

MUNICIPAL STORMWATER MANAGEMENT PLAN (MSWMP)

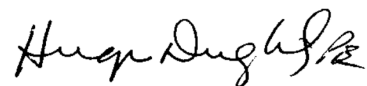


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Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for Berlin Borough 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 and/or create ¼ acre or more of regulated impervious surface and regulated motor vehicle surface.

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 Borough 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:

- a. Reduce flood damage, including damage to life and property.
- b. Minimize, to the extent practical, any increase in stormwater runoff from any new development.
- c. Reduce soil erosion from any development or construction project.
- d. Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures.
- e. Maintain groundwater recharge.
- f. Prevent, to the greatest extent feasible, an increase in nonpoint pollution.
- g. Maintain the integrity of stream channels for their biological functions, as well as for drainage.
- h. 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.

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

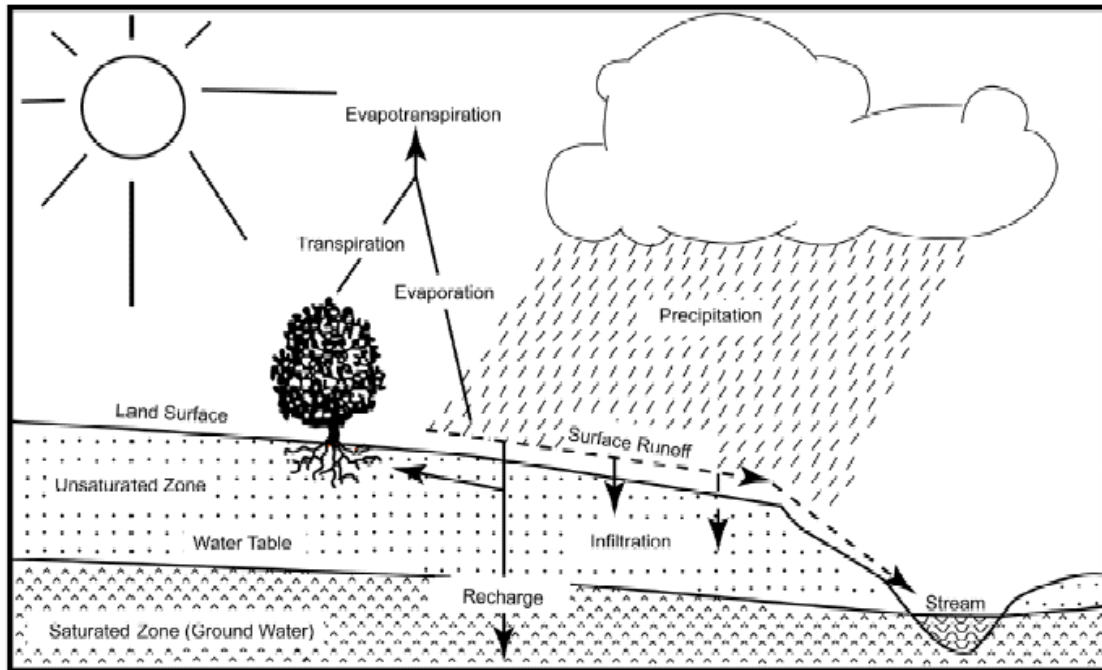
To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the plan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

Stormwater Discussion

The land development in the Borough of Berlin can dramatically alter the hydrologic cycle, which, ultimately, will affect entire watersheds (See Figure 1). 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 allow. 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.

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, including 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.



Source: New Jersey Geological Survey Report GSR-32.

Figure 1: Hydrologic Cycle

Background

Berlin Borough is located in approximately the center of Camden County, New Jersey. The Borough contains 3.64 square miles or 2324 square acres. Figure 2 provides a graphic illustration of the Borough on the USGS quadrangle map.

The population has grown 21.8% in the twenty-year period of 2000 to 2020. The year 2020 population was determined to be 7,489 residents, an increase of 1,340 people.

The Borough is divided by the Great Egg Harbor River. Tinkers Branch runs along the southern border of the Borough, and Trout Run runs in through the northwestern municipal boundary. Also, the North Branch Big Timber Creek runs through the western portion of the Borough. A map of the Borough waterways appears as Figure 3.

The New Jersey Department of Environmental Protection (NJDEP) has established the Ambient Biomonitoring Network (AMNET) to monitor and document the health of the state waterways. Sites are classified as non-impaired, moderately impaired, or severely impaired based on biometrics related to benthic macroinvertebrate data. The New Jersey Integrated Water Quality Monitoring and Assessment Report, 305(b) and 303(d), is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants.

Some impaired waters are issued a Total Maximum Daily Load (TMDL) from NJDEP for the pollutant. A TMDL is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one more of its designated uses. Implementation plans must be adopted to comply with a NJDEP TMDL.

According to the NJDEP data, the following TMDL's have been issued for waters connected to Berlin Borough.

- Big Timber Creek (North Branch)
 - Fecal Coliform
 - Mercury
 - Polychlorinated Biphenyls (PCBs)
- New Brooklyn Lake
 - Total Phosphorus
- Great Egg Harbor River (Watershed Management Area 15)
 - Total coliform
- Mullica River (Watershed Management Area 14)
 - Total coliform

Berlin Borough does not experience any significant flooding problems. Principal flooding occurs in middle and late summer and in the fall. Summer floods are generally the result of thunderstorms.

As the impervious cover has increased in Berlin Borough, the peak and volumes of stream flows have also increased. The increased amount of water has resulted in stream bank erosion along the Borough's waterways. The high imperviousness of the Borough has decreased the groundwater recharge, decreasing base flows in streams during dry weather periods. Lower base flows can have a negative impact on instream habitat during the summer months.

A map of the groundwater recharge areas is presented as Figure 4. Wellhead protection areas, also a required aspect of the MSWMP, are shown in Figure 5. There are two wellhead protection areas that infringe upon the Borough. Berlin Borough also has a Pinelands section. The region of the Borough, in the eastern corner, bordering Winslow Township and Berlin Township is the edge of a Pinelands Region.

Design and Performance Standards

Berlin Borough has adopted 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 Berlin Borough standards will also meet the regulations of the Pinelands Commission N.J.A.C. 7:50-6.84 for those lands within the Pinelands Area. The Borough Municipal Stormwater Control Ordinance was adopted by the Borough in 2006.

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

Plan Consistency

Berlin Borough is not within a Regional Stormwater Management Planning Area so this plan does not need to be consistent to a regional stormwater management plan (RSWMP). If a RSWMP is developed, this MSWMP will be revised to be consistent. Berlin Borough has not been issued any TMDLs either, so the plan does not need to be consistent with a TMDL response plan.

The Berlin Borough MSWMP is consistent with the Residential Site Improvement Standards (RSIS) as specified in N.J.A.C. 5:21. Any review of residential sites for stormwater management compliance will follow the most recent RSIS and this plan will be revised to include any RSIS updates.

Berlin Borough already requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. Borough inspectors will enforce these standards at all construction sites and report any violations or inconsistencies to the local Soil Conservation District.

Working closely with the NJDEP, the Pinelands Commission has developed a model stormwater control ordinance integrating the requirements of the NJDEP Stormwater Phase II Rules, the NJDEP Stormwater Management Rules (N.J.A.C. 7:8) and the Pinelands Comprehensive Management Plan ("CMP") (N.J.A.C. 7:50). As some of the land in the Borough lies within the Pinelands region, the Borough of Berlin has adopted the Stormwater Control Ordinance for Pinelands Area to be compliant with the CMP as modified by the model stormwater control ordinance. This MSWMP is also consistent with the CMP, and any future amendments to the CMP shall be incorporated into the plan.

Nonstructural Stormwater Management Strategies

Berlin Borough has reviewed the master plan, land use and zoning ordinances, and maps to determine what adjustments are needed for the implementation of the nonstructural stormwater management techniques. The ordinances that require revision are listed below. Once the ordinances have been revised as found necessary, they will be submitted for review and approval. A copy will be sent to the Department of Environmental Protection at the time of submission.

Section 335-36. Cluster development and lot size averaging.

This section provides an option to preserve land for private open spaces, common property, conservation areas and other public uses. The section may be amended to require a specific percentage of the total tract be preserved as common open space. The current language requires 20% of the original tract be preserved for common property or public area. It may also be amended to require 25% of the common area be landscaped with trees and/or shrubs.

Section 335-38. Curbs and gutters.

This section may be amended to allow for curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.

Section 335-39. Drainage.

This section may be amended to encourage the use of natural vegetated swales in lieu of inlets and pipes.

Section 335-40. Driveways.

This section may be amended to allow for pervious paving materials to be used in driveway construction to minimize stormwater runoff and promote groundwater recharge.

Section 335-45. Landscaping.

Section 335-77C. Buffers.

These sections may be amended to promote the use of native vegetation, which requires less fertilization and watering than non-native species. Also, they may be amended to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces.

Section 335-52. Off-site and off-tract improvements.

This section may be amended to require that any off-site and off-tract stormwater management and drainage improvements must conform to the “Design and Performance Standards” as described in this plan.

Section 335-53. Off-street parking and loading.

This section may be amended to allow for flush curb with curb stop or curbing with curb cuts to encourage developers to allow for the discharge of impervious areas into landscaped areas for stormwater management. Also, it may be amended to promote the use of natural vegetated swales, and to allow pervious paving to be used to provide overflow parking, vertical parking structures, smaller parking stalls and shared parking.

Section 335-60. Shade trees.

This section may be amended to require a minimum number of shade trees in a front yard, a “critical” area of 20 feet beyond the driveway and building footprint where clearing of trees cannot occur, identification of forested areas, and protection of a certain percentage of forested areas from disturbance.

Section 335-61. Sidewalks.

This section may be amended to encourage developers to design sidewalks to drain runoff onto landscaped areas or to use permeable paving surfaces where appropriate.

Section 335-63. Soil erosion and sediment control.

This section may be amended to require developers to comply with the New Jersey Soil Erosion and Sediment Control Ordinance.

Section 335-64. Stormwater runoff.

This section may be amended to incorporate all requirements outlined in N.J.A.C. 7:8-5.

Section 335-66. Streets.

This section may be amended to discourage on-street parking, therefore lessening road widths. Also, the minimum radius of a cul-de-sac may be reduced to lessen impervious surfaces.

Nonconforming uses, structures or lots.

This section may be added to require applicants who exceed the maximum percent impervious cover to mitigate the impact of the additional impervious surfaces. The mitigation effort must address water quality, flooding, and groundwater recharge.

The portion of the Code of the Borough of Berlin, regarding lot size and maximum percent impervious surface, will be reviewed. The Borough will evaluate the maximum allowable impervious cover for each zone to determine whether a reduction in impervious cover is appropriate. Also, the code may be amended to remind developers that satisfying the percent impervious requirements does not relieve them of responsibility for complying with the Design and Performance Standards for Stormwater Management Measures.

Land Use/ Build-Out Analysis

A detailed land use analysis for Berlin Borough was conducted. Figures 6 and 7 illustrate the HUC14s within the Borough. A zoning plan is attached as Figure 8 and an existing land use map is attached as Figure 9. The build-out calculations for impervious cover are shown in Table 1 and were calculated using the Berlin Borough zoning plan and zoning regulations. The existing impervious percentages are estimates based on the existing land use map, NJDEP impervious cover maps, aerial photography, and the current zoning regulations. As expected, the build-out of much of the currently undeveloped land will result in a significant increase in the impervious cover within the Borough.

Table 2 presents the pollutant loading coefficients by land cover. The pollutant loads at full build-out are presented in Table 3.

At full build-out, each HUC 14s will experience different pollutant loading ranging from 45 lbs/year to 1,561 lbs/year for Phosphorus loading, 472 lbs/year to 15,663 lbs/year for Nitrogen loading, and 4,288 lbs/year to 181,472 lbs/year for total suspended solid loading. Stormwater management strategies will be used to minimize the amount of nonpoint pollution occurring with increased development. Stormwater quality measures include directing runoff into natural areas and away from waterways to be filtered or infiltrated into the ground. Existing forested and vegetated areas, restricted for future development, can also be used as water quality mitigation areas for discharged sheet flow. The Borough of Berlin has also adopted design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of runoff, including pollutant loading, into receiving water bodies. The Borough may also adopt nonstructural stormwater management strategies which would reduce the adverse effects predicted by the build-out analysis. The mitigation plans provided in this report will reduce the negative build-out effects in situations in which a variance or exception to the design and performance standards was granted. It is the intention of these efforts to prevent the total pollutant loads per year, created by the complete Borough build-out as regulated by zoning ordinances, from being carried directly into waterways, but rather to be infiltrated, filtered, treated, or otherwise directed away from adjacent water bodies.

Mitigation Plans

This mitigation plan is provided for any proposed development that is granted a variance or exemption to the design and performance standards for stormwater runoff quality, stormwater runoff quantity, and groundwater recharge. The existence of the mitigation plan does not preclude the requirement that an applicant meet the design and performance standards to the maximum extend practicable but allows the Borough to waive strict compliance of one or more of the performance standards where full compliance cannot be reasonably accommodated on-site.

A portion of the Borough of Berlin is located within the Pinelands National Reserve. All proposed development in this area must comply with the Pinelands Comprehensive

Management Plan (“CMP”). It is anticipated that compliance with the CMP will result in compliance with the new stormwater regulations. If a Pinelands waiver were to be granted, it would remain necessary for the Borough to review the proposed stormwater management to assure it meets all Borough standards and requirements, including mitigation requirements that may not be required by a Pinelands Waiver of Strict Compliance.

Should any proposed development be granted a variance or exemption from the stormwater management design and performance standards, applicants may choose specific mitigation projects already designed and identified by the Borough of Berlin or may work with the Borough to develop a suitable project according to the following requirements:

Mitigation Project Criteria

A mitigation project must be implemented within the same area that would contribute to a sensitive receptor impacted by the development. If no sensitive receptor has been identified, the project should be implemented within the same drainage area as close to the proposed development as possible. For projects in the Pinelands portion of the Borough, any off-site mitigation project must occur within the Pinelands. Mitigation projects outside of the Pinelands region may be located elsewhere in the Borough at a location that would provide a greater benefit.

Sensitive receptors are areas with specific sensitivity to impacts of stormwater, whether through changes in stormwater runoff quality, quantity, and groundwater recharge. Sensitive receptors in Berlin include the streams and water bodies located within the Borough.

The mitigation project must provide additional groundwater recharge benefits, or provide protection of previously developed property from stormwater runoff. The developer must also ensure long-term maintenance for the project, including those maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater Best Management Practices Manual. A maintenance plan, including the maintenance responsibility and the expected costs shall be included. The responsible party for the construction and maintenance must also be identified.

The applicant may also select a project type from the following list to compensate for not meeting the requirements of the individual performance standards.

Groundwater Recharge

- Retrofit existing detention basin(s) to provide additional annual groundwater recharge.
- Replace impervious parking lot with permeable paving to provide additional groundwater recharge.

Water Quality

- Retrofit existing stormwater management facility to provide removal of 80% of total suspended solids from the parking lot runoff.
- Retrofit existing parking area to provide removal of total suspended solids. The retrofit BMP must be installed underground and may not reduce number of parking spaces.
- Enhance vegetative buffer within the “stream corridor”.

Water Quantity

- Install stormwater management measures in the open space to reduce the peak flow from the upstream development on the receiving stream for the 2, 10, and 100 –year storms respectively.

Specific Mitigation Projects for Each Watershed

Cross Keys Drainage Basin-HUC 02040302030010

- Remove silt
- Restabilize
- Clean out elliptical pipe into subdivision
- Concrete low flow channels
- Retrofit inlet heads

Presidential Basin-HUC 02040302030010

Basin #1

- Plug lift hole in pipe at OCS
- Replace casting and pour invert channel in structure
- Concrete swale
- Regrade bottom to eliminate low spots
- De-silt pipe and install scour hole
- Retrofit inlet heads

Basin #2

- De-silt bottom
- Fill bottom of concrete flow channel
- Plug lift hole in pipe at OCS
- Replace casting
- De-silt OCS and pour invert channel
- Retrofit inlet heads

Tansgate-HUC 02040302030010

- Clear inflow pipe
- Reshape and restore scour hole
- Retrofit inlet heads

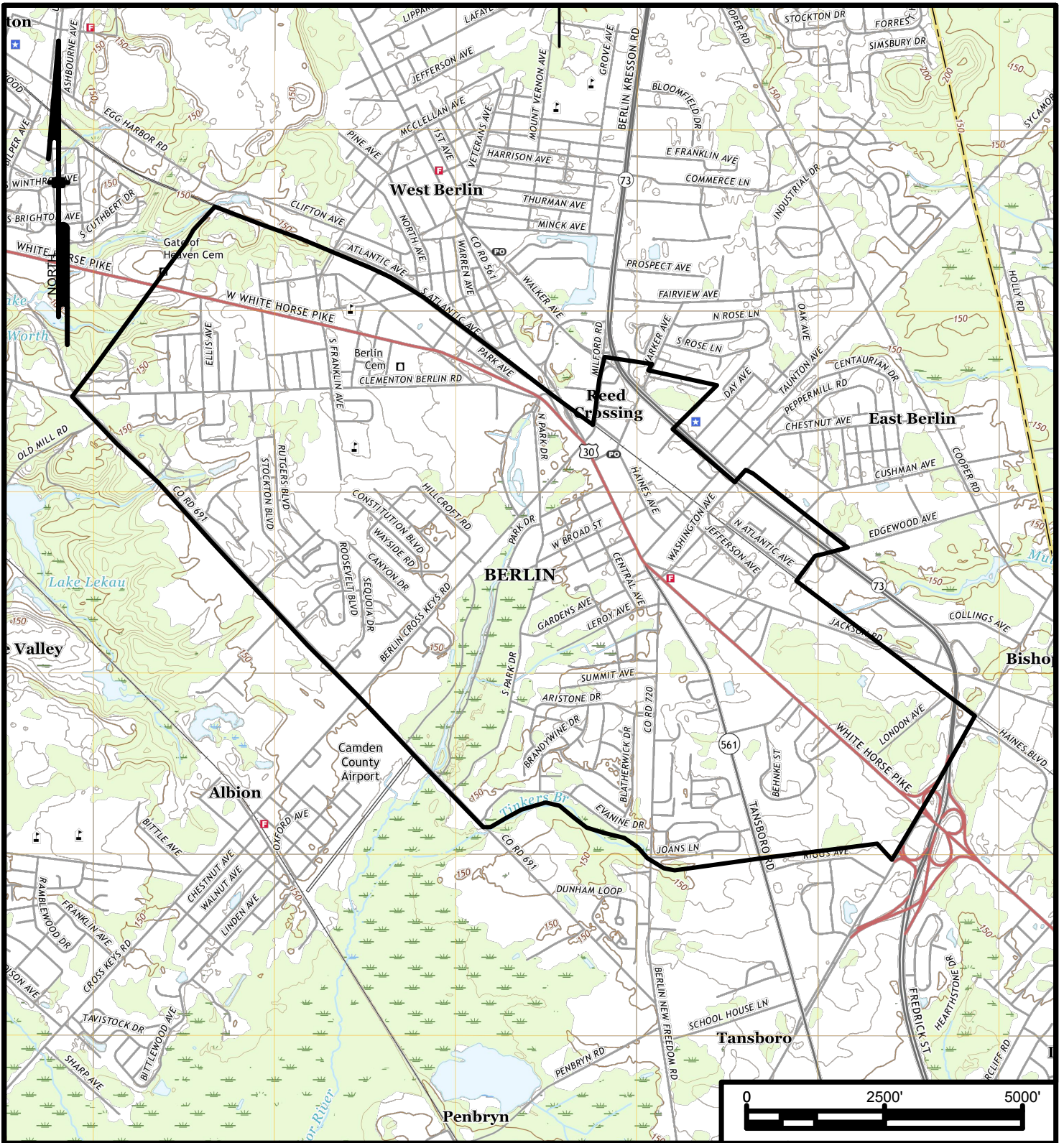
Gatsby-HUC 02040302030010

- Reshape and restore scour hole
- Retrofit inlet heads

Gardens Avenue-HUC 02040302030010

- Needs drainage improvements
- Repair flooding at curve near Park Drive
- Additional inlets and larger pipe required

Financial contributions may be used in situations where a project will have no immediate impact to a sensitive receptor or it is not practical to have a mitigation project for an individual application. In such cases, the contributions may be used alone or may be put towards a larger project. Funding a study for analysis for the Borough may also be an acceptable compensation. The contribution amount shall be equivalent to the cost of implementing, purchasing the property and/or easements for the project, and the costs associated with the long-term maintenance for which the exemption is granted. The developer may also contribute into a trust fund for updating the Municipal Stormwater Management Plan. Berlin Borough must expend any contributions collected within five (5) years of their receipt.



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MUNICIPAL STORMWATER MANAGEMENT PLAN

BERLIN BOROUGH BOUNDARY ON USGS QUADRANGLE

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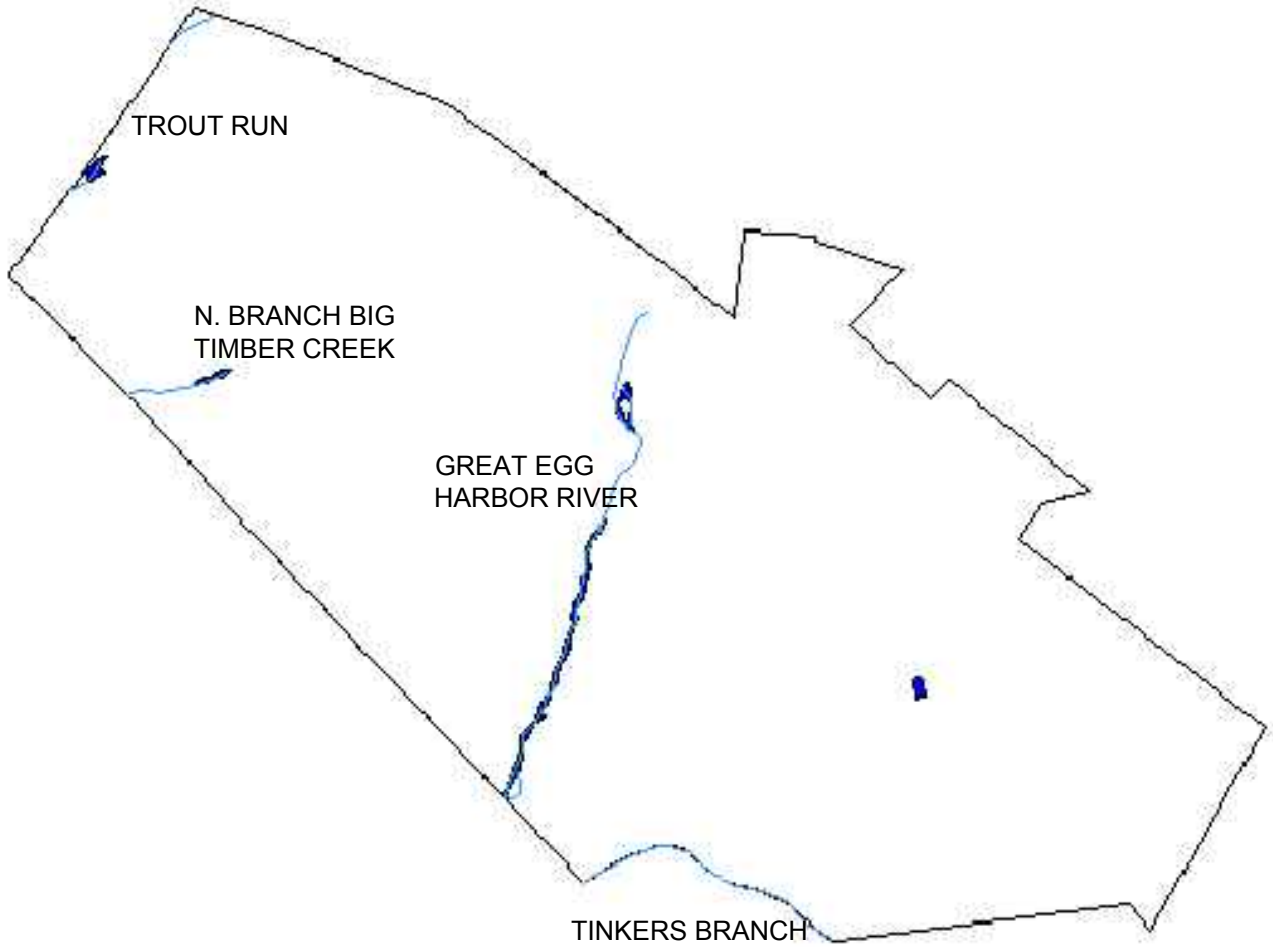
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FIGURE 2

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MUNICIPAL STORMWATER MANAGEMENT PLAN

BOROUGH WATERWAYS

PROJECT **BBGEX 23001**

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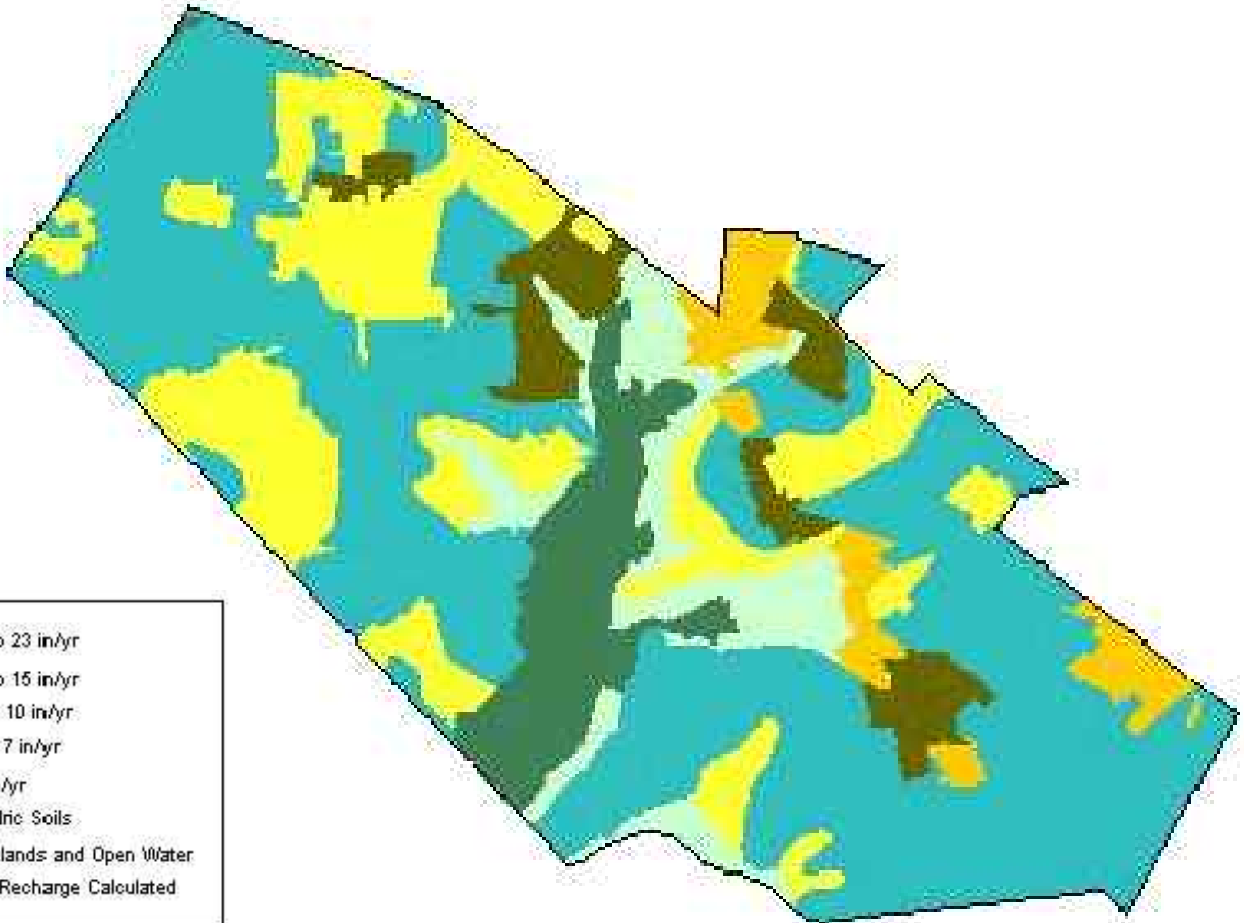
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FIGURE 3

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MUNICIPAL STORMWATER MANAGEMENT PLAN

GROUNDWATER RECHARGE

PROJECT **BBGEX 23001**

DATE **2023-08-08**

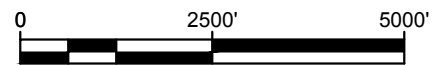
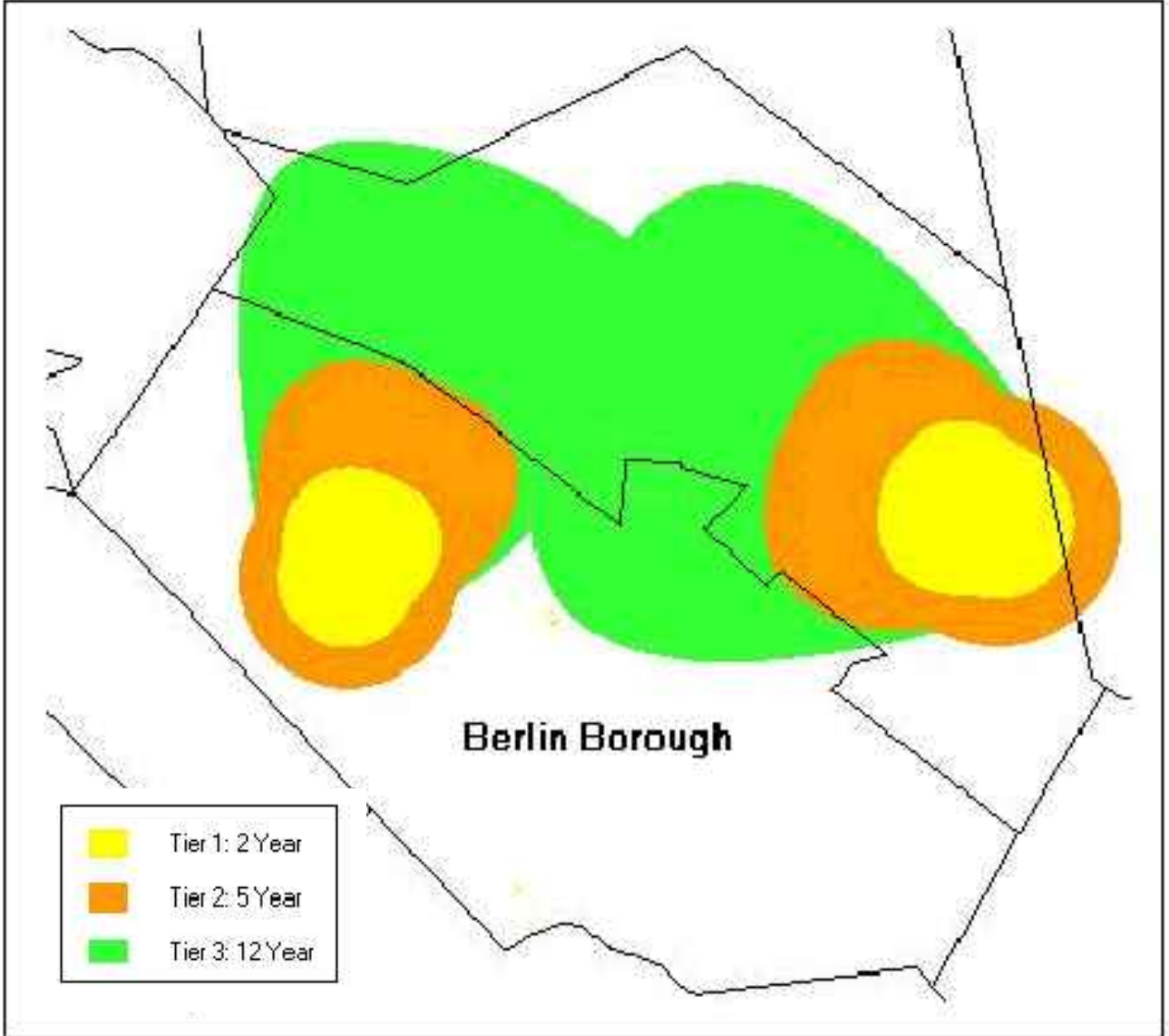
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FIGURE 4

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MUNICIPAL STORMWATER MANAGEMENT PLAN
 WELLHEAD PROTECTION AREAS

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FIGURE 5

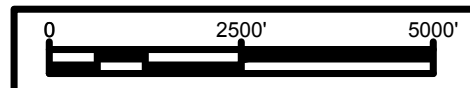
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MUNICIPAL STORMWATER MANAGEMENT PLAN

HYDROLOGIC UNITS (HUC14s)

PROJECT **BBGEX 23001**

DATE 2023-08-08

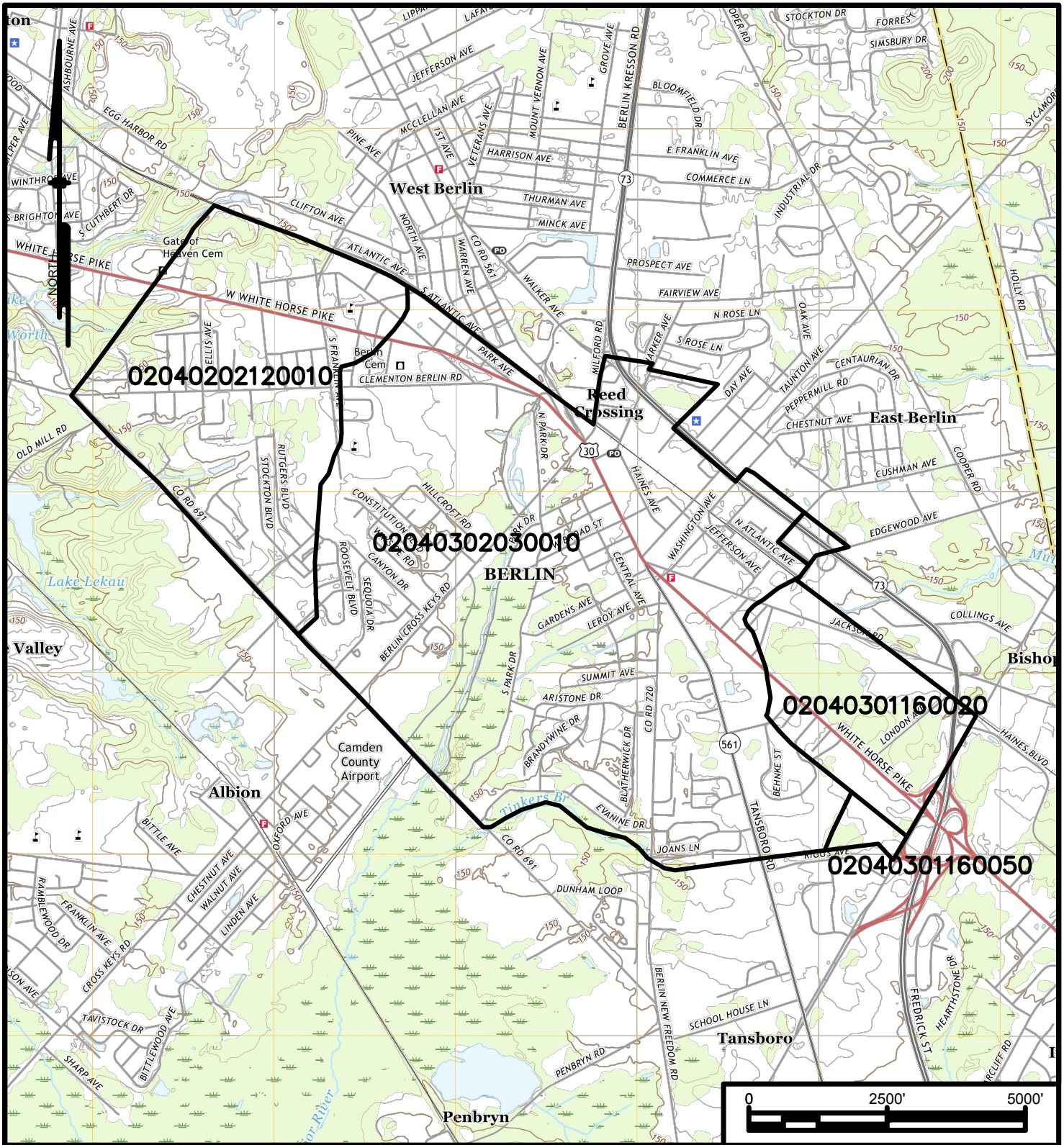
DRAWING SCALE 1"= 2,500'

DRAWN BY ACT

APPROVED BY CK

FIGURE 6

SHEET 1 OF 1



U:\ACCOUNTS\BBGEX1 - RESOURCES\STORMWATER REGSIM\WMP\HUC14 ON USGS.DWG
 PLOTTED: 8/9/2023 9:30:39 AM, BY: ANGELIQUE TUCKER PLOTSTYLE: PAIBASE.CTB, PROJECT STATUS: ---



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MUNICIPAL STORMWATER MANAGEMENT PLAN

HUC14 BOUNDARIES ON USGS QUADRANGLE

PROJECT **BBGEX 23001**

DATE **2023-08-08**

DRAWING SCALE **1" = 2,500'**

DRAWN BY **ACT**

APPROVED BY **CK**

FIGURE 7

SHEET **1 OF 1**

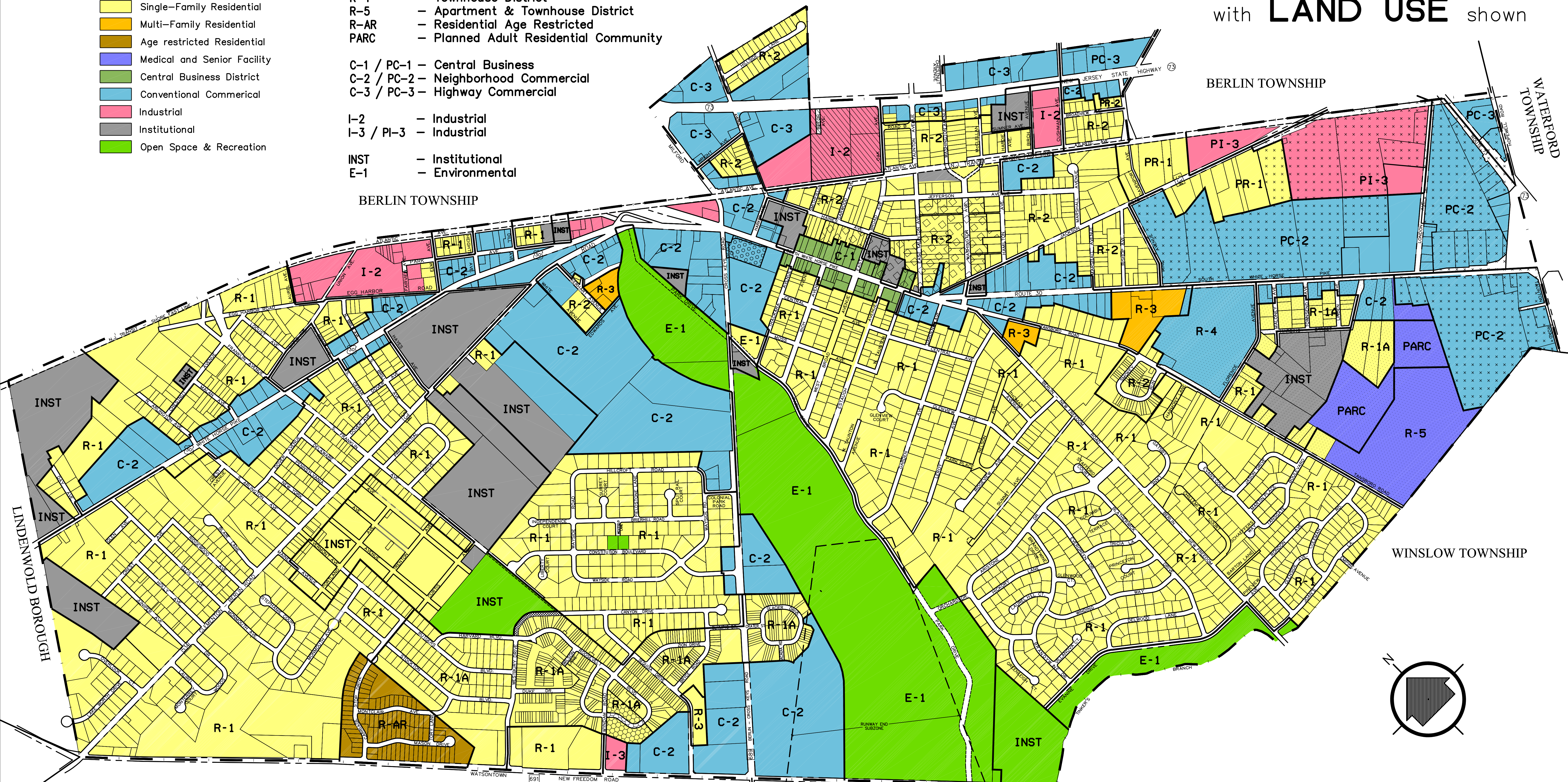
BOROUGH OF BERLIN ZONING MAP

with LAND USE shown

LAND USE PLANNING DISTRICT DESIGNATIONS

- Single-Family Residential
- Multi-Family Residential
- Age restricted Residential
- Medical and Senior Facility
- Central Business District
- Conventional Commercial
- Industrial
- Institutional
- Open Space & Recreation

- ### ZONING LEGEND
- R-1 / PR-1 - Low Density Residential
 - R-1a - Medium Density Residential
 - R-2 / PR-2 - High Density Residential
 - R-3 - Garden Apartment District
 - R-4 - Townhouse District
 - R-5 - Apartment & Townhouse District
 - R-AR - Residential Age Restricted
 - PARC - Planned Adult Residential Community
 - C-1 / PC-1 - Central Business
 - C-2 / PC-2 - Neighborhood Commercial
 - C-3 / PC-3 - Highway Commercial
 - I-2 - Industrial
 - I-3 / PI-3 - Industrial
 - INST - Institutional
 - E-1 - Environmental



LINDENWOLD BOROUGH

BERLIN TOWNSHIP

WATERFORD TOWNSHIP

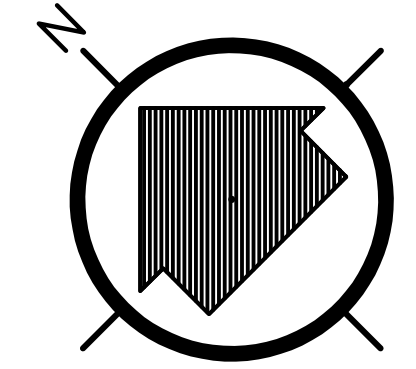
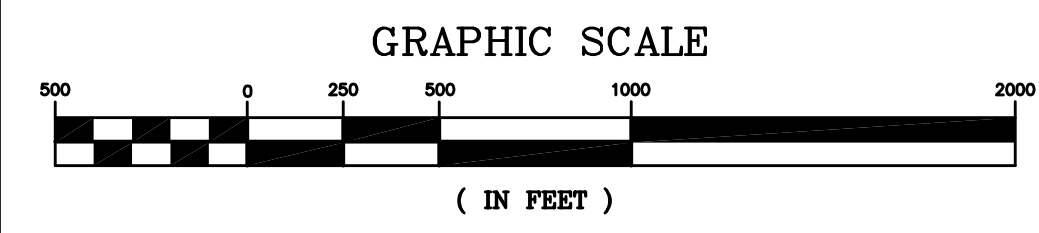
BERLIN TOWNSHIP

WINSLOW TOWNSHIP

PINE HILL BOROUGH

REDEVELOPMENT ZONE OVERLAYS

- Central Business District Redevelopment Area
- The Carriage Stop Redevelopment Area
- The Pinelands Redevelopment Area
- The White Horse East Redevelopment Area
- Historic District Overlay
- The 73 Redevelopment Area



NOTE: The preface "P" designates an area in the Pinelands.

	Pennoni Associates Inc.		DRAWN CWS
	CONSULTING ENGINEERS & PROFESSIONAL LAND SURVEYORS		APPROV DSD
	515 Grove Street		DATE 1/2/2019
	Haddon Heights, New Jersey 08035		SHEET 1 OF 1
	DENNIS S. DiBLASIO NJPLS *GS 28307 New Jersey Certificate of Authorization # 246A28033300		

Table 1: Build-Out Analysis for HUC14 Zones

HUC 14 and Zone	Total Area (Acres)	Existing Impervious (%)	Existing Impervious (Acres)	Constrained Land (Acres)	Developable Area (Acres)	Allowable Impervious (%)	Build-out Impervious (Acres)
02040202120010 - Big Timber Creek							
R-1	343.01	26.11%	89.57	7.40	335.61	25%	83.90
R-1a	49.23	30.00%	14.77	0.00	49.23	45%	22.15
R-AR	25.92	40.00%	10.37	0.00	25.92	55%	14.25
C-2	34.73	20.39%	7.08	0.00	34.73	70%	24.31
I-2	10.06	40.00%	4.02	0.00	10.06	50%	5.03
I-3	1.84	6.35%	0.12	0.00	1.84	50%	0.92
INST	90.08	7.50%	6.76	13.80	76.28	60%	45.77
TOTALS	554.86	23.91%	132.68	21.20	533.66	36.79%	196.33

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HUC 14 and Zone	Total Area (Acres)	Existing Impervious (%)	Existing Impervious (Acres)	Constrained Land (Acres)	Developable Area (Acres)	Allowable Impervious (%)	Build-out Impervious (Acres)
02040302030010 - Great Egg Harbor River							
R-1	558.39	26.27%	146.71	0.00	558.39	25%	139.60
PR-1	0.16	5.00%	0.01	0.00	0.16	25%	0.04
R-1a	60.55	26.74%	16.19	0.00	60.55	45%	27.25
R-2	138.74	33.82%	46.93	0.00	138.74	45%	62.43
R-3	13.62	39.75%	5.42	0.00	13.62	60%	8.17
R-5	29.10	75.00%	21.83	0.00	29.10	75%	21.83
PARC	21.56	35.25%	7.60	0.00	21.56	65%	14.01
C-1	13.05	80.00%	10.44	0.00	13.05	70%	9.14
C-2	263.85	59.32%	156.52	0.00	263.85	70%	184.69
C-3	52.54	40.00%	21.02	0.00	52.54	70%	36.78
PC-2	2.52	5.00%	0.13	0.00	2.52	70%	1.77
I-2	40.54	40.00%	16.22	0.00	40.54	50%	20.27
INST	123.34	8.85%	10.92	0.00	123.34	60%	74.01
E-1	190.15	5.00%	9.51	172.62	17.53	10%	1.75
TOTALS	1,508.11	31.13%	469.42	0.00	1,335.49	45.06%	601.73

Table 1: Build-Out Analysis for HUC14 Zones

HUC 14 and Zone	Total Area (Acres)	Existing Impervious (%)	Existing Impervious (Acres)	Constrained Land (Acres)	Developable Area (Acres)	Allowable Impervious (%)	Build-out Impervious (Acres)
02040301160020 - Mullica River							
PR-1	27.25	25.00%	6.81	0.00	27.25	25%	6.81
R-1a	10.17	30.00%	3.05	0.00	10.17	45%	4.58
R-2	5.60	30.00%	1.68	0.00	5.60	45%	2.52
PR-2	1.12	30.00%	0.34	0.00	1.12	45%	0.51
PARC	0.30	15.00%	0.05	0.00	0.30	65%	0.20
C-2	16.10	30.00%	4.83	0.00	16.10	70%	11.27
PC-2	113.83	5.00%	5.69	0.00	113.83	70%	79.68
PC-3	17.03	5.00%	0.85	0.00	17.03	70%	11.92
PI-3	43.30	60.00%	25.98	0.00	43.30	50%	21.65
INST	0.66	15.00%	0.10	0.00	0.66	60%	0.40
TOTALS	235.37	20.98%	49.38	0.00	235.37	59.28%	139.53
02040301160050 - Sleeper Branch							
PC-2	21.44	10.00%	2.14	0.00	21.44	70%	15.01
TOTALS	21.44	10.00%	2.14	0.00	21.44	70.00%	15.01

Table 2: Pollutant Loads by Land Cover

Land Cover	Total Phosphorus Load (lbs/acre/year)	Total Nitrogen Load (lbs/acre/year)	Total Suspended Solids Load (lbs/acre/year)
High, Medium Density Residential	1.4	15	140
Low Density, Rural Residential	0.6	5	100
Commercial	2.1	22	200
Industrial	1.5	16	200
Urban, Mixed Urban, Other Urban	1	10	120
Agricultural	1.3	10	300
Forest, Water Wetlands	0.1	3	40
Barrenland/ Transitional Area	0.5	5	60

Table 3: Nonpoint Source Loads at Build-out

HUC 14 and Zone	Land Cover	Developable Area (Acres)	TP (lbs/acre/yr)	TP (lbs/yr)	TN (lbs/acre/year)	TN (lbs/yr)	TSS (lbs/acre/yr)	TSS (lbs/yr)
02040202120010 - Big Timber Creek								
R-1	Low Density, Rural Residential	335.61	0.60	201.36	5.00	1,678.04	100.00	33,560.70
R-1a	High/ Medium Density Residential	49.23	1.40	68.92	15.00	738.39	140.00	6,891.61
R-AR	High/ Medium Density Residential	25.92	1.40	36.28	15.00	388.77	140.00	3,628.49
C-2	Commercial	34.73	2.10	72.93	22.00	764.00	200.00	6,945.42
I-2	Industrial	10.06	1.50	15.09	16.00	160.96	200.00	2,012.04
I-3	Industrial	1.84	1.50	2.77	16.00	29.51	200.00	368.90
INST	Urban, Mixed Urban, Other	76.28	1.00	76.28	10.00	762.75	120.00	9,153.02
TOTALS				473.62		4,522.41		62,560.17

Table 3: Nonpoint Source Loads at Build-out

HUC 14 and Zone	Land Cover	Developable Area (Acres)	TP (lbs/acre/yr)	TP (lbs/yr)	TN (lbs/acre/year)	TN (lbs/yr)	TSS (lbs/acre/yr)	TSS (lbs/yr)
02040302030010 - Great Egg Harbor River								
R-1	Low Density, Rural Residential	558.39	0.60	335.03	5.00	2,791.94	100.00	55,838.89
PR-1	Low Density, Rural Residential	0.16	0.60	0.10	5.00	0.80	100.00	16.00
R-1a	High/ Medium Density Residential	60.55	1.40	84.77	15.00	908.30	140.00	8,477.44
R-2	High/ Medium Density Residential	138.74	1.40	194.23	15.00	2,081.04	140.00	19,423.03
R-3	Urban, Mixed Urban, Other	13.62	1.00	13.62	10.00	136.24	120.00	1,634.93
R-5	Urban, Mixed Urban, Other	29.10	1.00	29.10	10.00	291.03	120.00	3,492.33
PARC	Urban, Mixed Urban, Other	21.56	1.00	21.56	10.00	215.56	120.00	2,586.70
C-1	Commercial	13.05	2.10	27.41	22.00	287.12	200.00	2,610.19
C-2	Commercial	263.85	2.10	554.08	22.00	5,804.63	200.00	52,769.38
C-3	Commercial	52.54	2.10	110.33	22.00	1,155.87	200.00	10,507.94
PC-2	Commercial	2.52	2.10	5.30	22.00	55.48	200.00	504.39
I-2	Industrial	40.54	1.50	60.81	16.00	648.67	200.00	8,108.38
INST	Urban, Mixed Urban, Other	123.34	1.00	123.34	10.00	1,233.44	120.00	14,801.22
E-1	Forest, Water, Wetlands	17.53	0.10	1.75	3.00	52.58	40.00	701.12
TOTALS				1,561.44		15,662.71		181,471.96

Table 3: Nonpoint Source Loads at Build-out

HUC 14 and Zone	Land Cover	Developable Area (Acres)	TP (lbs/acre/yr)	TP (lbs/yr)	TN (lbs/acre/year)	TN (lbs/yr)	TSS (lbs/acre/yr)	TSS (lbs/yr)
02040301160020 - Mullica River								
PR-1	Low Density, Rural Residential	27.25	0.60	16.35	5.00	136.26	100.00	2,725.28
R-1a	Low Density, Rural Residential	10.17	0.60	6.10	5.00	50.85	100.00	1,017.01
R-2	High/ Medium Density Residential	5.60	1.40	7.84	15.00	84.04	140.00	784.34
PR-2	High/ Medium Density Residential	1.12	1.40	1.57	15.00	16.86	140.00	157.32
PARC	Urban, Mixed Urban, Other	0.30	1.00	0.30	10.00	3.01	120.00	36.17
C-2	Commercial	16.10	2.10	33.80	22.00	354.10	200.00	3,219.07
PC-2	Commercial	113.83	2.10	239.04	22.00	2,504.28	200.00	22,766.19
PC-3	Commercial	17.03	2.10	35.77	22.00	374.68	200.00	3,406.20
PI-3	Industrial	43.30	1.50	64.96	16.00	692.87	200.00	8,660.88
INST	Forest, Water, Wetlands	0.66	0.10	0.07	3.00	1.99	40.00	26.51
TOTALS				405.80		4,218.94		42,798.97
02040301160050 - Sleeper Branch								
PC-2	Commercial	21.44	2.10	45.03	22.00	471.70	200.00	4,288.21
TOTALS				45.03		471.70		4,288.21