Engineers Planners Surveyors Landscape Architects Environmental Scientists

MASER CONSULTING P.A.

Municipal Stormwater Management Plan

Prepared For

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1. Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for Franklin Township ("the Township") to address stormwater-related impacts caused by development. 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, or create one-quarter acre or more of new impervious 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 existing ordinances, the Township Master Plan, and other planning efforts to encourage 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 on existing development.

2. Goals of the Stormwater Management Plan

The goals of this MSWMP are to:

- Safely convey floodwaters and 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 and quality;
- Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- Decrease overbank flooding (overbank flooding occurs when excess water overloads the stream channel and flows out into the floodplain) and maintain the integrity of stream channels for their biological functions, as well as for drainage and habitat, through the development of riparian buffer zones;
- 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;

- Protect public safety through the proper design and operation of stormwater basins;
- Preserve and protect the environmentally sensitive areas, including but not limited to steep slopes, wetlands, floodplains, groundwater recharge areas as defined by N.J.A.C. 7:8, and wildlife habitats; and
- Educate the public about and generate acceptance for the stormwater control measures detailed in the MSWMP.

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

3. Development Impacts Upon Stormwater Runoff

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

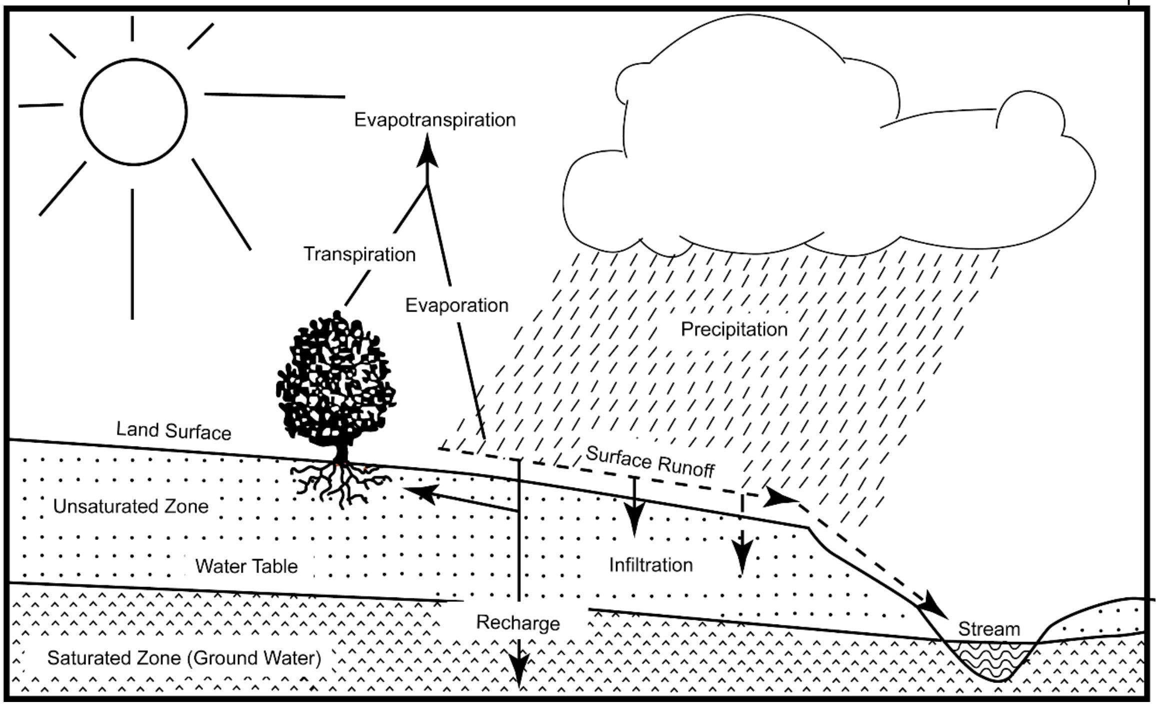


Figure C-1 – The Hydrologic Cycle
Source: New Jersey Geological Survey Report GSR-32.

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.

Land development can also 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.

4. Riparian Buffers

The vegetated area along a stream functions as a buffer and filter system between upland development and the stream itself, maintaining water quality by absorbing nutrients, accumulating and stabilizing sediments, and removing heavy metals and

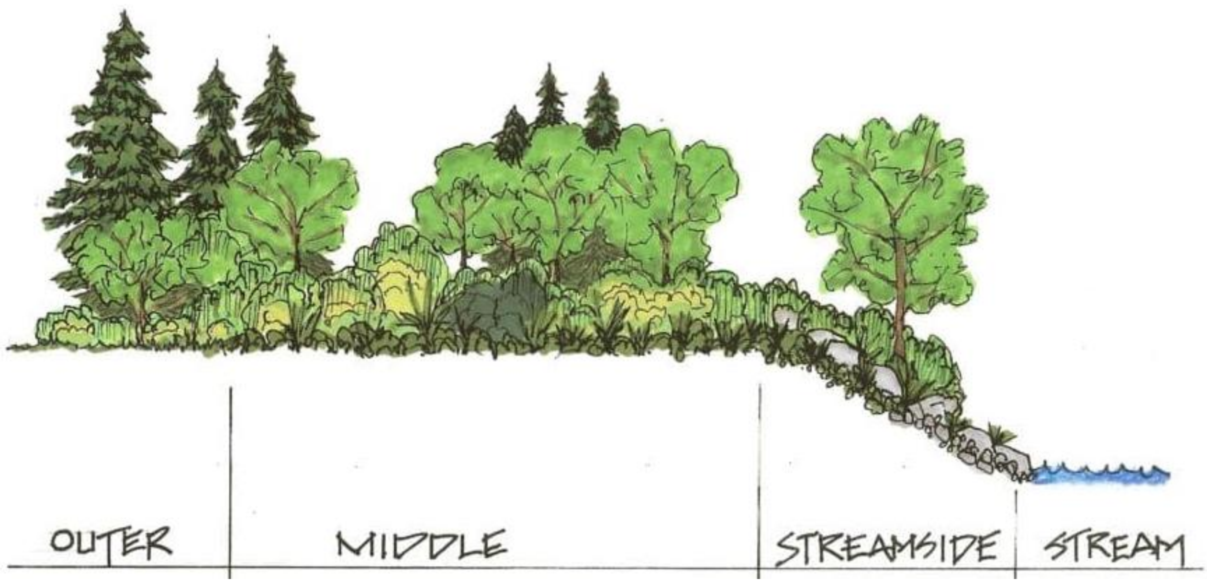
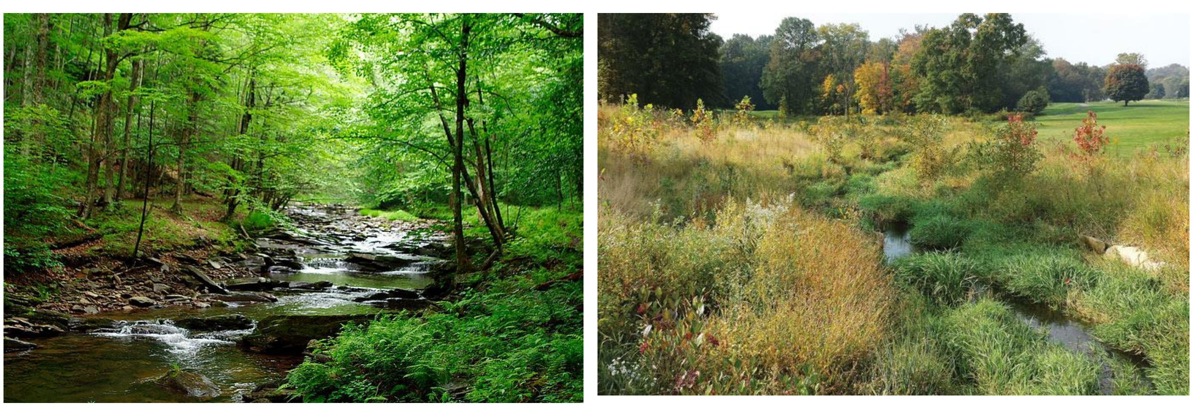


Figure C-2 - Riparian Buffer Diagram

pollutants from development that can enter the stream with surface water runoff. Near stream vegetation (trees, shrubs, grasses) stabilize the soil, help slow runoff, and serve as an effective nutrient and sediment filter. When a stream bank has been cleared of trees and shrubs, stream bank erosion and loss of valuable property occurs.



Stream with dense tree canopy | Stream with vegetated filters

Figure C-3 – Vegetated Stream Corridors

Figure C-3 – Agricultural Riparian Stream Buffer

Land disturbances within the watershed can increase pollutants. Runoff from roadways and a variety of sources may not pass through water quality basins or other treatment devices prior to entering waterways.

Pollutants such as road salts, oil, grease and other contaminants are problematic for the aquatic ecosystem. Silt is frequently a primary constituent of non-point source pollution and is a major threat to the state's water resources. Runoff from poor farming practices and land disturbances are major contributors of silt. Livestock grazing destroys near-stream vegetation, causing unstable banks that could be prevented or minimized through fencing.

5. Surface Water Classification

Trout fisheries are widely recognized as indicators of high-water quality. The high-water quality and habitat standards necessary for the survival and successful reproduction of trout have made them a useful indicator of stream health. In 1968, New Jersey began identifying and classifying the state's waters according to their suitability to support trout under a Federal Aid Grant. During the next several years, a classification system for New Jersey waters was developed based upon sampling completed under this study. The system classifies the state's waters as trout production (natural reproduction occurring), trout maintenance (ability to support trout year-round, but no reproduction documented) and non-trout (habitat and/or water quality are not conducive to the presence of trout or trout associated species). This classification system was formally recognized in 1981 under the state's Surface Water Quality Standards and is recognized in State regulatory programs governing water quality and land development.

The Surface Water Quality Standards includes statements of policy, designated use classifications, and corresponding water quality criteria, and surface water classifications. The suitability of a waterway to support trout affects the stringency of the standards set. Trout production waters are awarded Category One status, one of the highest levels of protection which mandates an anti-degradation standard for a number of identified water quality parameters. The New Jersey Department of Environmental Protection's Land Use Regulation Program through Stream Encroachment, Freshwater

Wetlands, and the Stormwater Management Rules acknowledge the fragile nature of these ecosystems and provide additional protective measures.

The general classification applied to freshwaters of the State is FW. Waters located wholly within State or Federal land or special holdings are typically classified as FW1. These waters receive the highest protection possible and shall be maintained as to quality in their natural state. All other surface freshwaters (excluding the Delaware River and Pinelands waters) are classified FW2. Waters are then further classified according to their suitability to support trout.

> **TP – Trout Production** – Waters designated [at N.J.A.C. 7:9B-1.15(b) through (g)] for use by trout for spawning or nursery purposes during their first summer.
>
> **TM – Trout Maintenance** – Waters designated [at N.J.A.C. 7:9B-1.15(b) through (g)] for the support of trout throughout the year.
>
> **NT – Non-Trout** – Waters that have not been designated [at N.J.A.C. 7:9B-1.15(b) through (h)] as trout production or trout maintenance. These waters are generally not suitable for trout because of their physical, chemical, or biological characteristics, but are suitable for a wide variety of other fish species.

Fresh waters classified as FW2 may be further designated as "Category One Waters" (C1) for the purposes of implementing anti-degradation policies (N.J.A.C. 7:9B-1.5(d)). These policies protect C1 waters from measurable changes to the existing water quality. These waters can be identified because of their clarity, color, scenic setting, and other characteristics of aesthetic value, exceptional ecological significance, exceptional water supply significance, or exceptional fisheries resource. These waters may include, but are not limited to:

- Waters originating wholly within Federal, interstate, State, county, or municipal parks, forests, fish and wildlife lands, and other special holdings that have not been designated as FW1;

- Waters that are classified as trout production and their tributaries;

- Surface waters classified as trout maintenance or non-trout that are upstream of waters classified as trout production;

- Shellfish waters of exceptional resource value;

- Other waters and their tributaries that flow through, or border, Federal, State, county, or municipal parks, forests, fish and wildlife lands, or special holding.

Comprehensive Stormwater Management Rules, adopted in January 2004, protect and enhance water quality and preserve the integrity of drinking water supplies statewide.

The rules minimize the impacts on Category One streams by controlling Major Development within a 300-foot buffer around these high-quality watersheds. These efforts enhance the protection of water quality and in-stream habit from the negative effects of widespread development.

Not only are there tangible economic benefits resulting from these rules, perhaps more importantly are the intangible benefits to all residents that appreciate the quality of life values. The state's nine million residents will all reap the benefits of these resource protection and preservation efforts. (See Map 2: Stream Classification)

6. Background Data

a. Land Area and Population

The Township encompasses 23.11 square miles in the central part of Hunterdon County, New Jersey. The predominant land use throughout the municipality is agricultural. The existing land uses in the Township are depicted in Map 6 and based on the 2016 NJDEP Land Use/Land Cover Mapping. The various zoning districts and the current zoning map are shown in Map 8.

In recent years the Township has gone through varying periods of growth, and the population has moderately increased from 2,850 in 1990, to 2,990 in 2000 and to 3,195 in 2010. From 2000 to 2010, this represents a 6.9% increase in population, which is greater than the state average of 4.5%, but less than the county increase of 18.2%. Increases in population typically accompany new development, and changes in the landscape that increase stormwater runoff volumes and pollutant loads to the waterways of the municipality.

Map 1 illustrates the waterways in the Township, and Map 3 indicates the topography and Township boundary Hunterdon County GIS mapping.

b. Watersheds

The Township is situated along the southwesterly side of the South Branch of the Raritan River in the Raritan Basin. The major streams in the Township include the South Branch of the Raritan River, which flows along the northeasterly border of the Township, the Capoolong Creek which flows through the north half of the Township, and the Lockatong Creek, Wickecheoke Creek and the Assiscong Creek which flow to the west, and south of the Township.

Per the current NJDEP mapping, this includes the following six (6) HUC 14 watersheds, depicted on Map 7:

1. Lockatong Creek (02040105200010)
2. Wickecheoke Creek (02040105200040)
3. Spruce Run Reservoir/ Wilboughy Brook (02030105020040)
4. Cakepoulin Creek - North and South Branch Raritan (02030105020060)

5. Grandin Stream - North and South Branch Raritan (02030105020070)
6. North and South Branch Raritan (02030105020080)
7. Assicong Creek - North and South Branch Raritan (02030105020100)
8. Nishisakawick Creek- Central Delaware (02040105200040)
9. Nishisakawick Creek - Central Delaware (02040105200010)

c. Water Quality

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. These sites are sampled for benthic macroinvertebrates 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.

There are four active AMNET stations within the Township, these are identified as follows:

1. AN0086 – Lockatong Creek at Oak Grove Road
2. AN0324A – Sidney Brook at Route 617
3. AN0325 – Cakepoulin Creek at Lower Landsdown Road
4. AN0325B - Cakepoulin Creek at Route 513

The above testing locations are within the Raritan Watershed Management Areas 8 and 11 and are classified to be in good to excellent condition.

Currently, there are four active identified impairments for the waterways within the Township. These pertain to elevated levels of fecal coliform, mercury, phosphorus, and total suspended solids. These have established Total Maximum Daily Loads (TMDL). 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 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 an 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.

A complete listing of TMDL Reports prepared by the NJDEP can be found here (search by County and Municipality): https://www.nj.gov/dep/dwq/msrp-tmdl-rh.htm

Fecal Coliform:

Land use in the areas of impairment is predominantly agriculture, with suburban and urban development, including some older development on septic systems, and forest. Potential sources of fecal coliform include livestock, land application of manure and older septic systems. Wildlife including, geese and beaver in the river can also contribute to these impairments.

Mercury:

Pursuant to the federal Clean Water Act air deposition is a nonpoint source of mercury that reaches surface waters through stormwater runoff. Industrial sources of runoff are regulated by the NPDES are point sources. Tier A and Tier B municipalities are regulated through the NJDEP Municipal Stormwater Regulation Program (MSRP). According to the TMDL document, air-deposition of mercury resulting in non-point source pollution is directly correlated to the area of urban land use within a municipality.

Phosphorus:

Land use in the areas of impairment is predominantly agriculture, with suburban and forest. Potential sources of phosphorus include livestock, land application of manure and chemical fertilizers.

Total Suspended Solids:

Sources of Total Suspended Solids in stormwater include sediments, soil erosion, vehicle exhaust emissions and fluids, construction debris, road salt, plant and leaf litter and atmospheric particle deposition.

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.

In order to address, and reduce the extent to stormwater runoff impacts waterways, and water quality, the Township must continue to monitor and enforce existing regulations along with the County Soil Conservation District and the NJDEP to ensure that soil erosion and stormwater best management practices are implemented on municipal, agricultural and existing and proposed land development projects. These measures will ensure that waterway impairments can be monitored and mitigated so as to not cause significant harm to wildlife, or to degrade water quality for the residents of the Township.

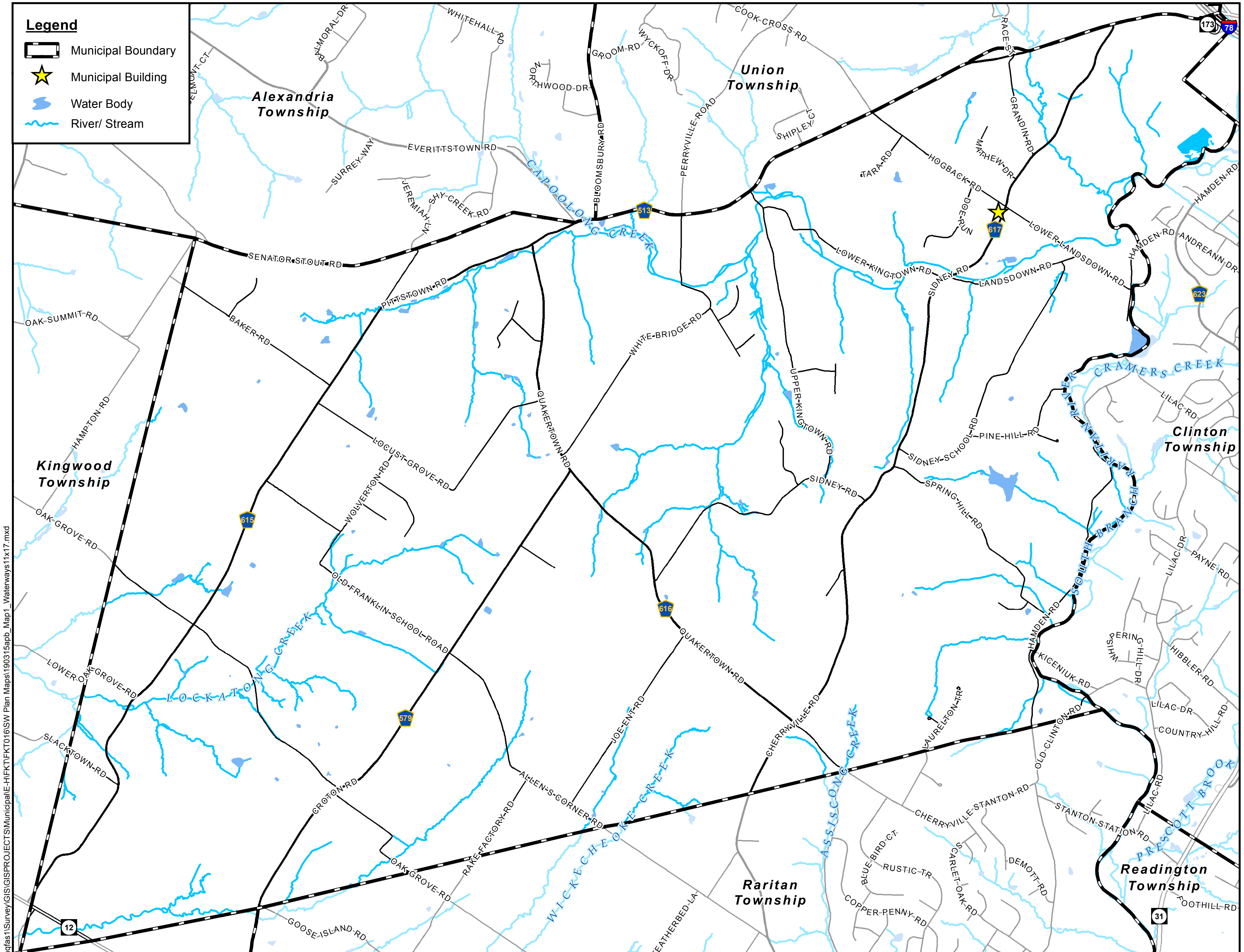
d. Runoff and Recharge

Additionally, increases in stormwater runoff can cause instances of severe stormwater runoff quantity problems including flooding, streambank erosion, and diminished base flow in streams. Some of the culverts associated with road crossings in the Township are undersized. During severe storm events, these undersized culverts do not have adequate capacity, thereby increasing the backwater effect and upstream flooding.

Many culverts were installed under significantly different hydrologic conditions (i.e., less development and impervious area) than presently exist in the Township. As impervious surfaces increase in the Township, peak volumes and rates of stream flows will also increase. The increased amount of surface water runoff would result in stream bank erosion, which will create unstable areas at roadways, bridge crossings, and degraded stream habitats. Impacts to off-site drainage conveyances, and the necessity for upgrades to existing infrastructure must be evaluated at the time of review and approval of major developments, and municipal infrastructure projects in order to mitigate the impacts resulting from the associated increase in stormwater runoff rates and volumes.

Increases in impervious surfaces also reduce groundwater recharge, decreasing base flows in streams during dry weather periods. Lower base flows have negative impacts on in-stream habitats during the summer months. A map of groundwater recharge areas in the Township are shown in Map 4. The locations of Public Water Supply Wellhead protection areas, also required as part of the MSWMP, are shown in Map 5.

Map 1 - Waterways



MAP 1 WATERWAYS

TOWNSHIP OF FRANKLIN

HUNTERDON COUNTY
NEW JERSEY

This map was developed using NJDOT, NJDEP and Hunterdon County GIS digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

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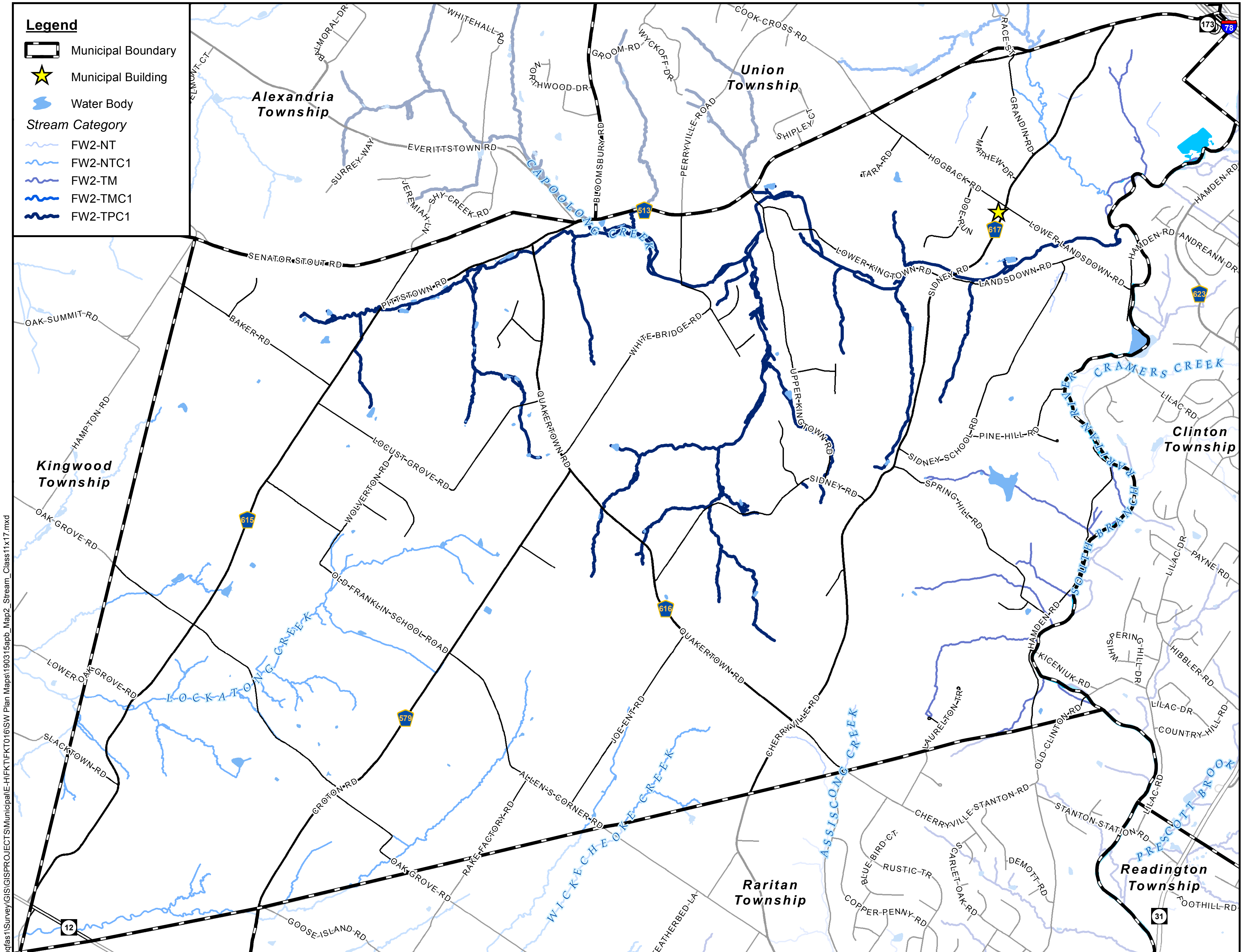
Map 2 – Stream Classification



MAP 2 STREAM CLASSIFICATION

TOWNSHIP OF FRANKLIN

HUNTERDON COUNTY
NEW JERSEY

0 1,500 3,000 Feet

1 inch = 3,000 feet

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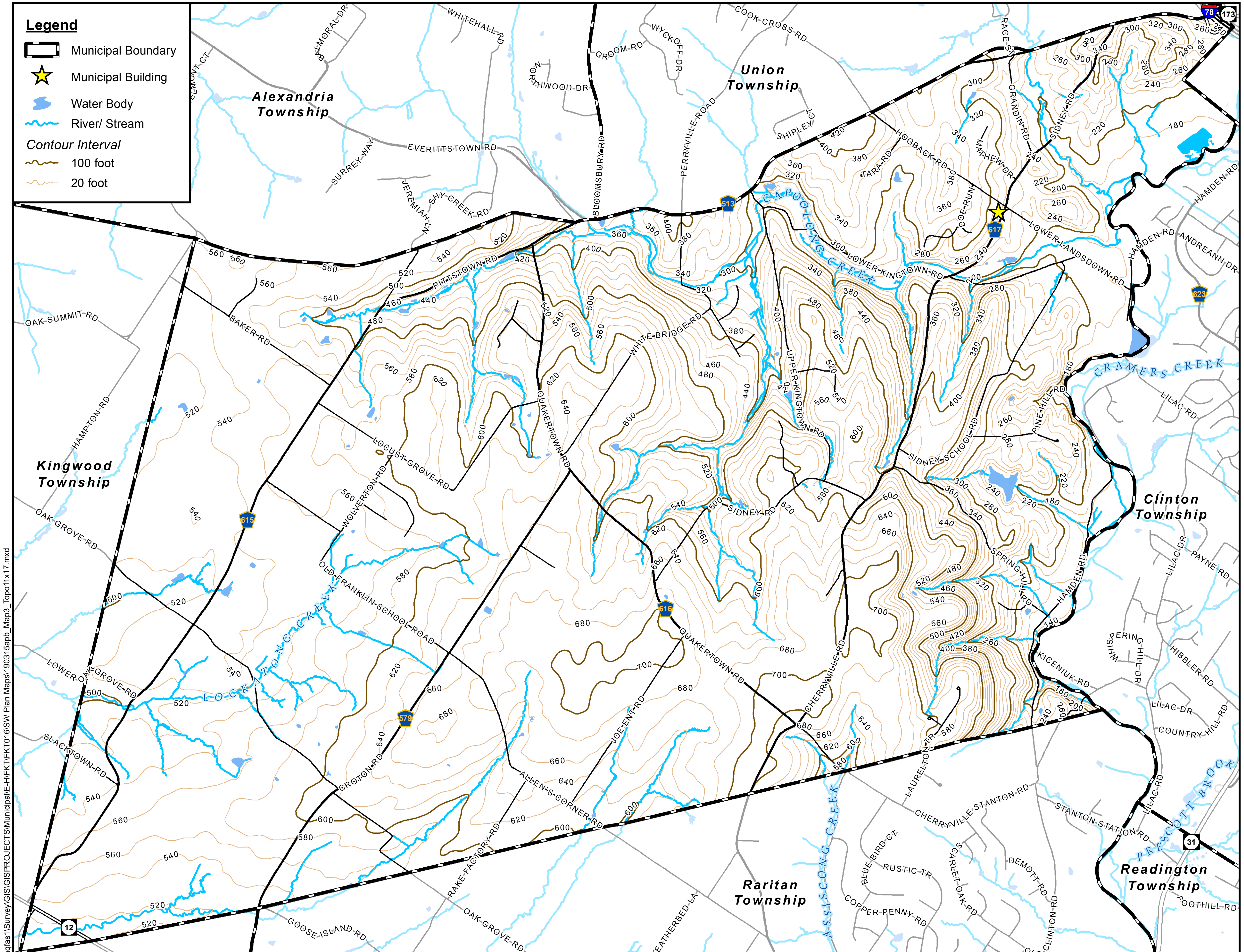
Map 3 – Contours



MAP 3
CONTOURS

TOWNSHIP OF FRANKLIN

HUNTERDON COUNTY
NEW JERSEY

0 1,500 3,000 Feet
1 inch = 3,000 feet

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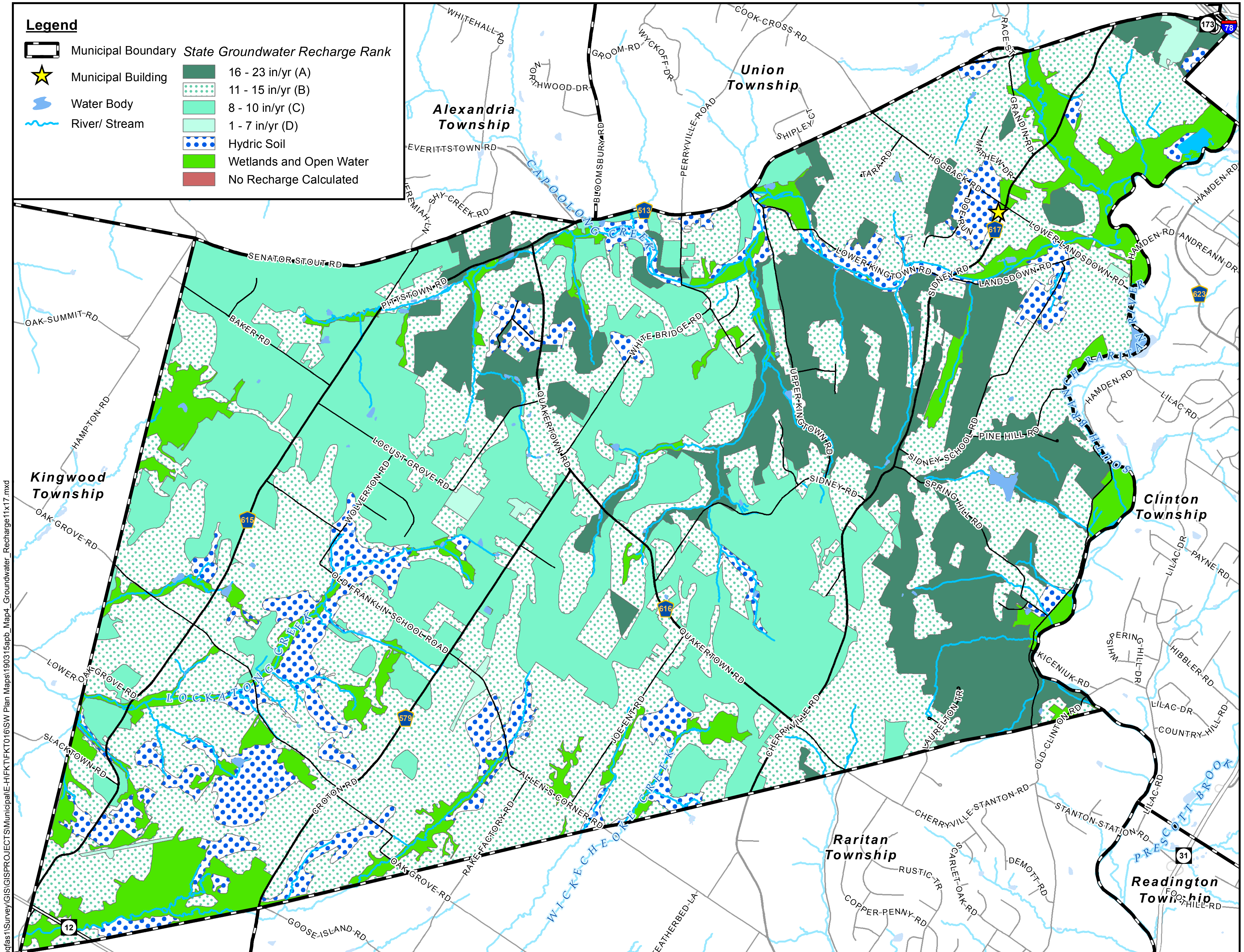
Map 4 – NJDEP Groundwater Recharge Rank



MAP 4
NJDEP GROUNDWATER RECHARGE RANK

TOWNSHIP OF FRANKLIN

HUNTERDON COUNTY
NEW JERSEY

0 1,500 3,000 Feet
1 inch = 3,000 feet

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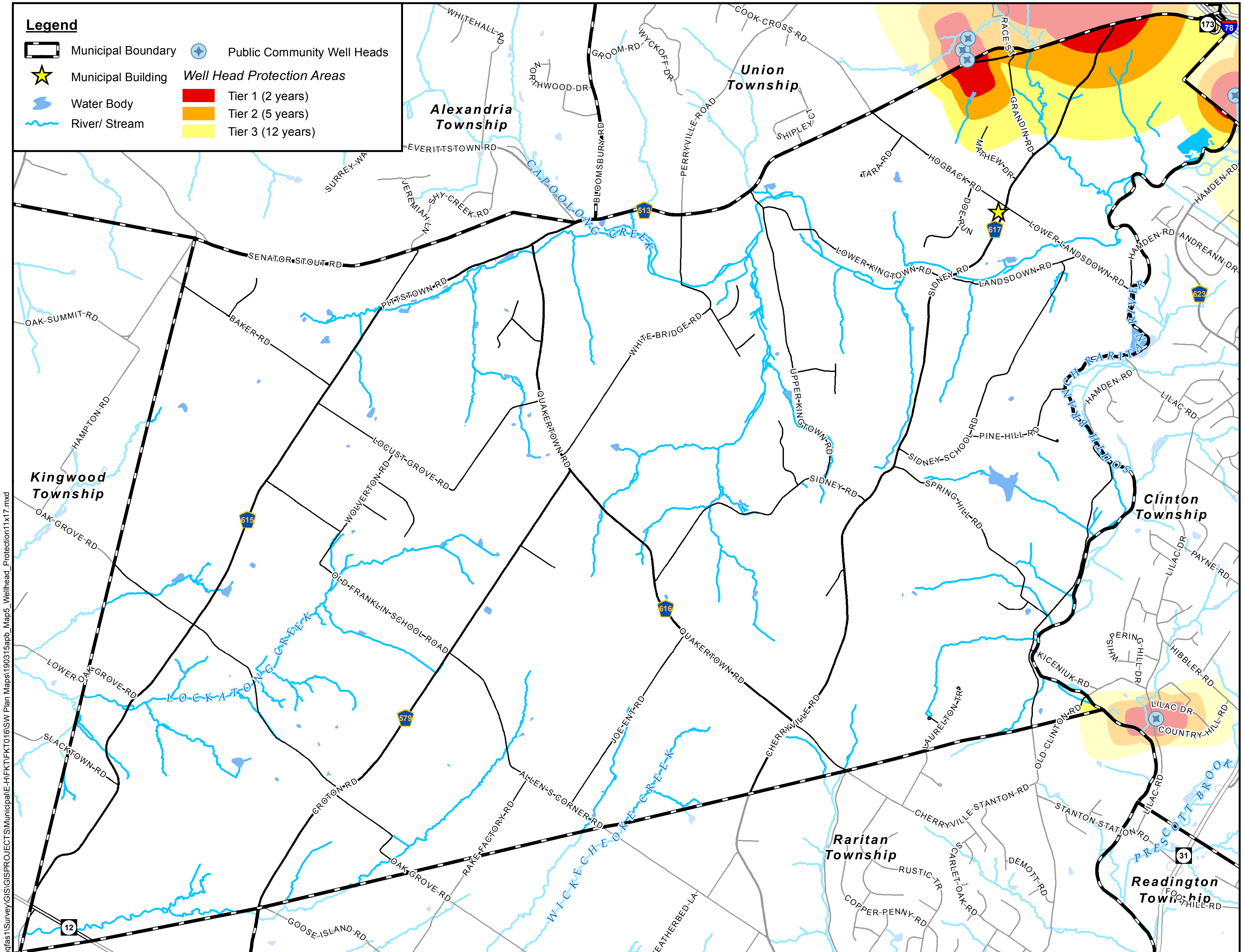
Map 5 – NJGS Wellhead Protection Areas



MAP 5
NJGS WELL HEAD PROTECTION AREAS

TOWNSHIP OF FRANKLIN

HUNTERDON COUNTY
NEW JERSEY

0 1,500 3,000 Feet

1 inch = 3,000 feet

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March 2019

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7. Design and Performance Standards

The Township has adopted, as part of its Stormwater Management Ordinance (Chapter 297 - Stormwater Management), the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impacts of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving 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 Stormwater Management Ordinance establishes minimum stormwater management requirements and controls for major development and to reduce the amount of non-point source pollutants entering waterways. The ordinance directs new development to be proactive and minimally impact natural resources. Specifically, the ordinance includes provisions and measures that:

- Reduce artificially induced flood damage, including damage to public health, life and property;
- Minimize increased stormwater runoff rates and volumes;
- Minimize the deterioration of existing structures that would result from increased rates of stormwater runoff;
- Induce water recharge into the ground wherever suitable infiltration, soil permeability, and favorable geological conditions exist;
- Prevent an increase in nonpoint source pollution;
- Maintain the integrity and stability of stream channels for their biological functions, as well as for drainage, the conveyance of floodwater, and other purposes;
- Control and minimize soil erosion and the transport of sediment;
- Assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- Minimize public safety hazards at any stormwater detention facility constructed pursuant to subdivision or site plan approval;
- Maintain high water in all streams and other surface water bodies;
- Protect all surface water resources from degradation; and
- Protect ground water resources from degradation.
- Minimize pollutants in stormwater runoff from new development in order 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 ecologic values, and to enhance the domestic, municipal, recreational, industrial and other uses of the water;
- Protect public safety through the proper design and operation of stormwater management facilities.

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

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

8. Plan Consistency

Based upon a review of the current NJDEP list there are fifteen TMDL's currently issued within the Township Limits:

1. Total Maximum Daily Loads for Fecal Coliform to Address 28 Streams in the Northwest Water Region: Fecal Coliform - 2003 : Nishisakawick Creek : View the TMDL Document

2. Total Maximum Daily Loads for Fecal Coliform to Address 48 Streams in the Raritan Water Region: Fecal Coliform - 2003 : S Br Raritan River, Assiscong Ck, : View the TMDL Document

3. Total Maximum Daily Loads for Fecal Coliform to Address 10 Streams in the Northwest Water Region: Fecal Coliform - 2005 : Wickechecoke Creek : View the TMDL Document

4. Total Maximum Daily Load for Mercury Impairments Based on Concentration in Fish Tissue Caused Mainly by Air Deposition to Address 122 HUC 14s Statewide: Mercury - 2010 : Raritan R SB(Three Bridges-Prescott Bk) : View the TMDL Document

5. Total Maximum Daily Load for Mercury Impairments Based on Concentration in Fish Tissue Caused Mainly by Air Deposition to Address 122 HUC 14s Statewide: Mercury - 2010 : Spruce Run Reservior / Willoughby Brook : View the TMDL Document

6. Total Maximum Daily Load Report For the Non-Tidal Raritan River Basin Addressing Total Phosphorus, Dissolved Oxygen, pH and Total Suspended Solids Impairments: Total Phosphorus - 2016 : Cakepoulin Creek : View the TMDL Document

7. Total Maximum Daily Loads for Phosphorus to Address Seven (7) Stream Segments in the Northwest Water Region: Total Phosphorus - 2005 : Lockatong Creek : View the TMDL Document

8. Total Maximum Daily Load Report For the Non-Tidal Raritan River Basin Addressing Total Phosphorus, Dissolved Oxygen, pH and Total Suspended Solids Impairments: Total Phosphorus - 2016 : Raritan R SB(Prescott Bk to River Rd) : View the TMDL Document

9. Total Maximum Daily Load Report For the Non-Tidal Raritan River Basin Addressing Total Phosphorus, Dissolved Oxygen, pH and Total Suspended Solids Impairments: Total Phosphorus - 2016 : Raritan R SB(River Rd to Spruce Run) : View the TMDL Document

10. Total Maximum Daily Load Report For the Non-Tidal Raritan River Basin Addressing Total Phosphorus, Dissolved Oxygen, pH and Total Suspended Solids Impairments: Total Phosphorus - 2016 : Raritan R SB(Three Bridges-Prescott Bk) : View the TMDL Document

11. Total Maximum Daily Loads for Phosphorus to Address Seven (7) Stream Segments in the Northwest Water Region: Total Phosphorus - 2005 : Wickechecoke Creek : View the TMDL Document

12. Total Maximum Daily Load Report For the Non-Tidal Raritan River Basin Addressing Total Phosphorus, Dissolved Oxygen, pH and Total Suspended Solids Impairments: Total Suspended Solids - 2016 : Cakepoulin Creek : View the TMDL Document

13. Total Maximum Daily Load Report For the Non-Tidal Raritan River Basin Addressing Total Phosphorus, Dissolved Oxygen, pH and Total Suspended Solids Impairments: Total Suspended Solids - 2016 : Raritan R SB(Prescott Bk to River Rd) : View the TMDL Document

14. Total Maximum Daily Load Report For the Non-Tidal Raritan River Basin Addressing Total Phosphorus, Dissolved Oxygen, pH and Total Suspended Solids Impairments: Total Suspended Solids - 2016 : Raritan R SB(River Rd to Spruce Run) : View the TMDL Document

15. Total Maximum Daily Load Report For the Non-Tidal Raritan River Basin Addressing Total Phosphorus, Dissolved Oxygen, pH and Total Suspended Solids Impairments: Total Suspended Solids - 2016 : Raritan R SB(Three Bridges-Prescott Bk) : View the TMDL Document

The TMDLs above include elevated levels of fecal coliform, mercury, phosphorus and total suspended solids in waterways as causes of impairments in Franklin Township. In order to address these concerns, continued monitoring of Township owned outfalls is required to ensure that illicit connections are not contributing to elevated levels of bacteria in the water. Continued enforcement and education on pet waste, and wildlife feeding/mitigation strategies would also be effective in addressing these concerns.

Addressing other contaminants, including mercury, phosphorus and total suspended solids in runoff requires a greater effort on a cumulative approach to improving water quality and promoting pollution prevention these include the following measures:

- Source control by enforcement of the ordinances currently enacted within the Township including littering/waste, illicit connections and storm drain retrofits;

- Ensure that private homeowners and agricultural uses are adhering to best management practices in the use of natural and chemical fertilizers.

- As private property owners and developers seek approvals for developments the Township Planning/Zoning Boards and Environmental commission should encourage the use of NJDEP BMP Manual measures, Non-Structural Strategies, and vegetated conveyances to address stormwater water quality which would directly impact the TSS and other non-point pollution in waterways.

The Township is partially within the Raritan Basin and much information on the basin and about its characteristics has been developed as part of the Raritan Plan. Additional information concerning this plan can be found at: http://www.raritanbasin.org. The Township supports the Raritan Plan.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The Township will utilize the most current update of the RSIS in the stormwater management review of residential areas. This Township 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 on-site soil erosion and sediment control measures and report any inconsistencies to the local Soil Conservation District.

The Township is approximately 13% developed. The existing land use, based on 2016 NJDEP Mapping, is shown in Map 6. The existing zoning is shown in Map 8. The vast majority of the developed land is residential. The ground water recharge rates for native soils in this area are generally between 8 and 15 inches annually. The average annual groundwater recharge rates are shown graphically in Map 4.

According to NJDEP, "A Well Head Protection Area (WHPA) in New Jersey is a map area calculated around a Public Community Water Supply (PCWS) well in New Jersey that delineates the horizontal extent of ground water captured by a well pumping at a specific rate over a two- (Tier 1), five- (Tier 2), and twelve- (Tier 3) year period of time for unconfined wells. The confined wells have a fifty-foot radius delineated around each well serving as the well head protection area to be controlled by the water purveyor in accordance with Safe Drinking Water Regulations (see NJAC 7:10 – 11.7 (b)1)."

WHPA delineations are conducted in response to the Safe Drinking Water Act Amendments of 1986 and 1996 as part of the Source Water Area Protection Program (SWAP). The delineations are the first step in defining the sources of water to a public supply well. Within these areas, potential contamination will be assessed, and appropriate monitoring will be undertaken as subsequent phases of the NJDEP SWAP. As shown in Map 5, a small portion of the Township contains Tier 1, 2 and 3 well head protection areas from wells located in Clinton Town and Union Township.

9. Non-Structural Stormwater Management Strategies

The Township has reviewed the master plan and ordinances with regards to the implementation of Non-Structural Stormwater Management Strategies in new Major as well as redevelopment.

Section 296-9 includes the implicit Low Impact Development requirements for projects outlined in the State's Stormwater Rules (N.J.A.C. 7:8), specifically:

(1) Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
(2) Minimize the creation of new impervious surfaces and reduce, break up or otherwise disconnect the flow of runoff over impervious surfaces;
(3) Maximize the protection of natural drainage features and vegetation, except where native or natural vegetation is considered invasive;
(4) Minimize the decrease in the time of concentration from preconstruction to postconstruction;
(5) Minimize land clearing and disturbance and overall site grading;
(6) Minimize soil compaction;
(7) Retain native, noninvasive vegetation, plant low-maintenance landscaping, plant native vegetation, and minimize the creation of lawns and the use of plantings and vegetation that require the excessive use of fertilizers, pesticides and irrigation;
(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, exposure and/or mobilization of pollutants and prevent or minimize the release and transport of those pollutants into stormwater runoff.

10. Land Use/Build-Out Analysis

- A detailed land use analysis for the Township was conducted. Map 6 illustrates the existing land use in the Township based upon GIS information from the Hunterdon County Planning Board.
- Map 7 illustrates the HUC14s within the Township.
- The Township Zoning Map is shown in Map 8.
- Map 9 illustrates the areas of constrained land in the Township.
- Build out calculations for impervious cover are shown in Table C-1. As expected, when developing agricultural and forest lands, the build-out of the several HUC14s in the Township will result in a significant increase in impervious surfaces.
- Table C-2 presents the pollutant loading coefficients by land cover.
- Pollutants loads at full build out are presented in Table C-3.

Table C-1: Build – Out Calculations for HUC14s

HUC14 and Zone*	Total Acres*	Existing Impervious (%)*	Existing Impervious (Acres)*	Critical Areas (Acres)*	Existing Developed Areas (Acres)*	Remaining Developable Areas (Acres) [1]	Allowable Impervious (%) [2]	Build-Out Impervious (Acres) [3]
02040105200010 – Lockatong Creek								
AR-7.0	1843.13	10	8.62		86.16	1756.97	10	175.70
R-13.0	196.91	10	0.00	1.00	0.00	195.91	10	19.59
R-3.0	1788.99	10	48.10	145.78	480.96	1162.25	10	116.23
C-S	5.40	60	3.24		5.40		60	0.00
Totals	**3834.43**		**59.95**	**146.78**		**3115.13**		**311.51**
02040105200040 – Wickecheoke Creek								
AR-7.0	1643.54	10	61.95	88.31	619.53	935.70	10	93.57
R-13.0	54.29	10	3.13		31.25	23.04	10	2.30
C-S	172.74	60	103.65		172.74		60	0.00
Totals	**227.03**		**106.77**	**0.00**		**23.04**		**95.87**
02030105020040 – Spruce Run Reservoir/Wilboughy Brook								
RR-5.0	4.91	10	0.49		4.91		10	0.00
C-N	58.92	60	35.35		58.92		60	0.00
Totals	**58.92**		**35.84**	**0.00**		**0.00**		

Table C-1: Build – Out Calculations for Franklin Township

HUC14 And Zone*	Total Acres*	Existing Impervious (%)*	Existing Impervious (Acres)*	Critical Areas (Acres)*	Existing Developed Areas (Acres)*	Remaining Developable Areas (Acres)[1]	Allowable Impervious (%)[2]	Build-Out Impervious (Acres)[3]
02030105020060 – Cakepoulin Creek								
AR-7.0	3518.17	10	124.95	328.584	1249.51	1940.08	10	194.01
R-13.0	666.25	10	0.00	4.18	0.00	622.07	10	66.21
R-3.0	271.44	10	9.37	6	93.66	171.78	10	17.18
RR-5.0	1061.07	10	63.39	96.99	633.89	330.19	10	33.02
NB	123.38	75	81.84	0.43	109.12	13.83	75	10.37
Totals	**5640.31**		**279.55**	**436.18**		**3117.95**		**320.78**
02030105020070 – Grandin Stream								
RR-5.0	1271.50	10	47.86	25.69	478.57	767.24	10	76.72
C-N	24.64	60	14.78		24.64		60	0.00
Totals	**1296.14**		**62.64**	**25.69**		**767.24**		**76.72**
02030105020080 – South Branch Raritan River								
RR-5.0	881.21	10	23.39	104.12	233.95	543.14	10	54.31
AR-7.0	821.24	10	30.30		303.04	518.20	10	51.82
R-13.0	11.01	10	0.00		0.00	11.01	10	1.10
Totals	**1713.46**		**53.70**	**104.12**		**1072.35**		**107.24**
02030105020100 – Assicong Creek								
AR-7.0	274.94	10	0.00	150.256	0.00	124.68	10	12.47
Totals	**274.94**		**0.00**	**150.26**		**124.68**		**12.47**
02040105170040 – Nishisakawick Creek								
R-3.0	60.73	10	0.00		0.00	60.73	10	6.07
Totals	**60.73**		**0.00**	**0.00**		**60.73**		**6.07**

020401051700540 – Nishisakawick Creek								
R-30	36.00	10	3.60		36.00		10	0.00
Totals	**36.00**		**3.60**	**0.00**		**0.00**		**0.00**
Total Existing Impervious Coverage		**566.21**		**Potential Additional Impervious Coverage**			**930.68**	

* Information Provided by Hunterdon County Planning Department

1. Remaining Developable Areas (Acres) = Total Acres - Critical Areas (Acres) - Existing Developed Areas (Acres)
2. Allowable Impervious (%) is the Maximum Impervious Coverage permitted by the Zoning Ordinance
3. Build - Out Impervious (Acres) = Remaining Developable Areas (Acres) x Allowable Impervious (%)

Table C-2: Pollutant Loads by Land Cover

Land Cover	Total Phosphorous 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	1.0	10	120
Agricultural	1.3	10	300
Forest, Water, Wetlands	0.1	3	40
Barrenland / Transitional Area	0.5	5	60

Source: NJDEP Stormwater BMP Manual 2004

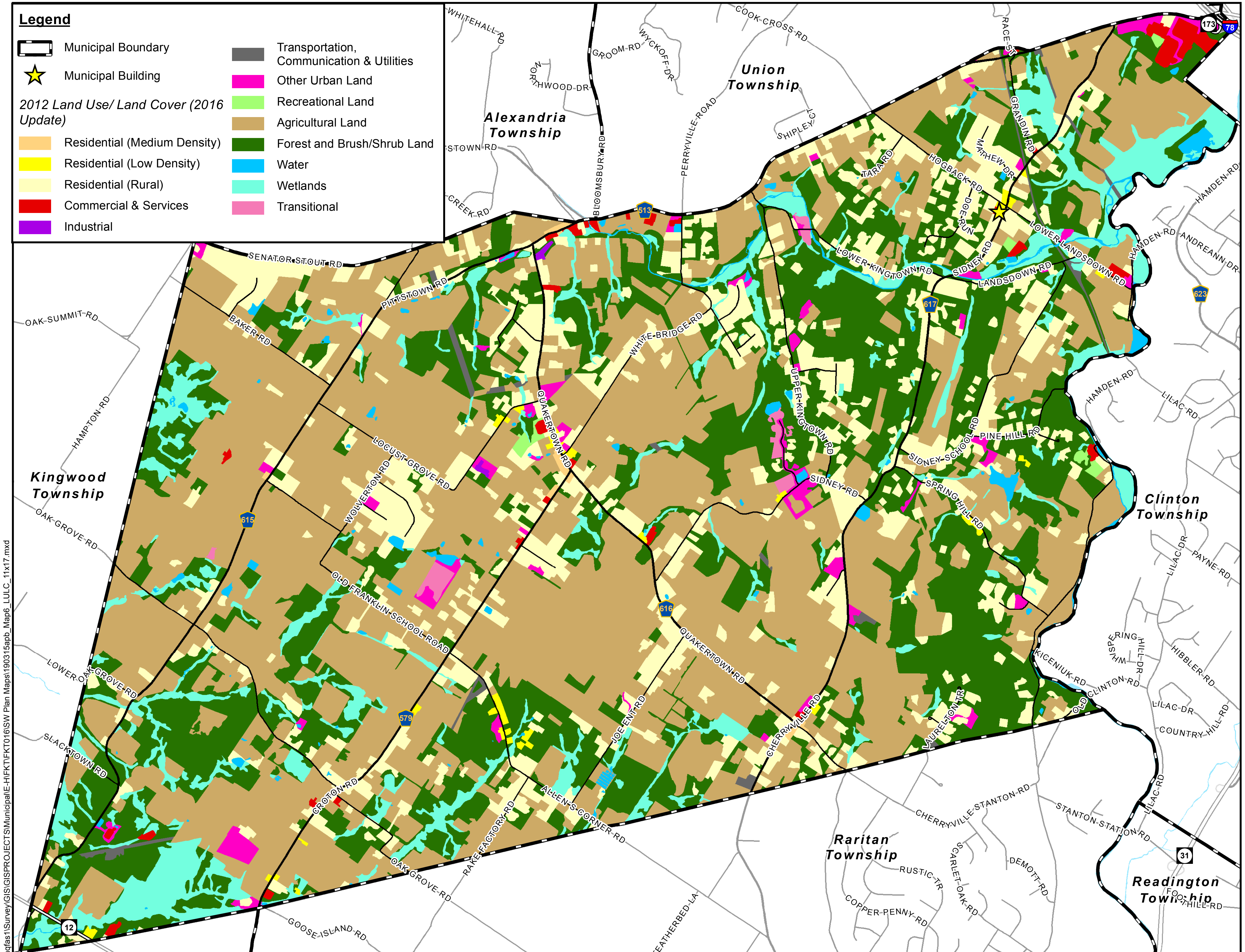
Table C-3: Nonpoint Source Loads at Build – Out for HUC14s

HUC14 and Zone	Build - Out Zoning	Acres	Total Phosphorous lbs/acre/year	Total Phosphorous lbs/year	Total Nitrogen lbs/acre/year	Total Nitrogen lbs/year	Total Suspended Solids lbs/acre/year	Total Suspended Solids lbs/year
02040105200010 – Lockatong Creek								
AR-7.0	10	175.70	0.6	105.42	5	878.50	100	17570.00
R-13.0	10	19.59	0.6	11.75	5	97.95	100	1959.00
R-3.0	10	116.23	0.6	69.74	5	581.15	100	11623.00
C-S	60	0.00	2.1	0.00	22	0.00	200	0.00
Totals				**186.91**		**1557.60**		**31152.00**
02040105200040 – Wickecheoke Creek								
AR-7.0	10	93.57	0.6	56.14	5	467.85	100	9357.00
R-13.0	10	2.3	0.6	1.38	5	11.50	200	230.00
C-S	60		2.1	0.00	22	0.00		0.00
Totals				**57.52**		**479.35**		**9587.00**
02030105020040 – Spruce Run Reservior/Wilboughy Brook								
RR-5.0	10	0	0.6	0.00	5	0.00	100	0.00
C-N	60	0	0.6	0.00	5	0.00	100	0.00
Totals				**0.00**		**0.00**		**0.00**
02030105020060 – Cakepoulin Creek								
AR-7.0	10	194.01	0.6	116.41	5	970.05	100	19401.00
R-13.0	10	71.47	0.6	42.88	5	357.35	100	7147.00
R-3.0	10	17.18	0.6	10.31	5	85.90	100	1718.00
RR-5.0	10	33.02	0.6	19.81	5	165.10	100	3302.00
NB	75	10.37	2.1	21.78	22	228.14	200	2074.00
Totals				**211.19**		**1806.54**		**33642.00**

Table C-3: Nonpoint Source Loads at Build – Out for HUC14s

HUC14 and Zone	Build - Out Zoning	Acres	Total Phosphorous lbs/acre/year	Total Phosphorous lbs/year	Total Nitrogen lbs/acre/year	Total Nitrogen lbs/year	Total Suspended Solids lbs/acre/year	Total Suspended Solids lbs/year
02030105020070 – Grandin Stream								
RR-5.0	10	76.72	0.6	46.03	5	383.60	100	7672.00
C-N	60	0	2.1	0.00	22	000	200	0.00
Totals				**46.03**		**383.60**		**7672.00**
02030105020080 – South Branch Raritan River								
RR-5.0	10	54.31	0.6	32.59	5	271.55	100	5431.00
AR-7.0	10	51.82	0.6	31.09	5	259.10	100	5182.00
R-13.0	10	1.10	0.6	0.66	5	5.50	100	110.00
Totals				**64.34**		**536.15**		**10723.00**
02030105020100 – Assicong Creek								
AR-7.0	10	37.3	0.6	22.38	5	186.50	100	3730.00
Totals				**22.38**		**186.50**		**3730.00**
02040105170040 – Nishisakawick Creek								
R-3.0	10	6.07	0.6	3.64	5	30.35	100	607.00
Totals				3.64		30.35		607.00
020401051700.540 – Nishisakawick Creek								
R-3.0	10	0	0.6	0.00	5	0.00	100	0.00
Totals				**0.00**		**0.00**		**0.00**
Total Non-Point Source Loads At Build-Out				**592.01**		**4980.09**		**97113.00**

Map 6 – 2016 Updated Land Use/ Land Cover



MAP 6
2016 UPDATED LAND USE/ LAND COVER

TOWNSHIP OF FRANKLIN

HUNTERDON COUNTY
NEW JERSEY

0 1,500 3,000
Feet

1 inch = 3,000 feet

This map was developed using NJDOT, NJDEP and Hunterdon County GIS digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

MASER CONSULTING P.A.

March 2019

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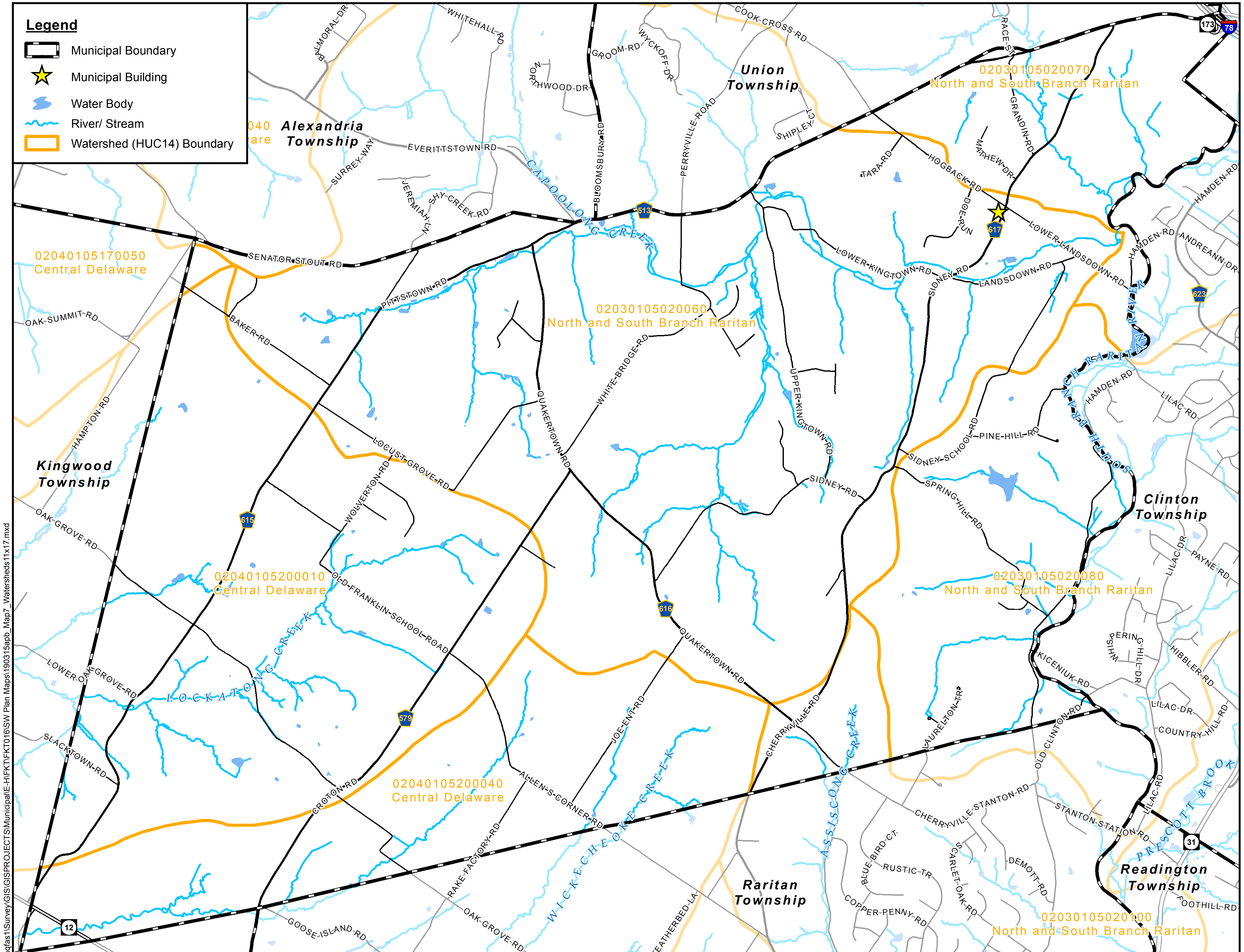
Map 7 – Watersheds by HUC14



MAP 7
WATERSHEDS BY HUC14

TOWNSHIP OF FRANKLIN

HUNTERDON COUNTY
NEW JERSEY

0 1,500 3,000
Feet

1 inch = 3,000 feet

This map was developed using NJDOT, NJDEP and Hunterdon County GIS digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

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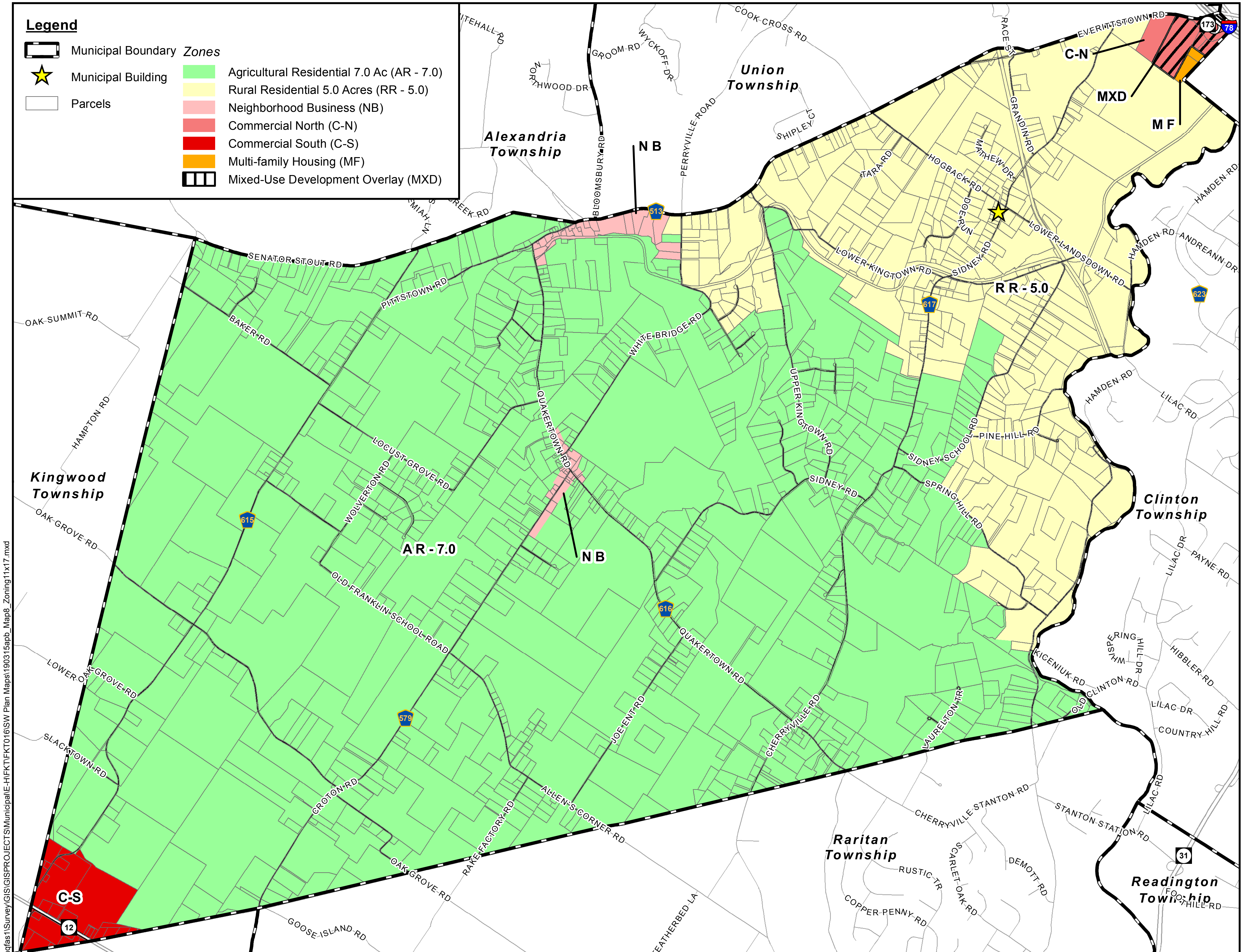
Map 8 – Zoning



MAP 8
ZONING

TOWNSHIP OF FRANKLIN

HUNTERDON COUNTY
NEW JERSEY

0 1,500 3,000 Feet

1 inch = 3,000 feet

This map was developed using NJDOT, NJDEP and Hunterdon County GIS digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

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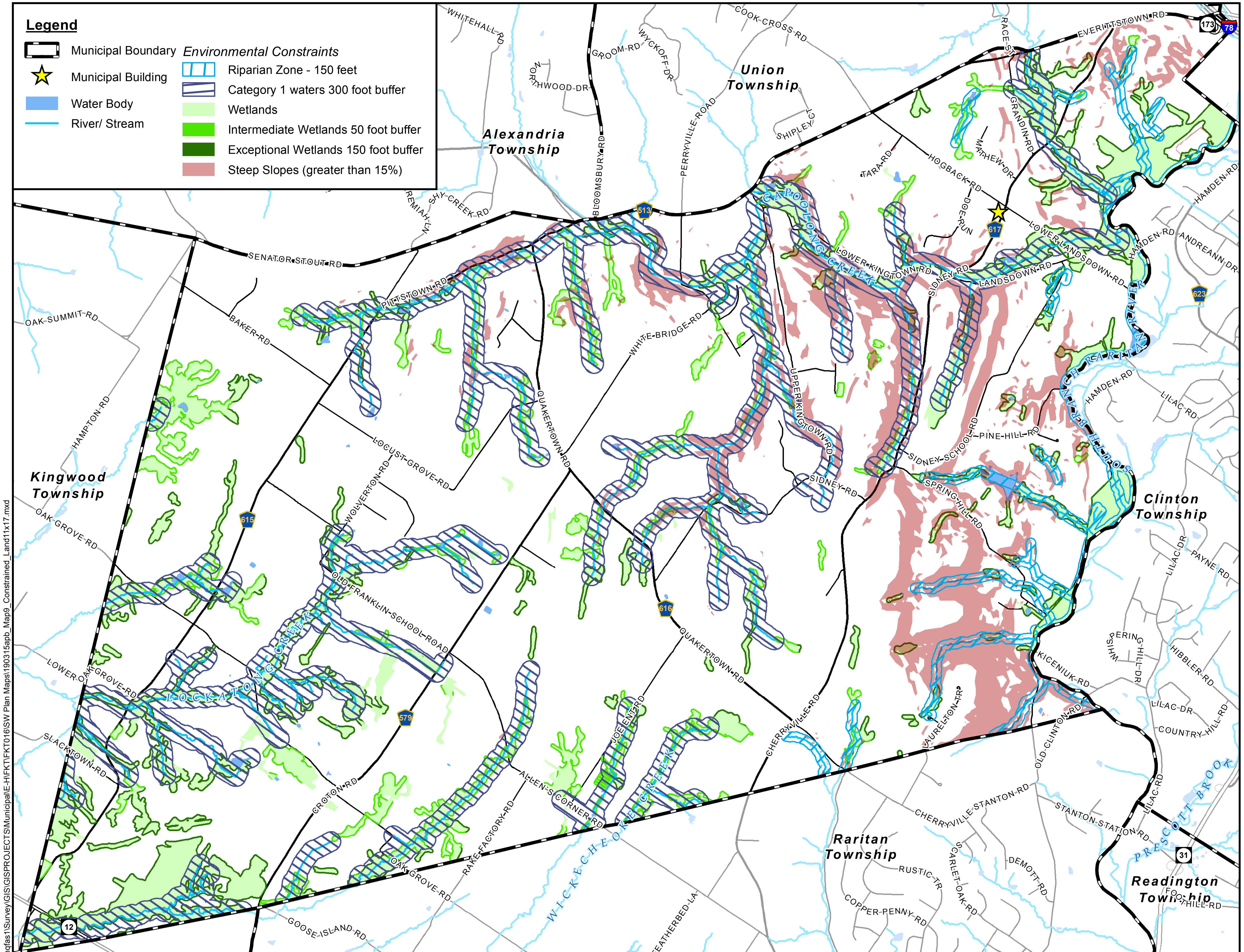
Map 9 – Constrained Lands



MAP 9
CONSTRAINED LANDS

TOWNSHIP OF FRANKLIN

HUNTERDON COUNTY
NEW JERSEY

0 1,500 3,000 Feet

1 inch = 3,000 feet

This map was developed using NJDOT, NJDEP and Hunterdon County GIS digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

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11. Stormwater Management Mitigation Plan

This mitigation plan is provided for a proposed development that is granted a variance or exemption from the stormwater management design and performance standards.

If it is deemed impracticable or impossible to meet the requirements of N.J.A.C. 7:8 a variance or exemption from strict compliance may be granted.

At 7:8-4.2c(11): In order to grant a variance or exemption from the design and performance standards in N.J.A.C. 7:8-5, include a mitigation plan that identifies what measures are necessary to offset the deficit created by granting the variance or exemption. The mitigation plan shall ensure that mitigation is completed within the drainage area and for the performance standard for which the variance or exemption was granted;

At 7:8-4.6: Variance or exemption from the design and performance standards for stormwater management measures. A municipality may grant a variance or exemption from the design and performance standards for stormwater management measures set forth in its approved municipal stormwater management plan and stormwater control ordinance(s), provided the municipal plan includes a mitigation plan in accordance with N.J.A.C. 7:8 4.2(c)11 and the municipality submits a written report to the county review agency and the Department describing the variance or exemption and the required mitigation.

The applicant must adequately demonstrate that there is no practicable alternative to address Stormwater Quantity, Stormwater Quality or Groundwater Recharge within the project limits. Alternatives should include the options of acquiring additional property, reduction of the scale of development and a no-build option. The applicant must demonstrate that the design is to the maximum extent practical conforming to the NJDEP's current Best Management Practices (BMPs) for non-point source control.

Chapter 3 of the New Jersey Stormwater Best Management Practices Manual (BMP Manual) provides detailed information on what the NJDEP requires for mitigation strategies: https://www.njstormwater.org/bmp_manual/NJ_SWBMP_3%20print.pdf

There are many options available for mitigation and they will be evaluated on a project basis as presented by the applicant in coordination with the Township Engineer during the land development approval process.

Mitigation Project Criteria

1. The mitigation project must be implemented in the same drainage area of the proposed development. The project must provide additional protection from stormwater runoff quality and quantity from previously developed property that does not currently meet the design and performance standards outlined in the Municipal Stormwater Management Plan. The developer must ensure the long-term maintenance of the project, including the maintenance requirements under Chapters 8 and 9 of the NJDEP Stormwater BMP Manual.

a. The applicant can select one of the Township's projects to compensate for the deficit from performance standards resulting from the proposed project. More detailed information on projects can be obtained from the Township Engineer.

b. The applicant can develop a project to compensate for the deficit from the performance standards resulting from the proposed project. Review and approval of the Planning Board, Committee and Township Engineer is required for all alternative projects.

2. If a suitable site cannot be located in the same drainage area as the proposed development, as discussed in Option 1, the mitigation project may provide mitigation that is not equivalent to the impacts for which the variance or exemption is sought, but that addresses the same issue.

3. If a suitable mitigation project cannot be implemented within the same drainage area of the proposed development, a project addressing the same issues may be acceptable within an adjacent upstream or downstream drainage area.

4. A developer may, at the discretion of the municipality, provide funding or partial funding for an environmental enhancement project, or towards the development of a Regional Stormwater Management Plan. The funding must be equal to or greater than the cost to implement the mitigation outlined above, including costs associated with purchasing the property or easement or mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.