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Municipal Stormwater Management Plan

Prepared By

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Municipal Stormwater
Management Plan
Township of Willingboro**

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I. Introduction

The following Municipal Separate Stormwater System (MS4) stormwater plan was prepared by Remington & Vernick Engineers for the Township of Willingboro. The New Jersey Department of Environmental Protection (NJDEP) "Sample Municipal Stormwater Management Plan" was used as a basis for preparation of the plan, as modified to provide specific information germane to the Township of Willingboro.

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Township of Willingboro to address stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 (Municipal Stormwater Regulations). As required, this plan contains all of the required elements described in N.J.A.C. 7:8 (Stormwater Management Regulations).

The plan contained herein 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/quantity and the loss of groundwater recharge that provides base flow in receiving water bodies.

In addition, this plan describes long-term operation and maintenance measures for existing and future stormwater facilities. 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 are sought.

II. Goals

The goals of this MSWMP are as follows:

- 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, 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:
 1. Restore, enhance and maintain the chemical, physical and biological integrity of the waters of the state, protect public health, safeguard fish and aquatic life and scenic and ecological values, enhance the domestic, municipal, recreational, industrial and other uses of water
 2. Protect public safety through the proper design and operation of stormwater basins.

In order to achieve the goals for Willingboro Township, it has identified the following stormwater management techniques:

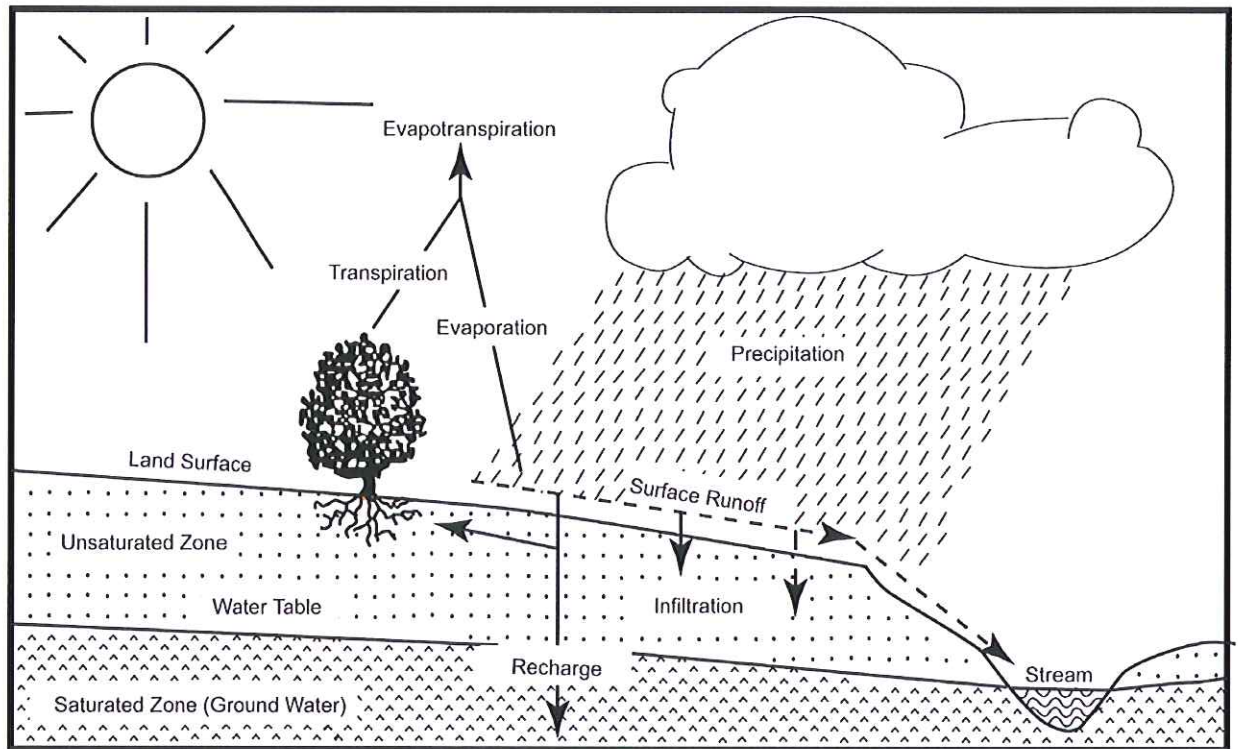
- Implementation of one or more stormwater management Best Management Practices (BMPs) as necessary to achieve the performance standards for stormwater runoff quantity and rate, groundwater recharge, erosion control and stormwater runoff quality per the NJ Stormwater Rule (NJAC 7:8) and established through the Township's stormwater ordinance.
- Compliance with the stormwater runoff quantity and rate, groundwater recharge, erosion control, and stormwater runoff quality standards established through N J AC 7 8 1 1 et. seq and the Township's stormwater ordinance shall be accomplished to the maximum extent practicable through the use of nonstructural BMPs before relying on structural BMPs.

- Nonstructural BMPs are also known as Low Impact Development (LID) techniques. Nonstructural BMPs shall 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 shall be developed based upon physical site conditions and the origin, nature and the anticipated quantity or amount of potential pollutants.
- Structural BMPs where necessary shall be integrated with nonstructural stormwater management strategies and proper maintenance plans.
- When using structural BMPs, multiple stormwater management measures smaller in size and distributed spatially throughout the land development site shall be used wherever possible to achieve the performance standards for water quality quantity and groundwater recharge established through the Township's stormwater ordinance before relying on a single larger stormwater management measure to achieve these performance standards.

III. Stormwater Discussion

Land development can dramatically alter the hydrologic cycle 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 lawns or impervious cover, thus 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.

Groundwater Recharge in the Hydrologic Cycle



In addition, 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 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, 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.

IV. Background

The Township of Willingboro encompasses approximately 8.1 square miles and has a population of approximately 33,000 residents, according to the 2000 Census Bureau Populations of New Jersey Municipalities. According to the *"Burlington County Data Book", 2002 Edition*, population declined approximately 9.0 percent from (1990-2000), and from a peak recorded population of 43,386 in 1970. The initial recorded Township population was 11,861 in 1960.

The 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. These sites are sampled for benthic macroinvertebrates (organisms living at the bottom of the waterway) by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics.

The Township of Willingboro is bordered by the Rancocas Creek (which runs into the Olympia Lakes) to the south and Mill Creek (and associated tributaries) runs through middle of the Township. No additional freshwater rivers or major streams exist within the Township, and no AMNET biomonitoring sites are located in its jurisdiction. It should be noted, however, that per NJDEP's 303(d) list, Mill Creek at Levitt Parkway is included on the list for impairment by phosphorous and benthic macroinvertebrates.

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, retrofitting stormwater systems, and other BMPs. 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.

Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDL's (Total Maximum Daily Load) are needed. It should be noted that as part of the Township's Municipal Separate Storm Sewer (MS4) regulations, existing inlets and outfalls will be inspected and repairs/maintenance will be made. At that time, existing water quantity and erosion problems (if any) will be assessed and abated to the maximum extent practicable.

Since the Township has been mostly developed for several decades, there has not been a significant increase in impervious cover to the extent that local groundwater recharge is significantly decreasing. However, future major development will comply with the new NJDEP Stormwater design standards (NJAC 7:8), including average annual recharge.

V. Design and Performance Standards

The Township 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/quantity and loss of groundwater recharge in receiving water bodies. This will be implemented by adoption of the NJDEP Model Stormwater ordinance (Appendix B), as amended for use and enforcement within the Township of Willingboro.

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).

Stormwater management measures will be operated and maintained in accordance with the General Maintenance requirements outlined within the Township's stormwater ordinance, including but not limited to the following requirements:

- 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).
- C. Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure(s), 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 non-vegetated linings.
- D. The person responsible for maintenance 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.
- E. The person responsible for maintenance shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.
- F. The person responsible for maintenance 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 10.B.6 and 10.B.7 of the Township's stormwater ordinance.

- G. 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. 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.

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

VI. Plan Consistency

The Township of Willingboro is not within a Regional Stormwater Management Planning Area and no Total Maximum Daily Limits (TMDL's) have been developed for waters within the Township; therefore this plan does not need to be consistent with any regional stormwater management plans (RSWMP's) nor any TMDL's. If any RSWMP's or TMDL's are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

It should be noted that a TMDL is under development at this time for Phosphorous in the Rancocas Creek. Further, the municipality is located in the Rancocas Creek Watershed, for which a Watershed Management Plan was developed.

Future implementation of the proposed Phosphorous, and other TMDL's, or revisions to the Rancocas Creek Watershed Management Plan could necessitate revisions to the Township's stormwater plan or ordinances as necessary to mitigate phosphorous and/or other water quality issues.

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 storm water 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, inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the Burlington County Soil Conservation District.

VII. Nonstructural Stormwater Management Strategies

Non-structural stormwater strategies for design of new developments, or redevelopment, as defined per the NJDEP Stormwater design Regulations (NJAC - 5.3(b)), include the following objectives:

- Protection of areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.
- Minimizing impervious surfaces and breakup or disconnecting the flow of runoff over impervious surfaces.
- Maximum protection of natural drainage features and vegetation.
- Minimizing the decrease in the “time of concentration” from pre-construction conditions to post-construction conditions.
- Minimizing land disturbance during clearing and grading.
- Minimizing soil compaction.
- Providing low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides.
- Providing vegetated open channel conveyance systems discharging into and through stable vegetative areas.
- Providing other source controls to prevent or minimize erosion.

An assessment of buildable land was performed for Township property using 2002 NJDEP GIS aerial mapping of developed and wetlands areas, including assumed freshwater wetlands development buffers of 50 feet. Developed, developable and non-developable areas were estimated as follows:

Land Cover	Total area (square miles)
Developed lands	6.22
Wetlands/buffers/floodplain	1.68
Partially Developed land	0.12
Undeveloped land	0.11
	Total 8.13 square miles

It should be noted that due to less of one (1) square mile of vacant or developable lands as referenced previously, outside of environmentally-constrained areas remaining in the Township, that Willingboro is exempt from the requirement to evaluate the extent to which the Township’s Master Plan implements the non-structural strategies referenced above.

If an applicant (or his/her Engineer) contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management strategies identified in (b) below into the design of a particular project, the applicant will identify the strategy and provide a basis for the contention. It is understood that any project requiring NJDEP Land Use Regulation Program permitting or approvals will also be subject to a similar stormwater review by the appropriate agency.

VIII. Land Use/Build-Out Analysis

As stated previously, there is less than one (1) square mile of vacant or developable lands, outside of environmentally-constrained areas remaining in the Township, that Willingboro is exempt from the requirement to evaluate the extent to which the Township's Master Plan implements the non-structural strategies referenced above (refer to Appendix A, Development Constraints Map for verification).

IX. Mitigation Plans

The Township has opted to consider mitigation projects as identified by future Developers on a case-by-case basis, in accordance with the NJDEP's *"Guidance for the Development of Municipal Mitigation Plans"* document, dated February, 2006.

As identified in NJDEP's Mitigation Plan Guidance Document, municipalities may:

- 1) Identify a pool of specific mitigation projects that could be selected by an applicant to offset the effect of a requested waiver/exemption or to address an existing stormwater problem; or
- 2) Choose to provide a process through which an applicant has the flexibility and responsibility to identify an appropriate mitigation project and a location to implement the mitigation project to offset the deficit that would be created by the grant of a waiver/exemption or to address a stormwater based impairment.

Willingboro Township has opted to provide a mitigation plan using option #2 above (i.e., provision of a mitigation process).

It must be stressed that requested exceptions will be granted only at the discretion of the Township. In addition, the issuance of a waiver(s) granted by NJDEP under a Land Use permit does not automatically waive the requirement for mitigation to be performed under a municipal review.

In order to select an appropriate mitigation project to respond to a requested waiver/exemption requires, an assessment of the impact that would result from the requested deviation from full compliance with the standard(s) in the drainage area affected by the proposed project is required. For example, a waiver for stormwater quantity requirements must focus on the impacts of increased runoff on flooding, considering both quantity and location.

Stormwater quality mitigation must aim to prevent an increase in pollutant load to the waterbodies that would be affected by the waiver/exemption. Ground water recharge mitigation must seek to maintain the baseflow and aquifer recharge in the area that would be affected by the waiver/exemption. For the purpose of this discussion, the term "sensitive receptor" is used to refer to a specific area or feature that would be sensitive to the impact assessed above.

Selection of an appropriate mitigation project for a requested waiver/exemption must adhere to the following requirements:

1. The project must be within the same area that would contribute to the receptor impacted by the project. Note that depending on the specific performance standard waived, the sensitive receptor and/or the contributory area to that receptor may be different. If there are no specific sensitive receptors that would be impacted as the

result of the grant of the waiver/exemption, then the location of the mitigation project can be located anywhere within the municipality, and should be selected to provide the most benefit relative to an existing stormwater problem in the same category (quality, quantity or recharge).

2. 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.
3. 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. For example, if the project for which a waiver is obtained discharges to a tributary, but the closest location discharges to the main branch, it may be more beneficial to identify a location discharging to the same tributary.
4. For ease of administration, if sensitive receptors are addressed, it is preferable to have one location that addresses any and all of the performance standards waived, rather than one location for each performance standard.
5. It must be demonstrated that implementation of the mitigation project will result in no adverse impacts to other properties.
6. Mitigation projects that address stormwater runoff quantity can provide storage for proposed increases in runoff volume, as opposed to a direct peak flow reduction.

All necessary information to support a specific waiver request(s) must be provided by the Developer(s) for consideration by the Township, in accordance with applicable NJDEP and/or Township requirements, and as outlined in NJDEP's "Guidance for the Development of Municipal Mitigation Plans" document, dated February 2006.

At the Township's discretion, a developer may be permitted to fund analyses to identify potential mitigation projects that could be used to address deficits in complying with each of the performance standards. However, the funding option shall only be allowed where the project requesting the waiver will have no measurable impact with respect to flooding, erosion, water quality degradation, etc. The funding option may also be appropriate in situations where the size of an individual project requesting a waiver/exemption is small, or the degree of deficit in complying with the design and performance standard(s) is small. Or, where the project requiring mitigation is for one individual single family home, given authority constraints, a financial contribution may be a preferred option.

Finally, the following information will be obtained and provided by the Developer of an approved waiver for the Township to comply with its annual NJDEP MS4 permitting requirements:

1. Impact from noncompliance -- Provide a table quantifying what would be required for the project to achieve the standards, the extent to which this value will be achieved on site and the extent to which the value must be mitigated off site.

2. Narrative and supporting information regarding the need for the waiver including:

- The waiver cannot be due to a condition created by the applicant. If the applicant can comply with the Stormwater Management rules through a reduction in the scope of the project, the applicant has created the condition and a waiver cannot be issued. Demonstrate that the need for a waiver is not created by the applicant.
- Provide a discussion and supporting documentation of the site conditions peculiar to the subject property that prevent the construction of a stormwater management facility that would achieve full compliance with the design and performance standards. Site conditions may include soil type, the presence of karst geology, acid soils, a high groundwater table, unique conditions that would create an unsafe design, as well as conditions that may provide a detrimental impact to public health, welfare, and safety.
- Demonstration that the grant of the requested waiver/exemption would not result in an adverse impact that would not be compensated for by off site mitigation.

3. Identify the sensitive receptor(s) related to the performance standard from which a waiver is sought. Demonstrate that the mitigation site contributes to the same sensitive receptor.

4. Provide the design details of the mitigation project. This includes, but is not limited to, drawings, calculations, and other information needed to evaluate the mitigation project.

5. List the party or parties responsible for the construction and the maintenance of the mitigation project. Documentation must be provided to demonstrate that the responsible party is aware of, has authority to, and accepts the responsibility for construction and maintenance. Under no circumstance shall the responsible party be an individual single-family homeowner. Selection of a project location that is under municipal authority avoids the need to obtain authority from a third party for the construction and future maintenance of the project.

6. Include a maintenance plan that addresses the maintenance criteria at N.J.A.C. 7:8-5.8. In addition, if the maintenance responsibility is being transferred to the municipality or another entity, the entity responsible for the cost of the maintenance must be identified. The municipality may provide the option for the applicant to convey the mitigation project to the municipality, if the applicant provides for the cost of maintenance in perpetuity.

7. Obtain any and all necessary local, State or other applicable permits for the mitigation measure or project. Permits must be obtained prior to the municipal approval of the project for which mitigation is being provided.

8. Demonstrate that the construction of the mitigation project coincides with the construction of the proposed project. A certificate of occupancy or final approval by the municipality for the project requiring mitigation cannot be issued until the mitigation project or measure receives final approval. Any mitigation projects proposed by the municipality to offset the stormwater impacts of that municipality's own projects must be completed within 6 months of the completion of the municipal project, in order to remain in compliance with their NJPDES General Permit.

X. Stream Corridor Protection Plan (Optional)

It should be noted that there are no Special Water Resource protection areas designated Category One (NJAC 7:9B) or upstream perennial or intermittent streams of said waters within the Township of Willingboro. If such water bodies are found or designated at a later date, future major development within 300 feet of said waters will be regulated in accordance with NJAC 7:8-5.5(h) as outlined in the model stormwater ordinance.

Appendix A -- Mapping

Figure 1 – U.S.G.S. Quadrangle/ Hydrologic Units (HUC14's)

Figure 2 – Wellhead Protection Areas/Groundwater Recharge Areas

Figure 3 – Zoning Districts

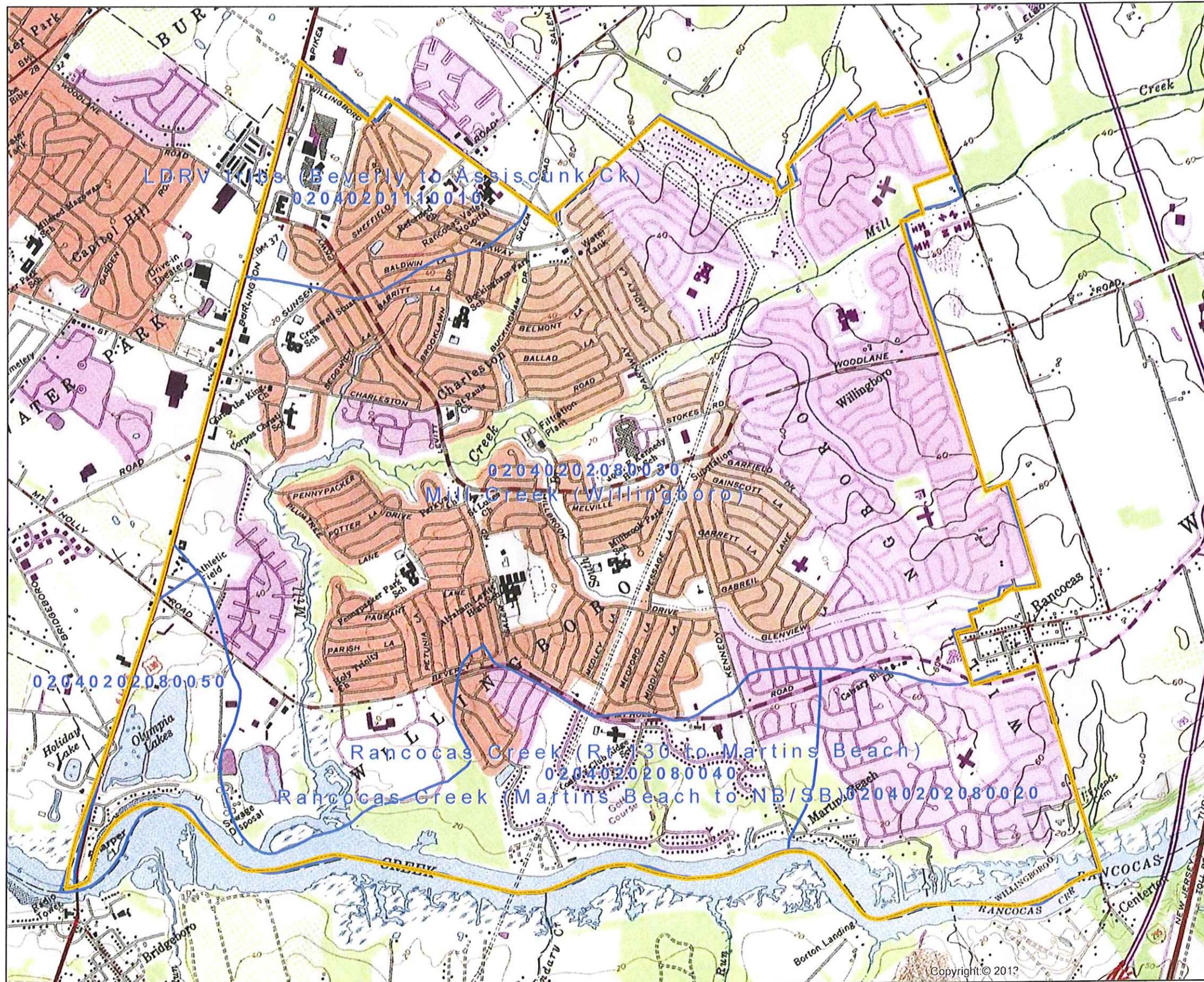
Figure 4 – Wetlands

Figure 5 – Soils

Figure 6 – Floodprone Areas

Figure 7 – Aerial Photo of Existing Conditions

Figure 8 – Development Constraints Ma





Township of Willingboro

Burlington County, NJ

USGS Quadrangle

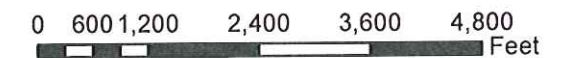
HUC 14 Delineation

Legend

-  Municipal Boundary
-  HUC 14 Delineations
- USA Topo Maps



1 inch = 2,000 feet



RV
&A

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Township of Willingboro

Burlington County, NJ

Groundwater Recharge/ Well Head Protection Areas



Legend

Municipal Boundary

Wells

Well Head Protection Areas

Tier 1

Tier 2

Tier 3

Groundwater Recharge Values

13 to 14 in/yr

11 to 12 in/yr

9 to 10 in/yr

1 to 7 in/yr

0 in/yr

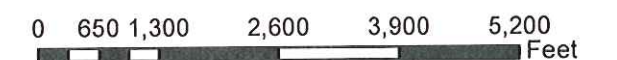
Hydric Soils

Wetlands and Open Water

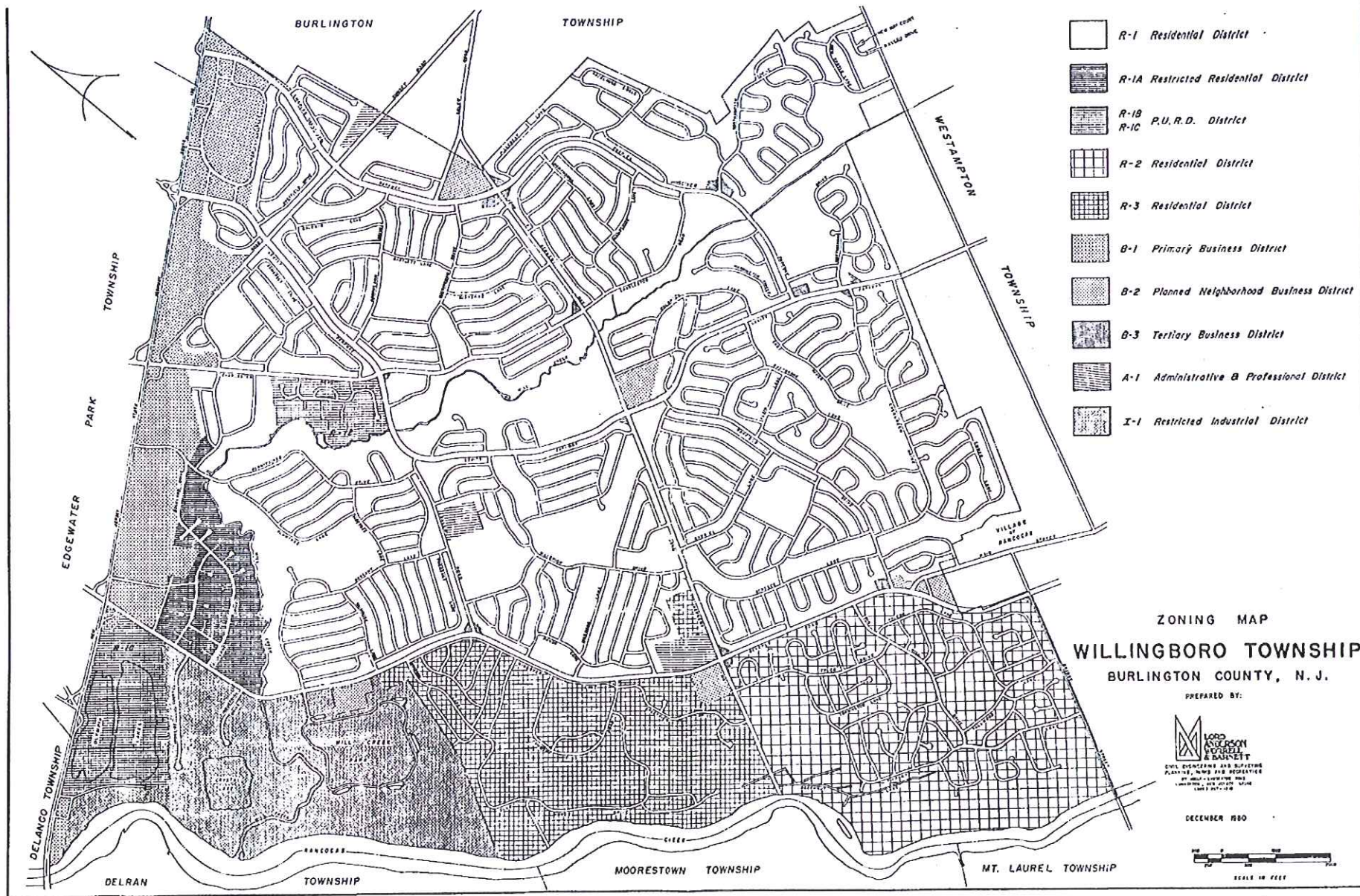
No Recharge Calculated



1 inch = 2,000 feet



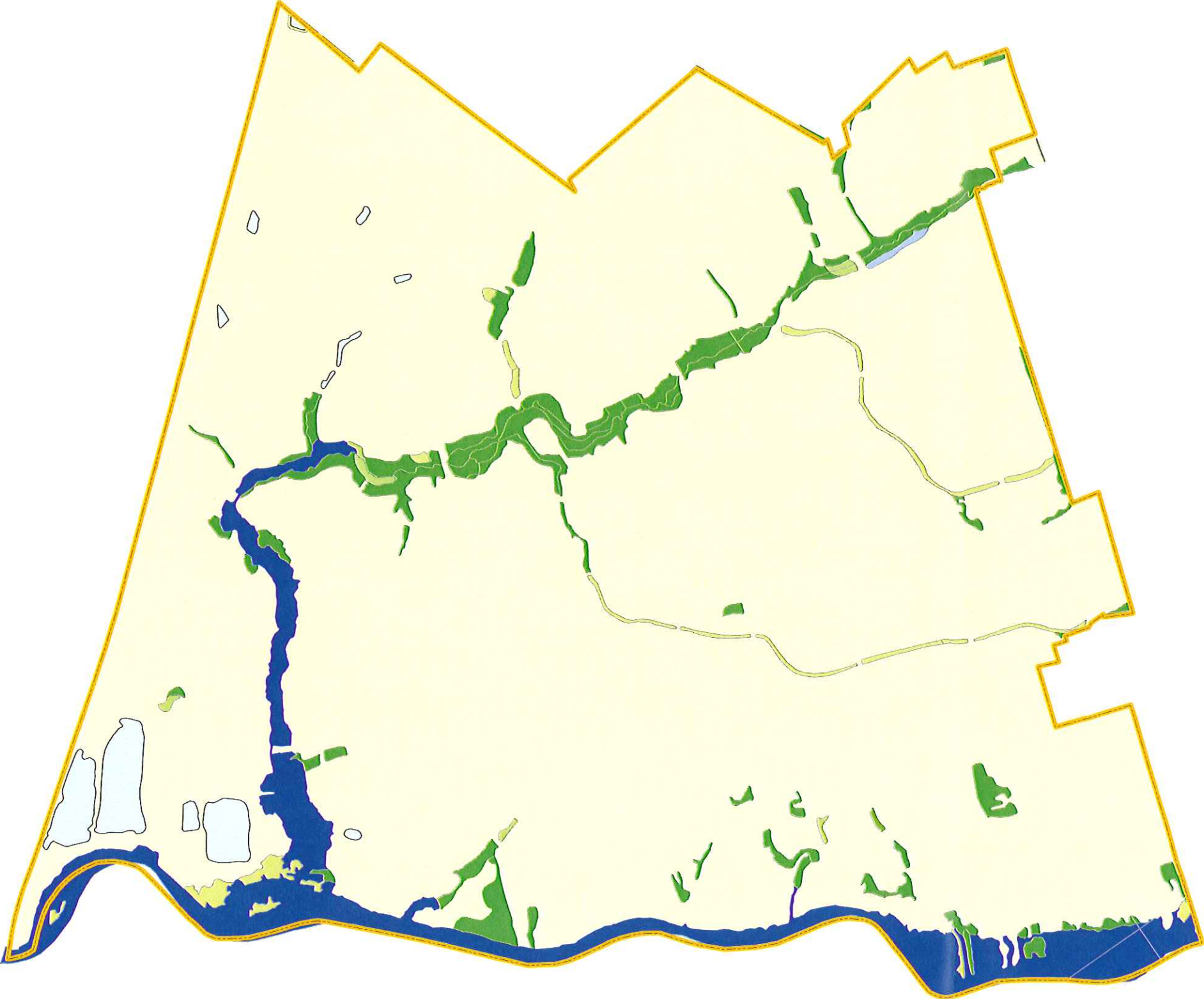
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Township of Willingboro

Burlington County, NJ

Wetlands



Legend

-  MUNICIPAL BOUNDARY
- WETLANDS**
-  AGRICULTURAL WETLANDS (MODIFIED)
-  ARTIFICIAL LAKES
-  DECIDUOUS SCRUB/SHRUB WETLANDS
-  DECIDUOUS WOODED WETLANDS
-  HERBACEOUS WETLANDS
-  MANAGED WETLANDS (MODIFIED)
-  MIXED FORESTED WETLANDS (DECIDUOUS DOM.)
-  TIDAL WATER
-  UPLANDS



1 inch = 2,000 feet



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Township of Willingboro


















Burlington County, NJ

Soils

Legend

 Municipal Boundary

Soils

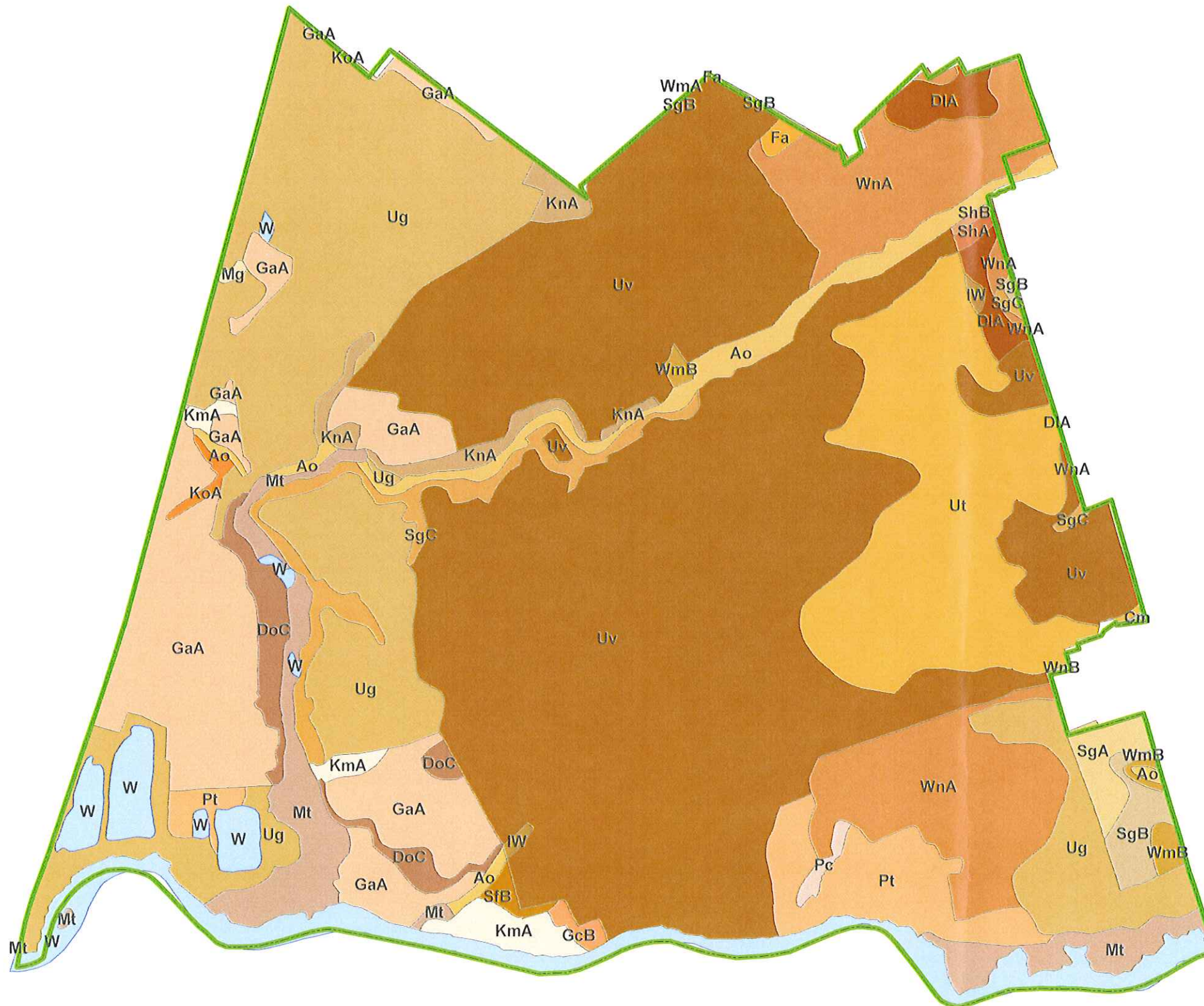
-  Ao
-  Cm
-  DIA
-  DoC
-  Fa
-  GaA
-  GcB
-  IW
-  KmA
-  KnA
-  KoA
-  Mg
-  Mt
-  Pc
-  Pt
-  SfB
-  SgA
-  SgB
-  SgC
-  ShA
-  ShB
-  Ug
-  Ut
-  Uv
-  Water
-  WmA
-  WmB
-  WnA
-  WnB

1 inch = 2,000 feet

0 625 1,250 2,500 3,750 5,000 Feet



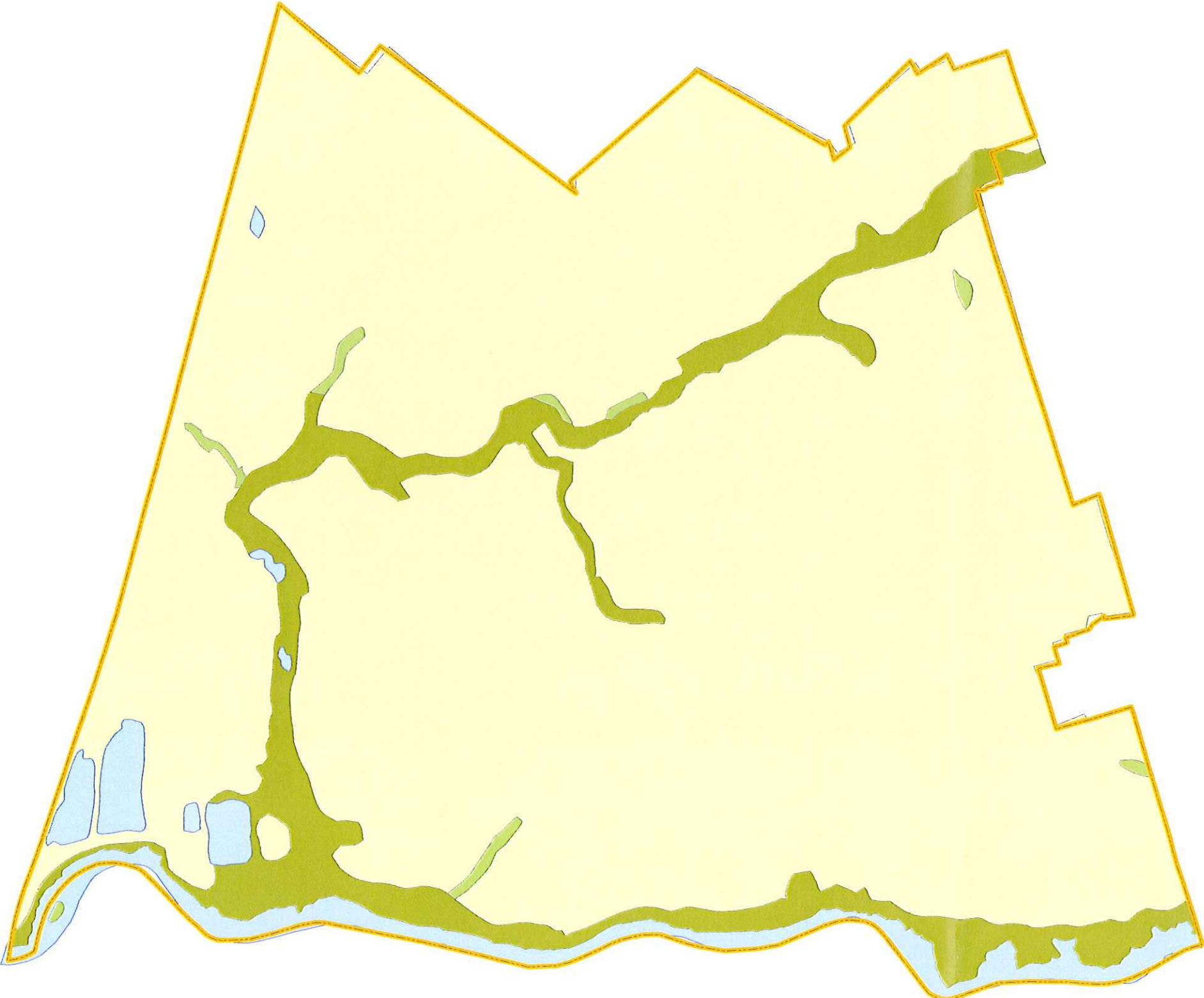
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Township of Willingboro

Burlington County, NJ

Floodprone Areas



- Legend**
-  Municipal Boundary
 - Floodprone Areas**
 -  USGS Documented Floodprone Area
 -  Undocumented Floodprone Area
 -  Water
 -  Not a Floodprone Area



1 inch = 2,000 feet



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Township of Willingboro

Burlington County, NJ

Existing Conditions




Legend

 Municipal Boundary



1 inch = 2,000 feet

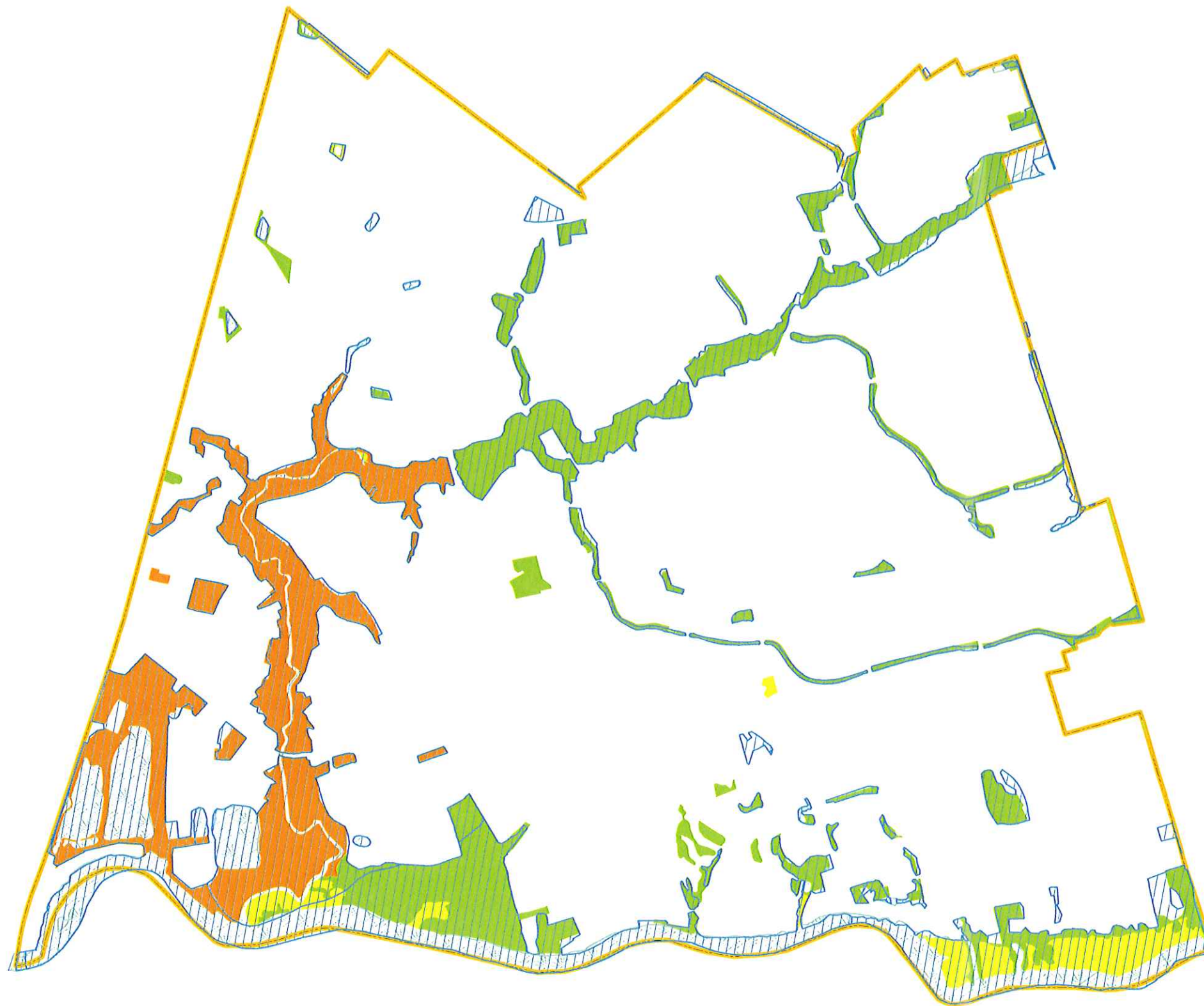
0 1,250 2,500 5,000 Feet

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Township of Willingboro

Burlington County, NJ

Development Constraints



Legend

-  Critical Undeveloped/Underdeveloped Areas
- NJDFW Landscape Project 2.1 Habitat Areas**
-  Priority Species (Rank 2)
-  State Threatened (Rank 3)
-  State Endangered (Rank 4)
-  Municipal Boundary
-  Wetlands



1 inch = 2,000 feet



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