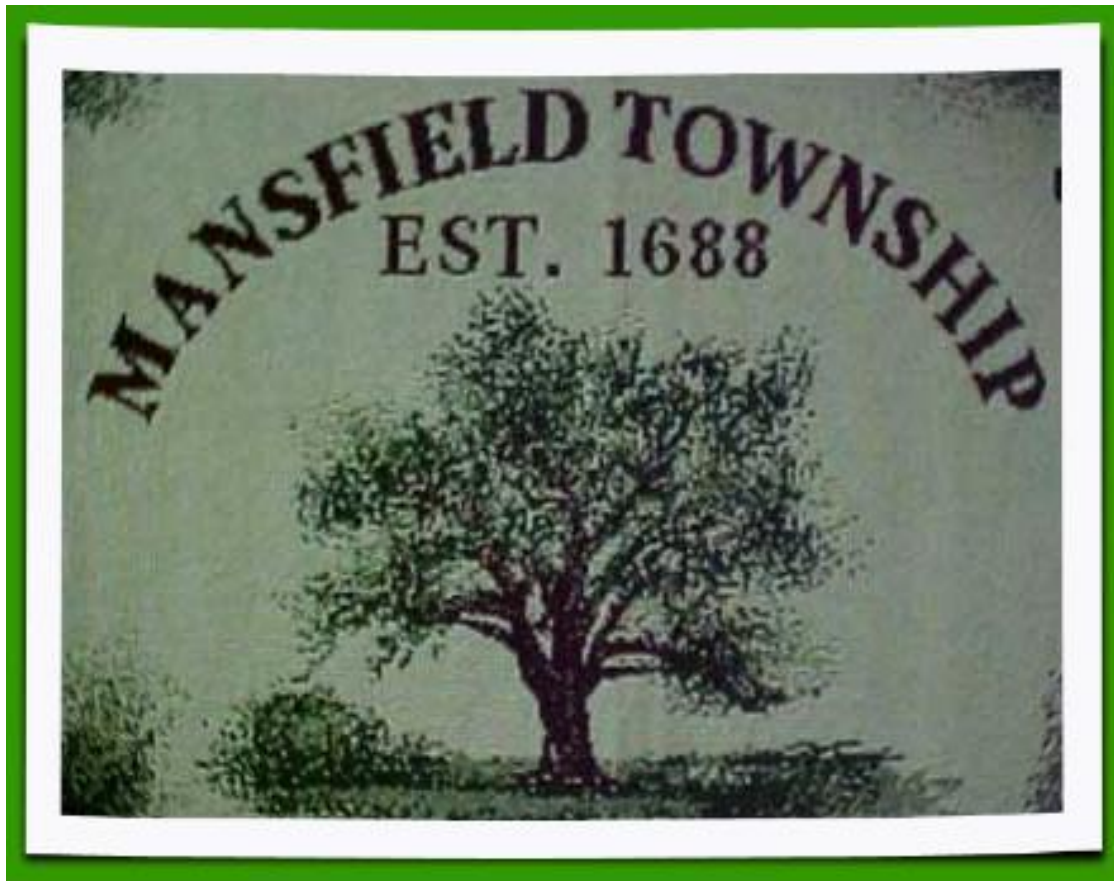


MANSFIELD TOWNSHIP

MUNICIPAL STORMWATER MANAGEMENT PLAN



OCTOBER 9, 2007

Table of Contents

Introduction	2
Goals	2
Stormwater Discussion	3
Background.....	5
Design and Performance Standards.....	13
Plan Consistency	14
Nonstructural Stormwater Management Strategies.....	15
Land Use/Build-Out Analysis.....	16
Mitigation Plans.....	22

List of Tables

Table T-1: Mansfield Township and Burlington County Population Comparisons	7
Table T-2: AMNET Data, Round 1 and Round 2	10
Table T-3: 2006 Integrated List of Waters, Appendix A-1	11
Table T-4: 2006 Integrated List of Waters, Appendix B.....	12
Table C-1: Pollutant Loads by Land Cover	19
Table C-2: Build-Out Calculations	20
Table C-3: Non-point Source Loads at Build-Out for HUC-14s	22

List of Figures

Figure F-1: Groundwater Recharge in the Hydrologic Cycle	4
Figure F-2: Township and Its Waterways	6
Figure F-3: Township Boundary on USGS Quadrangles.....	9
Figure F-4: Category One Streams in Mansfield Township.....	10
Figure F-5: Groundwater Recharge Rates & Wetlands	10
Figure F-6: Wellhead Protection Areas and Hydrologic Units (HUC-14s)	15
Figure F-7: Township's Existing Land Use	27
Figure F-8: Zoning Districts within the Township.....	28
Figure F-9: Developable Lands and Constrained Areas	29

Attachments

Ordinance 2006-18 Section 50-27A, Stormwater Control

Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for Mansfield Township (“the Township”) to address stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 Municipal Stormwater Regulations. This plan contains all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules. The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, defined as projects that disturb one or more acre of land. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

A “build-out” analysis has been included in this plan based upon existing zoning and land available for development. The plan also addresses the review and update of existing ordinances, the Township Master Plan, and other planning documents to allow for project designs that include low impact development techniques. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

Goals

The goals of this MSWMP are to:

- Reduce flood damage, including damage to life and property;
- Minimize, to the extent practical, any increase 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 recharge;
- Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- Maintain the integrity of stream channels for their biological functions, as well as for drainage;
- Minimize pollutants in stormwater runoff 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 water; and
- Protect public safety through the proper design and operation of stormwater basins.

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 correct 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.

Stormwater Discussion

Land development can dramatically alter the hydrologic cycle (See Figure F-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 evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration 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 aggravate 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.

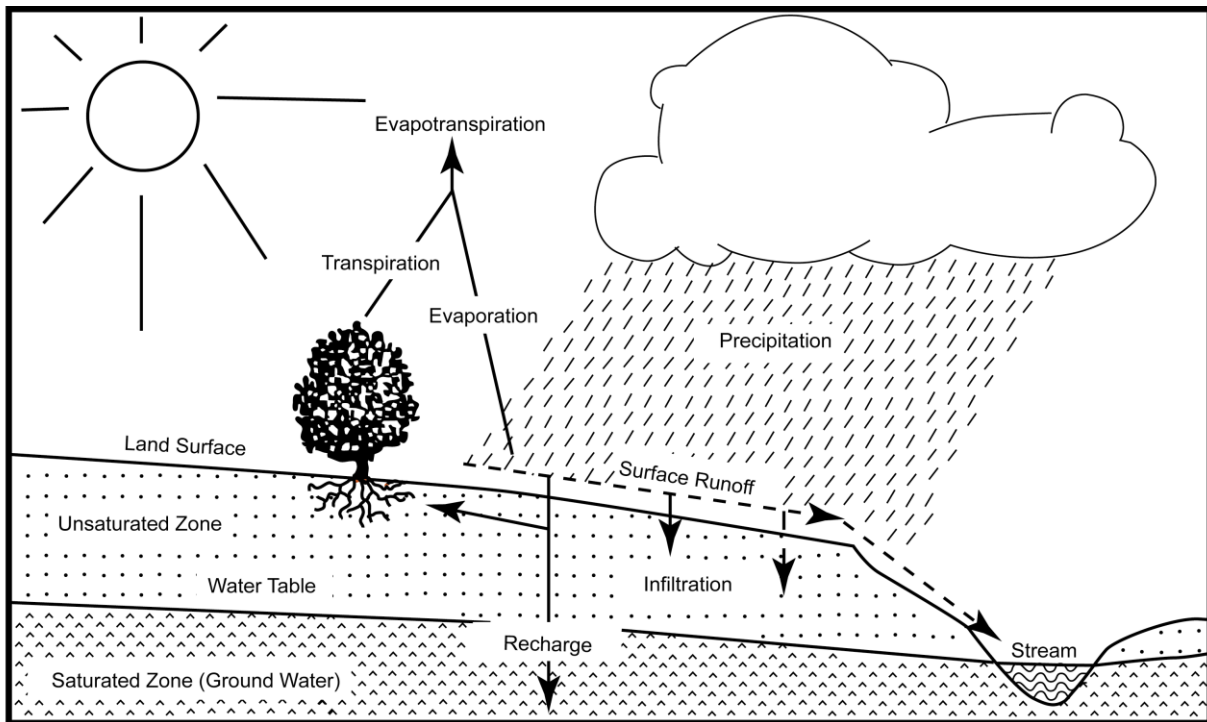


Figure F- 1: Groundwater Recharge in the Hydrologic Cycle
 Source: New Jersey Geological Survey Report GSR-32.

The Township experienced modest population growth between 1940 and 1970 and fell slightly by 1980. However, between 1980 and 1990, the Township grew by 53.5% and continued a strong growth rate of 31% to the present. Due to the large number of dwelling units approved by the Planning Board, a high rate of growth is expected to continue at least.

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, 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 affect 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.

Background

Mansfield Township is located in northern Burlington County, New Jersey. It is a rural community comprising twenty-three square miles. Although seemingly landlocked, Mansfield's corporate boundary extends west to the Delaware River. As such, Mansfield does not share a boundary with Bucks County, Pennsylvania. Mansfield's immediate Burlington County neighbors include Bordentown, Chesterfield, Florence and Springfield townships.

In 1977, seventy-five percent of the township's land use was for farming purposes, woods, and vacant land. At that time only four percent of the land use was for residential purposes. The remaining land usage was in streets and highways, institutions, and flood plains with less than one percent for commercial land use. Today, Mansfield's land use for farming purposes has decreased to forty-five percent, residential land use has increased to eleven percent, and commercial land use has remained somewhat constant due to an already low percentage. Currently, five housing developments of approximately thirty-five houses each are at the Planning Board stage. Figure F-2 depicts the Township boundary.

In 1970 the township's population was 2,597. Its current population (2005) is approximately 8,500. Age categories within this population increase have changed. The percentage of school age children as a portion of the entire population has declined twenty percent since 1970, whereas the age category of sixty-five and over increased from nine percent in 1970 to sixty-three percent in the year 2000. This age group represents the largest percentage of the entire township population. Population increases, with its resultant housing demands have most likely disturbed land contours, and most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality. Figure F-2 illustrates the waterways in the Township.

The Township experienced modest population growth between 1940 and 1970 and fell slightly by 1980. However, between 1980 and 1990, the Township grew by 53.5% and continued a strong growth rate of 31% to the present. Due to the large number of dwelling units approved by the Planning Board, a high rate of growth is expected to continue at least over the next 10 years. Mansfield's percentage of the County population decreased between 1940 and 1980, reflecting the rapid development of southern Burlington County communities. By 2000, the Township share of the County population increased to 1.2%.

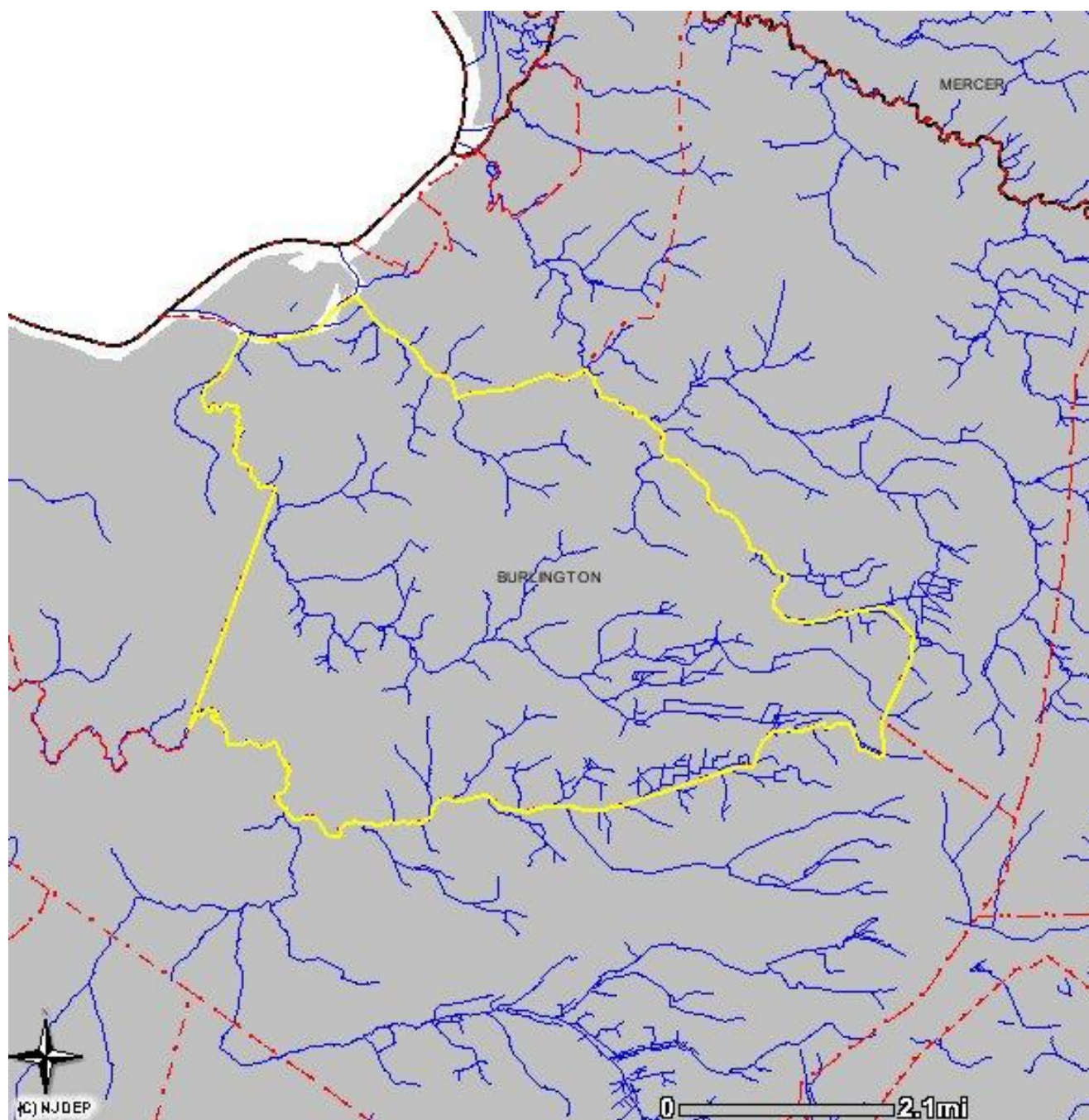


Figure F-2: The Township and Its Waterways

According to the Delaware Valley Regional Planning commission (DVRPC), the population of Mansfield Township is expected to increase from 5,090 in 2000 to 7,560 (48.5%) in 2015 and 9,220 (81.1%) in 2025. These population forecasts developed by DVRPC are not accurate based on existing development trends. Approximately 950 new homes have been occupied since the 2000 census. About 800 of these units, including 97 affordable townhouses, are part of the Mapleton development. DVRPC did not predict this number of residents until approximately the year 2025. Also, according to DVRPC, the number of jobs located in the community is expected to increase from 1,353 to 1,832 (35.3) in 2015 and 2,284 (68.85) in 2025.

Table T-1: Mansfield Township and Burlington County Population Comparisons

Year	County Population (Burlington)	Township Population	Township % Increase	% of County
2000	423,394	5,090	31	1.2
1990	395,066	3,874	53.5	1.0
1980	362,542	2,523	-2.8	.7
1970	323,132	2,597	24.6	.8
1960	224,499	2,084	9.3	.9
1950	135,910	1,907	16.1	1.4
1940	97,013	1,642	-3.9	1.7

Figure F-3 depicts the Township boundary on the USGS quadrangle maps. The Township is bordered to the west by the Delaware River, the major river of the region. The major water courses which drain Mansfield Township into the Delaware River include Blacks Creek (via Crosswicks Creek in Bordentown), Bacon's Run (via Blacks Creek), Crafts Creek, Spring Hill Brook (via Crystal Lake) and Assiscunk Creek

On April 22, 2003, the New Jersey Department of Environmental Protection increased the protection for fifteen water bodies in the State of New Jersey including 38.6 miles of the Assiscunk Creek along the southern border of Mansfield Township. The portion of the Assiscunk from the headwaters to the confluence with Barkers Brook, including all tributaries was upgraded to Category C1. The ruling found that this portion of the Assiscunk Creek is surrounded by farmland and bordered by a rich floodplain of oak and maple-forested swamp, vernal pools, and marshes and contains important wildlife habitat and has high water quality. A map of the Assiscunk Creek designated as Category C-1 showing the zoning and municipal boundaries is shown in Figure F-4.

Special considerations are required for development within 300 feet of a Category C-1 Stream when new development is proposed as set forth in Section 50-27A.13.H of the Mansfield Stormwater Control Ordinance. In the future, the municipality may adopt a stream corridor protection ordinance for the C-1 stream corridor.

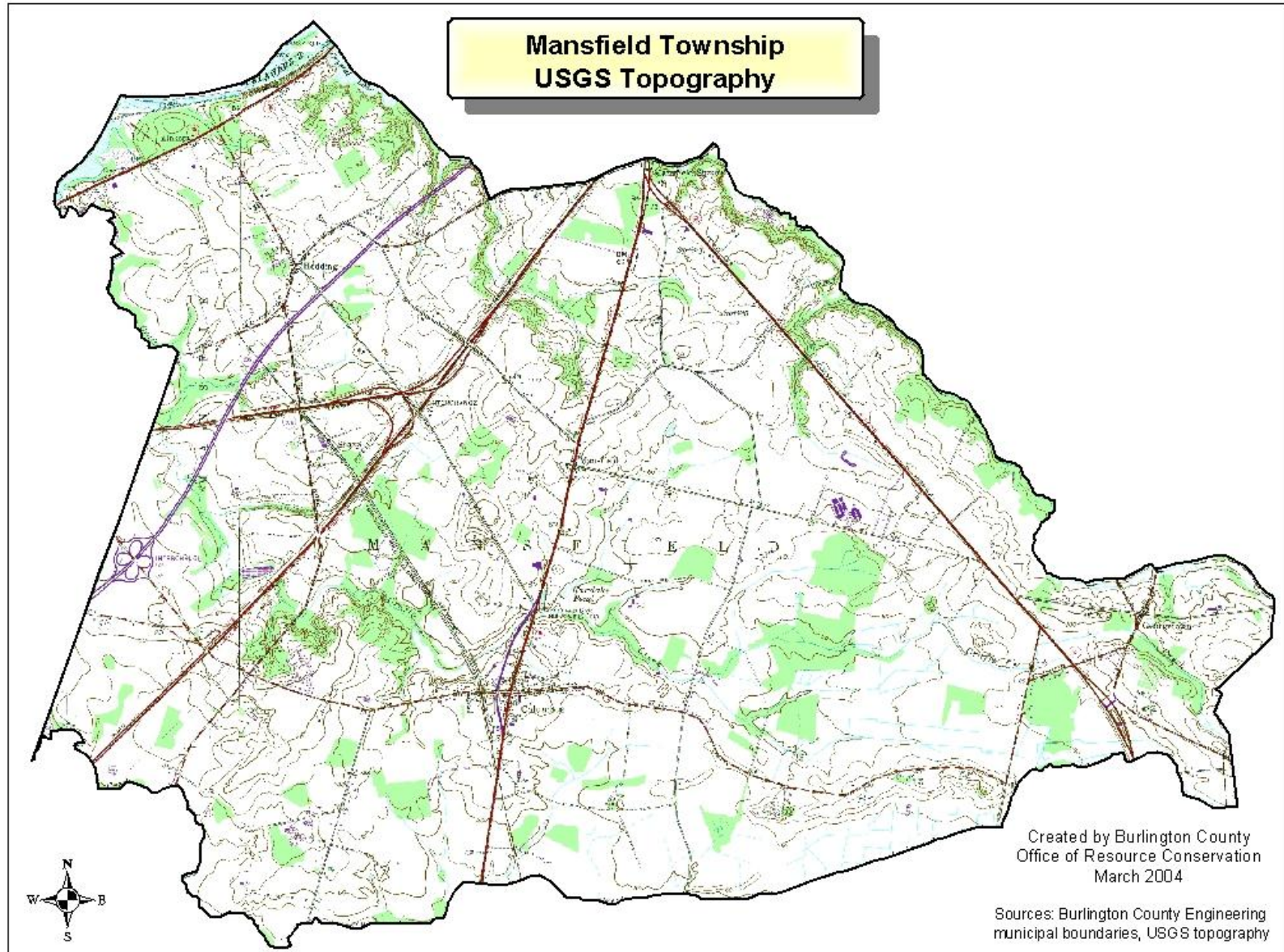


Figure F-3: The Township Boundary on USGS Quadrangle

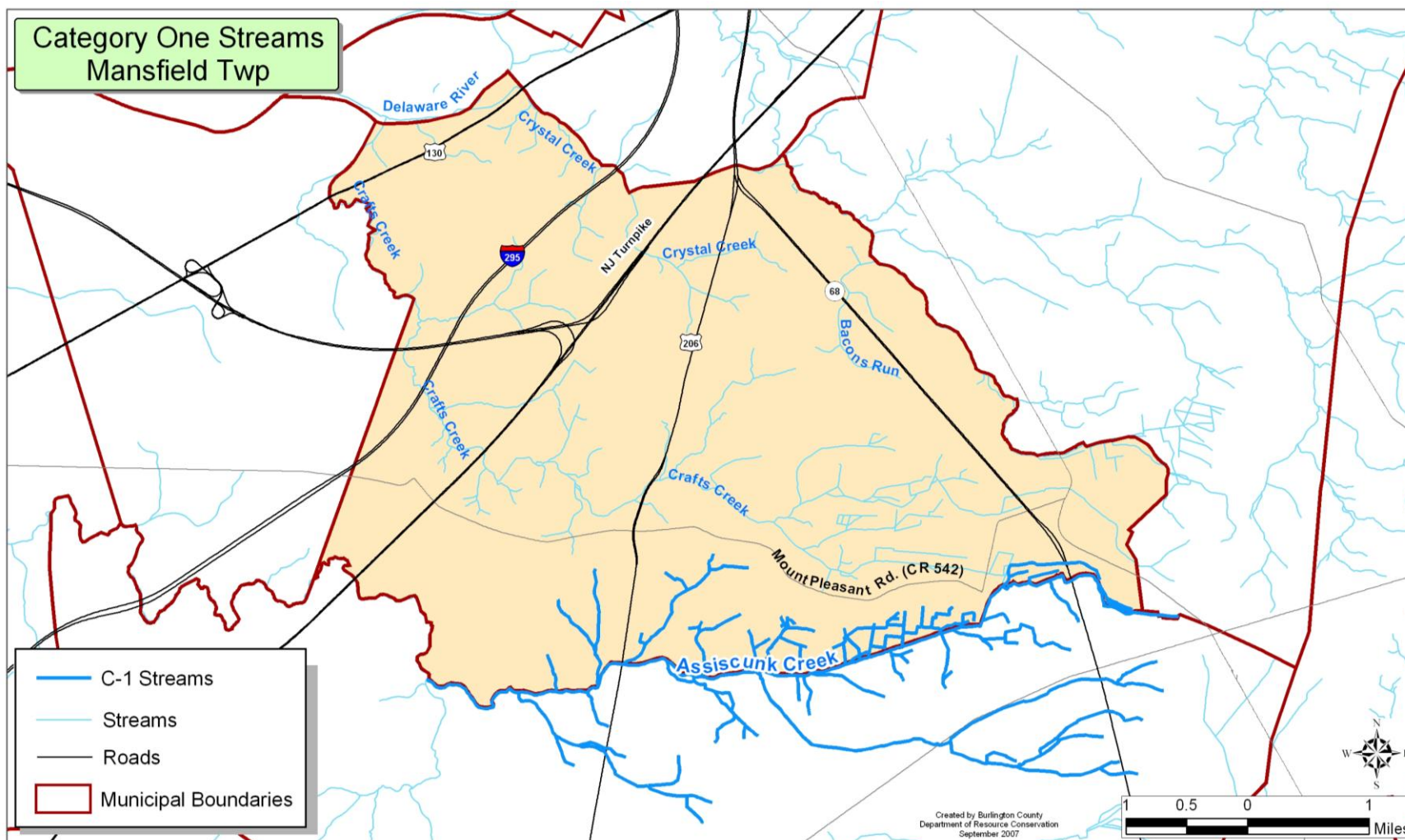


Figure F-4: Category One Streams in Mansfield Township, New Jersey

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sites throughout the state of New Jersey that are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Utilizing the NJDEP Rapid Bioassessment Protocol, the macroinvertebrate data is evaluated to generate a New Jersey Impairment Score (NJIS), which is used to classify streams as non-impaired, moderately impaired, or severely impaired based on the dynamics of the benthic macroinvertebrate communities found in the stream.

There were three AMNET sites within Mansfield Township where biological data was collected in Round 1 and Round 2 of the NJDEP process. The biological assessments for the three stations are shown below:

Table T-2: AMNET Data Round 1 and Round 2

Round 1 Data					
Station	Creek Name	Location	Date	Rating	Assessment
AN0135	Crafts Ck.	Gaunt Br. Rd.	1/25/1993	6	Severe
AN0136	Craft Ck.	Island Rd.	1/25/1993	9	Moderate
AN0137	Assiscunk Ck.	Columbus-Georgetown Rd.	1/25/1993	6	Severe
Round 2 Data					
AN0135	Crafts Ck.	Gaunt Br. Rd.	1/16/2001	12	Moderate
AN0136	Craft Ck.	Island Rd.	1/16/2001	12	Moderate
AN0137	Assiscunk Ck.	Columbus-Georgetown Rd.	1/16/2001	15	Moderate

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List) is required by the Federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sub-list 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed.

A Total Maximum Daily Load (TMDL) is the amount of a pollutant that can be accepted by a water body without causing an exceedance of water quality standards or interfering with the ability to use a water body for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require and NJPDES permit to discharge, and nonpoint source, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other BMPs.

The New Jersey Department of Environmental Protection (NJDEP) published integrated water quality reports in 2004 and 2006. The reports present which waters are attaining water quality standards and which waters area impaired for various uses such as aquatic life, recreation, drinking water supply, etc. Each use is assessed with a status or listing from Sub-list 1 to Sub-list 5. Sub-list 5 identifies streams or stream segments that are impaired or threatened by pollutants such that the designated use is not attained and for which a TMDL is required. Sub-list 4 indicates that the designated use is not attained or is threatened but the development of a TMDL is not currently required for one of three reasons. Sub-list 3 indicates that insufficient data is available to determine if the water body can attain the designated use.

There are eight sub-watersheds within Mansfield Township. These sub-watersheds are designated with a fourteen digit hydrologic code known as a HUC-14. The eight HUC-14 sub-watersheds are shown on Figure F-6.

Appendix A-1 of the New Jersey 2006 Integrated List of Waters can be found on the NJDEP website <http://www.state.nj.us/dep/wms/bwqsa/integratedlist2006Report.html>. Page 14 of Appendix A-1 lists the eight sub-watersheds within Mansfield Township and the status for multiple uses is provided across the spreadsheet. The status of the stream segments in Mansfield Township for general aquatic life is shown in the following Table T-3:

Table T-3: 2006 Integrated List of Waters, Appendix A-1,
Streams within Mansfield Township-Aquatic Life (general)

WMA	Assessment Unit ID	Unit Name	Aquatic Life (General)
20	02040201080020-01	Blacks Creek (Bacons Run to 40d06m10s)	Sub-list 5
20	02040201080030-01	Blacks Creek (below Bacons Run)	Sub-list 5
20	02040201090010-01	Crafts Creek (above Rt. 206)	Sub-list 5
20	02040201090020-01	Crafts Creek (below Rt. 206)	Sub-list 5
20	02040201090030-01	LDRV tribs (Assiscunk Ck to Blacks Ck)	Sub-list 3
20	02040201100010-01	Assiscunk Ck (above Rt. 206)	Sub-list 5
20	02040201100040-01	Assiscunk Ck (Jacksonville Rd to Rt. 206)	Sub-list 5
20	02040201100050-01	Assiscunk Ck (Neck Rd to Jacksonville Rd)	Sub-list 5

Appendix B of the New Jersey 2006 Integrated List of Waters can be found on the NJDEP website <http://www.state.nj.us/dep/wms/bwqsa/integratedlist2006Report.html>. Page 17 of Appendix B lists the parameters tested in each of the eight sub-watersheds within Mansfield Township and the priority ranking of those watersheds or stream segments. The water quality parameters tested and priority ranking for stream segments and sub-watersheds within Mansfield Township are listed in the following Table T-4:

Table T-4: 2006 Integrated List of Waters, Appendix B
Streams within Mansfield Township- Aquatic Life (general)

WMA	Assessment Unit ID	Unit Name	Parameter	Ranking
20	02040201080020-01	Blacks Creek (Bacons Run to 40d06m10s)	pH	M
20	02040201080030-01	Blacks Creek (below Bacons Run)	Dioxin, PCBs, Phosphorus	M
20	02040201080030-01	Blacks Creek (below Bacons Run)	Total Suspended Solids	L
20	02040201090010-01	Crafts Creek (above Rt. 206)	pH, Phosphorus	M
20	02040201090020-01	Crafts Creek (below Rt. 206)	Dioxin, PCBs, pH	M
20	02040201090030-01	LDRV tribs (Assiscunk Ck to Blacks Ck)	Dioxin, PCBs	M
20	02040201100010-01	Assiscunk Ck (above Rt. 206)	pH, Phosphorus	M
20	02040201100040-01	Assiscunk Ck (Jacksonville Rd to Rt. 206)	Arsenic, Mercury, pH	M
20	02040201100050-01	Assiscunk Ck (Neck Rd to Jacksonville Rd)	Arsenic, Dioxin, Mercury, PCBs, pH	M

The NJDEP 2006 Integrated List includes Appendix C, List of Delisted Waters, located on the NJDEP website <http://www.state.nj.us/dep/wms/bwqsa/integratedlist2006Report.html>. The list of Delisted Waters includes Crystal Lake off Route 130 in Mansfield Township. Previously assessed Sub-list 5 has been removed for impairment from Mercury. The reason for the listing is not provided in Appendix C.

The 2006 Integrated Report includes Appendix D, a two-year TMDL schedule dated December 2006. The TMDL schedule does not include any new TMDLs for the lakes, streams or stream segments within Mansfield Township.

There have been two TMDLs issued for the Delaware River. One TMDL Report was issued by the New Jersey Department of Environmental Protection on September 2003 entitled “Total Maximum Daily Loads for Polychlorinated Biphenyls (PCBs) for Zones 2-5 of the Tidal Delaware River” as prepared by the Delaware River Basin Commission. Another TMDL entitled “Delaware River Basin Commission (DRBC) and The Estuary Program”. This TMDL was approved by NDEP on May 22, 2000 and established that the Delaware River is above assimilative capacity for tetrachloroethene (TCE) and 1, 2-dichloroether (1, 2 DCE) in the tidal Delaware River. If numerical allocations are set in the future for these impairments, the Municipal Stormwater Management Plan will be amended to address the impairment and ordinances will be revised to implement the modifications.

There is a TMDL for fecal coliform along Bacons Creek entitled “Total Maximum Daily Load for Fecal Coliform to Address 27 Streams in the Lower Delaware Region” dated April 21, 2003. This TMDL has been adopted and much of this MSWMP and the adopted Mansfield Stormwater Pollution Prevention Plan will meet the strategies recommended for reduction of fecal coliform. Specifically in Mansfield’s situation the stormwater outfall mapping, illicit connection, elimination program and the passage of the illicit connection mapping, pet waste ordinance and wildlife feeding ordinance will meet the strategies identified in the TMDL for nonpoint source control.

The Township has no severe water quantity problems such as flooding, stream bank erosion, or diminished base flow in its streams. In preparation of this report, a survey was performed by the Township Superintendent who reported the culverts associated with road crossings in the Township are properly sized, and during severe storm events, all culverts have adequate capacity.

A map of the groundwater recharge areas are shown in Figure F-5. The wellhead protection areas required as part of the MSWMP are shown in Figure F-6. The wells clustered in the center of the municipality are privately owned and are located on a rural 120 acre farm and are not located adjacent to residential homes. The active wells for potable water are owned by New Jersey American Water. All wells are confined and have a fifty foot radius of influence.

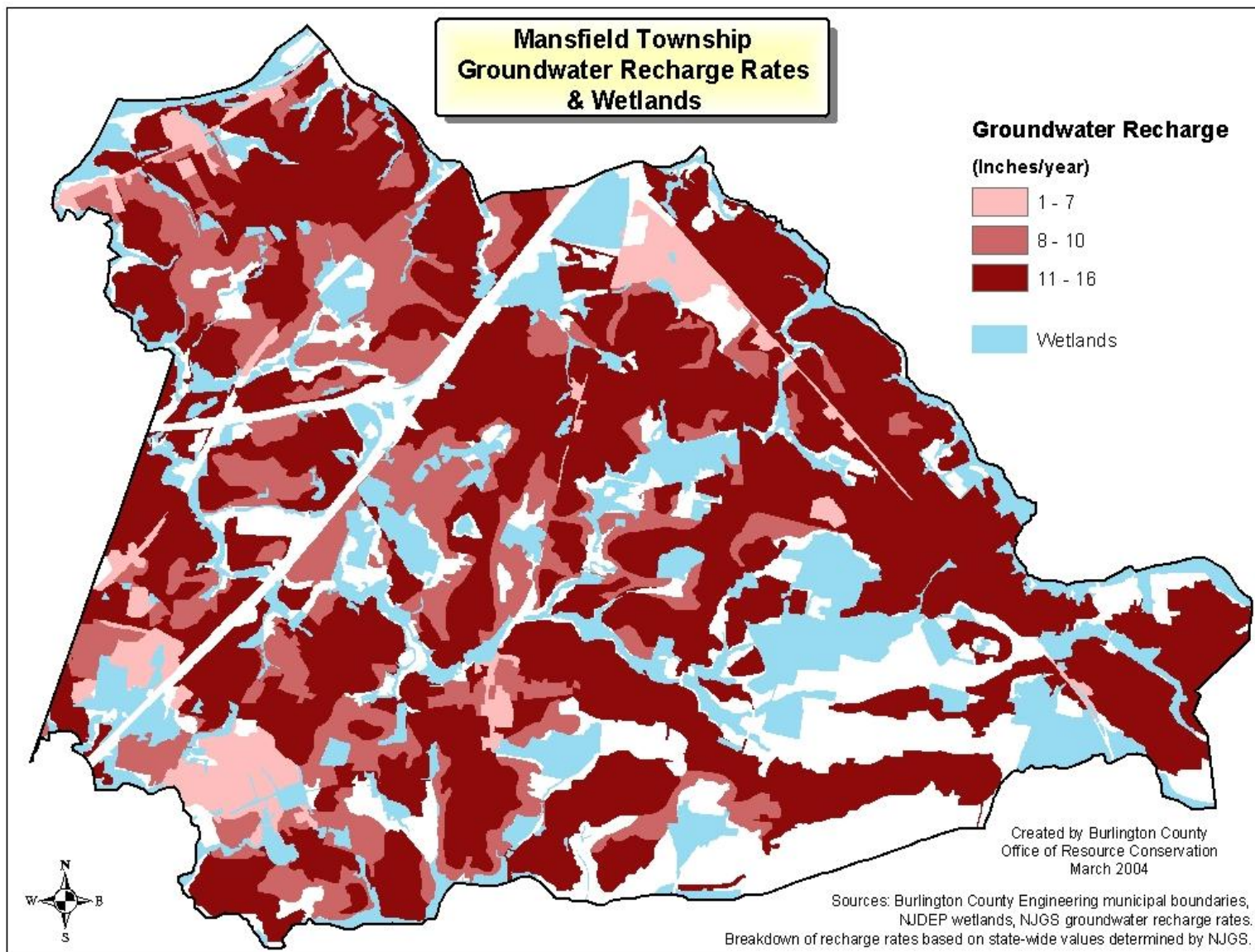


Figure F-5: Groundwater Recharge Areas in the Township

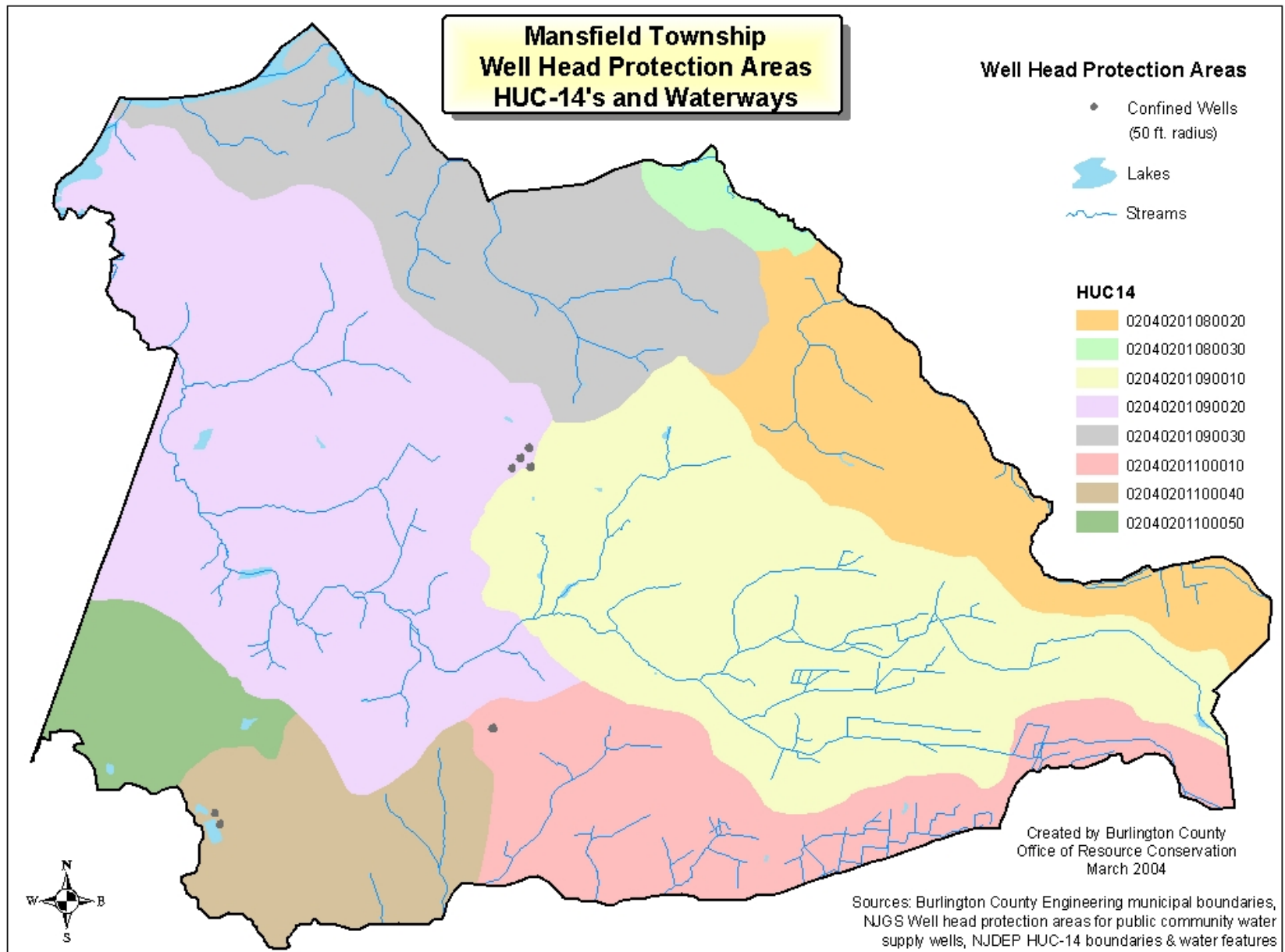


Figure F-6: Wellhead Protection Areas and HUC 14s in the Township

Design and Performance Standards

The Township 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 impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for 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. 7:8-6 Safety Standards for Stormwater Management Basins. The ordinances have been submitted to the county for review and approval.

In addition to the design standards from N.J.A.C. 7:8, Mansfield will adopt specific design standards for the Township in relation to stormwater facilities. In the Township stormwater ordinance, underground detention facilities are not a recommended design solution for residential development. The Township of Mansfield will not accept maintenance responsibility for underground stormwater detention facilities or stormwater outflow control structures located within stormwater inlets within the public right-of-way. Detention basins, infiltration basins or wet ponds will not be permitted within landscape buffers required between commercial and residential zones or properties or within sight triangle areas, nor within 10 feet of any property line.

Mansfield Township will ensure the proper maintenance and ongoing repairs to all BMP's through the Public Works Department. The Planning Board reviews development plans to ensure they meet all of the requirements of the Township's ordinance and/or the Residential Site Improvement Standards. A stormwater management long term operation and maintenance plan and manual will be required for all projects in conformance with the applicable regulations. In addition, all projects are also required to be designed in conformance with the Standards for Soil Erosion and Sediment Control in New Jersey even though a Soil Erosion and Sediment Control Plan Certification is only required for projects that disturb over 5,000 square feet. As part of any approval that may be granted by the Board, it is standard procedure to include a condition for all outside agency approvals or permits to be obtained prior to the start of construction.

Township inspectors observe construction of all projects to ensure that they are constructed in accordance with the approved plans and any permits that may have been issued. This includes ensuring that stormwater management facilities are constructed properly and that soil erosion control measures are being maintained. During construction, any deficiencies noted in the field by the Township's inspector that cannot be resolved with the contractor are reported to the appropriate agency; typically the Township Engineer, the NJDEP Bureau of Enforcement or the Burlington County Soil Conservation District for enforcement.

Plan Consistency

The Township is not within a Regional Stormwater Management Planning Area; therefore this plan does not need to be consistent with any regional stormwater management plans (RSWMPs). If any RSWMPs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The municipality will utilize the most current update of the RSIS in the stormwater management review of residential areas. This Municipal Stormwater Management Plan will be updated to be consistent with any future updates to the RSIS.

The Township's Stormwater Management Ordinance requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, Township inspectors will observe onsite soil erosion and sediment control measures and report any inconsistencies to the Burlington County Soil Conservation District.

Nonstructural Stormwater Management Strategies

The implementation of Ordinance 50-27A.11 will require nonstructural stormwater management strategies for all major development projects. Each applicant will provide a design meeting these requirements.

A review of the Township Master Plan and ordinances reveals that Chapter K of the Master Plan incorporates nonstructural stormwater management strategies by protecting stream areas that provide water quality benefits. The Mansfield Township Master Plan, prepared by Louis Glass Associates, adopted October 18, 2001, Chapter K, Open Space and Recreation Plan, identifies that a coordinated acquisition of open space along streams is needed. These stream corridors could provide a unified greenway for water quality, flood control and wildlife habitat purposes. The following projects have been identified as meeting the goal:

- F. Delaware River Greenway. The Greenway would be a project tied to the proposed Delaware River Heritage Trail, which links various heritage, historic, and scenic sites between Trenton and Camden. The goal would be to preserve wetlands, floodplains and steep slopes associated with the river. Public access to the river is the recreational goal.
- K. Stream Corridors and Greenways. The next four projects are part of the Township's goal of preserving interconnecting greenways along the major streams within and adjacent to the Township. These greenways will provide passive open space and wildlife habitat as well as protect water quality and minimize flooding.
 - 1. Crystal Lake Tributaries Greenway
 - 2. Assiscunk Creek Greenway
 - 3. Crafts Creek Greenway
 - 4. Blacks Creek/Bacon Run Greenway

A review of the Township Ordinance reveals that the Township has the following ordinances addressing nonstructural strategies:

- Ordinance Section 47-1.B.3, Soil Removal Buffers
- Ordinance Section 18-6.H, Tree Removal
- Ordinance Section 65-100, Landscape Buffers
- Ordinance Section 60 A-1 thru A-27, Trees, Shrubbery & Landscaping
- Ordinance Section 60 A-4, Selection of Species
- Ordinance Section 65-95.3.A, Drainage Requirements

Land Use/Build-Out Analysis

The Land Use/Build-Out Analysis is element 9 of N.J.A.C. 7:8-4.2. This analysis determines the pollutant loads to the streams in the municipality under maximum development permitted in the zoning code. Figure F-7 illustrates the existing land use in the Township based on DVRPC land use information. Figure F-6 illustrates the sub-watersheds or HUC-14s within the Township. The Township Zoning Map is shown in Figure F-8. Figure F-9 is a composite drawing of the constrained land uses with the HUC-14 boundaries within the Township. Table C-1 below presents the pollutant loading coefficients by land cover as published in the NJDEP's Stormwater BMP Manual. An additional column was added to the State's table to correlate the State's land cover designations to the Mansfield Township zoning district designations. The R-1 zoning district permits both residential as well as agricultural development depending on minimum lot size. Based on a visual evaluation of the zoning map, it was estimated that approximately equal portions of the entire R-1 district could be developed as residential and agricultural. This is why a 50% risk factor was applied to the R-1 areas in each of the HUC-14s. The developable areas in each zoning district within the HUC-14 sub-watersheds for each zoning district is shown in Table C-2 by subtracting out the constrained land area from the total area in each zoning district within the HUC-14. The pollutant loads at build-out are presented in Table C-3 for the developable acres. This table illustrates the importance of controlling the impacts from development. Mansfield has approximately 63% of the Township still remaining to be developed that has the potential to generate significant amounts of phosphorous, nitrogen and suspended solids. Much of the agricultural area will be preserved and remain as its current land use. While many would perceive this as beneficial protecting land from development, Table C-3 shows that agricultural type of land use generates the highest rate of suspended solids as a result of erosion and has the potential to generate over 800,000 pounds per year in Mansfield. This can significantly affect stream water quality through the accelerated rate of sedimentation if it is not controlled properly and poses a similar challenge for the Township. Implementation of this MSWMP and the new stormwater ordinance will provide the mechanisms to minimize impacts to the environment from both future development and present land use conditions.

Table C-1: Pollutant Loads by Land Cover

Land Cover	Mansfield Zoning Districts	Total Phosphorous Load (lbs/acre/year)	Total Nitrogen Load (lbs/acre/year)	Total Suspended Solids Load (lb/acre/year)
High, Medium Density Residential	PVS	1.4	15	140
Low Density, Rural Residential	R-1	0.6	5	100
Commercial	C-1, C-2, C-3	2.1	22	200
Industrial	LI, GI, HI	1.5	16	200
Urban, Mixed Urban, Other Urban	None	1.0	10	120
Agricultural	R-1	1.3	10	300
Forest, Water, Wetlands	FP	0.1	3	40
Barren Land/ Transition Area	None	0.5	5	60

Source: NJDEP Stormwater BMP Manual 2004.

Table C-2: HUC- 14 Build-Out Calculations

HUC-14 and Zone	Acres	Constrained Lands (Acres)	Developable Area (Acres)
HUC-14 ID 02040201080020			
PVD	0	0	0
R-1 Low Density Res.	584.5	115	469.5
C-1, C-2, C-3	107	0	107
LI, GI, HI	0	0	0
R-1 Agricultural	584.5	115	469.5
FP Floodplain	103.9	103.9	0
Watershed Total	1379.9	338	1046.1
HUC-14 ID 02040201080030			
PVD	0	0	0
R-1 Low Density Res.	0	0	0
C-1, C-2, C-3	131.9	11	120.9
LI, GI, HI	0	0	0
R-1 Agricultural	0	0	0
FP Floodplain	33.5	33.5	0
Watershed Total	165.4	44.5	120.9
HUC-14 ID 02040201090010			
PVD	0	0	0
R-1 Low Density Res.	1414.9	659.5	755.4
C-1, C-2, C-3	223.8	40.3	183.5
LI, GI, HI	0	0	0
R-1 Agricultural	1410.4	659.5	750.8
FP Floodplain	260.4	260.4	0
Watershed Total	3309.5	1619.8	1689.7
HUC-14 ID 02040201090020			
PVD	30.8	0.4	30.4
R-1 Low Density Res.	1291.7	349.1	942.6
C-1, C-2, C-3	127.3	18.1	109.2
LI, GI, HI	924.3	119.9	804.4
R-1 Agricultural	1212.9	349.1	863.8
FP Floodplain	277.7	277.7	0
Watershed Total	3864.6	1114.2	2750.4
HUC-14 ID 02040201090030			
PVD	323.8	22.3	301.6
R-1 Low Density Res.	380.1	109.4	270.7
C-1, C-2, C-3	463.5	86.4	377.1
LI, GI, HI	256.7	135.4	121.2
R-1 Agricultural	380.1	109.4	270.7
FP Floodplain	148	148	0
Watershed Total	1952.3	610.9	1341.3

Table C-2: HUC-14 Build-Out Calculations (continued)

HUC-14 and Zone	Acres	Constrained Lands (Acres)	Developable Area (Acres)
HUC-14 ID 02040201100010			
PVD	0	0	0
R-1 Low Density Res.	602	355.5	246.5
C-1, C-2, C-3	294.5	90.6	203.9
LI, GI, HI	4.5	0	4.5
R-1 Agricultural	542	355.5	186.5
FP Floodplain	240.7	240.7	0
Watershed Total	1683.7	1042.4	641.3
HUC-14 ID 2040201100040			
PVD	0	0	0
R-1 Low Density Res.	493.8	48.6	445.3
C-1, C-2, C-3	6.2	0	6.2
LI, GI, HI	162	25.5	136.4
R-1 Agricultural	265.5	48.6	217.1
FP Floodplain	85.4	85.4	0
Watershed Total	1013	208.1	804.9
HUC-14 ID 2040201100050			
PVD	0	0	0
R-1 Low Density Res.	169.3	16.5	152.8
C-1, C-2, C-3	0	0	0
LI, GI, HI	235.4	21.8	213.6
R-1 Agricultural	120.5	16.5	104
FP Floodplain	66.8	66.8	0
Watershed Total	592	121.5	470.5
Township Total	13960.3	5095.1	8865.2

Table C-3: Nonpoint Source Loads at Build-Out

HUC-14 and Zone	Developable Area (Acres)	TP (lbs/ac/yr)	TP (lbs/yr)	TN (lbs/ac/yr)	TN (lbs/yr)	TSS (lbs/ac/yr)	TSS (lbs/yr)
HUC-14 ID 02040201080020							
PVD	0	1.4	0	15	0	140	0
R-1 Low Density Res.	469.5	0.6	281.7	5	2347.7	100	46954.6
C-1, C-2, C-3	107	2.1	224.7	22	2353.7	200	21397.2
LI, GI, HI	0	1.5	0	16	0	200	0
R-1 Agricultural	469.5	1.3	610.4	10	4695.5	300	140863.8
FP Floodplain	0	0.1	0	3	0	40	0
Watershed Total	1046.1		1116.8		9396.9		209215.7
HUC-14 ID 02040201080030							
PVD	0	1.4	0	15	0	140	0
R-1 Low Density Res.	0	0.6	0	2	0	100	0
C-1, C-2, C-3	120.9	2.1	253.9	22	2659.9	200	24181.2
LI, GI, HI	0	1.5	0	16	0	200	0
R-1 Agricultural	0	1.3	0	10	0	300	0
FP Floodplain	0	0.1	0	3	0	40	0
Watershed Total	120.9		253.9		2659.9		24181.2
HUC-14 ID 02040201090010							
PVD	0	1.4	0	15	0	140	0
R-1 Low Density Res.	755.4	0.6	453.2	5	3776.8	100	75536.4
C-1, C-2, C-3	183.5	2.1	385.4	22	4037.2	200	36701.9
LI, GI, HI	0	1.5	0	16	0	200	0
R-1 Agricultural	750.8	1.3	976.1	10	7508.5	300	225253.9
FP Floodplain	0	0.1	0	3	0	40	0
Watershed Total	1689.7		1814.7		15322.5		337492.2
HUC-14 ID 02040201090020							
PVD	30.4	1.4	41.5	15	455.4	140	4250.5
R-1 Low Density Res.	942.6	0.6	565.6	5	4713	100	94260.7
C-1, C-2, C-3	109.2	2.1	229.4	22	2402.8	200	21843.7
LI, GI, HI	804.4	1.5	1206.6	16	12870.4	200	160880
R-1 Agricultural	863.8	1.3	1122.9	10	8638	300	259141.2
FP Floodplain	0	0.1	0	3	0	40	0
Watershed Total	2750.4		3167		29079.7		540376.1
HUC-14 ID 02040201090030							
PVD	301.6	1.4	422.2	15	4523.5	140	42219.4
R-1 Low Density Res.	270.7	0.6	162.4	5	1353.6	100	27072.2
C-1, C-2, C-3	377.1	2.1	791.9	22	8295.9	200	75417.6
LI, GI, HI	121.2	1.5	181.9	16	1940	200	24249.8
R-1 Agricultural	270.7	1.3	351.9	10	2707.2	300	81216.7
FP Floodplain	0	0.1	0	3	0	40	0
Watershed Total	1341.3		1910.3		18820.3		240175.8

TP – Total Phosphorus

TN – Total Nitrogen

TSS – Total Suspended Solids

Table C-3: Nonpoint Source Loads at Build-Out (continued)

HUC-14 and Zone	Developable Area (Acres)	TP (lbs/ac/yr)	TP (lbs/yr)	TN (lbs/ac/yr)	TN (lbs/yr)	TSS (lbs/ac/yr)	TSS (lbs/yr)
HUC-14 ID 02040201100010							
PVD	0	1.4	0	15	0	140	0
R-1 Low Density Res.	246.5	0.6	147.9	5	1232.3	100	24645.5
C-1, C-2, C-3	203.9	2.1	428.2	22	4485.9	200	400781.3
LI, GI, HI	4.5	1.5	6.7	16	71.8	200	897.1
R-1 Agricultural	186.5	1.3	242.5	10	1865.1	300	55950.6
FP Floodplain	0	0.1	0	3	0	40	0
Watershed Total	641.3		825.3		7655		122274.5
HUC-14 ID 02040201100040							
PVD	0	1.4	0	15	0	140	0
R-1 Low Density Res.	445.3	0.6	267.2	5	2226.3	100	44526.1
C-1, C-2, C-3	6.2	2.1	13.1	22	137.1	200	1246.7
LI, GI, HI	136.4	1.5	204.6	16	2182.9	200	27286.6
R-1 Agricultural	217	1.3	282	10	2169.6	300	65086.6
FP Floodplain	0	0.1	0	3	0	40	0
Watershed Total	804.9		766.9		6715.9		138146
HUC-14 ID 02040201100050							
PVD	0	1.4	0	15	0	140	0
R-1 Low Density Res.	152.8	0.6	91.7	5	764.1	100	15281.9
C-1, C-2, C-3	0	2.1	0	22	0	200	0
LI, GI, HI	213.6	1.5	320.5	16	3418.3	200	4728.7
R-1 Agricultural	104	1.3	135.2	10	1040.3	300	31208.8
FP Floodplain	0	0.1	0	3	0	40	0
Watershed Total	470.5		547.4		5222.7		89219.4
Township Total	8865.2		10402.3		94872.9		1711080.9

TP – Total Phosphorus

TN – Total Nitrogen

TSS – Total Suspended Solids

Mitigation Plan

Variance or Exemption from Stormwater Design Standards

1. A variance or exemption from the design standards for stormwater management basins may be granted only upon a finding by the Township of Mansfield Planning board that the variance or exemption will be mitigated by the construction of a stormwater project of equal construction value within the same sub drainage area (HUC-14) that does not negatively impact sensitive receptors within Mansfield.
2. In order to be granted a variance or exemption a development must demonstrate that the design standard cannot be met due to unusual circumstances on the existing property. Variances or exemptions are not recommended for properties that have not been previously developed.
3. In order to be granted a variance or exemption, the applicant will be required to perform a preliminary stormwater management design and cost analysis of the stormwater system that would be required to meet all of the stormwater management requirements of N.J.A.C. 7:8 Subchapter 5. This analysis will be utilized to determine and select the mitigation project to be constructed by the applicant. The following specific items are required to be submitted for review by the Board:
 - a) A table to show the required values and the values provided in the project are equivalent;
 - b) An alternative analysis demonstrating that on-site compliance was maximized;
 - c) Narrative and supporting information regarding the need for the waiver;
 - d) Identify the sensitive receptor and demonstrate that the mitigation project contributes to the same sensitive receptor;
 - e) Design details to include but not be limited to drawings, calculations, and other information needed to evaluate the mitigation project;
 - f) List the party or parties responsible for the construction and the future operation and maintenance of the mitigation project. Submit ownership documentation or easements as applicable;
 - g) Maintenance Plan meeting the requirements of the Township's drainage ordinance;
 - h) Construction schedule of the mitigation project and development project.

4. All mitigation projects are to be reviewed and approved by the Township Engineer subject to all of the requirements of the Stormwater Ordinance. Proposed mitigation projects will be evaluated based on:
 - a) Project must be within the same area that would contribute to the receptor impacted by the project. If there is no specific sensitive receptor impacted, then the location of the mitigation project can be located anywhere within the Township, preferable at a location that would provide the most benefit.
 - b) Legal authorization must be obtained to construct the project at the location selected. This includes the maintenance and any access needs for the project in the future.
 - c) The project should be close to the location of the original project, and if possible, be located upstream at a similar distance from the identified sensitive receptor. This distance should not be based on actual location, but on a similar hydraulic distance to the sensitive receptor.
 - d) Preference is given to one location that addresses any and all of the performance standards waived, rather than separate locations for each performance standard.
 - e) The project location must demonstrate no adverse impacts to other properties.

Mitigation Projects

Stormwater Outfall Retrofit

Please provide retrofit measures at existing stormwater outfalls within the same HUC-14 under the guidance of the Township Engineer. Review of each outfall condition should be reviewed with the Township Engineer before selecting one or more of the following options:

- a) Outlet Structure Modifications (for example, repair of outfall condition through installation of drop manhole, upgraded outfall structure, rip-rap apron, or scour hole)
- b) Installation of in-line or end-of-pipe Best Management Practice (BMP) as approved by the NJDEP to pre-treat stormwater draining into an existing stormwater management basin.

Stream or Lake Bank Stabilization

Stream or Lake Bank projects meeting the following criteria may be presented for review and approval by the Township Engineer. Stabilization projects will be reviewed for the following benefits:

- a) Stabilization of eroded stream or lake banks where public or private property or structures are threatened
- b) Stabilization of eroded river, creek, or lake banks to reduce sediment deposition and improve water quality.

Stormwater Recharge Systems

Construction of stormwater recharge systems in areas of the Township with existing drainage problems can be addressed through compliance with the N.J.A.C. 7:8 Section 5 under the guidance of the Township Engineer.

Lake and Pond Management

- a)* Provide a comprehensive management plan and maintenance schedule for publicly held lakes or ponds within Mansfield Township.
- b)* Provide a lake edge stabilization project through the use of native plants and erosion control.
- c)* Provide a geese management plan through the vegetation of lake edge to reduce the fecal impairment of the lake or pond.

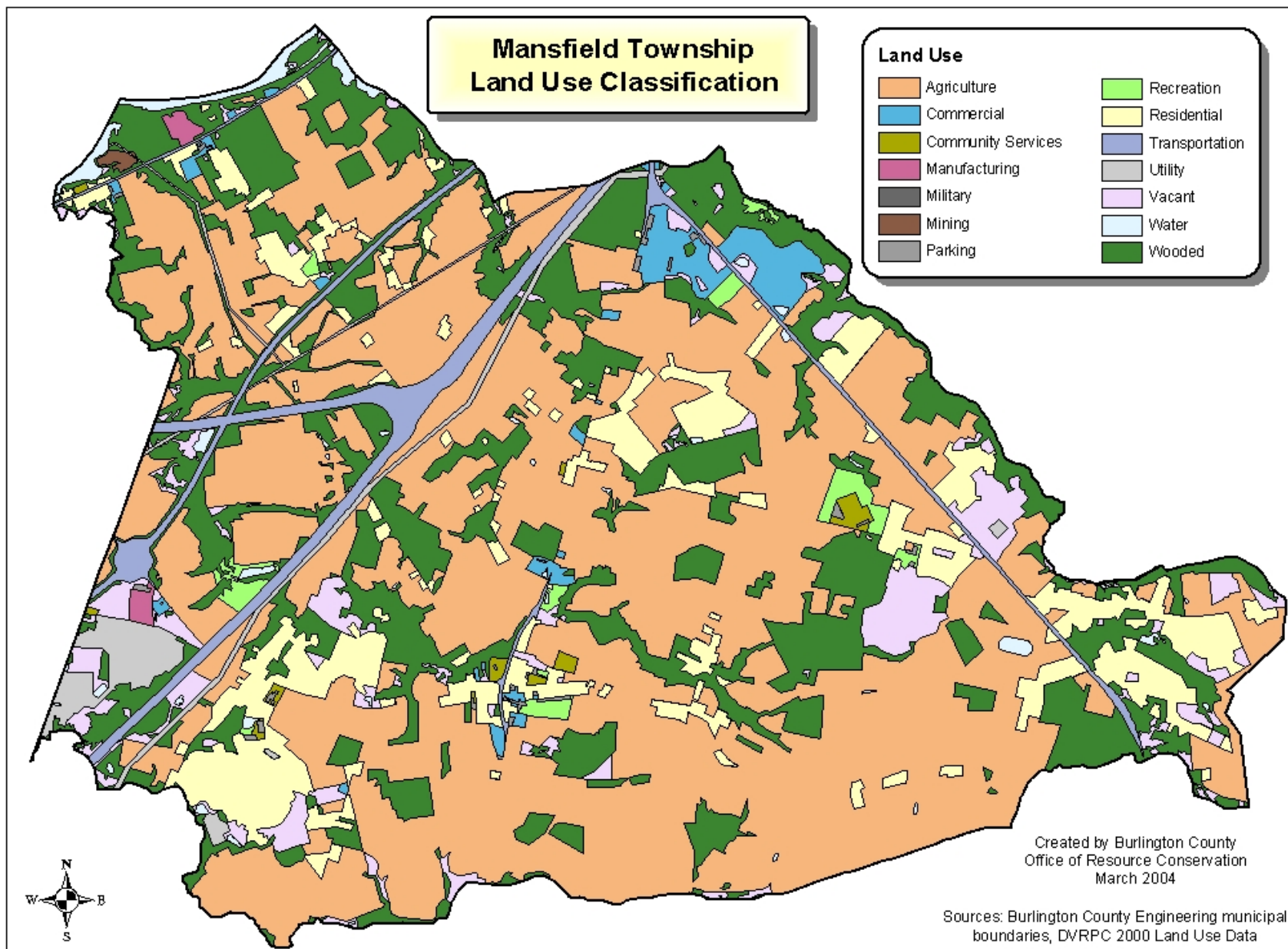


Figure F-7: Township's Existing Land Use

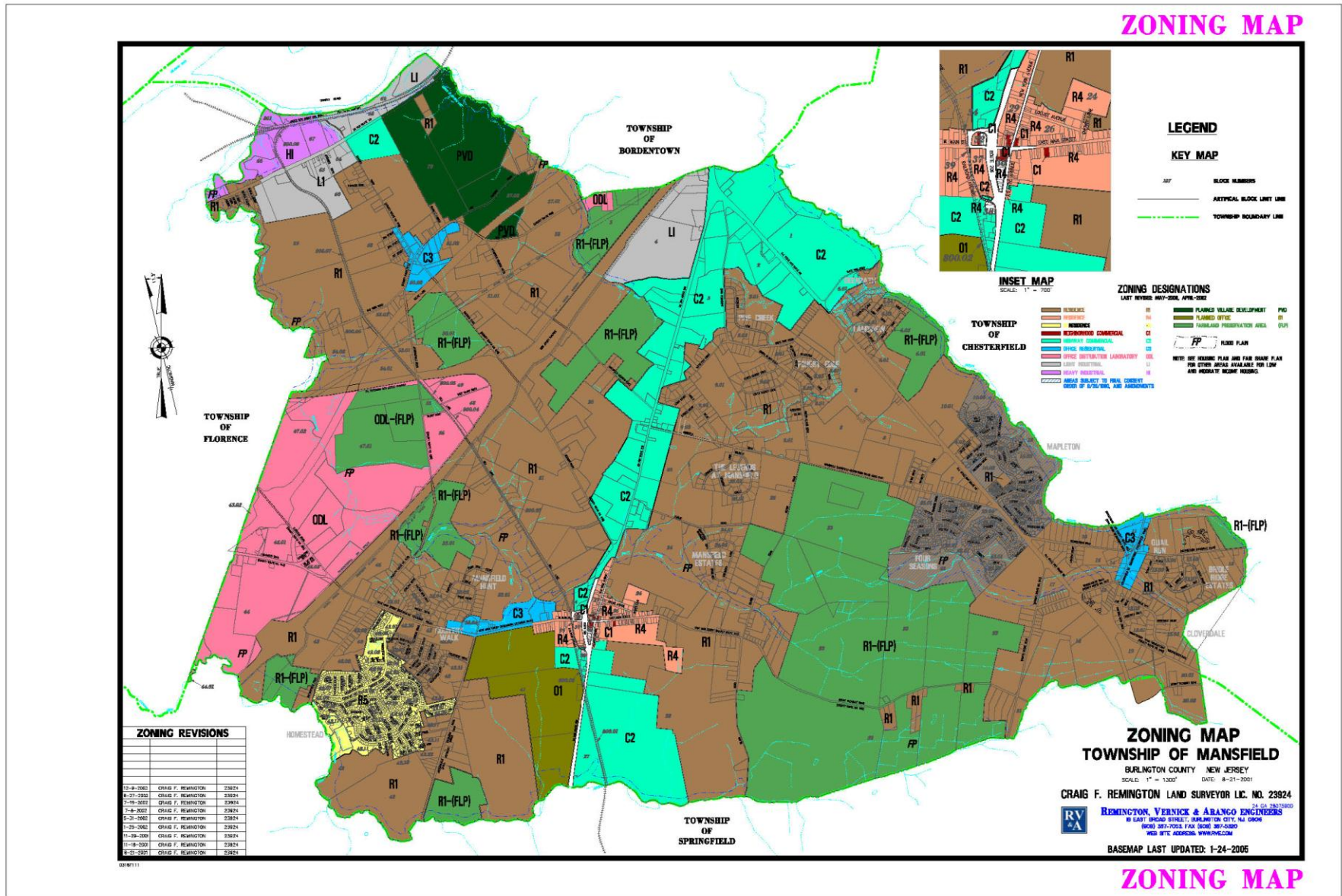
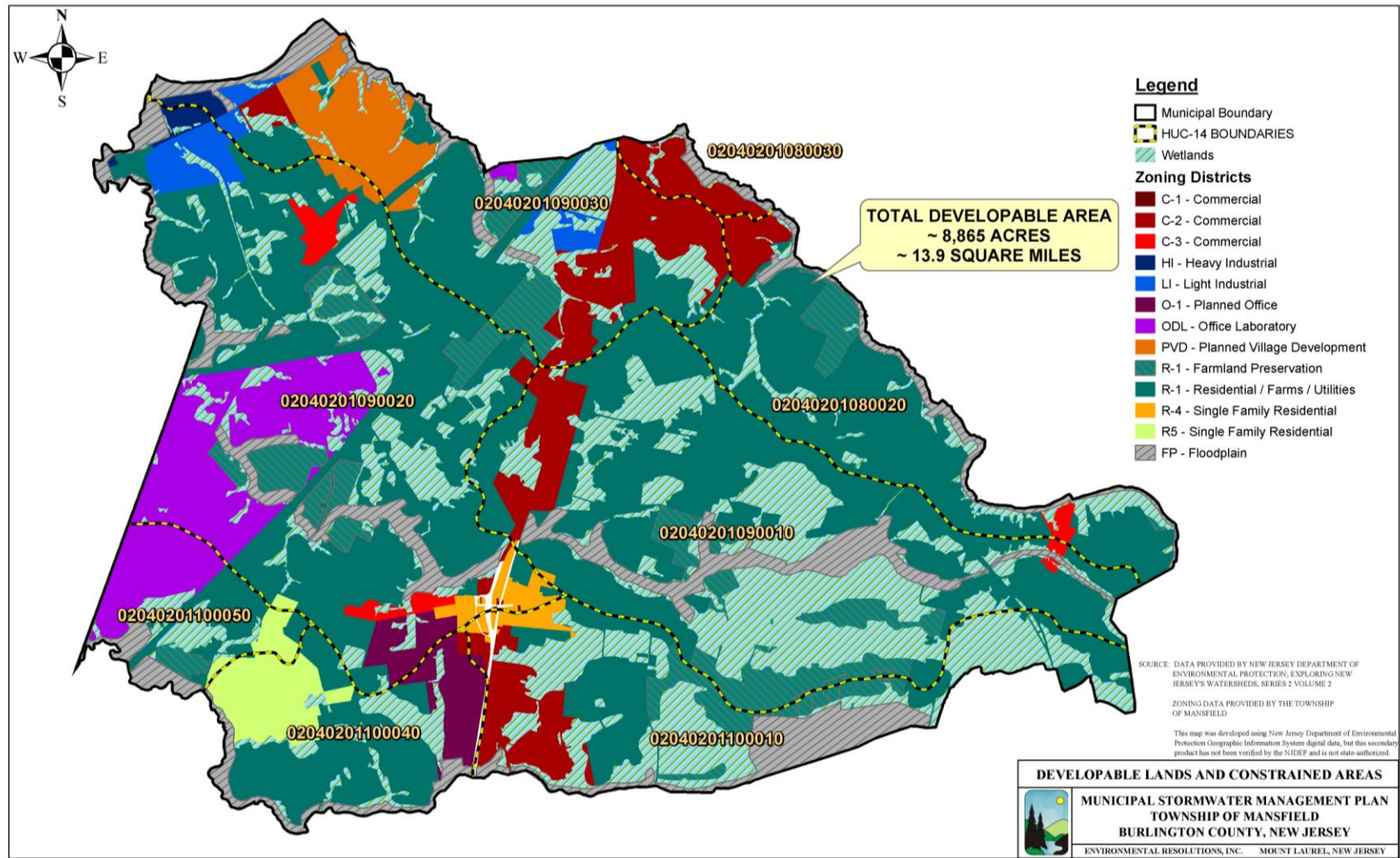


Figure F-8: Zoning Districts within the Township



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Figure F-9: Developable Lands and Constrained Areas

**TOWNSHIP OF MANSFIELD
BURLINGTON COUNTY**

**ORDINANCE 2006-18
AN ORDINANCE SUPPLEMENTING
THE CODE OF THE TOWNSHIP OF
MANSFIELD BY ADDING A NEW
SECTION, SECTION 50-27A ENTITLED
“STORMWATER CONTROL”**

**ARTICLE I
Scope and Purpose**

- 50-27A.1 Policy Statement
- 50-27A.2 Purpose
- 50-27A.3 Applicability
- 50-27A.4 Compatibility With Other Requirements

**ARTICLE II
Definitions**

- 50-27A.5 Words and Phrases

**ARTICLE III
General Standards**

- 50-27A.6 Design and Performance Standards

**ARTICLE IV
Requirements For Major Developments**

- 50-27A.7 Maintenance Plan
- 50-27A.8 Adverse Impacts
- 50-27A.9 Exempt Projects
- 50-27A.10 Waiver of Strict Compliance
- 50-27A.11 Non-Structural Stormwater Management Strategies
- 50-27A.12 Erosion Control, Groundwater Recharge and Runoff Quality Standards
- 50-27A.13 Stormwater Runoff Quality Standards

ARTICLE V

Calculation of Stormwater Runoff and Groundwater Recharge

50-27A.14 Methodology – Stormwater Runoff

50-27A.15 Methodology – Groundwater Recharge

ARTICLE VI

Standards For Structural Stormwater Management Measures

50-27A.16 Enumeration of Standards For Structural
Stormwater Management Measures

50-27A.17 Alternative Stormwater Management Measures

50-27A.18 Manufactured Treatment Devices

ARTICLE VII

Technical Guidance

50-27A.19 Documents

50-27A.20 Additional Sources

ARTICLE VIII

Safety Standards For Stormwater Management Basins

50-27A.21 New Stormwater Management Basins

50-27A.22 Requirements For Trash Racks, Overflow Grates and Escape Provisions

50-27A.23 Exemptions From Standards

50-27A.24 Safety Ledger In New Stormwater Management Basins

ARTICLE IX

Requirements For A Site Development Stormwater Plan

50-27A.25 Plan Submission

50-27A.26 Plan Approval

50-27A.27 Checklist Requirements

ARTICLE X

Maintenance and Repair

50-27A.28 Applicability

50-27A.29 General Maintenance

50-27A.30 Performance and Maintenance Guarantees

ARTICLE XI
Mitigation Plan

50-27A.31 Variance or Exemption From Stormwater Design Standards

50-27A.32 Mitigation Projects

50-27A.33 Stream or Lake Bank Stabilization

50-27A.34 Stormwater Recharge Systems

50-27A.35 Lake and Pond Management

50-27A.36 Underground Detention Basins

50-27A.37 Setbacks and Design Standards For Detention Basins

ARTICLE XII
Penalties

ARTICLE XIII
Effective Date

ARTICLE XIV
Severability

ARTICLE I: SCOPE AND PURPOSE

50-27A.1. 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.

50-27A.2. Purpose

It is the purpose of this ordinance to establish minimum stormwater management requirements and controls for “major development,” as defined in Article II.

50-27A.3. Applicability

- A. 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:
 - 1. Non-residential major developments; and
 - 2. Aspects of residential major developments that are not pre-empted by the Residential Site Improvement Standards at N.J.A.C. 5:21.
- B. This ordinance shall also be applicable to all major developments undertaken by Mansfield Township.

50-27A.4. Compatibility with Other Permit and Ordinance Requirements

Development approvals issued for subdivisions and site plans pursuant to this ordinance are to be considered an integral part of development approvals under the subdivision and site plan review process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation and application, the provisions of this ordinance shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This ordinance is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that, where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

ARTICLE II: DEFINITIONS

50-27A.5. Words and Phrases

Unless specifically defined below, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application. The definitions below are the same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C. 7:8-1.2.

“CAFRA Planning Map” means the geographic depiction of the boundaries for Coastal Planning Areas, CAFRA Centers, CAFRA Cores and CAFRA Nodes pursuant to N.J.A.C. 7:7E-5B.3.

“CAFRA Centers, Cores or Nodes” means those areas within boundaries accepted by the Department pursuant to N.J.A.C. 7:8E-5B.

“Compaction” means the increase in soil bulk density.

“Core” means a pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

“County review agency” means an agency designated by the County Board of Chosen Freeholders to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

A county planning agency; or

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 approved by the Department’s Endangered and Nongame Species Program.

“Empowerment Neighborhood” means a neighborhood designated by the Urban Coordinating Council “in consultation and conjunction with” the New Jersey Redevelopment Authority pursuant to N.J.S.A 55:19-69.

“Erosion” means the detachment and movement of soil or rock fragments by water, wind, ice or gravity.

“Impervious surface” means a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

“Infiltration” is the process by which water seeps into the soil from precipitation.

“Major development” means any “development” that provides for ultimately disturbing one or more acres of land. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

“Municipality” means any city, borough, town, township, or village.

“Node” means an area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

“Nutrient” means a chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

“Person” means any individual, corporation, company, partnership, firm, association, Mansfield Township, or political subdivision of this State subject to municipal jurisdiction pursuant to the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq.

“Pollutant” means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a 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.

“Tidal Flood Hazard Area” means a flood hazard area, which may be influenced by stormwater runoff from inland areas, but which is primarily caused by the Atlantic Ocean.

“Urban Coordinating Council Empowerment Neighborhood” means a neighborhood given priority access to State resources through the New Jersey Redevelopment Authority.

“Urban Enterprise Zones” means a zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, N.J.S.A. 52:27H-60 et. seq.

“Urban Redevelopment Area” is defined as previously developed portions of areas:

1. Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes;
2. Designated as CAFRA Centers, Cores or Nodes;
3. Designated as Urban Enterprise Zones; and
4. Designated as Urban Coordinating Council Empowerment Neighborhoods.

“Waters of the State” means the ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or ground water, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

“Wetlands” or “wetland” means an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

ARTICLE III: GENERAL STANDARDS

50-27A.6. Design and Performance Standards for Stormwater Management Measures

- A. Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in Article IV. To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these

strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.

- B. 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.

ARTICLE IV: STORMWATER MANAGEMENT REQUIREMENTS FOR MAJOR DEVELOPMENT

50-27A.7. Maintenance Plan

The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with **Article X.**

50-27A.8. Adverse Impacts

Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department's 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).

50-27A.9. Exempt Projects

The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Sections 50-27A.12 and 50-27A.13:

- A. The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;
- B. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and
- C. The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.

50-27A.10. Waiver of Strict Compliance

A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Section 50-27A.12 and Section 50-27A.13 may be obtained for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:

- A. The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
- B. The applicant demonstrates through an alternatives analysis, that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Sections 50-27A.12 and 50-27A.13 to the maximum extent practicable;
- C. The applicant demonstrates that, in order to meet the requirements of Sections 50-27A.12 and 50-27A.13, existing structures currently in use, such as homes and buildings, would need to be condemned; and
- D. The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under Section 50-27A.10.C, above, within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of Sections 50-27A.12 and 50-27A.13 that were not achievable on-site.

50-27A.11. Nonstructural Stormwater Management Strategies

- A. To the maximum extent practicable, the standards in Sections 50-27A.12 and 50-27A.13 shall be met by incorporating nonstructural stormwater management strategies set forth in this Article into the design. The applicant shall identify the nonstructural measures 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 measures identified in Paragraph B below into the design of a particular project, the applicant shall identify the strategy considered and provide a basis for the contention.
- B. 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 watershed 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;
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. Such source controls include, but are not limited to:
 - (a) Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Section 50-27A.11.C.3 below;
 - (b) Site design features that help to prevent discharge of trash and debris from drainage systems;
 - (c) Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and

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.

- C. Site design features identified under Section 50-27A.11.B9.b, above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Section 50-27A.11.C.3, below.

1. Design engineers shall use either of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:
 - (a) The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or
 - (b) A different grate, if each individual clear space in that grate has an area of no more than seven (7.0) square inches, or is no greater than 0.5 inches across the smallest dimension.

Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.

2. Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if the curb opening has two or more clear spaces) shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension.
3. This standard does not apply:
 - (a) Where the review agency determines that this standard would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets that meet these standards;
 - (b) Where flows from the water quality design storm as specified in Section 50-27A.13.A 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:
 - (i) 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
 - (ii) A bar screen having a bar spacing of 0.5 inches.
 - (c) 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 70-13.A.
 - (d) 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.
- D. Any land area used as a nonstructural stormwater management measure to meet the performance standards in Section 50-27A.12 and Section 50-27A.13 shall be 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.

- E. 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 Article VII, or found on the Department's website at www.njstormwater.org.

50-27A.12. Erosion Control, Groundwater Recharge and Runoff Quantity Standards

- A. This subsection contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of major development.
 - 1. The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules.
 - 2. The minimum design and performance standards for groundwater recharge are as follows:
 - (a) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Article V, either:
 - (i) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site; or
 - (ii) Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the 2-year storm is infiltrated.
 - (b) This groundwater recharge requirement does not apply to projects within the "urban redevelopment area," or to projects subject to (c) below.
 - (c) The following types of stormwater shall not be recharged:
 - (i) Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied, areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than "reportable quantities" as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with Department approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and

- (ii) 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.
 - (d) 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.
- 3. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Article V, complete one of the following:
 - (a) 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;
 - (b) 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 analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;
 - (c) Design stormwater management measures so that the post-construction peak runoff rates for the 2, 10 and 100 year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed. The percentages shall not be applied to post-

construction stormwater runoff into tidal flood hazard areas if the increased volume of stormwater runoff will not increase flood damages below the point of discharge; or

- (d) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with (a), (b) and (c) above shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.
- B. Any application for a new agricultural development that meets the definition of major development at Article II shall be submitted to the appropriate Soil Conservation District for review and approval in accordance with the requirements of this section and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control. For the purposes of this section, “agricultural development” means land uses normally associated with the production of food, fiber and livestock for sale. Such uses do not include the development of land for the processing or sale of food and the manufacturing of agriculturally related products.

50-27A .13. Stormwater Runoff Quality Standards

- A. Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff by 80 percent of the anticipated load from the developed site, expressed as an annual average. Stormwater management measures shall only be required for water quality control if an additional 1/4 acre of impervious surface is being proposed on a development site. The requirement to reduce TSS does not apply to any 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		

- B. 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 Article VII, or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Article VII. 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 demonstrating the capability of these alternative rates and methods to the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the Department at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, PO Box 418 Trenton, New Jersey, 08625-0418.
- C. If more than one BMP in series is necessary to achieve the required 80 percent TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

$$R = A + B - (AXB)/100$$

Where

R = total TSS percent load removal from application of both BMPs, and

A = the TSS percent removal rate applicable to the first BMP

B = the TSS percent removal rate applicable to the second BMP

Table 2: TSS Removal Rates for BMPs	
Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90

Extended Detention Basin	40-60
Infiltration Structure	80
Manufactured Treatment Device	See Section 50-27A.18
Sand Filter	80
Vegetative Filter Strip	60-80
Wet Pond	50-90

- D. If there is more than one onsite drainage area, the 80 percent TSS removal rate shall apply to each drainage area, unless the runoff from the subareas converge on site in which case the removal rate can be demonstrated through a calculation using a weighted average.
- E. 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 50-27A.12 and 50-27A.13.
- F. Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Article VII.
- G. 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.
- H. 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:
 - 1. The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:
 - (a) 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.

- (b) Encroachment within the designated special water resource protection area under Subsection (a) above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area be reduced to less than 150 feet as measured perpendicular to the top of bank of the waterway or centerline of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.
- 2. All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the Standard for Off-Site Stability in the “Standards For Soil Erosion and Sediment Control in New Jersey,” established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq.
- 3. If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the Standard For Off-Site Stability in the “Standards for Soil Erosion and Sediment Control in New Jersey,” established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:
 - (a) Stabilization measures shall not be placed within 150 feet of the Category One waterway;
 - (b) Stormwater associated with discharges allowed by this section shall achieve a 95 percent TSS post-construction removal rate;
 - (c) Temperature shall be addressed to ensure no impact on the receiving waterway;
 - (d) The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;
 - (e) A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and
 - (f) All encroachments proposed under this section shall be subject to review and approval by the Department.

4. 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 50-27A.13.H 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 Section 50-27A.13.H shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in Section 50-27A.13.H.1.(a), 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.
5. Section 50-27A.13.H 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.

ARTICLE V: CALCULATION OF STORMWATER RUNOFF AND GROUNDWATER RECHARGE

50-27A.14 Methodology – Stormwater Runoff

- 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 wooded land use with good hydrologic condition. The term “runoff coefficient” applies to both the NRCS methodology at Section 5.A.1.a and the Rational and Modified Rational Methods at Section 5.A.1.b. A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years

without interruption prior to the time of application. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).

3. In computing pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts, that may reduce pre-construction stormwater runoff rates and volumes.
4. In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release 55 – Urban Hydrology for Small Watersheds and other methods may be employed.
5. If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.

50-27A.15. Methodology – Groundwater Recharge

Groundwater recharge may be calculated in accordance with the following:

The New Jersey Geological Survey Report GSR-32 A Method for Evaluating Ground-Water Recharge Areas in New Jersey, incorporated herein by reference as amended and 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.

ARTICLE VI: STANDARDS FOR STRUCTURAL STORMWATER MANAGEMENT MEASURES

50-27A.16. Enumeration of Standards For Structural Stormwater Management Measures

Standards for structural stormwater management measures are as follows:

- A. 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).

- B. 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 50-27A.24.
- C. 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.
- D. 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.
- E. Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Article VIII.
- F. Underground Detention Basins. Underground detention facilities are not recommended as a design solution for residential development. The Township of Mansfield will not accept maintenance responsibility for underground stormwater detention facilities or stormwater outflow control structures located within stormwater inlets within the public right-of-way. Exemptions from the runoff quantity design and performance standards may be offset through the mitigation process by the construction of a mitigation project of equal value within the same sub-watershed HUC-14 to meet the same design standard.
- G. Setbacks and Design Standards For Detention Basins. Detention/infiltration basins will not be permitted within landscape buffers required between commercial and residential and within sight triangle areas, nor within 10 feet of any property line.

50-27A.17. Alternative Stormwater Management Measures

Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its

design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by Article IV of this ordinance.

50-27A.18. Manufactured Treatment Devices

Manufactured treatment devices may be used to meet the requirements of Article IV of this ordinance, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

ARTICLE VII: SOURCES FOR TECHNICAL GUIDANCE

50-27A.19. Documents

Technical guidance for stormwater management measures can be found in the documents listed at 1 and 2 below, which are available from Maps and Publications, New Jersey Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; telephone (609) 777-1038.

- A. Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended. Information is provided on stormwater management measures such as: bioretention systems, constructed stormwater wetlands, dry wells, extended detention basins, infiltration structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.
- B. The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.

50-27A.20. Additional Sources

Additional technical guidance for stormwater management measures can be obtained from the following:

- A. The "Standards for Soil Erosion and Sediment Control in New Jersey" promulgated by the State Soil Conservation Committee and incorporated into N.J.A.C. 2:90. Copies of these standards may be obtained by contacting the State Soil 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;
- B. The Rutgers Cooperative Extension Service, 732-932-9306; and
- C. 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.

ARTICLE VIII: SAFETY STANDARDS FOR STORMWATER MANAGEMENT BASINS

50-27A.21. New Stormwater Management Basins

This section sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. This article 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 THIS Article, Section 70-22, for trash racks, overflow grates, and escape provisions at outlet structures.

50-27A.22. Requirements for Trash Racks, Overflow Grates and Escape Provisions

- A. 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:
 - 1. The trash rack shall have parallel bars, with no greater than six inch spacing between the bars.
 - 2. The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.
 - 3. The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.
 - 4. The trash rack shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs/ft sq.
- B. An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:
 - 1. The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.
 - 2. The overflow grate spacing shall be no less than two inches across the smallest dimension.
 - 3. The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs./ft sq.
- C. For purposes of this paragraph, “escape provisions” means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible

means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:

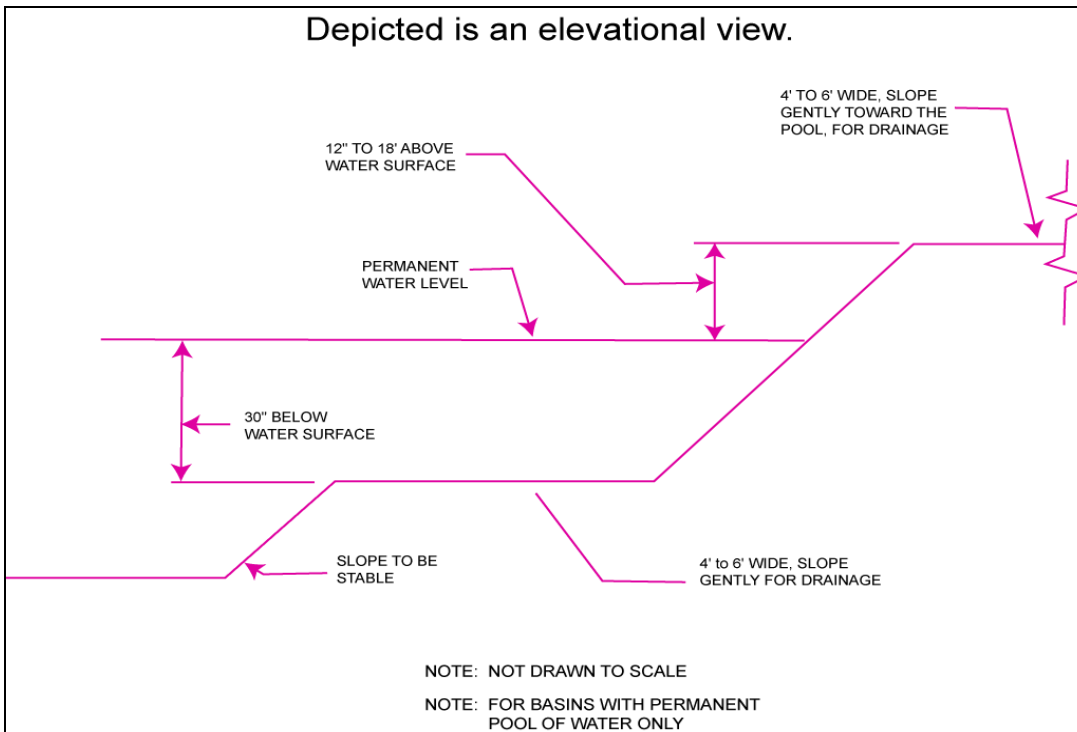
1. If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Section 50-27A.23.A, a free-standing outlet structure may be exempted from this requirement.
2. Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Such safety 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 50-27A.24 for an illustration of safety ledges in a stormwater management basin.
3. 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.

50-27A.23 Variance or Exemption from Safety Standards

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.

50-27A.24 Safety Ledger In New Stormwater Management Basins

Illustration of Safety Ledges in a New Stormwater Management Basin



ARTICLE IX: REQUIREMENTS FOR A SITE DEVELOPMENT STORMWATER PLAN

50-27A.25. Submission of Site Development Stormwater Plan

- A. Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at Section 50-27A.27 below as part of the submission of the applicant's application for subdivision or site plan approval.
- B. The applicant shall demonstrate that the project meets the standards set forth in this ordinance.
- C. The applicant shall submit 3 copies of the materials listed in the checklist for site development stormwater plans in accordance with Section 50-27A.27 of this ordinance.

50-27A.26. Site Development Stormwater Plan Approval

The applicant's Site Development project shall be reviewed as a part of the subdivision or site plan review process by the municipal board or official from which municipal approval is sought. That municipal board or official shall consult the engineer retained by the Planning and/or Zoning Board (as appropriate) to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this ordinance.

50-27A.27. Checklist Requirements

The following information shall be required:

A. Topographic Base Map

The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of 1"=200' or greater, showing 2-foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and manmade features not otherwise shown.

B. 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.

C. 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.

D. Land Use Planning and Source Control Plan

This plan shall provide a demonstration of how the goals and standards of Articles III through VI 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.

E. Stormwater Management Facilities Map

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

1. 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.

2. 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 provisions with maximum discharge capacity of each spillway.

F. Calculations

1. Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Section 50-27A.12.A.3(a) of this ordinance.
2. When the proposed stormwater management control measures (e.g., infiltration basins) depends on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on onsite boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.

G. Maintenance and Repair Plan

The design and planning of the stormwater management facility shall meet the maintenance requirements of Article X.

H. Waiver from Submission Requirements

The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements in Sections 50-27A.27.A through 50-27A.27.F of this ordinance when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

ARTICLE X: MAINTENANCE AND REPAIR

50-27A.28. Applicability

Projects subject to review as in Section 50-27A.3 of this ordinance shall comply with the requirements of Sections 50-27A.29 and 50-27A.30.

50-27A.29. General Maintenance

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

- C. 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.
- D. If the person responsible for maintenance identified under Section 50-27A.29.B above is not a public agency, the maintenance plan and any future revisions based on Section 50-27A.29.G below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
- E. 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 areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.
- F. The person responsible for maintenance identified under Section 50-27A.29.B above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.
- G. The person responsible for maintenance identified under Section 50-27A.29.B above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.
- H. The person responsible for maintenance identified under Section 50-27A.29.B above shall retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by Sections 50-27A.29.F and 50-27A.29.G above.
- I. The requirements of Sections 50-27A.29.C and 50-27A.29.D do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.
- J. In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his 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.

50-27A.30. Performance and Maintenance Guarantees

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.

ARTICLE XIV: MITIGATION PLAN

50-27A.31 Variance or Exemption from Stormwater Design Standards

- A. A variance or exemption from the design standards for stormwater management basins may be granted only upon a finding by the Township of Mansfield Planning Board that the variance or exemption will be mitigated by the construction of a stormwater project of equal construction value within the same subdrainage area (HUC-14) that will not negatively impact sensitive receptors within the Township.
- B. In order to be granted a variance or exemption a development must demonstrate that the design standard cannot be met due to unusual circumstances on the existing property. Variances or exemptions are not recommended for properties that have not been previously developed.
- C. In order to be granted a variance or exemption, the applicant will be required to perform a preliminary stormwater management design and cost analysis of the stormwater system that would be required to meet all the stormwater management requirements of NJAC 7:8 Subchapter 5. This analysis will be utilized to determine and select the mitigation project to be constructed by the applicant.
- D. Any request for a variance or exemption shall include as a minimum the following items as part of the analysis to be prepared by the applicant:
 - a) A table to show the required values and the values provided in the project are equivalent
 - b) An alternatives analysis demonstrating that on-site compliance was maximized.
 - c) Narrative and supporting information regarding the need for the waiver.
 - d) Identify the sensitive receptor and demonstrate that the mitigation project contributes to the same sensitive receptor.
 - e) Design details to include but not be limited to drawings, calculations, and other information needed to evaluate the mitigation project.
 - f) List the party or parties responsible for the construction and the future operation and maintenance of the mitigation project. Submit ownership documentation or easements as applicable.

- g) Maintenance Plan meeting the requirements of the Township's drainage ordinance.
- h) Construction schedule of the mitigation project and development project.

50-27A.32 Mitigation Projects

Variances or exemptions are to be granted only upon the condition that the applicant provides a mitigation project of equal value within the same sub-watershed as delineated by the HUC 14. All mitigation projects are to be under the review and approval of the Township Engineer. The mitigation projects proposed within the Township of Mansfield are:

A. Stormwater Outfall Retrofit

Provide retrofit measures at existing stormwater outfalls within the same HUC14 under the guidance of the Township Engineer. Review of each outfall condition should be reviewed with the Township Engineer before selecting one or more of the following options:

- 1. Outlet Structure Modifications (for example, repair of outfall condition through installation of drop manhole, upgraded outfall structure, rip-rap apron, or scour hole)
- 2. Installation of in-line or end-of-pipe Best Management Practice (BMP) as approved by the NJDEP to pretreat stormwater draining into an existing stormwater management basin

50-27A.33 Stream or Lake Bank Stabilization

Stream or Lake Bank projects meeting the following criteria may be presented for review and approval by the Township Engineer. Stabilization projects will be reviewed for the following benefits:

- A. Stabilization of eroded stream or lake banks where public or private property or structures are threatened.
- B. Stabilization of eroded river, creek or lake banks to reduce sediment deposition and improve water quality.

50-27A.34 Stormwater Recharge Systems

Construction of stormwater recharge systems in areas of the Township with existing drainage problems can be addressed through compliance with the NJAC 7:8 Section 5 under the guidance of the Township Engineer.

50-27A.35 Lake and Pond Management

- A. Provide a comprehensive management plan and maintenance schedule for a publicly held lakes or ponds within Mansfield Township.
- B. Provide a lake edge stabilization project through the use of native plants and erosion control.

- C. Provide a geese management plan through the vegetation of lake edge to reduce the fecal impairment of the lake or pond.

ARTICLE XI: PENALTIES

Any person who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this ordinance shall be subject to a penalty not to exceed \$5,000.00 per violation.

ARTICLE XII: EFFECTIVE DATE

This ordinance shall take effect immediately upon the approval by the county review agency, or sixty (60) days from the receipt of the ordinance by the county review agency if the county review agency should fail to act.

ARTICLE XIII: SEVERABILITY

If the provisions of any section, subsection, paragraph, subdivision, or clause of this ordinance shall be judged invalid by a court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any section, subsection, paragraph, subdivision, or clause of this ordinance.