

MUNICIPAL STORMWATER MANAGEMENT PLAN

FOR THE

**TOWNSHIP OF SOUTH HACKENSACK
BERGEN COUNTY, NEW JERSEY**



**FEBRUARY 2005
REVISED FEBRUARY 2007
LAST REVISED NOVEMBER 2, 2022**

NEA Project No.: SHACADM22.010



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Introduction

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

A “build-out” analysis has not been included as the Township does not have one square mile of agricultural or vacant land. The plan also addresses the review and update of existing ordinances, the Township Master Plan, and other planning documents to allow for project designs that include low impact development techniques. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

Goals

The goals of this MSWMP are to:

1. Reduce flood damage, including damage to life and property

This is to occur through the adoption of the Stormwater Control Ordinance as required by NJDEP. This ordinance will govern stormwater quantity, stormwater quality, and groundwater recharge thereby reducing flooding impact and reducing damage to life and property. This is accomplished through flow and suspended solids reduction to watercourses and stormwater conveyance systems.

2. Minimize, to the extent practical, any increase in stormwater runoff from any new development

This is to occur through the adoption of the Stormwater Control Ordinance as required by NJDEP. This ordinance will govern stormwater quantity, stormwater quality, and groundwater recharge thereby reducing stormwater runoff quantities from new development.

3. Reduce soil erosion from any development or construction project

This is to occur through the implementation of New Jersey’s Soil Erosion and Sediment Control Standards requirements. This Plan is to be consistent with those Standards cited by the Bergen County Soil Conservation District (BCSCD), which reviews and approves all

developments in Bergen County that propose a disturbance in excess of 5,000 square feet. For developments that propose a disturbance under 5,000 square feet, the Township and Board engineers review the plans against BCSCD standards. The requirements are also included within the Stormwater Control Ordinance to be adopted, as required by NJDEP.

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

This is to occur through the adoption of the Stormwater Control Ordinance as required by NJDEP. This ordinance will govern stormwater quantity, stormwater quality, and groundwater recharge thereby reducing flow and suspend solids which affect flow channels through culverts and bridges. In addition, inadequate culverts that were constructed prior to the Stormwater Control Ordinance may be updated through the Mitigation Plan section of this report (see below), and as required by the Stormwater Pollution and Prevention Plan.

5. Maintain groundwater recharge

This is to occur through the adoption of the Stormwater Control Ordinance as required by NJDEP. Groundwater recharge requirements for all major development will be governed through the adoption of this ordinance. The Township also limits the amount of impervious coverage proposed on a site, subject to the zoning district.

6. Prevent, to the greatest extent feasible, an increase in nonpoint pollution

This is to occur through the adoption of Ordinance §82-23 to regulate pet solid waste, Ordinance §138 to regulate littering, and Ordinance §82-28 to regulate wildlife feeding. Violation of these ordinances will result in fines to support enforcement to prevent non-point source pollution.

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

This is to occur through the adoption of the ordinances listed above as well as the Stormwater Control Ordinance as required by NJDEP. This ordinance will govern stormwater quantity, stormwater quality, and groundwater recharge thereby reducing pollutants within the flow which affect biological function and drainage conveyance ability of stream channels.

8. 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

This is to occur through the preventative public education program implemented by the Township to inform its residents on consequences of pollution as well as the adoption of the Stormwater Control Ordinance as required by the NJDEP. This ordinance will govern

stormwater quantity, stormwater quality, and groundwater recharge thereby reducing pollutants.

In addition to the Stormwater Control Ordinance, Ordinance §180-17 implements a restriction on prohibits the piling, dumping or disposal of materials other than stormwater to the municipal separate storm sewer system operated by the Township of South Hackensack, in addition to the series of ordinances mentioned above, which will all reduce pollutants within stormwater runoff.

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

This is to occur through the adoption of the Stormwater Control Ordinance as required by NJDEP. A section within the adopted ordinance will address safety standards for stormwater management 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 (see Mitigation Plans section). Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater management facilities (see Design and Performance Standards section). The plan also outlines safety standards for stormwater infrastructure to be implements to protect public safety.

Stormwater Discussion

Land development can dramatically alter the hydrologic cycle of a site and, ultimately, an entire watershed (see Figure C-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 under natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel and turbidity of the water. 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, reduced 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.

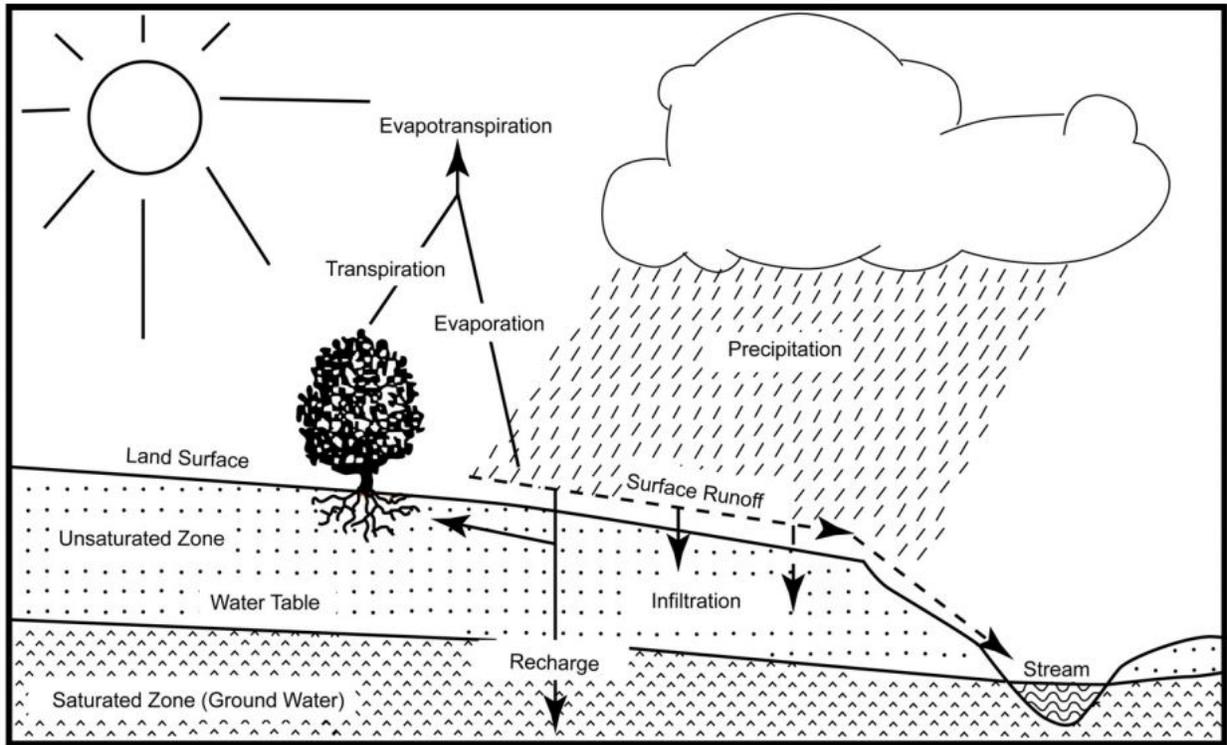


Figure C- 1 Groundwater Recharge in the Hydrologic Cycle (Ref.: NJDEP BMP Manual)

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

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

Background

The Township of South Hackensack encompasses an area of approximately 0.80 square miles, or 512 acres, in Bergen County, New Jersey. Figure C-3 depicts the Township boundary on the United States Geological Survey (USGS) quadrangle maps. As seen on Figure C-3, the Township is composed of three (3) separate non-contiguous portions, which makes stormwater management a uniquely collaborative effort between the bordering municipalities. Figure C-2 illustrates the Township’s Waterways while Figure C-3 illustrates the Township’s boundary on the USGS Maps.

Throughout the years, the total population for the Township of South Hackensack has decreased from 2,229 residents in 1980 to 2,106 residents in 1990, increased to 2,249 residents in 2000, increased to 2,378 residents in 2010, and increased to 2,701 residents in 2020.

This population increase has resulted in considerable demand for new development; changes in the landscape have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality. Approximately 97.77% of the Township of South Hackensack is considered developed (See Appendix for Table 1 – NJDEP Land Use / Land Cover Data). This supports the principle that the Township is a fully-developed community.

The Township of South Hackensack provides full sanitary sewer service. The Township’s sanitary sewers collect waste flow throughout town, and ultimately discharge into larger interceptors, which are under the jurisdiction of the Bergen County Utilities Authority. Domestic and fire water services are provided to the Township by Veolia (formerly known as Suez).

According to the New Jersey Department of Environmental Protection (“NJDEP”) GeoWeb GIS service, there are no community or non-community wellhead protection areas within the borders of South Hackensack. However, GeoWeb indicates that there is a community wellhead protection area located within the Boroughs of Teterboro and Hasbrouck Heights, west of the Township of South Hackensack Section A as defined in the enclosed Figure C-5 and within the City of Garfield, northwest of Section B as defined in the enclosed Figure C-5. It should be noted that the wellhead is not located within the Township of South Hackensack, and no portions of the wellhead protection encroach upon the Township of South Hackensack borders.

The Township contains stormwater features which include but are not limited to interconnected drainage swales, culverts, outfalls, and detention basins. At this time, a detailed list of the individual stormwater features is not available.

Streams

The NJDEP has established the 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 the NJDEP on a five-year cycle. Streams are classified as either “non-impaired,” “moderately impaired,” or “severely impaired,” based on the AMNET data and criteria. 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 multiple streams located within the Township of South Hackensack, including main streams and unnamed tributaries thereto. The main streams include: Riser Ditch (FW2-NT/SE2), Losen Slofe (FW2-NT/SE2), Berrys Creek, unnamed tributaries to the Saddle River (FW2-NT/SE3), unnamed tributaries to the Hackensack River (SE2):

- FW2 – General surface water classification applied to fresh waters
- SE2/3 – Saline Estuaries
- NT – Does not support trout production or maintenance

Refer to Figure C-2 for a map of all NJDEP-mapped streams, including unnamed tributaries.

According to a map entitled, “New Jersey’s Watersheds, Watershed Management Areas, and Water Regions” (NJDEP, Division of Watershed Management, February 2007), the majority of the Township of South Hackensack is located within “Hackensack, Hudson, and Pascack” Watershed Management Area 5 (“WMA5”), while the westernmost portion of the Township is located with “Lower Passaic and Saddle” Watershed Management Area 4 (“WMA4”). Refer to Figure C-8 for a map of New Jersey’s watershed management areas.

The Township of South Hackensack also contains five (5) different sub-watersheds, each identified with a 14-digit Hydrologic Unit Code (“HUC-14”), (refer to Figure C-7). The five (5) HUC-14 sub-watersheds are indicated and described below:

- HUC-14 No.: 02030103180060 – Berrys Creek (Above Paterson Avenue)
- HUC-14 No.: 02030103180050 – Hackensack River (Bellmans Creek to Fort Lee Road)
- HUC-14 No.: 02030103180030 – Hackensack River (Fort Lee Road to Oradell Gage)
- HUC-14 No.: 02030103140070 – Saddle River (below Lodi gage)
- HUC-14 No.: 02030103180080 – Hackensack River (Route 3 to Bellmans Creek)

Category One (C1) waters are waters that receive special protection under the NJDEP Surface Water Quality Standards because of their clarity, color, scenic setting or other characteristics of aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance or exceptional fisheries resource(s). The NJDEP has determined that protection buffers of three hundred (300) feet are necessary to prevent water quality degradation and to protect the attributes for which Category One waters have been designated. The Township contains no C1 designated waterways.

The above-referenced streams that flow through the Township to the major rivers within the watershed are impaired based on AMNET data. In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. These data show that the in-stream water quality constituents frequently exceed the state’s criteria. This means that these rivers are impaired waterways and the NJDEP is required to develop a Total Maximum Daily Load (TMDL) for these pollutants for each waterway.

A TMDL is the amount of a pollutant that can be accepted by a water body without causing an exceedance of water quality standards or interfering with the ability to use a water body for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require 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.

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 water is attaining water quality standards and identifies waters that are impaired. Water bodies are classified through the use of Sublists. Sublist 1 and 2 waterbodies are unimpaired. Sublist 3 waterbodies have limited assessment or data availability. Sublist 4 waterbodies are impaired due to pollution rather than pollutants or have had a TMDL or other enforceable management measure approved by the EPA expected to achieve Water Quality Standards. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed.

- The Hackensack River (Bellmans Creek to Ft. Lee Road) is on Sublist 5 for Benzo[A]Pyrene(PAHs), Heptachlor Epoxide, and Chlordane, DDT, Dieldrin, Dioxin, and PCBs in fish tissue. The priority ranking for TMDL is listed as Low.
- The Hackensack River (Ft. Lee Road to Oradell Gage) is on Sublist 5 for Arsenic, Benzo[A]Pyrene(PAHs), Heptachlor Epoxide, and Chlordane, DDT, Dieldrin, Dioxin, and PCBs in fish tissue. The priority ranking for TMDL is listed as Low.
- The Hackensack River (Route 3 to Bellmans Creek) is on Sublist 5 for Benzo[A]Pyrene(PAHs), Heptachlor Epoxide, and Chlordane, DDT, Dieldrin, Dioxin, and PCBs in fish tissue. The priority ranking for TMDL is listed as Low.
- The Saddle River (below Lodi Gage) is on Sublist 4 (Total Dissolved Solids (TDS), Arsenic, Biological-cause unknown, Chloride, and Chlordane in fish tissue – priority ranking for TMDL is listed as low), (Total Phosphorus – priority ranking for TMDL is listed as high).
- Berrys Creek (Above Paterson Avenue) is on Sublist 5 (Arsenic, Benzo[A]Pyrene(PAHs), Cadmium, Copper, Heptachlor Epoxide, Lead, and Chlordane, DDT, Dieldrin, Dioxin, Mercury and PCBs in fish tissue) and the priority ranking for TMDL is listed as Low.
- Riser Ditch and Losen Slofe are not listed.

For this reason, TMDLs are required for these constituents within these watercourses. Based on inquiry to the NJDEP's TMDL Look-Up Tool, provided by the Bureau of Nonpoint Pollution, there are no applicable lake, or shellfish TMDLs in the Township of South Hackensack.

The following TMDLs are applicable to the Township's streams:

- Total Maximum Daily Loads for Fecal Coliform to Address 32 Streams in the Northeast Water Region
 - Fecal Coliform - 2003 : W Br Saddle, Saddle R at Ridgewood, Lodi & Fairlawn, Ramsey Bk at Allendale, Hohokus Bk at Paramus
- Amendment to the Northeast Water Quality Management Plan to Establish a Total Maximum Daily Load for Nickel in the Hackensack River
 - Nickel - 2000 : Berrys Creek (above Paterson Ave)
- Amendment to the Northeast Water Quality Management Plan to Establish a Total Maximum Daily Load for Nickel in the Hackensack River
 - Nickel - 2000 : Hackensack R (Bellmans Ck to Ft Lee Rd)
- Amendment to the Northeast Water Quality Management Plan to Establish a Total Maximum Daily Load for Nickel in the Hackensack River
 - Nickel - 2000 : Hackensack R (Ft Lee Rd to Oradell gage)
- Amendment to the Northeast Water Quality Management Plan to Establish a Total Maximum Daily Load for Nickel in the Hackensack River
 - Nickel - 2000 : Hackensack R (Rt 3 to Bellmans Ck)

In addition to water quality issues, the Township has exhibited water quantity problems including flooding, stream bank erosion, and diminished base flow in its streams. Many 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 causing a backwater effect and flooding upstream. Specific areas that are affected by stormwater quantity problems include the following:

- Green Street, particularly below the US Route 80 overpass bridge along Berrys Creek;
- Wesley Street;
- Along Hegner Court and within E. Grove Street intersection; and
- Along Huyler Street and within Grove Street intersection.

These culverts were designed at a time during which the hydrologic conditions greatly differed from those that exist today (i.e. less impervious area, less overall development, etc.). As the impervious area increased within the Township, the peak rates and volumes of stream flows also increased. The increased amount and flow rate of water has caused stream bank erosion, which resulted in unstable areas at roadway/bridge crossings (stream section and culvert obstructions), and degraded stream habitats. The high impervious area of the Township has significantly decreased groundwater recharge, decreasing base flows in streams during dry weather periods. Lower base flows can have a negative impact on in stream habitat during the summer months. A map of the groundwater recharge areas is shown in Figure C-4. Well head protection areas, also required as part of the MSWMP, are shown in Figure C-5. A map containing flood data from FEMA is shown in figure C-11.

Design and Performance Standards

The Township adopted Ordinance §113, entitled Flood Damage Prevention and Stormwater Management, on October 14, 2021, as Ordinance No. 2021-09. The Stormwater Control Ordinance dictates the required design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8. The purpose for this is to ensure that developers 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 requirements for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, as well as requirements for safety standards consistent with N.J.A.C. 7:8-5.6 Safety Standards for Stormwater Management Basins. The ordinance was submitted to the County for review and ultimately approved prior to the Township's adoption.

When an applicant proposes to develop or redevelop a property, the proposed improvements are reviewed for conformance with both §113 of the Township Ordinance, and N.J.A.C. 7:8. If the development is classified as a "major development," thereby triggering the Stormwater Management Rules at N.J.A.C. 7:8, the applicant is required to submit plans and a stormwater management report to substantiate the design and operation of any proposed stormwater management facilities, including, but not limited to, detention basins, infiltration basins, water quality treatment devices, etc. Additionally, if deemed a "major development," the applicant is also required to submit a Stormwater Maintenance Manual, in accordance with N.J.A.C. 7:8-5.8. Once approved by the Planning Board, Zoning Board of Adjustments, or the Building Department, the applicant is required to notify the Township, as well any other agencies having jurisdiction thereof, that construction will be commencing. During construction of stormwater management facilities and measures, Township inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed. If the Township determines that non-compliance is occurring, the Township shall issue non-compliance citations, stop-work orders, and fines to ensure compliance.

Once construction is complete, long-term maintenance is required for existing and future stormwater facilities to ensure long-term operation for all project governed by the requirements set forth within the Stormwater Control Ordinance. The ordinance requires the submission of an acceptable maintenance and repair plan that will provide specific preventative maintenance tasks and schedules, along with the name of the person or people responsible for preventive or corrective maintenance. The person responsible for maintenance will be required to evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as necessary.

To ensure proper maintenance and facility repair, the Township will notify the responsible person in writing should a stormwater facility become a danger to public safety, public health, or require maintenance or repair. Upon receipt of the written notice, the responsible person will have fourteen (14) days to perform the required maintenance and/or repair of the facility in a manner that is approved by the Township Engineer. The Township, at its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or

refuses to perform such maintenance and repair, the Township or County may immediately proceed to do so and shall bill the cost to the responsible person.

Plan Consistency

The Township is within a Regional Stormwater Management Planning Area (Bergen County) and TMDLs have been developed for waters within the Township. As such, this plan does need to be consistent with the regional stormwater management plan (“RSWMP”) and the TMDLs. The TMDLs have been developed for fecal coliform due to waterfowl and pet waste.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (“RSIS”) as N.J.A.C. 5:21. The municipality will utilize the most current update of the RSIS in the stormwater management review of residential areas. This Municipal Stormwater Management Plan will be updated to be consistent with any future updated 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. Projects with areas of disturbance greater than or equal to 5,000 square feet require review by the Bergen County Soil Conservation District (excluding a one lot, single-family dwelling development). During construction, Township inspectors will observe on-site erosion and sediment control measures and report any inconsistencies to the local Soil Conservation District.

Nonstructural Stormwater Management Strategies

The Township’s Stormwater Control Ordinance §113, provides further guidance about non-structural strategies. The Township goes into further detail, in §133-4.E, regarding specific nonstructural stormwater management strategies, and requires their implementation, to the maximum extent practicable. The ordinance was adopted by the Township in October 2021 and submitted to the County Planning Board, who reviewed and granted conditional approval of this ordinance.

Land Use / Build-Out Analysis

The Township of South Hackensack does not contain more than 640 acres of vacant developable land, therefore a land use analysis is not required. Refer to Figure C-6 of this report, which illustrates the Township’s existing land use and land coverages and Figure C-10, which illustrates the Township’s vacant land. In addition, Table 1 – Land Use and Land Cover Data, concludes that approximately 10.63 acres, or 2.23%, of the total land in the Township is currently vacant land area. Additionally, the Township of South Hackensack does not consist of any land that is used for agricultural purposes. Therefore, the total area of vacant and agricultural land is approximately 0.017 square miles, which is far below the threshold of one (1) square mile which would require a Land Use/Build-Out Analysis. As such, a Land Use/Build-Out Analysis has not been provided.

Mitigation Plans

This mitigation plan is provided for a proposed development that is granted a variance or exemption from the stormwater management design and performance standards. Presented below is a hierarchy of preferred options:

Mitigation Project Criteria

- A. The mitigation project must be implemented in the same drainage area as the proposed development. The project must provide additional groundwater recharge benefits, or 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.

The applicant can select one of the following projects listed to compensate for the deficit from the performance standards resulting from the proposed project. More detailed information on the projects and a list of additional projects can be obtained from the Township Engineer. Listed below are some projects that can be used to address the mitigation requirement. A possible project (at the discretion of the Township and its engineer) is to provide a detailed study to determine additional mitigation projects within the Township.

Water Quality

1. Reconstruct, retrofit and maintain an existing stormwater management facility on Township-owned property to provide the removal of 80% of total suspended solids (TSS) from the stormwater runoff resulting from the parking lot, in accordance with NJDEP Standards.

Water Quantity

1. Provide stormwater quantity measures within the drainage area to reduce the peak flows from an upstream development on the receiving stream in accordance with §113-R.
2. Provide stormwater quantity measures in accordance with §113-R if an area listed below is within the same drainage area:
 - a) Green Street, particularly below the US Route 80 overpass bridge along Berrys Creek;
 - b) Wesley Street;
 - c) Along Hegner Court and within E. Grove Street intersection; and
 - d) Along Huyler Street and within Grove Street intersection;

Groundwater Recharge

1. Reconstruct and retrofit an existing Township-owned property to provide an additional average annual groundwater recharge of 300,000 cubic feet.
2. Replace an existing deteriorated impervious parking lot on Township-owned property with permeable pavement, in accordance with Chapter 9.6 of the NJDEP BMP.

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. For example, if a variance is given because the 80 percent TSS requirements are not met, the selected project may address water quality impacts due to a fecal impairment. Listed below are specific projects that can be used to address the mitigation option.

Water Quality

1. Re-establish a vegetative buffer (minimum 50 feet wide) along the existing streams and watercourses within the Township; and
2. Provide goose management measures including public education at a Township Park and/or field.

The Township of South Hackensack shall permit the perspective development to provide funding or partial funding for an environmental enhancement project that has been identified in the Municipal Stormwater Management Plan or towards an environmental enhancement project that has been deemed by the Township as an environmentally sensitive area. The funding shall be equal to or greater than the cost to implement the mitigation outlined above or in subsequent environmental reports, including costs associated with but not limited to purchasing the property or easement for mitigation, and the cost associated with the long-term maintenance requirements of the mitigation measure.

M:\South Hackensack\SHACADM22.010\MS4\Municipal Stormwater Management Plan

Municipal Stormwater Management Plan

Township of South Hackensack, Bergen County, New Jersey

Appendix

Stormwater Control Ordinance (Adopted by Borough & Approved by Bergen County)

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Chapter 113

FLOOD DAMAGE PREVENTION AND STORMWATER MANAGEMENT

[HISTORY: Adopted by the Township Committee of the Township of South Hackensack 10-14-2021 by Ord. No. 2021-09.¹ Amendments noted where applicable.]

§ 113-1. Scope and purpose.

- A. Policy statement. Flood control, groundwater recharge, and pollutant reduction shall be achieved through the use of stormwater management measures, including green infrastructure best management practices (GI BMPs) and nonstructural stormwater management strategies. GI BMPs and low-impact development (LID) should be utilized to meet the goal of maintaining natural hydrology to reduce stormwater runoff volume, reduce erosion, encourage infiltration and groundwater recharge, and reduce pollution. GI BMPs and LID should be developed based upon physical site conditions and the origin, nature and the anticipated quantity, or amount, of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.
- B. Purpose. The purpose of this chapter is to establish minimum stormwater management requirements and controls for "major development," as defined below in § 113-2.
- C. Applicability.
 - (1) This chapter shall be applicable to the following major developments:
 - (a) Nonresidential major developments; and
 - (b) Aspects of residential major developments that are not pre-empted by the Residential Site Improvement Standards at N.J.A.C. 5:21.
 - (2) This chapter shall also be applicable to all major developments undertaken by The Township of South Hackensack,
- D. Compatibility with other permit and ordinance requirements.
 - (1) Development approvals issued pursuant to this chapter are to be considered an integral part of development approvals and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation and application, the provisions of this chapter shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare.
 - (2) This chapter is not intended to interfere with, abrogate, or annul any other ordinances, rule or regulation, statute, or other provision of law except that,

1. Editor's Note: This ordinance also repealed former Ch. 113, Flood Damage Prevention and Stormwater Management, adopted 8-8-2019 by Ord. No. 2019-05.

where any provision of this chapter imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

§ 113-2. Definitions.

For the purpose of this chapter, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory. The definitions below are the same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C. 7:8-1.2.

CAFRA CENTERS, CORES OR NODES — Those areas with boundaries incorporated by reference or revised by the Department in accordance with N.J.A.C. 7:7-13.16.

CAFRA PLANNING MAP — The map used by the Department to identify the location of Coastal Planning Areas, CAFRA centers, CAFRA cores, and CAFRA nodes. The CAFRA Planning Map is available on the Department's Geographic Information System (GIS).

COMMUNITY BASIN — An infiltration system, sand filter designed to infiltrate, standard constructed wetland, or wet pond, established in accordance with N.J.A.C. 7:8-4.2(c)14, that is designed and constructed in accordance with the New Jersey Stormwater Best Management Practices Manual, or an alternate design, approved in accordance with N.J.A.C. 7:8-5.2(g), for an infiltration system, sand filter designed to infiltrate, standard constructed wetland, or wet pond and that complies with the requirements of this chapter.

COMPACTION — The increase in soil bulk density.

CONTRIBUTORY DRAINAGE AREA — The area from which stormwater runoff drains to a stormwater management measure, not including the area of the stormwater management measure itself.

CORE — A pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

COUNTY REVIEW AGENCY — An agency designated by the County Commissioners to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

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

DEPARTMENT — The Department of Environmental Protection.

DESIGN ENGINEER — A person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but not necessarily be limited

to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

DESIGNATED CENTER — A State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

DEVELOPMENT — The division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlarge-enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq.

A. In the case of development of agricultural land, development means: any activity that requires a state permit, any activity reviewed by the County Agricultural Board (CAB) and the State Agricultural Development Committee (SADC), and municipal review of any activity not exempted by the Right to Farm Act, N.J.S.A. 4:1C-1 et seq.

DISTURBANCE — The placement or reconstruction of impervious surface or motor vehicle surface, or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Milling and repaving is not considered disturbance for the purposes of this definition.

DRAINAGE AREA — A geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving waterbody or to a particular point along a receiving waterbody.

EMPOWERMENT NEIGHBORHOODS — Neighborhoods designated by the Urban Coordinating Council "in consultation and in conjunction with" the New Jersey Redevelopment Authority pursuant to N.J.S.A. 55:19-69.

ENVIRONMENTALLY CONSTRAINED AREA — The following areas where the physical alteration of the land is in some way restricted, either through regulation, easement, deed restriction or ownership such as: wetlands, floodplains, threatened and endangered species sites or designated habitats, and parks and preserves. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Nongame Species Program.

ENVIRONMENTALLY CRITICAL AREA — An area or feature which is of significant environmental value, including but not limited to: stream corridors, natural heritage priority sites, habitats of endangered or threatened species, large areas of contiguous open space or upland forest, steep slopes, and well head protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Nongame Species Program.

EROSION — The detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

GREEN INFRASTRUCTURE — A stormwater management measure that manages stormwater close to its source by:

A. Treating stormwater runoff through infiltration into subsoil;

- B. Treating stormwater runoff through filtration by vegetation or soil; or
- C. Storing stormwater runoff for reuse.

HUC 14 or HYDROLOGIC UNIT CODE 14 — An area within which water drains to a particular receiving surface water body, also known as a subwatershed, which is identified by a fourteen-digit hydrologic unit boundary designation, delineated within New Jersey by the United States Geological Survey.

IMPERVIOUS SURFACE — A surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

INFILTRATION — The process by which water seeps into the soil from precipitation.

LEAD PLANNING AGENCY — One or more public entities having stormwater management planning authority designated by the regional stormwater management planning committee pursuant to N.J.A.C. 7:8-3.2, that serves as the primary representative of the committee.

MAJOR DEVELOPMENT —

- A. An individual "development," as well as multiple developments that individually or collectively result in:
 - (1) The disturbance of one or more acres of land since February 2, 2004;
 - (2) The creation of 1/4 acre or more of "regulated impervious surface" since February 2, 2004;
 - (3) The creation of 1/4 acre or more of "regulated motor vehicle surface" since March 2, 2021; or
 - (4) A combination of Subsection A(2) and (3) above that totals an area of 1/4 acre or more. The same surface shall not be counted twice when determining if the combination area equals 1/4 acre or more.
- B. "Major development" includes all developments that are part of a common plan of development or sale (for example, phased residential development) that collectively or individually meet any one or more of Subsection A(1), (2), (3), or (4) above. Projects undertaken by any government agency that otherwise meet the definition of "major development" but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered "major development."

MOTOR VEHICLE — Land vehicles propelled other than by muscular power, such as automobiles, motorcycles, autocycles, and low speed vehicles. For the purposes of this definition, "motor vehicle" does not include farm equipment, snowmobiles, all-terrain vehicles, motorized wheelchairs, go-carts, gas buggies, golf carts, ski-slope grooming machines, or vehicles that run only on rails or tracks.

MOTOR VEHICLE SURFACE — Any pervious or impervious surface that is intended to be used by motor vehicles and/or aircraft, and is directly exposed to precipitation including, but not limited to, driveways, parking areas, parking garages, roads, racetracks, and runways.

MUNICIPALITY — Any city, borough, town, township, or village.

NEW JERSEY STORMWATER BEST MANAGEMENT PRACTICES (BMP) MANUAL or BMP MANUAL — The manual maintained by the Department providing, in part, design specifications, removal rates, calculation methods, and soil testing procedures approved by the Department as being capable of contributing to the achievement of the stormwater management standards specified in this chapter. The BMP Manual is periodically amended by the Department as necessary to provide design specifications on additional best management practices and new information on already included practices reflecting the best available current information regarding the particular practice and the Department's determination as to the ability of that best management practice to contribute to compliance with the standards contained in this chapter. Alternative stormwater management measures, removal rates, or calculation methods may be utilized, subject to any limitations specified in this chapter, provided the design engineer demonstrates to the municipality, in accordance with § 113-4F of this chapter and N.J.A.C. 7:8-5.2(g), that the proposed measure and its design will contribute to achievement of the design and performance standards established by this chapter.

NODE — An area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

NUTRIENT — A chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

PERSON — Any individual, corporation, company, partnership, firm, association, political subdivision of this state and any state, interstate or federal agency.

POLLUTANT — Any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance [except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. §§ 2011 et seq.)], thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, ground waters or surface waters of the state, or to a domestic treatment works. "Pollutant" includes both hazardous and nonhazardous pollutants.

RECHARGE — The amount of water from precipitation that infiltrates into the ground and is not evaporated.

REGULATED IMPERVIOUS SURFACE — Any of the following, alone or in combination:

- A. A net increase of impervious surface;
- B. The total area of impervious surface collected by a new stormwater conveyance system (for the purpose of this definition, a "new stormwater conveyance system" is a stormwater conveyance system that is constructed where one did not exist immediately prior to its construction or an existing system for which a new discharge location is created);
- C. The total area of impervious surface proposed to be newly collected by an existing stormwater conveyance system; and/or
- D. The total area of impervious surface collected by an existing stormwater conveyance system where the capacity of that conveyance system is increased.

REGULATED MOTOR VEHICLE SURFACE — Any of the following, alone or in combination:

- A. The total area of motor vehicle surface that is currently receiving water;
- B. A net increase in motor vehicle surface; and/or quality treatment either by vegetation or soil, by an existing stormwater management measure, or by treatment at a wastewater treatment plant, where the water quality treatment will be modified or removed.

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

SITE — The lot or lots upon which a major development is to occur or has occurred.

SOIL — All unconsolidated mineral and organic material of any origin.

STATE DEVELOPMENT AND REDEVELOPMENT PLAN METROPOLITAN PLANNING AREA (PA1) — An area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the state's future redevelopment and revitalization efforts.

STATE PLAN POLICY MAP — The geographic application of the State Development and Redevelopment Plan's goals and statewide policies, and the official map of these goals and policies.

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

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

STORMWATER MANAGEMENT MEASURE — Any practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal nonstormwater discharges into stormwater conveyances.

STORMWATER MANAGEMENT PLANNING AGENCY — A public body authorized by legislation to prepare stormwater management plans.

STORMWATER MANAGEMENT PLANNING AREA — The geographic area for which a stormwater management planning agency is authorized to prepare stormwater management plans, or a specific portion of that area identified in a stormwater management plan prepared by that agency.

STORMWATER RUNOFF — Water flow on the surface of the ground or in storm sewers, resulting from precipitation.

TIDAL FLOOD HAZARD AREA — A flood hazard area in which the flood elevation resulting from the two-, ten-, or 100-year storm, as applicable, is governed by tidal

flooding from the Atlantic Ocean. Flooding in a tidal flood hazard area may be contributed to, or influenced by, stormwater runoff from inland areas, but the depth of flooding generated by the tidal rise and fall of the Atlantic Ocean is greater than flooding from any fluvial sources. In some situations, depending upon the extent of the storm surge from a particular storm event, a flood hazard area may be tidal in the 100-year storm, but fluvial in more frequent storm events.

URBAN COORDINATING COUNCIL EMPOWERMENT NEIGHBORHOOD — A neighborhood given priority access to state resources through the New Jersey Redevelopment Authority.

URBAN ENTERPRISE ZONES — A zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, N.J.S.A. 52:27H-60 et. seq.

URBAN REDEVELOPMENT AREA — Previously developed portions of areas:

- A. Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes;
- B. Designated as CAFRA Centers, Cores or Nodes;
- C. Designated as Urban Enterprise Zones; and
- D. Designated as Urban Coordinating Council Empowerment Neighborhoods.

WATER CONTROL STRUCTURE — A structure within, or adjacent to, a water, which intentionally or coincidentally alters the hydraulic capacity, the flood elevation resulting from the two-, ten-, or 100-year storm, flood hazard area limit, and/or floodway limit of the water. Examples of a water control structure may include a bridge, culvert, dam, embankment, ford (if above grade), retaining wall, and weir.

WATERS OF THE STATE — The ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or groundwater, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

WETLANDS or WETLAND — An area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

§ 113-3. Design and performance standards for stormwater management measures.

- A. Stormwater management measures for major development shall be designed to provide erosion control, groundwater recharge, stormwater runoff quantity control, and stormwater runoff quality treatment as follows:
 - (1) The minimum standards for erosion control are those established under the Soil and Sediment Control Act, N.J.S.A. 4:24-39 et seq., and implementing rules at N.J.A.C. 2:90.
 - (2) The minimum standards for groundwater recharge, stormwater quality, and stormwater runoff quantity shall be met by incorporating green infrastructure.

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

§ 113-4. Stormwater management requirements for major development.

- A. The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with § 113-10.
- B. Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department's Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlenbergii* (bog turtle).
- C. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity requirements of § 113-4P, Q and R:
- (1) The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;
 - (2) The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and
 - (3) The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.
- D. A waiver from strict compliance from the green infrastructure, groundwater recharge, stormwater runoff quality, and stormwater runoff quantity requirements of § 113-4O, P, Q and R may be obtained for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:
- (1) The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
 - (2) The applicant demonstrates through an alternatives analysis, that through the use of stormwater management measures, the option selected complies with the requirements of § 113-4O, P, Q and R to the maximum extent practicable;
 - (3) The applicant demonstrates that, in order to meet the requirements of § 113-4O, P, Q and R, existing structures currently in use, such as homes and buildings, would need to be condemned; and
 - (4) The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under

§ 113-4D(3) above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of § 113-4O, P, Q and R that were not achievable on site.

- E. Tables 1 through 3 below summarize the ability of stormwater best management practices identified and described in the New Jersey Stormwater Best Management Practices Manual to satisfy the green infrastructure, groundwater recharge, stormwater runoff quality and stormwater runoff quantity standards specified in § 113-4O, P, Q and R. When designed in accordance with the most current version of the New Jersey Stormwater Best Management Practices Manual, the stormwater management measures found at N.J.A.C. 7:8-5.2 (f) Tables 5-1, 5-2 and 5-3 and listed below in Tables 1, 2 and 3 are presumed to be capable of providing stormwater controls for the design and performance standards as outlined in the tables below. Upon amendments of the New Jersey Stormwater Best Management Practices to reflect additions or deletions of BMPs meeting these standards, or changes in the presumed performance of BMPs designed in accordance with the New Jersey Stormwater BMP Manual, the Department shall publish in the New Jersey Registers a notice of administrative change revising the applicable table. The most current version of the BMP Manual can be found on the Department's website at: https://njstormwater.org/bmp_manual2.htm.
- F. Where the BMP tables in the NJ Stormwater Management Rule are different due to updates or amendments with the tables in this chapter the BMP Tables in the Stormwater Management rule at N.J.A.C. 7:8-5.2(f) shall take precedence.

Table 1				
Green Infrastructure BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity				
Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Cistern	0	Yes	No	—
Dry well ^(a)	0	No	Yes	2
Grass swale	50 or less	No	No	2 ^(e) 1 ^(f)
Green roof	0	Yes	No	—
Manufactured treatment device ^{(a)(g)}	50 or 80	No	No	Dependent upon the device

Table 1				
Green Infrastructure BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity				
Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Pervious paving system ^(a)	80	Yes	Yes ^(b)	2 ^(b)
			No ^(c)	1 ^(c)
Small-scale bioretention basin ^(a)	80 or 90	Yes	Yes ^(b)	2 ^(b)
			No ^(c)	1 ^(c)
Small-scale infiltration basin ^(a)	80	Yes	Yes	2
Small-scale sand filter	80	Yes	Yes	2
Vegetative filter strip	60 to 80	No	No	—

(Notes corresponding to annotations^(a) through ^(g) are found below Table 3.)

Table 2				
Green Infrastructure BMPs for Stormwater Runoff Quantity				
(or for Groundwater Recharge and/or Stormwater Runoff Quality with a Waiver or Variance from N.J.A.C. 7:8-5.3)				
Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Bioretention system	80 or 90	Yes	Yes ^(b)	2 ^(b)
			No ^(c)	1 ^(c)
Infiltration basin	80	Yes	Yes	2

Table 2
Green Infrastructure BMPs for Stormwater Runoff Quantity
(or for Groundwater Recharge and/or Stormwater Runoff Quality with a Waiver or Variance from N.J.A.C. 7:8-5.3)

Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Sand filter ^(b)	80	Yes	Yes	2
Standard constructed wetland	90	Yes	No	N/A
Wet pond ^(d)	50 to 90	Yes	No	N/A

(Notes corresponding to annotations ^(b) through ^(d) are found below Table 3.)

Table 3
BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity
only with a Waiver or Variance from N.J.A.C. 7:8-5.3

Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Blue roof	0	Yes	No	N/A
Extended detention basin	40 to 60	Yes	No	1
Manufactured treatment device ^(h)	50 or 80	No	No	Dependent upon the device
Sand filter ^(c)	80	Yes	No	1
Subsurface gravel wetland	90	No	No	1
Wet pond	50 to 90	Yes	No	N/A

Notes to Tables 1, 2, and 3:	
(a)	Subject to the applicable contributory drainage area limitation specified at § 113-4O(2);
(b)	Designed to infiltrate into the subsoil;
(c)	Designed with underdrains;
(d)	Designed to maintain at least a ten-foot-wide area of native vegetation along at least 50% of the shoreline and to include a stormwater runoff retention component designed to capture stormwater runoff for beneficial reuse, such as irrigation;
(e)	Designed with a slope of less than 2%;
(f)	Designed with a slope of equal to or greater than 2%;
(g)	Manufactured treatment devices that meet the definition of "green infrastructure" at § 113-2;
(h)	Manufactured treatment devices that do not meet the definition of "green infrastructure" at § 113-2.

- G. An alternative stormwater management measure, alternative removal rate, and/or alternative method to calculate the removal rate may be used if the design engineer demonstrates the capability of the proposed alternative stormwater management measure and/or the validity of the alternative rate or method to the municipality. A copy of any approved alternative stormwater management measure, alternative removal rate, and/or alternative method to calculate the removal rate shall be provided to the Department in accordance with § 113-6B. Alternative stormwater management measures may be used to satisfy the requirements at § 113-4O only if the measures meet the definition of "green infrastructure" at § 113-2. Alternative stormwater management measures that function in a similar manner to a BMP listed at Subsection O(2) are subject to the contributory drainage area limitation specified at Subsection O(2) for that similarly functioning BMP. Alternative stormwater management measures approved in accordance with this subsection that do not function in a similar manner to any BMP listed at Subsection O(2) shall have a contributory drainage area less than or equal to 2.5 acres, except for alternative stormwater management measures that function similarly to cisterns, grass swales, green roofs, standard constructed wetlands, vegetative filter strips, and wet ponds, which are not subject to a contributory drainage area limitation. Alternative measures that function similarly to standard constructed wetlands or wet ponds shall not be used for compliance with the stormwater runoff quality standard unless a variance in accordance with N.J.A.C. 7:8-4.6 or a waiver from strict compliance in accordance with § 113-4D is granted from § 113-4O.
- H. Whenever the stormwater management design includes one or more BMPs that will infiltrate stormwater into subsoil, the design engineer shall assess the hydraulic impact on the groundwater table and design the site, so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table, so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems or other subsurface structures within the zone

of influence of the groundwater mound, or interference with the proper functioning of the stormwater management measure itself.

- I. Design standards for stormwater management measures are as follows:
 - (1) Stormwater management measures shall be designed to take into account the existing site conditions, including, but not limited to, environmentally critical areas; wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability, and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone);
 - (2) Stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure, as appropriate, and shall have parallel bars with one-inch spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than 1/3 the width of the diameter of the orifice or 1/3 the width of the weir, with a minimum spacing between bars of one inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of § 113-8C;
 - (3) Stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion-resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement;
 - (4) Stormwater management BMPs shall be designed to meet the minimum safety standards for stormwater management BMPs at § 113-8; and
 - (5) The size of the orifice at the intake to the outlet from the stormwater management BMP shall be a minimum of 2 1/2 inches in diameter.
- J. Manufactured treatment devices may be used to meet the requirements of this subchapter, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department. Manufactured treatment devices that do not meet the definition of green infrastructure at § 113-2 may be used only under the circumstances described at § 113-4O(4).
- K. Any application for a new agricultural development that meets the definition of major development at § 113-2 shall be submitted to the Soil Conservation District for review and approval in accordance with the requirements at § 113-4O, P, Q and R and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control. For purposes of this subsection, "agricultural development" means land uses normally associated with the production of food, fiber, and livestock for sale. Such uses do not include the development of land for the processing or sale of food and the manufacture of agriculturally related products.
- L. If there is more than one drainage area, the groundwater recharge, stormwater

runoff quality, and stormwater runoff quantity standards at § 113-4P, Q and R shall be met in each drainage area, unless the runoff from the drainage areas converge on site and no adverse environmental impact would occur as a result of compliance with any one or more of the individual standards being determined utilizing a weighted average of the results achieved for that individual standard across the affected drainage areas.

- M. Any stormwater management measure authorized under the municipal stormwater management plan or ordinance shall be reflected in a deed notice recorded in the Office of the County Clerk of the County of Bergen. A form of deed notice shall be submitted to the municipality for approval prior to filing. The deed notice shall contain a description of the stormwater management measure(s) used to meet the green infrastructure, groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at § 113-4O, P, Q and R and shall identify the location of the stormwater management measure(s) in NAD 1983 State Plane New Jersey FIPS 2900 US feet or latitude and longitude in decimal degrees. The deed notice shall also reference the maintenance plan required to be recorded upon the deed pursuant to § 113-10B(5). Prior to the commencement of construction, proof that the above-required deed notice has been filed shall be submitted to the municipality. Proof that the required information has been recorded on the deed shall be in the form of either a copy of the complete recorded document or a receipt from the clerk or other proof of recordation provided by the recording office. However, if the initial proof provided to the municipality is not a copy of the complete recorded document, a copy of the complete recorded document shall be provided to the municipality within 180 calendar days of the authorization granted by the municipality.
- N. A stormwater management measure approved under the municipal stormwater management plan or ordinance may be altered or replaced with the approval of the municipality, if the municipality determines that the proposed alteration or replacement meets the design and performance standards pursuant to § 113-4 of this chapter and provides the same level of stormwater management as the previously approved stormwater management measure that is being altered or replaced. If an alteration or replacement is approved, a revised deed notice shall be submitted to the municipality for approval and subsequently recorded with the Office of the County Clerk of the County of Bergen and shall contain a description and location of the stormwater management measure, as well as reference to the maintenance plan, in accordance with Subsection M above. Prior to the commencement of construction, proof that the above required deed notice has been filed shall be submitted to the municipality in accordance with Subsection M above.
- O. Green infrastructure standards.
- (1) This subsection specifies the types of green infrastructure BMPs that may be used to satisfy the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards.
 - (2) To satisfy the groundwater recharge and stormwater runoff quality standards at § 113-4P and Q, the design engineer shall utilize green infrastructure BMPs identified in Table 1 at § 113-4F and/or an alternative stormwater management measure approved in accordance with § 113-4G. The following green

infrastructure BMPs are subject to the following maximum contributory drainage area limitations:

Best Management Practice	Maximum Contributory Drainage Area
Dry well	1 acre
Manufactured treatment device	2.5 acres
Pervious pavement systems	Area of additional inflow cannot exceed 3 times the area occupied by the BMP
Small-scale bioretention systems	2.5 acres
Small-scale infiltration basin	2.5 acres
Small-scale sand filter	2.5 acres

- (3) To satisfy the stormwater runoff quantity standards at § 113-4R, the design engineer shall utilize BMPs from Table 1 or from Table 2 and/or an alternative stormwater management measure approved in accordance with § 113-4G.
- (4) If a variance in accordance with N.J.A.C. 7:8-4.6 or a waiver from strict compliance in accordance with § 113-4D is granted from the requirements of this subsection, then BMPs from Table 1, 2, or 3, and/or an alternative stormwater management measure approved in accordance with § 113-4G may be used to meet the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at § 113-4P, Q and R.
- (5) For separate or combined storm sewer improvement projects, such as sewer separation, undertaken by a government agency or public utility (for example, a sewerage company), the requirements of this subsection shall only apply to areas owned in fee simple by the government agency or utility, and areas within a right-of-way or easement held or controlled by the government agency or utility; the entity shall not be required to obtain additional property or property rights to fully satisfy the requirements of this subsection. Regardless of the amount of area of a separate or combined storm sewer improvement project subject to the green infrastructure requirements of this subsection, each project shall fully comply with the applicable groundwater recharge, stormwater runoff quality control, and stormwater runoff quantity standards at § 113-4P, Q and R, unless the project is granted a waiver from strict compliance in accordance with § 113-4D.

P. Groundwater recharge standards.

- (1) This subsection contains the minimum design and performance standards for groundwater recharge as follows.
- (2) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at § 113-5, either:
 - (a) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100% of the average

- annual pre-construction groundwater recharge volume for the site; or
- (b) Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the two-year storm is infiltrated.
- (3) This groundwater recharge requirement does not apply to projects within the "urban redevelopment area," or to projects subject to Subsection P(4) below.
 - (4) The following types of stormwater shall not be recharged:
 - (a) Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied, areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than "reportable quantities" as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with Department-approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and
 - (b) Industrial stormwater exposed to "source material." "Source material" means any material(s) or machinery, located at an industrial facility, that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.

Q. Stormwater runoff quality standards.

- (1) This subsection contains the minimum design and performance standards to control stormwater runoff quality impacts of major development. Stormwater runoff quality standards are applicable when the major development results in an increase of 1/4 acre or more of regulated motor vehicle surface.
- (2) Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm as follows:
 - (a) Eighty percent TSS removal of the anticipated load, expressed as an annual average shall be achieved for the stormwater runoff from the net increase of motor vehicle surface.
 - (b) If the surface is considered regulated motor vehicle surface because the water quality treatment for an area of motor vehicle surface that is currently receiving water quality treatment either by vegetation or soil, by an existing stormwater management measure, or by treatment at a

wastewater treatment plant is to be modified or removed, the project shall maintain or increase the existing TSS removal of the anticipated load expressed as an annual average.

- (3) The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollutant Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. Every major development, including any that discharge into a combined sewer system, shall comply with Subsection Q(2) above, unless the major development is itself subject to a NJPDES permit with a numeric effluent limitation for TSS or the NJPDES permit to which the major development is subject exempts the development from a numeric effluent limitation for TSS.
- (4) The water quality design storm is 1.25 inches of rainfall in two hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table 4, below. The calculation of the volume of runoff may take into account the implementation of stormwater management measures.

Table 4 - Water Quality Design Storm Distribution

Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
1	0.00166	41	0.1728	81	1.0906
2	0.00332	42	0.1796	82	1.0972
3	0.00498	43	0.1864	83	1.1038
4	0.00664	44	0.1932	84	1.1104
5	0.00830	45	0.2000	85	1.1170
6	0.00996	46	0.2117	86	1.1236
7	0.01162	47	0.2233	87	1.1302
8	0.01328	48	0.2350	88	1.1368
9	0.01494	49	0.2466	89	1.1434
10	0.01660	50	0.2583	90	1.1500
11	0.01828	51	0.2783	91	1.1550
12	0.01996	52	0.2983	92	1.1600
13	0.02164	53	0.3183	93	1.1650
14	0.02332	54	0.3383	94	1.1700
15	0.02500	55	0.3583	95	1.1750
16	0.03000	56	0.4116	96	1.1800
17	0.03500	57	0.4650	97	1.1850

Table 4 - Water Quality Design Storm Distribution

Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
18	0.04000	58	0.5183	98	1.1900
19	0.04500	59	0.5717	99	1.1950
20	0.05000	60	0.6250	100	1.2000
21	0.05500	61	0.6783	101	1.2050
22	0.06000	62	0.7317	102	1.2100
23	0.06500	63	0.7850	103	1.2150
24	0.07000	64	0.8384	104	1.2200
25	0.07500	65	0.8917	105	1.2250
26	0.08000	66	0.9117	106	1.2267
27	0.08500	67	0.9317	107	1.2284
28	0.09000	68	0.9517	108	1.2300
29	0.09500	69	0.9717	109	1.2317
30	0.10000	70	0.9917	110	1.2334
31	0.10660	71	1.0034	111	1.2351
32	0.11320	72	1.0150	112	1.2367
33	0.11980	73	1.0267	113	1.2384
34	0.12640	74	1.0383	114	1.2400
35	0.13300	75	1.0500	115	1.2417
36	0.13960	76	1.0568	116	1.2434
37	0.14620	77	1.0636	117	1.2450
38	0.15280	78	1.0704	118	1.2467
39	0.15940	79	1.0772	119	1.2483
40	0.16600	80	1.0840	120	1.2500

- (5) If more than one BMP in series is necessary to achieve the required 80% TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

$$R = A + B - (A \times B)/100$$

Where:

- R = total TSS percent load removal from application of both BMPs.
- A = the TSS percent removal rate applicable to the first BMP.
- B = the TSS percent removal rate applicable to the second BMP.

- (6) Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include green infrastructure BMPs that optimize nutrient removal while still achieving the performance standards in § 113-4P, Q and R.
- (7) In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.
- (8) The Flood Hazard Area Control Act Rules at N.J.A.C. 7:13-4.1(c)1 establish 300-foot riparian zones along Category One waters, as designated in the Surface Water Quality Standards at N.J.A.C. 7:9B, and certain upstream tributaries to Category One waters. A person shall not undertake a major development that is located within or discharges into a 300-foot riparian zone without prior authorization from the Department under N.J.A.C. 7:13.
- (9) Pursuant to the Flood Hazard Area Control Act Rules at N.J.A.C. 7:13-11.2(j)3.i, runoff from the water quality design storm that is discharged within a 300-foot riparian zone shall be treated in accordance with this subsection to reduce the post-construction load of total suspended solids by 95% of the anticipated load from the developed site, expressed as an annual average.
- (10) This stormwater runoff quality standards do not apply to the construction of one individual single-family dwelling, provided that it is not part of a larger development or subdivision that has received preliminary or final site plan approval prior to December 3, 2018, and that the motor vehicle surfaces are made of permeable material(s) such as gravel, dirt, and/or shells.

R. Stormwater runoff quantity standards.

- (1) This subsection contains the minimum design and performance standards to control stormwater runoff quantity impacts of major development.
- (2) In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at § 113-5, complete one of the following:
 - (a) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two-, ten-, and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;
 - (b) Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the two-, ten- and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land

uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;

- (c) Design stormwater management measures so that the post-construction peak runoff rates for the two-, ten- and 100-year storm events are 50%, 75% and 80%, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed; or
 - (d) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with Subsection R(2)(a), (b) and (c) above is required unless the design engineer demonstrates through hydrologic and hydraulic analysis that the increased volume, change in timing, or increased rate of the stormwater runoff, or any combination of the three will not result in additional flood damage below the point of discharge of the major development. No analysis is required if the stormwater is discharged directly into any ocean, bay, inlet, or the reach of any watercourse between its confluence with an ocean, bay, or inlet and downstream of the first water control structure.
- (3) The stormwater runoff quantity standards shall be applied at the site's boundary to each abutting lot, roadway, watercourse, or receiving storm sewer system.

§ 113-5. Calculation of stormwater runoff and groundwater recharge.

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

- (1) The design engineer shall calculate runoff using one of the following methods:
 - (a) The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in Chapters 7, 9, 10, 15 and 16 Part 630, Hydrology National Engineering Handbook, incorporated herein by reference as amended and supplemented. This methodology is additionally described in Technical Release 55 - Urban Hydrology for Small Watersheds (TR-55), dated June 1986, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the Natural Resources Conservation Service website at: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044171.pdf or at United States Department of Agriculture Natural Resources Conservation Service, 220 Davison Avenue, Somerset, New Jersey 08873; or
 - (b) The Rational Method for peak flow and the Modified Rational Method for hydrograph computations. The rational and modified rational methods are described in "Appendix A-9 Modified Rational Method" in the Standards for Soil Erosion and Sediment Control in New Jersey, January 2014. This document is available from the State Soil Conservation Committee or any of the Soil Conservation Districts listed at N.J.A.C.

2:90-1.3(a)3. The location, address, and telephone number for each Soil Conservation District is available from the State Soil Conservation Committee, PO Box 330, Trenton, New Jersey 08625. The document is also available at: <http://www.nj.gov/agriculture/divisions/anr/pdf/2014NJSoilErosionControlStandardsComplete.pdf>.

- (2) For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction condition of a site or portion thereof is a wooded land use with good hydrologic condition. The term "runoff coefficient" applies to both the NRCS methodology above at § 113-5A(1)(a) and the Rational and Modified Rational Methods at § 113-5A(1)(b). A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).
 - (3) In computing pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts, that may reduce pre-construction stormwater runoff rates and volumes.
 - (4) In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release 55 - Urban Hydrology for Small Watersheds or other methods may be employed.
 - (5) If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.
- B. Groundwater recharge may be calculated in accordance with the following: The New Jersey Geological Survey Report GSR-32, A Method for Evaluating Groundwater-Recharge Areas in New Jersey, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New Jersey Stormwater Best Management Practices Manual; at the New Jersey Geological Survey website at: <https://www.nj.gov/dep/njgs/pricelst/greport/gsr32.pdf> or at New Jersey Geological and Water Survey, 29 Arctic Parkway, PO Box 420 Mail Code 29-01, Trenton, New Jersey 08625-0420.

§ 113-6. Sources for technical guidance.

- A. Technical guidance for stormwater management measures can be found in the documents listed below, which are available to download from the Department's website at: http://www.nj.gov/dep/stormwater/bmp_manual2.htm.
- (1) Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended and supplemented. Information is provided on stormwater management measures such as, but not limited to, those listed in Tables 1, 2, and 3.
 - (2) Additional maintenance guidance is available on the Department's website at: https://www.njstormwater.org/maintenance_guidance.htm.
- B. Submissions required for review by the Department should be mailed to: The Division of Water Quality, New Jersey Department of Environmental Protection, Mail Code 401-02B, PO Box 420, Trenton, New Jersey 08625-0420.

§ 113-7. Solids and floatable materials control standards.

- A. Site design features identified under § 113-4F above, or alternative designs in accordance with § 113-4G above, to prevent discharge of trash and debris from drainage systems shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this subsection, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see § 113-7A(2) below.
- (1) Design engineers shall use one of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:
 - (a) The New Jersey Department of Transportation (NJDOT) bicycle-safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines; or
 - (b) A different grate, if each individual clear space in that grate has an area of no more than 7.0 square inches, or is no greater than 0.5 inch across the smallest dimension.
 - [1] Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater system floors used to collect stormwater from the surface into a storm drain or surface water body.
 - (c) For curb-opening inlets, including curb-opening inlets in combination inlets, the clear space in that curb opening, or each individual clear space if the curb opening has two or more clear spaces, shall have an area of no more than 7.0 square inches, or be no greater than 2.0 inches across the smallest dimension.

- (2) The standard in Subsection A(1) above does not apply:
- (a) Where each individual clear space in the curb opening in existing curb-opening inlet does not have an area of more than 9.0 square inches;
 - (b) Where the municipality agrees that the standards would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets;
 - (c) Where flows from the water quality design storm as specified in N.J.A.C. 7:8 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:
 - [1] A rectangular space $4 \frac{5}{8}$ (4.625) inches long and $1 \frac{1}{2}$ (1.5) inches wide (this option does not apply for outfall netting facilities); or
 - [2] A bar screen having a bar spacing of 0.5 inch.

Note that these exemptions do not authorize any infringement of requirements in the Residential Site Improvement Standards for bicycle-safe grates in new residential development [N.J.A.C. 5:21-4.18(b)2 and 7.4(b)1].

- (d) Where flows are conveyed through a trash rack that has parallel bars with one-inch spacing between the bars, to the elevation of the Water Quality Design Storm as specified in N.J.A.C. 7:8; or
- (e) Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at N.J.A.C. 7:4- 7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.

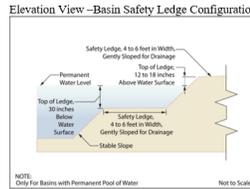
§ 113-8. Safety standards for stormwater management basins.

- A. This section sets forth requirements to protect public safety through the proper design and operation of stormwater management BMPs. This section applies to any new stormwater management BMP.
- B. The provisions of this section are not intended to preempt more stringent municipal or county safety requirements for new or existing stormwater management BMPs. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management BMPs to be retrofitted to meet one or more of the safety standards in § 113-8C(1), (2) and (3) for trash racks, overflow grates, and escape provisions at outlet structures.
- C. Requirements for trash racks, overflow grates and escape provisions.
 - (1) A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the Stormwater management BMP to ensure proper functioning of

the BMP outlets in accordance with the following:

- (a) The trash rack shall have parallel bars, with no greater than six-inch spacing between the bars;
 - (b) The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure;
 - (c) The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack; and
 - (d) The trash rack shall be constructed of rigid, durable, and corrosion-resistant material and designed to withstand a perpendicular live loading of 300 pounds per square foot.
- (2) An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:
- (a) The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.
 - (b) The overflow grate spacing shall be no less than two inches across the smallest dimension.
 - (c) The overflow grate shall be constructed and installed to be rigid, durable, and corrosion-resistant, and shall be designed to withstand a perpendicular live loading of 300 pounds per square foot.
- (3) Stormwater management BMPs shall include escape provisions as follows:
- (a) If a stormwater management BMP has an outlet structure, escape provisions shall be incorporated in or on the structure. Escape provisions include the installation of permanent ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management BMPs. With the prior approval of the municipality pursuant to § 113-8C, a freestanding outlet structure may be exempted from this requirement;
 - (b) Safety ledges shall be constructed on the slopes of all new stormwater management BMPs having a permanent pool of water deeper than 2 1/2 feet. Safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately 2 1/2 feet below the permanent water surface, and the second step shall be located one to 1 1/2 feet above the permanent water surface. See § 113-8E for an illustration of safety ledges in a stormwater management BMP; and
 - (c) In new stormwater management BMPs, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than three horizontal to one vertical.

- D. Variance or exemption from safety standard. A variance or exemption from the safety standards for stormwater management BMPs may be granted only upon a written finding by the municipality that the variance or exemption will not constitute a threat to public safety.
- E. Safety ledge illustration.



§ 113-9. Requirements for a site development stormwater plan.

- A. Submission of site development stormwater plan.
 - (1) Whenever an applicant seeks municipal approval of a development subject to this chapter, the applicant shall submit all of the required components of the checklist for the site development stormwater plan at § 113-9C below as part of the submission of the application for approval.
 - (2) The applicant shall demonstrate that the project meets the standards set forth in this chapter.
 - (3) The applicant shall submit 12 copies of the materials listed in the checklist for site development stormwater plans in accordance with § 113-9C of this chapter.
- B. Site development stormwater plan approval. The applicant's Site Development project shall be reviewed as a part of the review process by the municipal board or official from which municipal approval is sought. That municipal board or official shall consult the municipality's review engineer to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this chapter.
- C. Submission of site development stormwater plan. The following information shall be required:
 - (1) Topographic base map. The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of one inch equals 200 feet or greater, showing two-foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and manmade features not otherwise shown.

- (2) Environmental site analysis. A written and graphic description of the natural and man-made features of the site and its surroundings should be submitted. This description should include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site. Particular attention should be given to unique, unusual, or environmentally sensitive features and to those that provide particular opportunities or constraints for development.
- (3) Project description and site plans. A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations will occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high groundwater elevations. A written description of the site plan and justification for proposed changes in natural conditions shall also be provided.
- (4) Land use planning and source control plan. This plan shall provide a demonstration of how the goals and standards of §§ 113-3 through 113-5 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.
- (5) Stormwater management facilities map. The following information, illustrated on a map of the same scale as the topographic base map, shall be included:
 - (a) Total area to be disturbed, paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.
 - (b) Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.
- (6) Calculations.
 - (a) Comprehensive hydrologic and hydraulic design calculations for the predevelopment and post-development conditions for the design storms specified in § 113-4 of this chapter.
 - (b) When the proposed stormwater management control measures depend on the hydrologic properties of soils or require certain separation from the seasonal high water table, then a soils report shall be submitted. The soils report shall be based on on-site boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.
- (7) Maintenance and repair plan. The design and planning of the stormwater management facility shall meet the maintenance requirements of § 113-10.

- (8) Waiver from submission requirements. The municipal official or board reviewing an application under this chapter may, in consultation with the municipality's review engineer, waive submission of any of the requirements in § 113-9C(1) through (6) of this chapter when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

§ 113-10. Maintenance and repair.

- A. Applicability. Projects subject to review as in § 113-1C of this chapter shall comply with the requirements of § 113-10B and C.
- B. General maintenance.
 - (1) The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.
 - (2) The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). The plan shall contain information on BMP location, design, ownership, maintenance tasks and frequencies, and other details as specified in Chapter 8 of the NJ BMP Manual, as well as the tasks specific to the type of BMP, as described in the applicable chapter containing design specifics.
 - (3) If the maintenance plan identifies a person other than the property owner (for example, a developer, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's or entity's agreement to assume this responsibility, or of the owner's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.
 - (4) Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project. The individual property owner may be assigned incidental tasks, such as weeding of a green infrastructure BMP, provided the individual agrees to assume these tasks; however, the individual cannot be legally responsible for all of the maintenance required.
 - (5) If the party responsible for maintenance identified under § 113-10B(3) above is not a public agency, the maintenance plan and any future revisions based on § 113-10B(7) below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.
 - (6) Preventative and corrective maintenance shall be performed to maintain the functional parameters (storage volume, infiltration rates, inflow/outflow capacity, etc.) of the stormwater management measure, including, but not limited to, repairs or replacement to the structure; removal of sediment, debris,

or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.

- (7) The party responsible for maintenance identified under § 113-10B(3) above shall perform all of the following requirements:
 - (a) 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;
 - (b) Evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed; and
 - (c) 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 § 113-10B(6) and (7) above.
 - (8) The requirements of § 113-10B(3) and (4) do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency, subject to all applicable municipal stormwater general permit conditions, as issued by the Department. https://njstormwater.org/maintenance_guidance.htm.
 - (9) In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have 14 days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or County may immediately proceed to do so and shall bill the cost thereof to the responsible person. Nonpayment of such bill may result in a lien on the property.
- C. Nothing in this subsection shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

§ 113-11. Penalties.

Any person(s) who erects, constructs, alters, repairs, converts, maintains, or uses any building, structure or land in violation of this chapter shall be subject to the following penalties:

- A. Fine up to \$1,500/day for each day a violation of this chapter shall continue.

§ 113-12. Severability.

Each section, subsection, sentence, clause and phrase of this chapter is declared to be an independent section, subsection, sentence, clause and phrase, and the finding or holding of any such portion of this chapter to be unconstitutional, void, or ineffective for any cause, or reason, shall not affect any other portion of this chapter.

§ 113-13. Effective date.

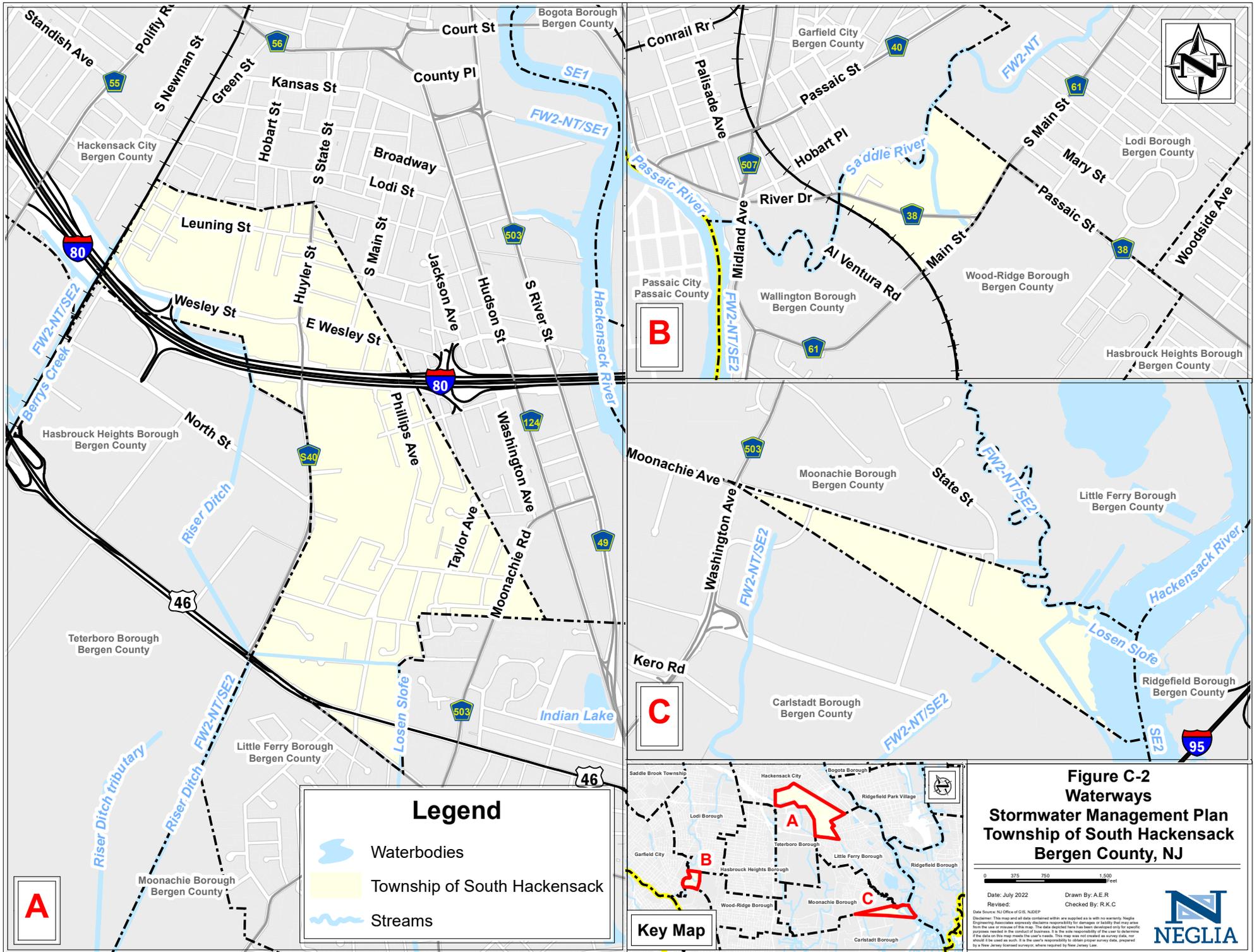
This chapter shall be in full force and effect from and after its adoption and any publication as required by law.

Table 1 - NJDEP Land Use / Land Cover Data
Municipal Stormwater Management Plan
Township of South Hackensack, Bergen County, New Jersey

NJDEP Land Use	Area	
	(Acres)	(Sq. Miles)
Athletic Fields (Schools)	3.468	0.005
Bridge Over Water	0.047	0.000
Cemetery	22.854	0.036
Commercial / Services	54.013	0.084
Deciduous Forest (10-50% Crown Closure)	2.927	0.005
Deciduous Wooded Wetlands	0.045	0.000
Disturbed Tidal Wetlands	12.664	0.020
Industrial	203.314	0.318
Major Roadway	14.712	0.023
Mixed Transportation Corridor Overlap Area	0.087	0.000
Mixed Urban or Built-Up Land	8.509	0.013
Old Field (< 25% Brush Covered)	0.927	0.001
Other Urban Or Built-Up Land	3.418	0.005
Phragmites Dominate Coastal Wetlands	8.946	0.014
Phragmites Dominate Old Field	0.390	0.001
Railroads	1.043	0.002
Recreational Land	5.003	0.008
Residential (High Density or Multiple Dwellings)	48.105	0.075
Residential (Single Unit Medium Density)	54.227	0.085
Saline Marsh (High Marsh)	1.413	0.002
Saline Marsh (Low Marsh)	1.871	0.003
Streams and Canals	1.652	0.003
Tidal Mud Flat	5.977	0.009
Tidal Rivers, Inland Bays, and other Tidal Waters	15.728	0.025
Transitional Areas	1.341	0.002
Transportation/Communication/Utilities	3.622	0.006
Total Land Area	476.303	0.744

Undeveloped Land Calculations		
Vacant Land Area (See Figure C-10)	10.63	0.017
Vacant Land Area (% of Total Land Area)		2.23%
Developed Land Area (% of Total Land Area)		97.77%

References:
Land Use / Land Cover data provided above was obtained from the New Jersey Department of Environmental Protection's Geographic Information Systems (GIS) database, latest edition (2015) for the Township of South Hackensack



Legend

-  Waterbodies
-  Township of South Hackensack
-  Streams

Key Map

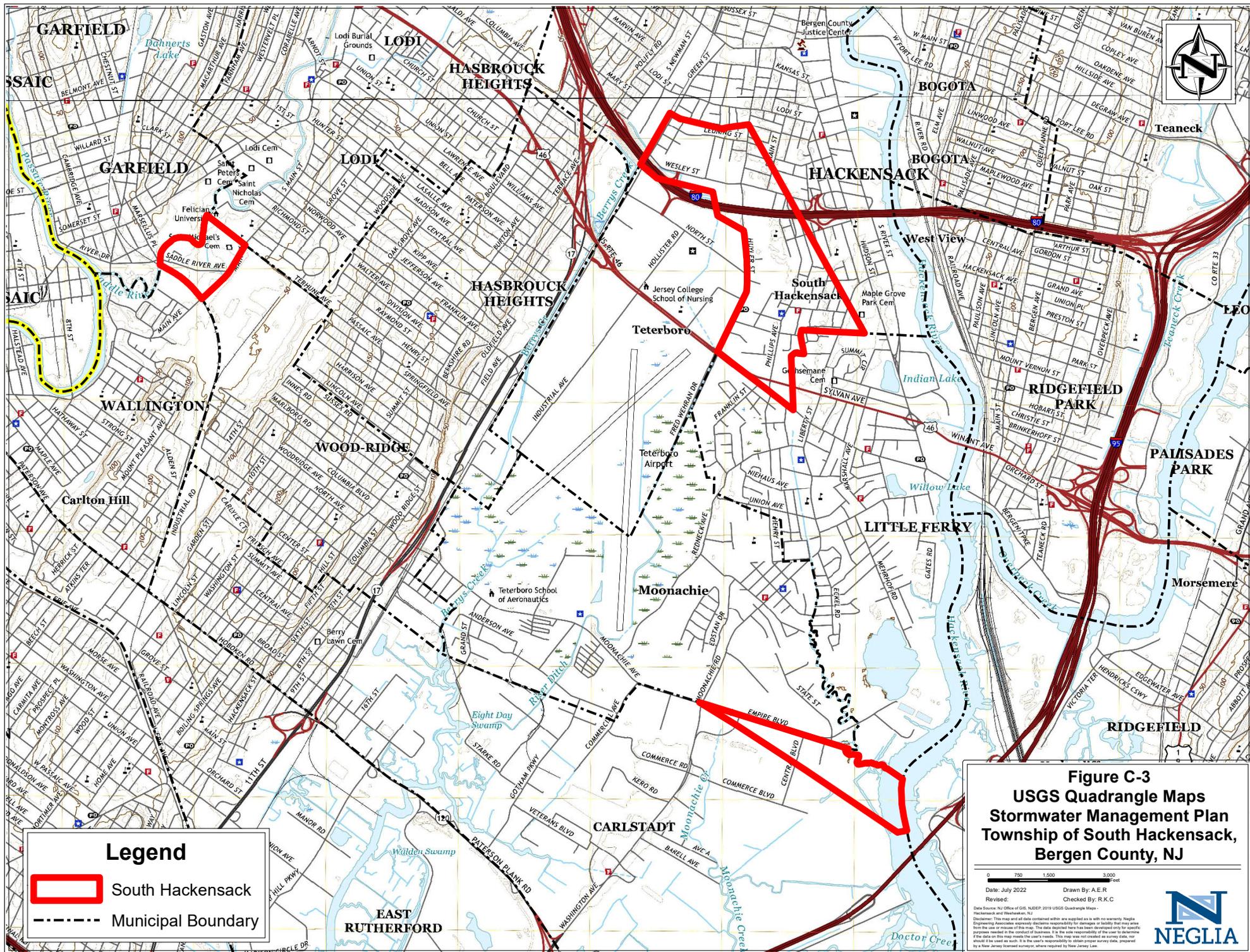
The key map shows the Township of South Hackensack in red, with areas A, B, and C highlighted in red. It includes a north arrow and a scale bar.

Figure C-2 Waterways Stormwater Management Plan Township of South Hackensack Bergen County, NJ

0 375 750 1500 Feet

Date: July 2022 Drawn By: A.E.R.
 Revised: Checked By: R.K.C.

NEGLIA
 NEGLIA Engineering Associates, Inc. is a professional engineering firm. The data on this map was prepared by a New Jersey licensed surveyor, where required by New Jersey Law.



Legend

- South Hackensack
- Municipal Boundary

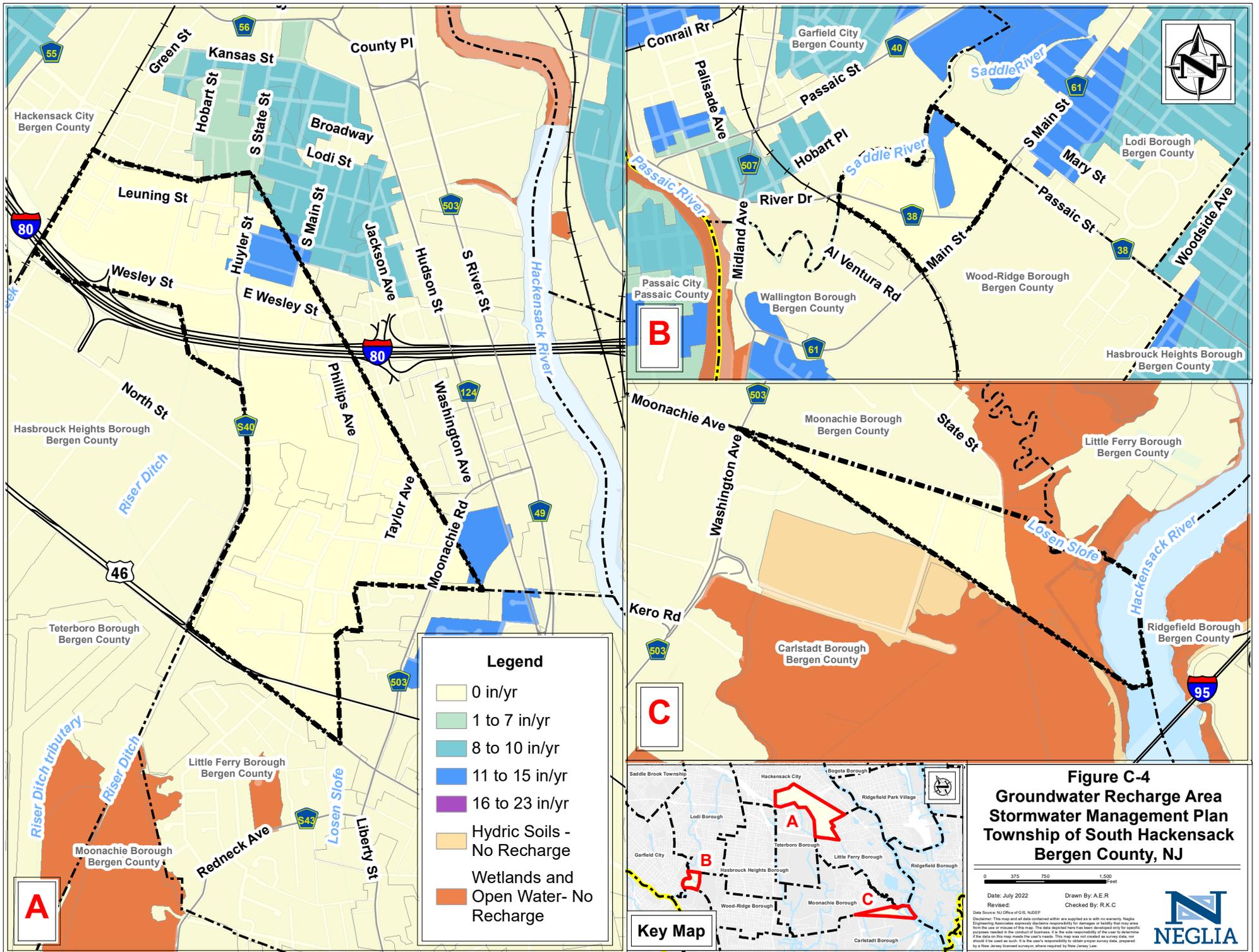
Figure C-3
USGS Quadrangle Maps
Stormwater Management Plan
Township of South Hackensack,
Bergen County, NJ

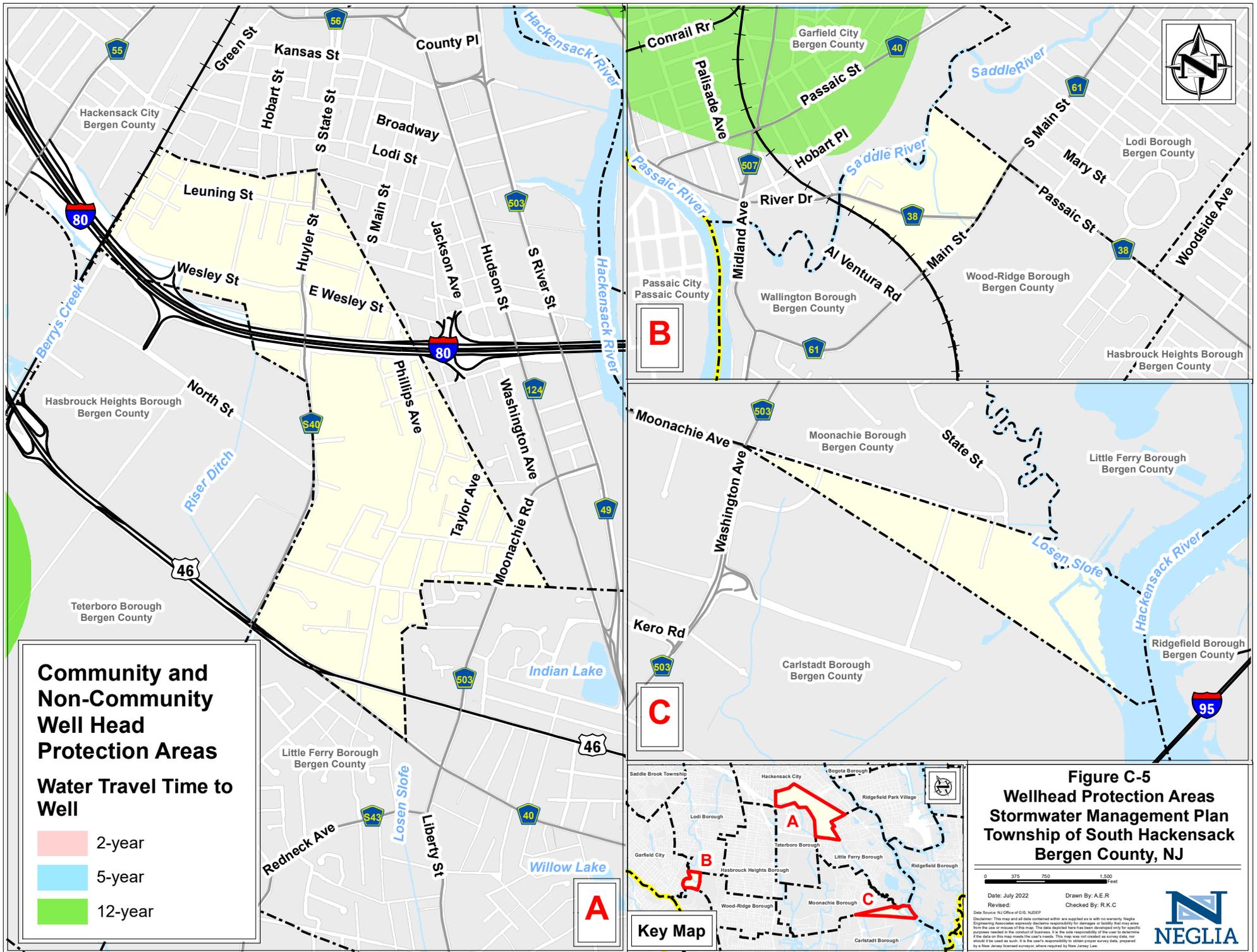
0 750 1,500 3,000 Feet

Date: July 2022 Drawn By: A.E.R.
 Revised: Checked By: R.K.C.

Data Source: NJ Office of GIS, NDEP 2019 USGS Quadrangle Maps
 Disclaimer: This map and all data contained within are supplied as is with no warranty. NEGLIA Engineering Associates expressly disclaims responsibility for damages or liability that may arise from the use or misuse of this map. The data displayed here has been developed solely for general information purposes and is not intended to be used for any specific project. NEGLIA Engineering Associates is not responsible for any errors or omissions in the data on this map, nor does it warrant the accuracy of the data. This map was not created as survey data, nor should it be used as such. To the maximum extent permitted by law, NEGLIA Engineering Associates, its employees, and its agents, disclaims any liability for any damages, including consequential damages, arising from the use of this map.





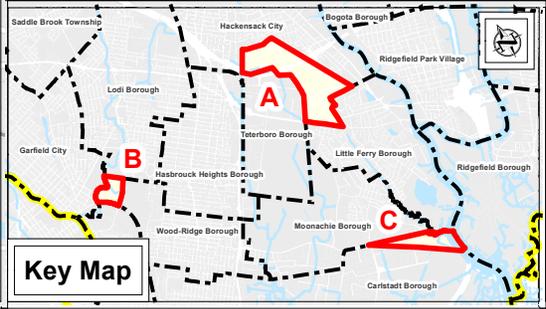


Community and Non-Community Well Head Protection Areas
Water Travel Time to Well

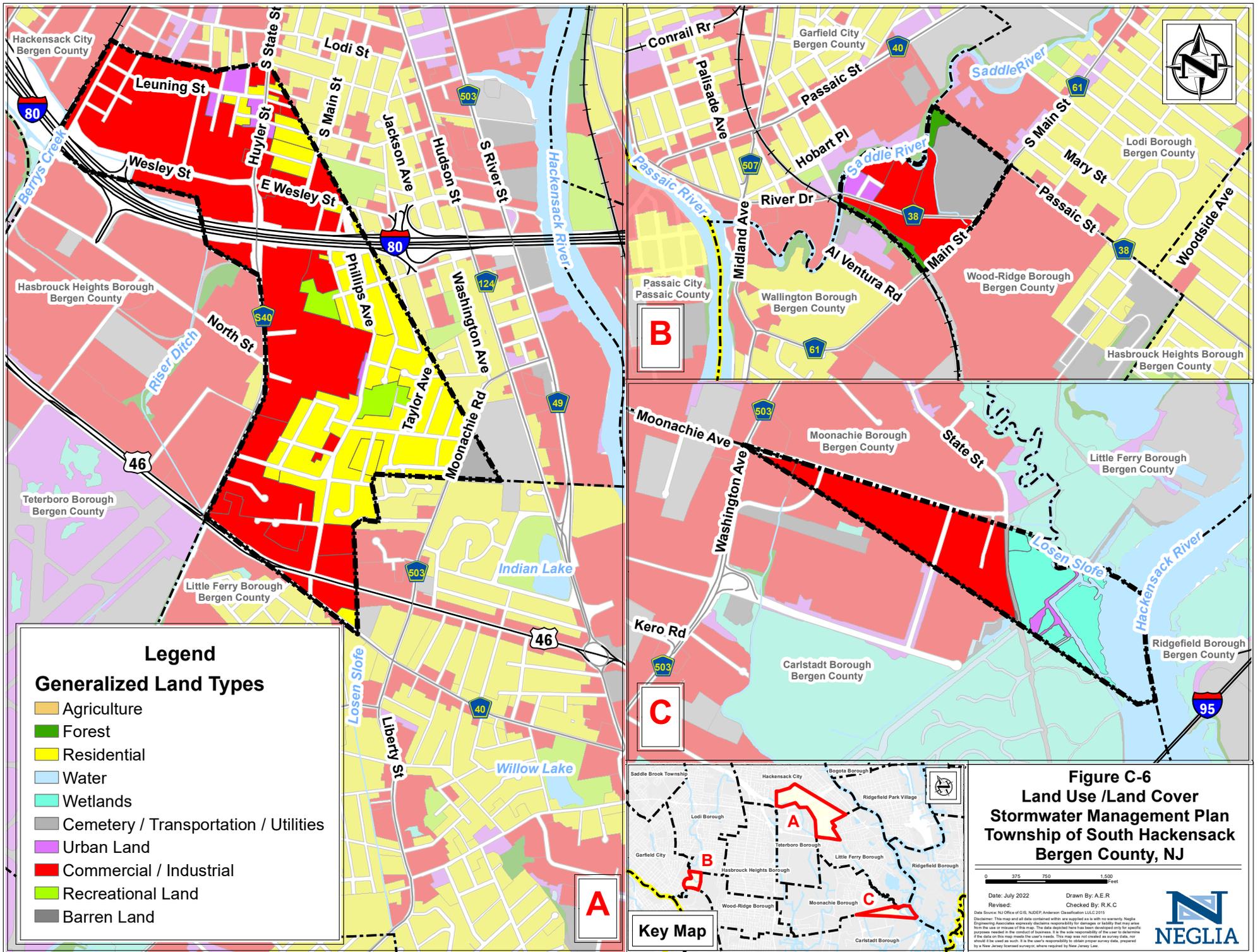
- 2-year
- 5-year
- 12-year

Figure C-5
Wellhead Protection Areas
Stormwater Management Plan
Township of South Hackensack
Bergen County, NJ

0 375 750 1500 Feet
 Date: July 2022 Drawn By: A.E.R.
 Revised: Checked By: R.K.C.
NEGLIA
 Date Source: NJ Office of GIS, NDEP
 Disclaimer: This map and all data contained within are supplied as is with no warranty. Neglia Engineering Associates expressly disclaims responsibility for damages or liability that may arise from the use or misuse of this map. The data depicted here has been developed only for specific purposes intended in the context of Hackensack, NJ, and the user assumes all responsibility for the data on this map meets the user's needs. This map was not created as a survey, and should not be used as such. To the user's responsibility to obtain proper survey data, prepared by a New Jersey licensed surveyor, where required by New Jersey Law.



Key Map



Legend

Generalized Land Types

- Agriculture
- Forest
- Residential
- Water
- Wetlands
- Cemetery / Transportation / Utilities
- Urban Land
- Commercial / Industrial
- Recreational Land
- Barren Land

Figure C-6
Land Use /Land Cover
Stormwater Management Plan
Township of South Hackensack
Bergen County, NJ

0 375 750 1500 Feet
 Date: July 2022 Drawn By: A.E.R.
 Revised: Checked By: R.K.C.
Date Source: NJ Office of GIS, NDEP Anderson Classification LU/C 2015
 Disclaimer: This map and all data contained within are supplied as is with no warranty. Neglia Engineering Associates expressly disclaims responsibility for damages or liability that may arise from the use or misuse of this map. The data depicted here has been developed only for specific purposes intended in the context of Hackensack, NJ, and the sole responsibility of the user. No representation of the data on this map meets the user's needs. This map was not created as a survey data, nor should it be used as such. To the user's responsibility to obtain proper survey data, prepared by a New Jersey licensed surveyor, where required by New Jersey Law.



Key Map

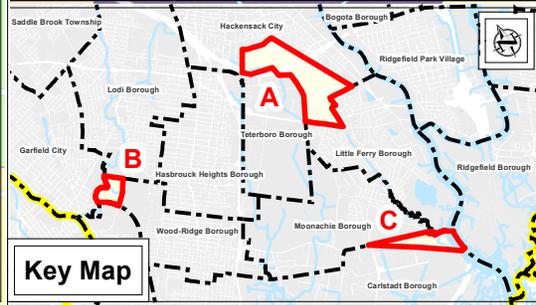
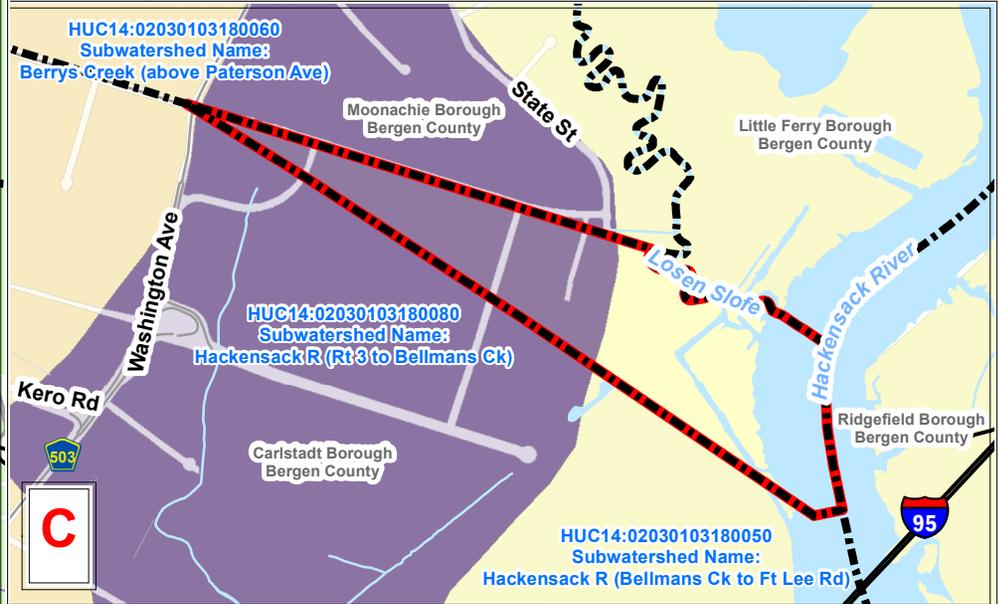
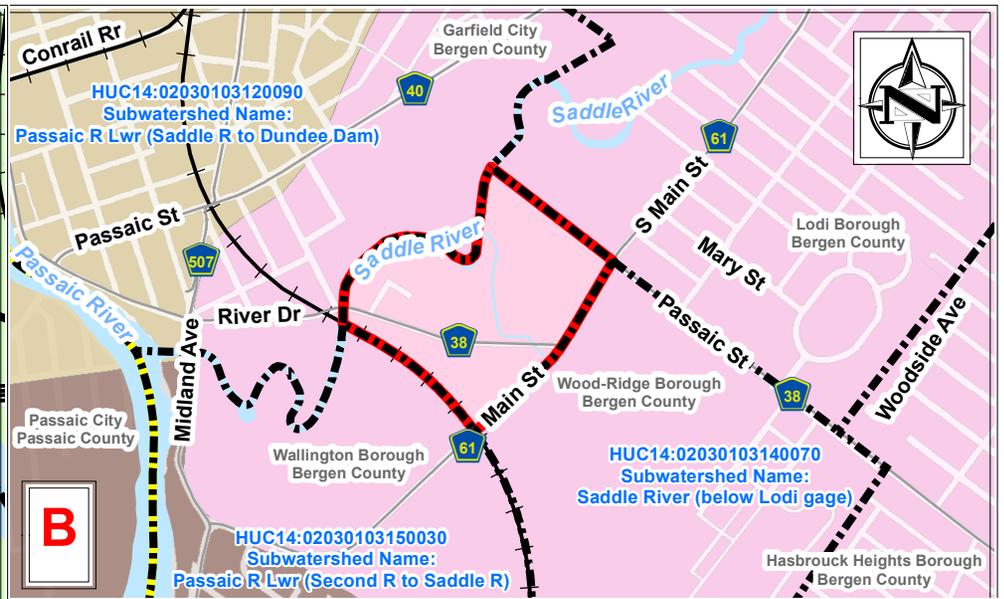
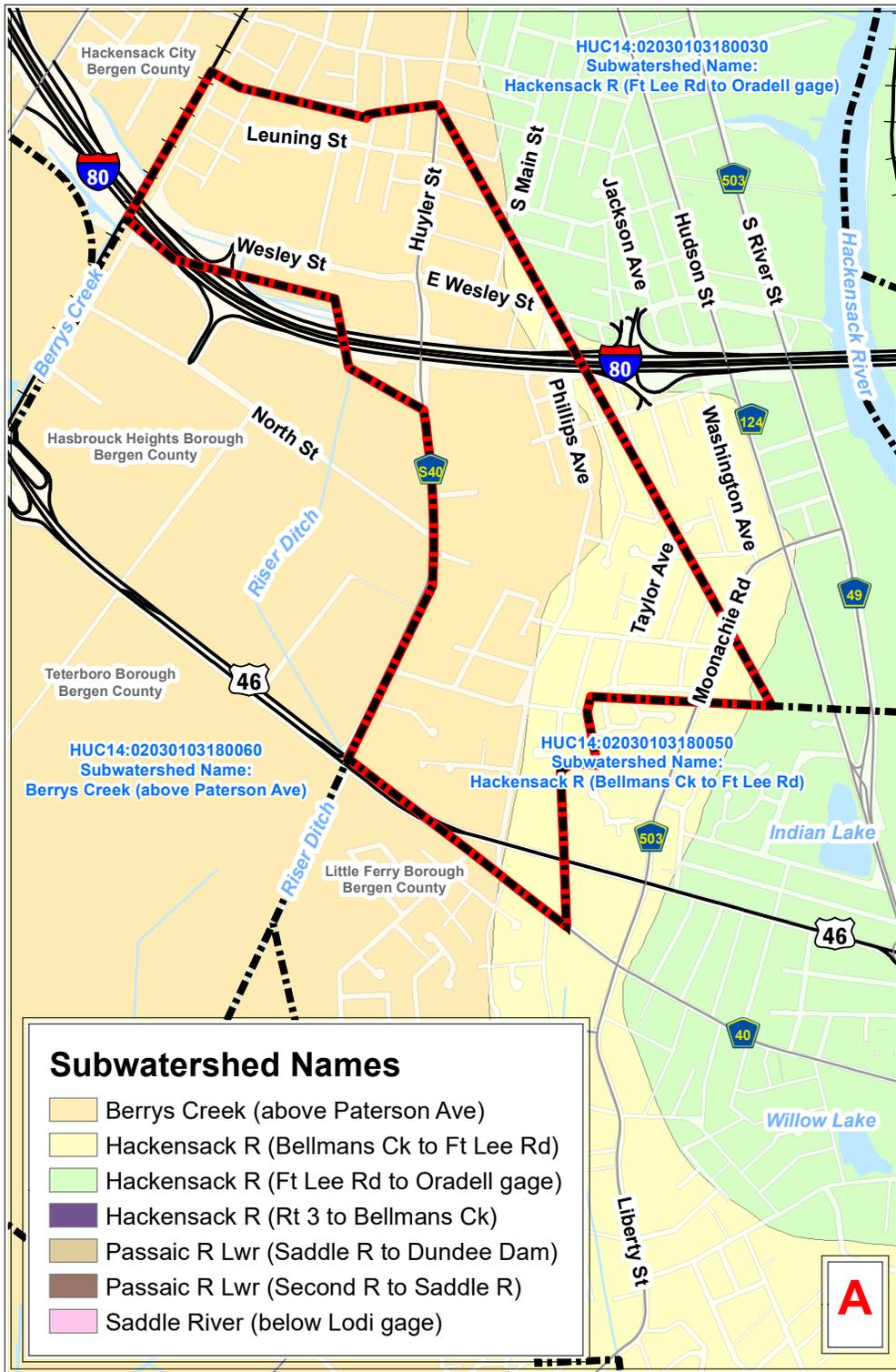


Figure C-7
NJDEP HUC14 Watersheds
Stormwater Management Plan
Township of South Hackensack
Bergen County, NJ

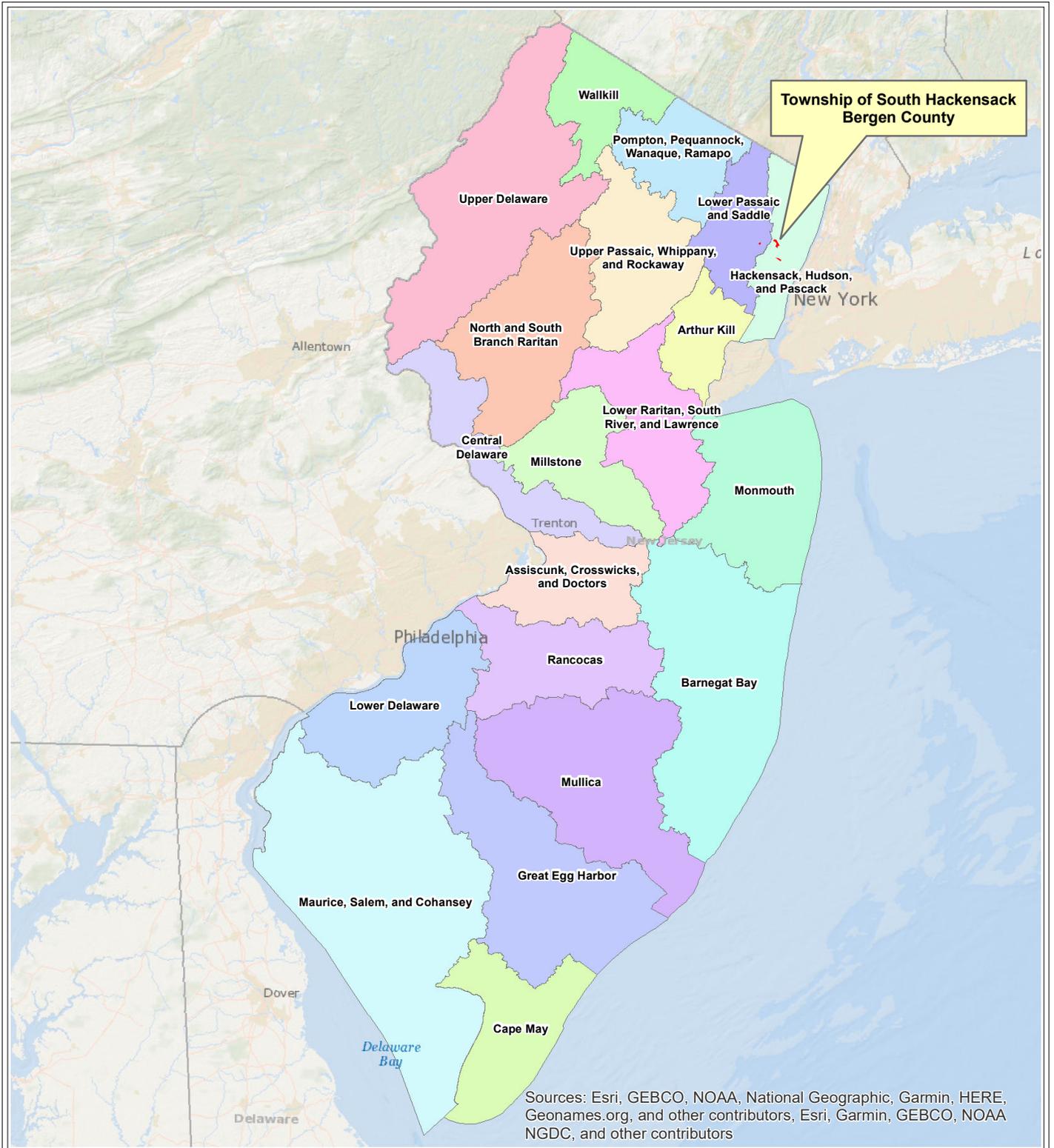
0 375 750 1500 Feet

Date: July 2022 Drawn By: A.E.R.
Revised: Checked By: R.K.C.

NEGLIA

Subwatershed Names

- Berrys Creek (above Paterson Ave)
- Hackensack R (Bellmans Ck to Ft Lee Rd)
- Hackensack R (Ft Lee Rd to Oradell gage)
- Hackensack R (Rt 3 to Bellmans Ck)
- Passaic R Lwr (Saddle R to Dundee Dam)
- Passaic R Lwr (Second R to Saddle R)
- Saddle River (below Lodi gage)



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CERTIFICATE OF AUTHORIZATION (N.J.S.A. 45:8-56) 24GA27927000



Figure C-8

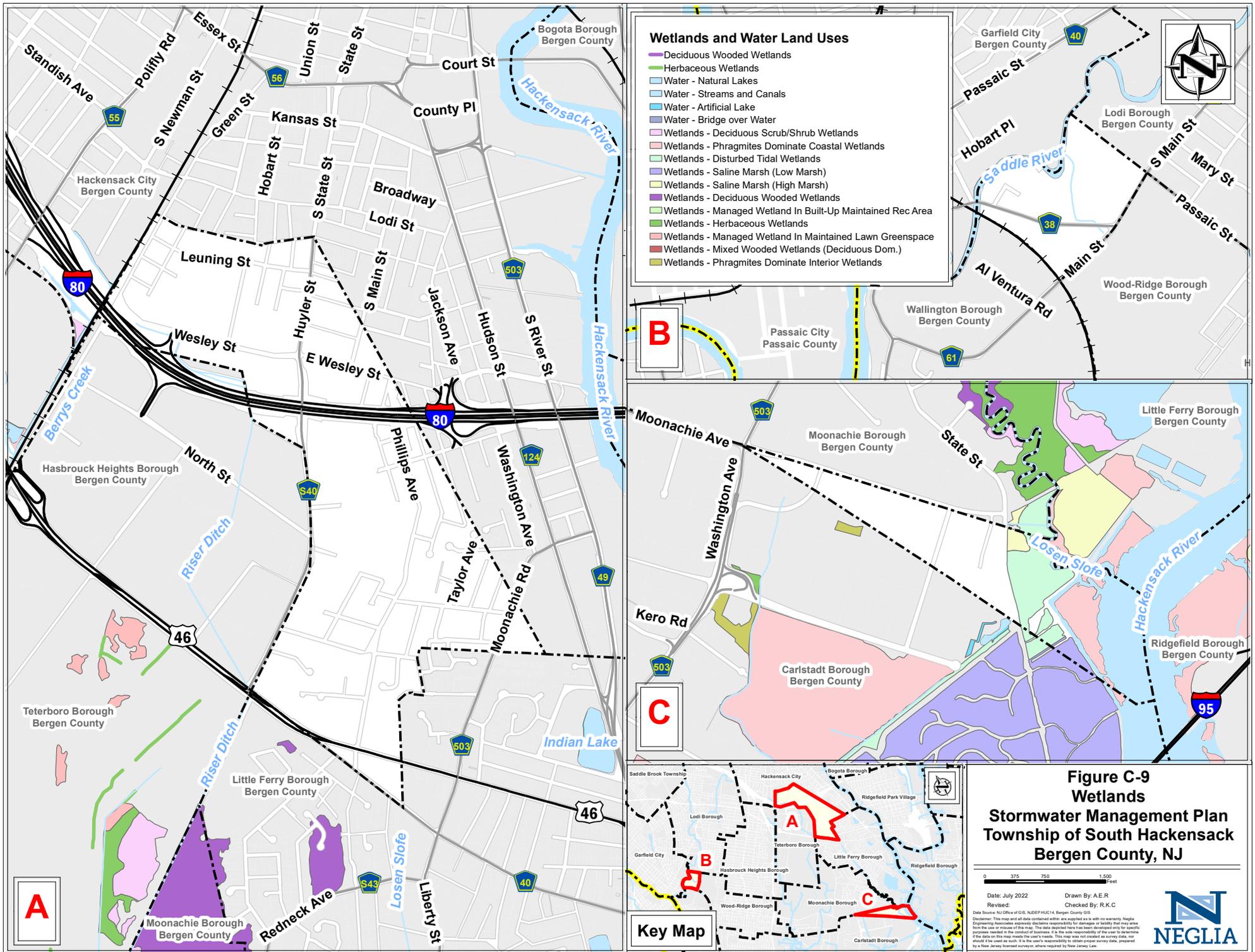
Watershed Management Areas Township of South Hackensack Bergen County, NJ

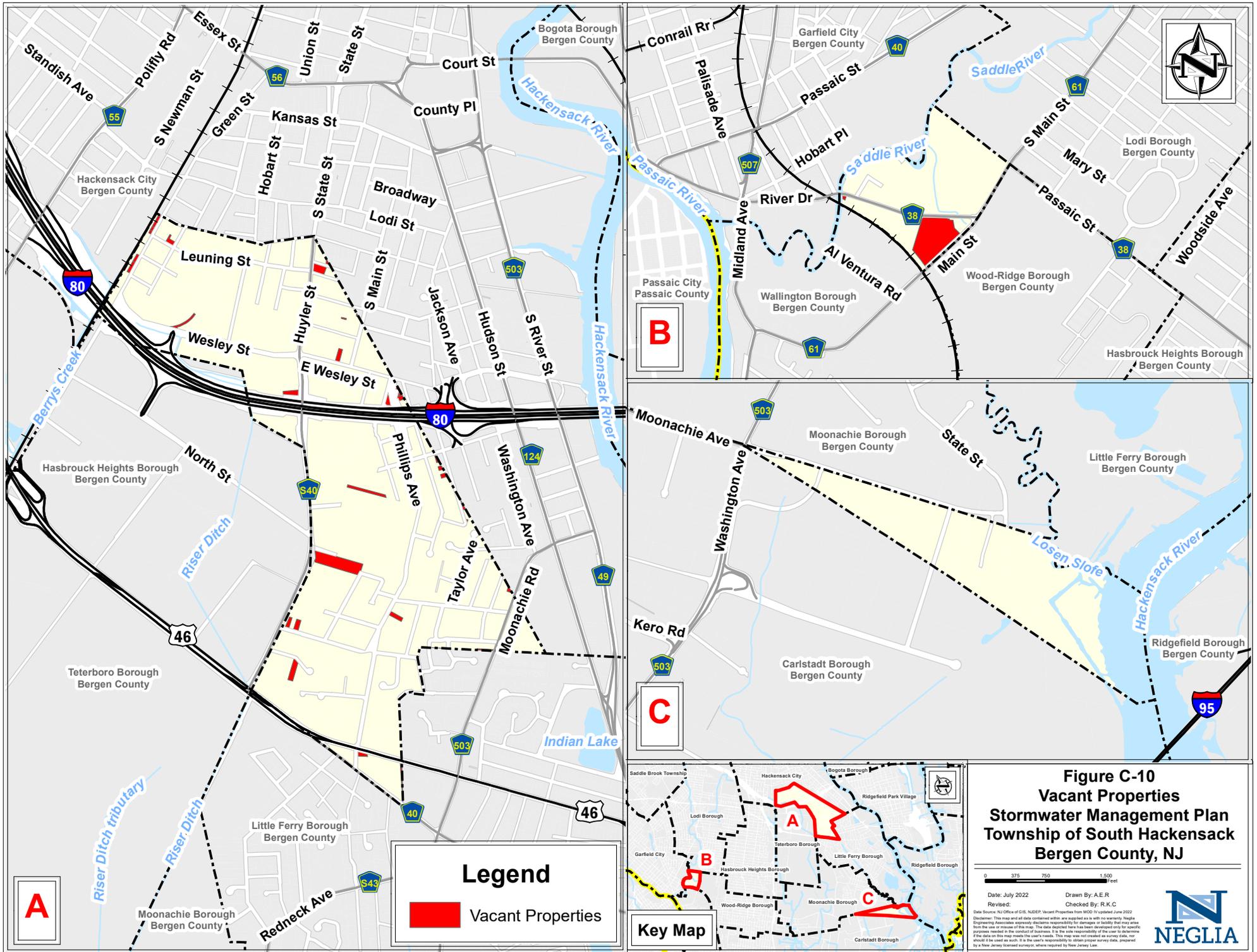
Legend

■ Township of South Hackensack



Drawn By: A.E.R	Checked By: R.K.C	Project No:	Sheet No:	Map References:
Designed By: R.K.C.	Page:	SHACMUN22.013	Figure C-8	New Jersey Office of GIS, NJDEP
Field Book No:	Date: July 2022			





Legend

Vacant Properties

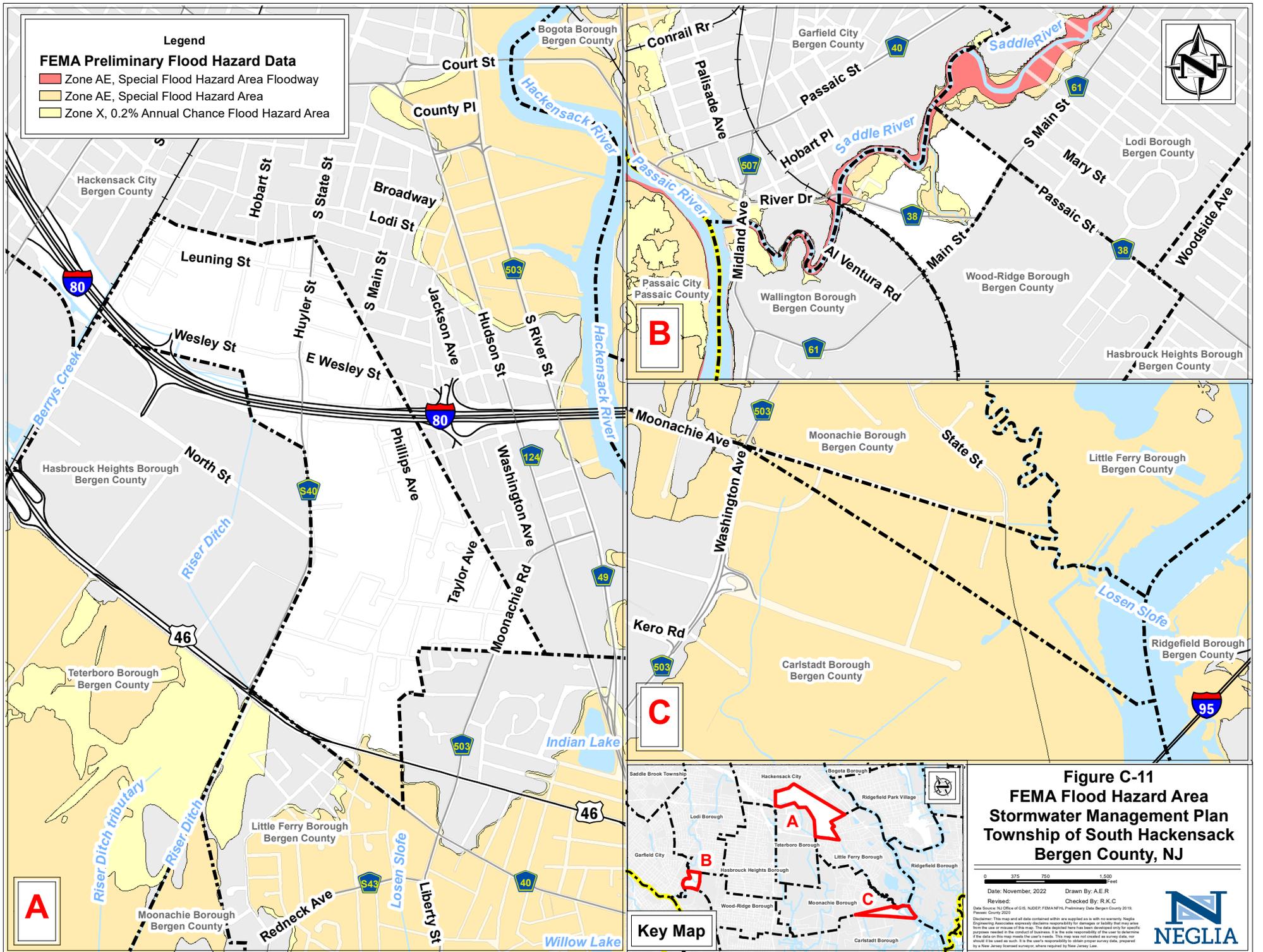
Key Map

Figure C-10
Vacant Properties
Stormwater Management Plan
Township of South Hackensack
Bergen County, NJ

0 375 750 1500 Feet

Date: July 2022 Drawn By: A.E.R.
 Revised: Checked By: R.K.C.

NEGLIA



Legend

FEMA Preliminary Flood Hazard Data

- Zone AE, Special Flood Hazard Area Floodway
- Zone AE, Special Flood Hazard Area
- Zone X, 0.2% Annual Chance Flood Hazard Area



B

C

A

Key Map

Figure C-11
FEMA Flood Hazard Area
Stormwater Management Plan
Township of South Hackensack
Bergen County, NJ

0 375 750 1500 feet

Date: November, 2022 Drawn By: A.E.R.
 Revised: Checked By: R.K.C.
 Data Source: NJ Office of GIS, NDEP FEMA NFHL Preliminary Data Bergen County 2019, Passaic County 2020

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