsible person.

B. Nothing in this section shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

Van Cleef
ENGINEERING ASSOCIATES

APPENDIX



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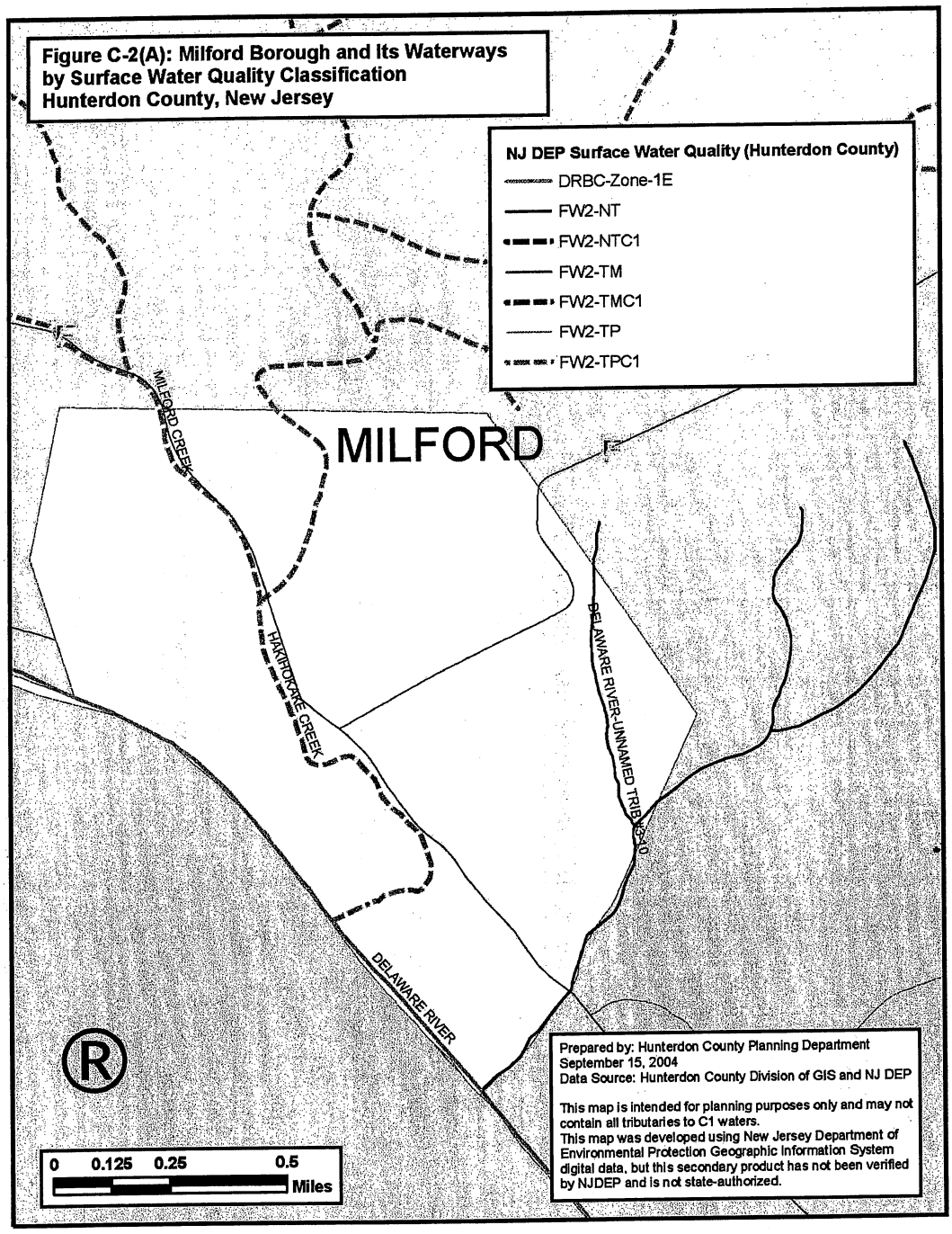

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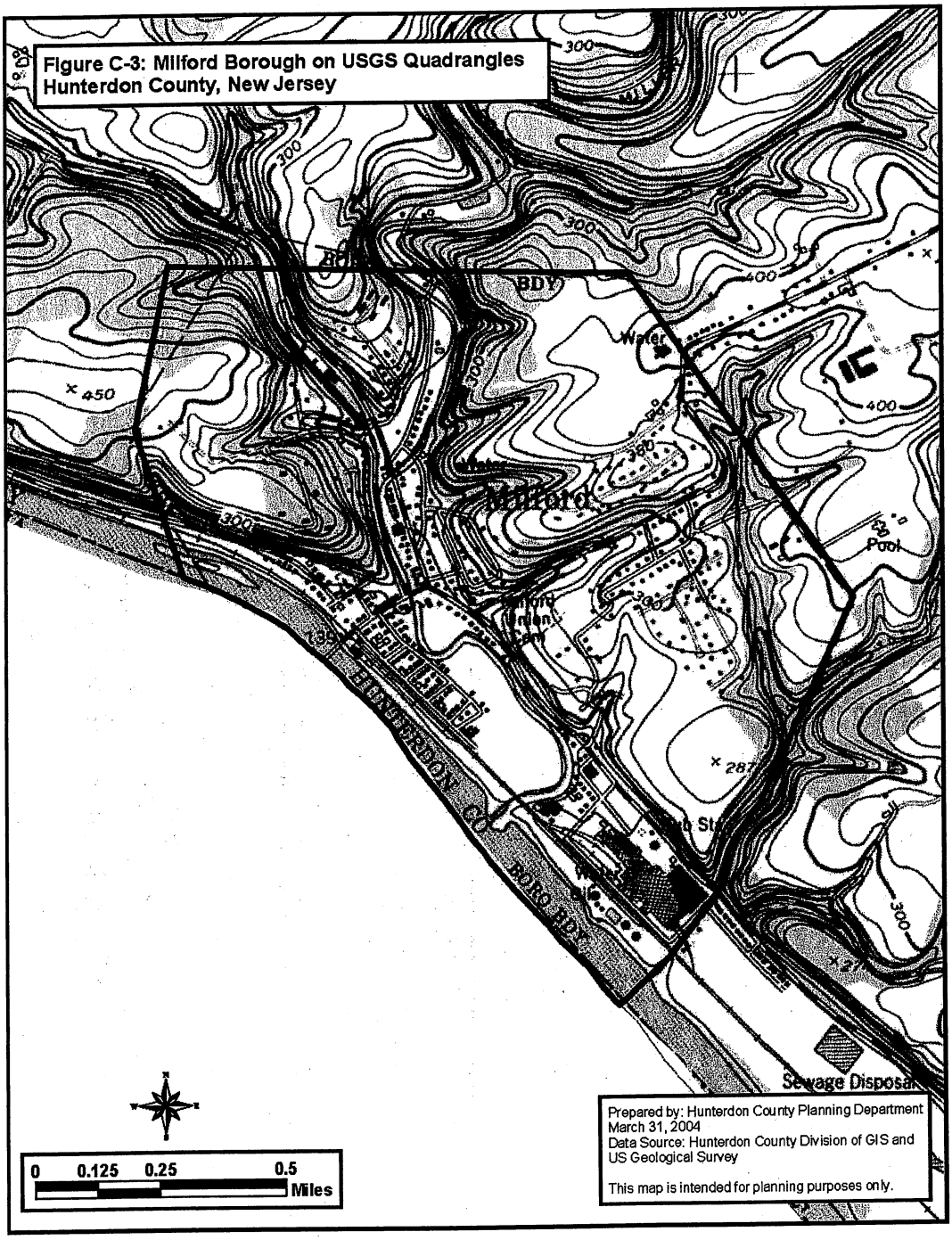

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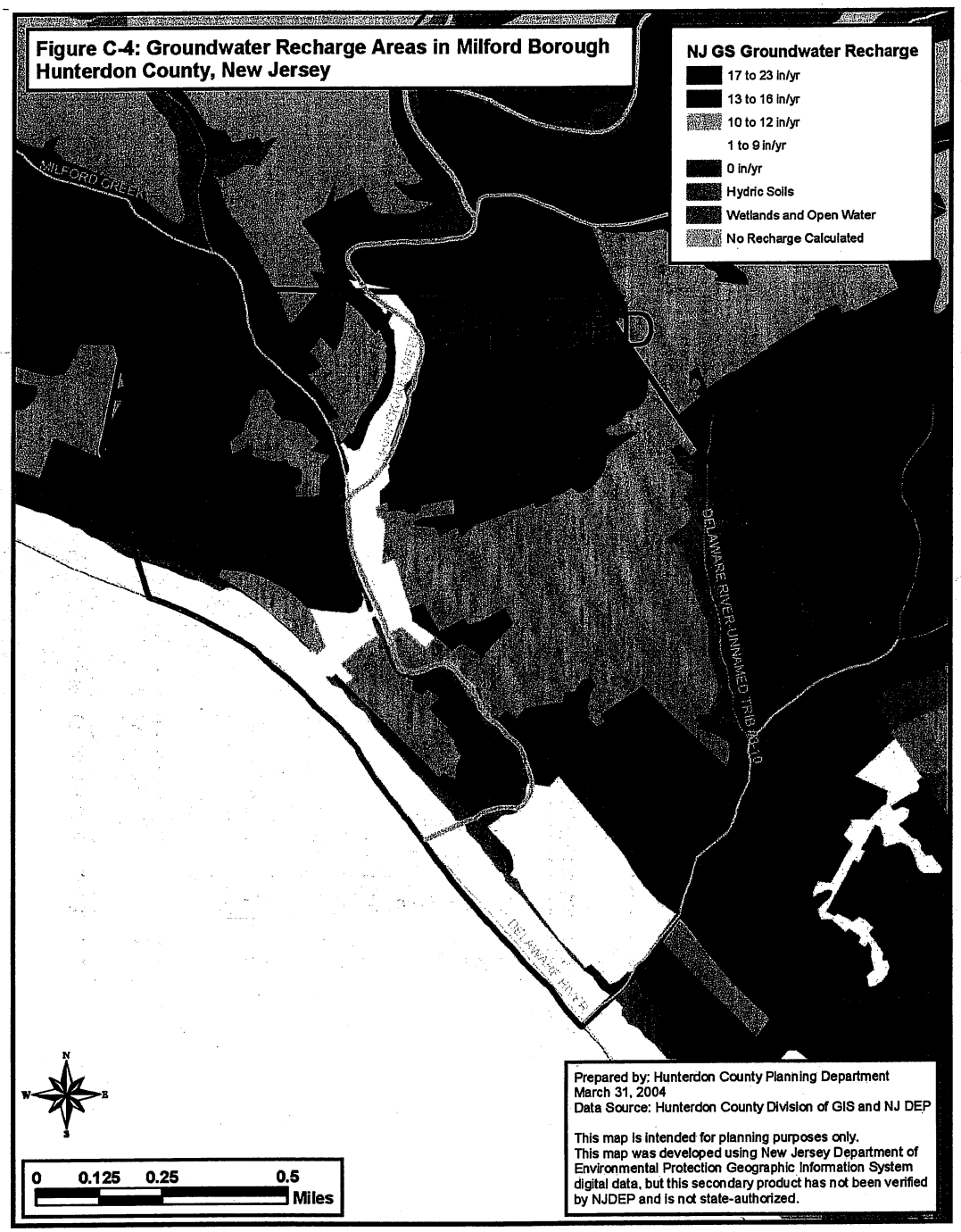

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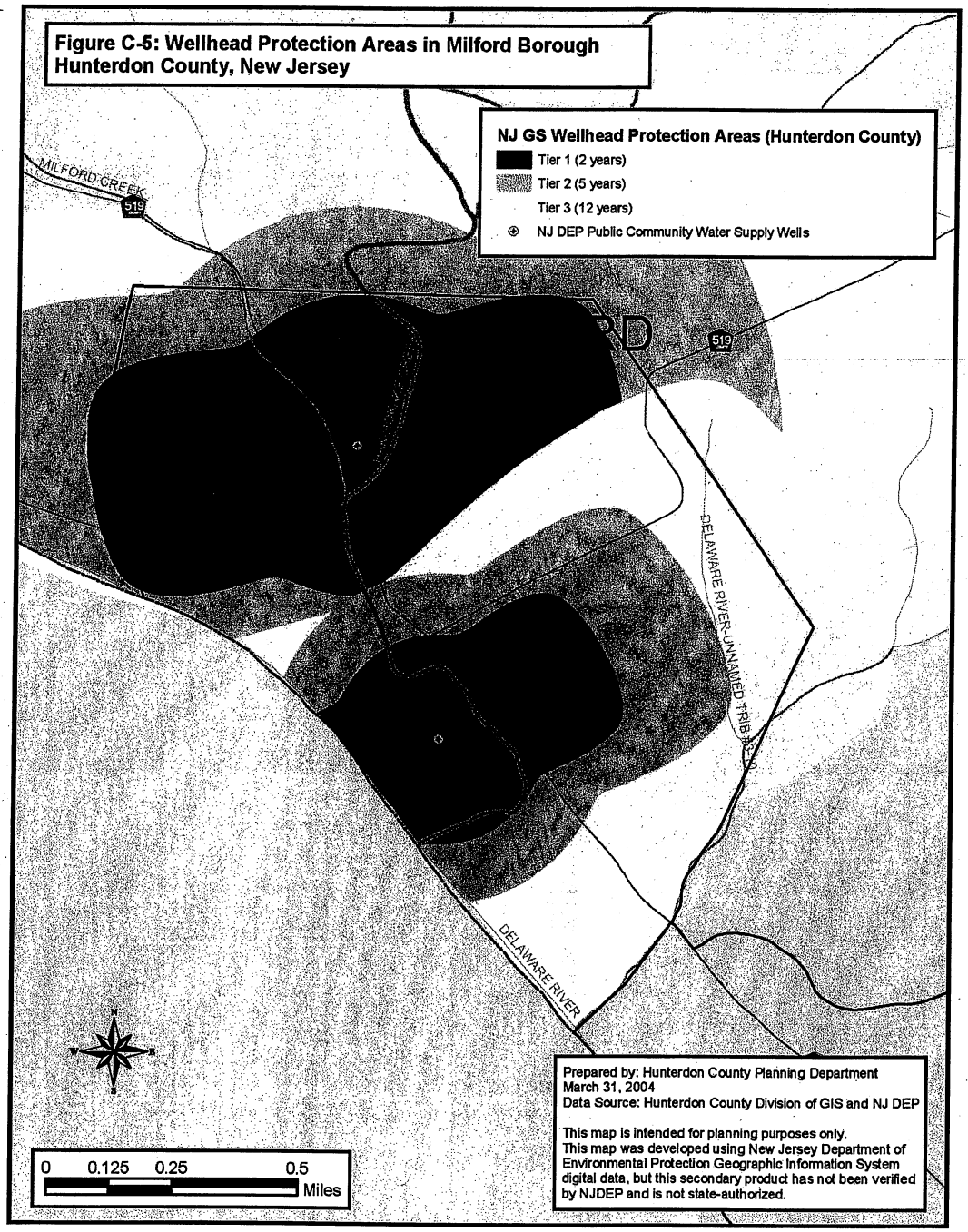

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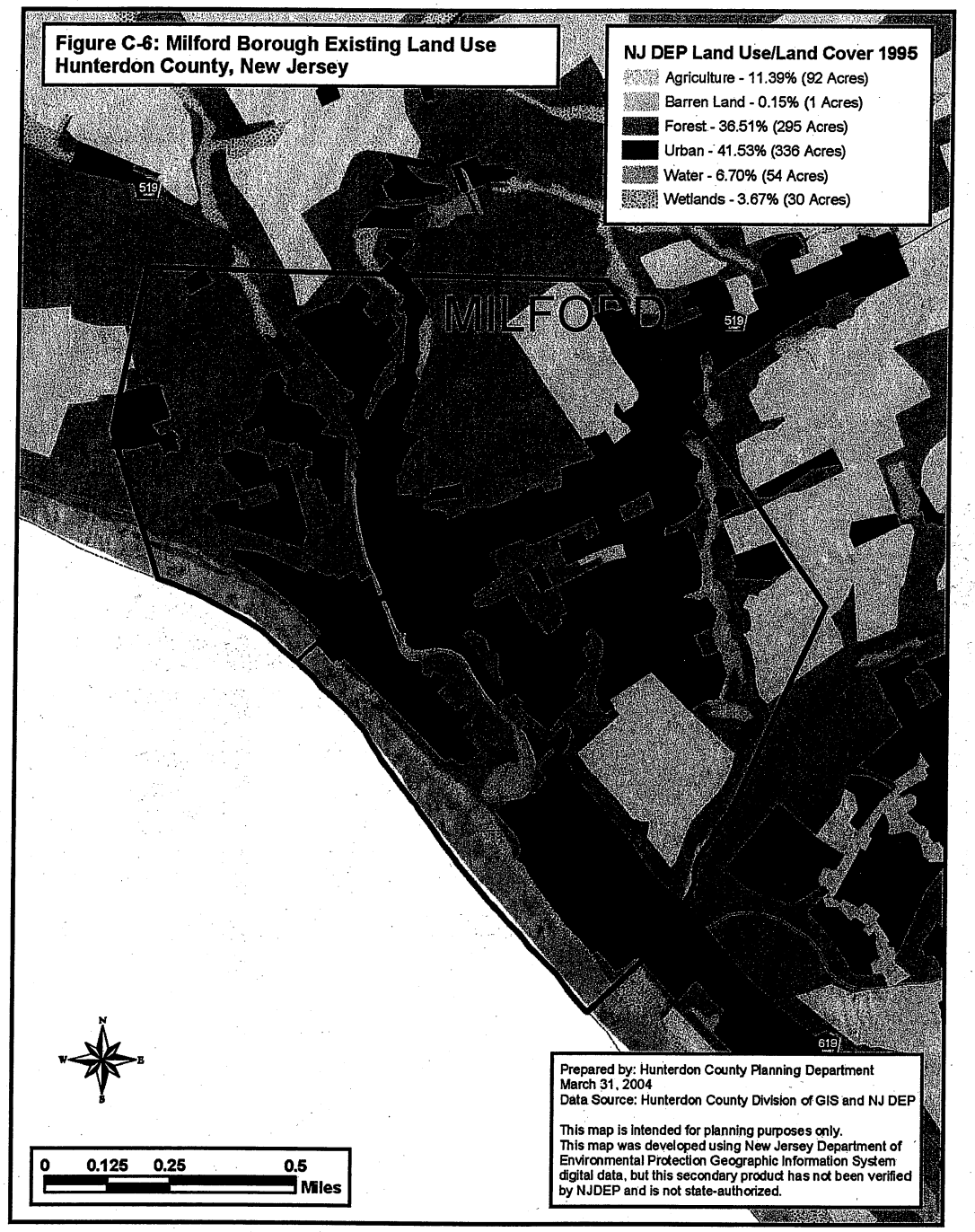

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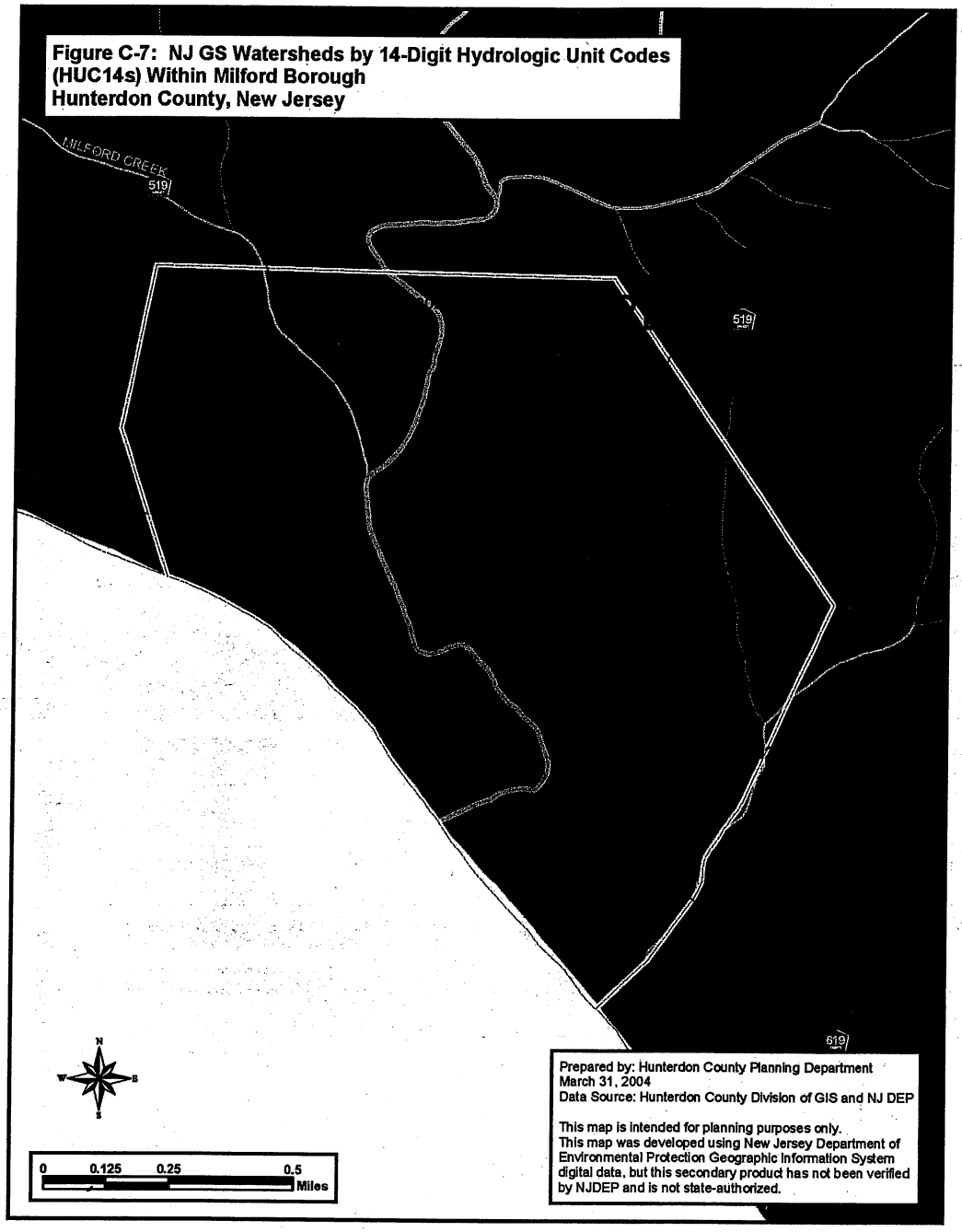

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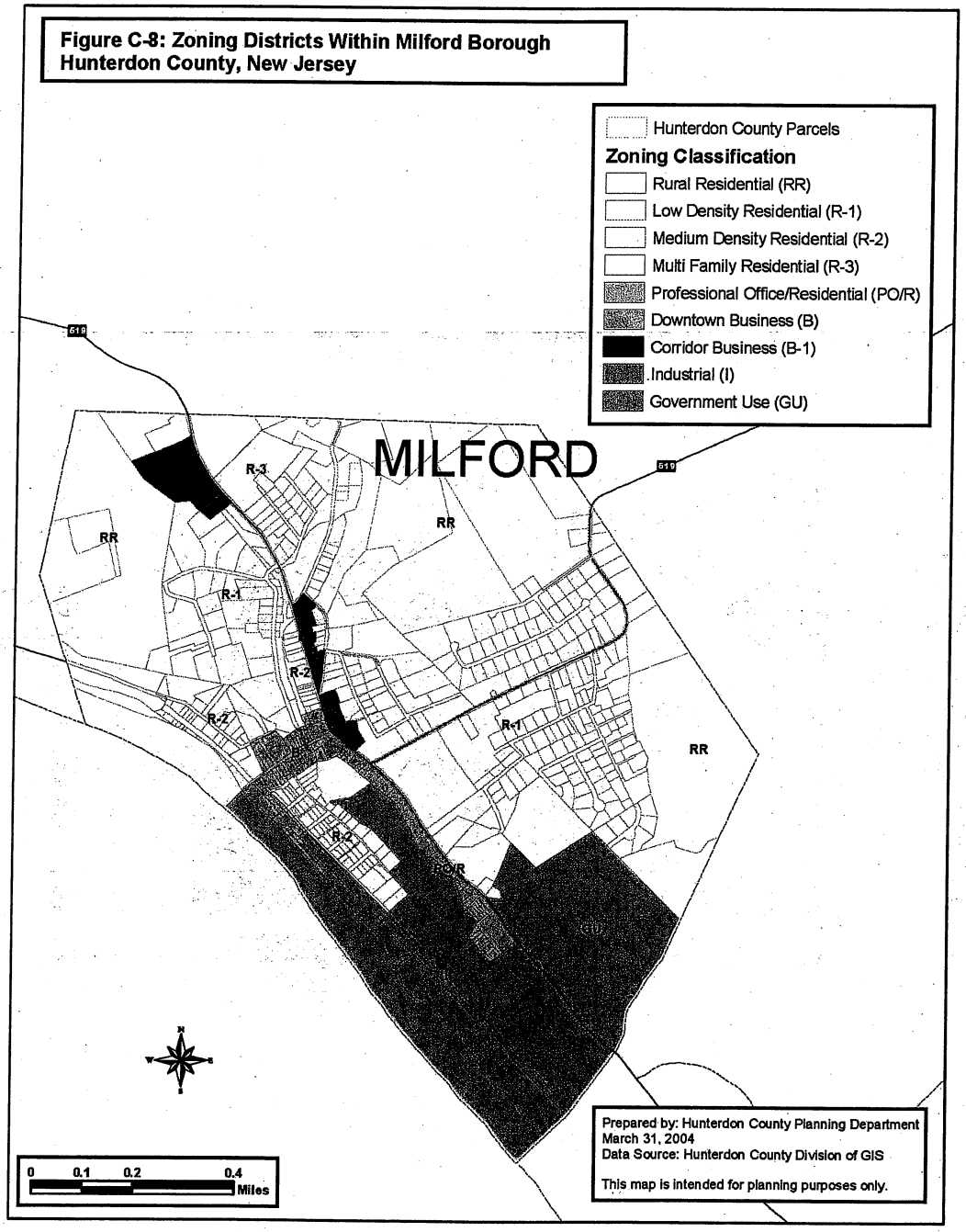
Figure C-8: Zoning Districts Within Milford Borough
Hunterdon County, New Jersey



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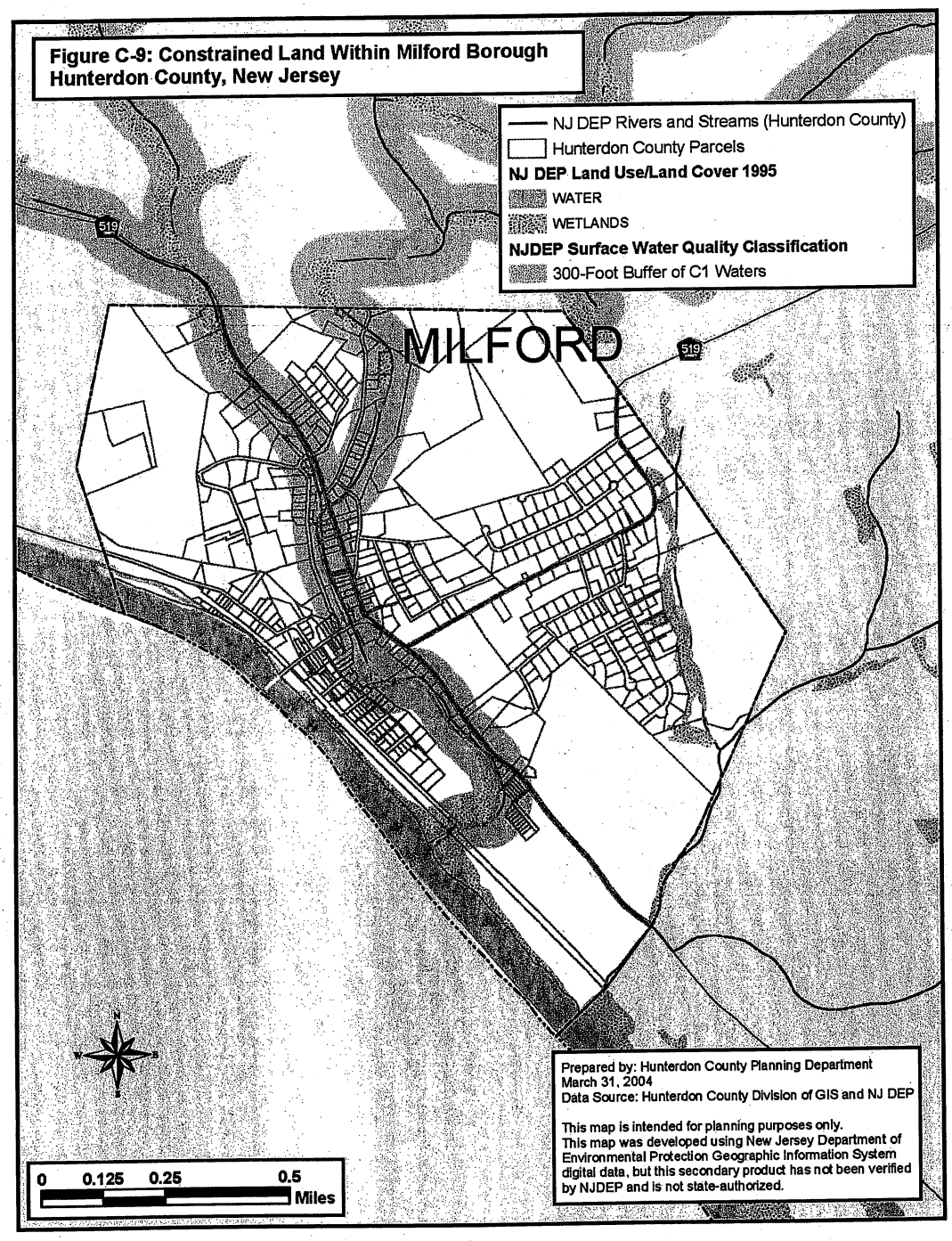

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