



# Green Infrastructure Planning

5 Points 10 Points 20 Points

New Action February 2018

Green infrastructure is part of the solution to several water resource problems in New Jersey. Green Infrastructure refers to methods of stormwater management that reduce wet weather/stormwater volume, flow, or changes the characteristics of the flow into combined or separate sanitary or storm sewers, or surface waters, by allowing the stormwater to infiltrate, to be treated by vegetation or by soils; or to be stored for reuse. Green Infrastructure methods are management practices that address stormwater runoff through soils or reuse.

Green Infrastructure practices include, but are not limited to: bioretention systems; bioretention basins; small scale bioretention (rain gardens, downspout planter boxes, stormwater planters, bioswales, enhanced and continuous tree pits); pervious paving systems (permeable asphalt, pervious concrete, permeable pavers); vegetated filter strips, green roofs, cisterns, tree plantings, grass swales, infiltration basins, sand filters designed to infiltrate into the subsoil, and dry wells (See Attachment 1 for some examples).

## Attachment 1: Green Infrastructure Practices

The use of green infrastructure encourages the idea that stormwater is a resource that can be reused, instead of being treated as a nuisance that needs to be removed as quickly as possible. (NJDEP, 2017.)

New Jersey municipalities are faced with a myriad of water-related issues. Many communities experience flooding, even during small rainfall events. Streams are polluted and some are not fishable or swimmable. Stream banks are eroding, and stream channels are downcutting. These problems can result in property and infrastructure damages, public health issues, and ecological concerns. As New Jersey's landscape is developed and redeveloped, these problems intensify. The changing climate will cause more frequent and intense storm events, adding to the state's water resources problems.

The primary cause of these problems is that stormwater runs rapidly off impervious surfaces into storm sewers or combined sewer systems and local waterways. **Impervious surfaces** are any ground cover that cannot infiltrate stormwater, including paved roadways, parking areas, sidewalks, and building roofs. To intercept stormwater runoff from going directly to local waterways, green infrastructure can capture and treat it for infiltration, reuse, or slow release; all in a cost-effective manner. By managing stormwater runoff from impervious surfaces, communities can reduce flooding and improve the quality of New Jersey's water resources.

Municipalities can earn up to 20 points for three levels of green infrastructure planning, including:

### ***Tier 1 Impervious Cover Assessment***

Locate and quantify impervious surfaces, and the runoff volumes associated with these surfaces. **[5 points]**

### ***Tier 2 Green Infrastructure Action Plan***

Complete requirements of Tier 1, plus identify immediate and short-term (i.e., < 5 years) green infrastructure projects to manage stormwater runoff from impervious surfaces. **[5 points]**

### ***Tier 3 Green Infrastructure Strategic Plan***

Complete requirements of Tiers 1 and 2, plus identify long-term (i.e., 5-20 years) green infrastructure projects and policy recommendations for community-wide green infrastructure implementation. **[10 points]**

This action is worth a maximum of **20 points**. Municipalities can achieve 5 points for Tier 1, 5 points for Tier 2, and 10 points for Tier 3, but the Tiers must be completed in sequential order.

### **Why is it important?**

Impervious cover is linked to the quality of rivers/streams, lakes, reservoirs, estuaries, and aquifers, and the amount of impervious cover in a watershed is often used to determine the current and future quality of water bodies. Literature suggests a link between impervious cover and stream ecosystem impairment starting at approximately 10% impervious surface cover. Better management of stormwater runoff from impervious surfaces can reduce flooding and improve water quality in streams.

Green infrastructure in streets is important because it helps create healthy environments for multiple users in numerous ways, including the provision of adequate vegetation/ tree cover to act as a carbon sink for pollutants from vehicles; green corridor linkages that support an urban bio-diversity habitat; and reduced storm water runoff and flooding from impervious roads.

Green infrastructure is a cost-effective and environmentally sustainable approach to stormwater management. Green infrastructure measures capture, filter, absorb, and reuse stormwater to maintain or mimic natural systems and to treat runoff at its source (i.e., where rainfall hits the ground). When used as components of a stormwater management system, green infrastructure practices (See Attachment 1), such as bioretention basins, green roofs, porous pavement, rain gardens, and vegetated swales, can produce a variety of environmental benefits. The United States Environmental Protection Agency noted in 2013 that in addition to effectively retaining and infiltrating rainfall, these technologies can simultaneously help filter air pollutants, reduce energy demands, mitigate urban heat islands, and sequester carbon, while also providing communities with aesthetic and natural resource benefits.

### **Who should lead and be involved with this action?**

The staff primarily responsible for stormwater infrastructure (e.g., municipally separate sewer system or combined sewer system) in the municipality should lead this action, such as departments of engineering, public works, utilities, and/or municipal utility authorities. Environmental commissions, green team or municipal sustainability committee members, and county/municipal planners/engineers should be involved with this action. If present, local redevelopment or improvement authorities should also be involved. Schools and non-profit organizations or community groups should be involved for raising community awareness and education.

Some municipalities may choose to form a municipal action team to bring together local governments, utility authorities, residents, and community organizations that work to achieve shared green infrastructure goals (Camden SMART, Newark DIG, Perth Amboy Swim). Municipal action teams are not required, but should be involved if they have been established.

### **Timeframe**

Tier 1 should take up to two months to complete the Impervious Cover Assessment, while completion of the steps necessary to achieve Tier 2 should take up to six months, and Tier 3 should take up to 12 months.

### **Project Costs and Resource Needs**

Samples of a Tier 1 Impervious Cover Assessment, Tier 2 Green Infrastructure Action Plan, and Tier 3 Green Infrastructure Strategic Plan are readily available online and can be used as models. Links to these documents are provided in the "Resources" section. The anticipated costs and resources required to earn points under each tier of the Green Infrastructure Planning Action are as follows:

**Tier 1** requires basic geographical information system (GIS) capabilities from either a student intern or junior planner and could be accomplished for less than \$5,000.

**Tier 2** requires support from a professional engineer, planner, and/or landscape architect, and could cost between

\$20,000 and \$30,000. Trained graduate students may also be able to complete the Tier 2 requirements, reducing the costs of professional services.

**Tier 3** requires significant support from a professional engineer, planner, and/or landscape architect, and could cost between \$75,000 and \$200,000.

It is worth noting that these estimated costs can vary largely based on the size of the municipality, number of subwatersheds (i.e., an area that drains into a single body of water) and sewersheds (i.e., an area that drains into part of the sewer infrastructure system), complexity of existing hydrologic and infrastructure systems, impervious area, and procurement methods (among other factors).

## **What to do, and how to do it**

*This section provides guidance and recommendations for implementing the action. A municipality does not need to follow this guidance exactly as long as it meets the requirements for earning points for this action.*

The three tiers of the Green Infrastructure Planning Action build upon each other. Municipalities can achieve 5 points for Tier 1, 5 points for Tier 2, and 10 points for Tier 3, but the Tiers must be followed in sequential order. Tier 1 develops an Impervious Cover Assessment to determine the amount of impervious cover in a municipality and the runoff volumes associated with these surfaces. Building upon Tier 1, the Tier 2 Green Infrastructure Action Plan includes completing the requirements of Tier 1, plus identifying immediate and short-term (i.e., < 5 years) green infrastructure projects to manage stormwater runoff from impervious surfaces. Building upon Tiers 1 and 2, the Tier 3 Green Infrastructure Strategic Plan includes completing the requirements of Tiers 1 and 2, plus identifying long-term (i.e., 5-20 years) green infrastructure projects and policy recommendations for community-wide green infrastructure implementation.

### **Tier 1 Impervious Cover Assessment [5 Points]**

The first tier is the Impervious Cover Assessment, which locates and quantifies impervious surfaces, and the runoff volumes associated with these surfaces.

To earn points for Tier 1, the Impervious Cover Assessment must complete the following steps.

#### **1. Assemble the following GIS data for the municipality:**

- Land use. New Jersey Department of Environmental Protection (NJDEP) 2007/2012 land use/land cover data can be obtained from [NJDEP](#).
- Municipal and county boundaries. Boundaries of municipalities and counties can be obtained from [NJDEP](#).
- Watershed boundaries or HUC14 boundaries. Boundaries of watersheds and sub-watersheds can be obtained from [NJDEP](#).
- Water bodies. Boundaries of water bodies can be obtained from [NJDEP](#).
- Sewershed boundaries, if available. Sewer operators (i.e., utility companies or departments of public works) may have GIS data of sewershed boundaries. This data may not be publicly available but may be available by making a request to the operator.

#### **2. Create the following pie charts and maps (using the GIS data):**

- Pie chart and maps illustrating percentage breakdown of land use for the entire municipality. This includes general land cover types, such as agriculture, barren land, forest, water, wetlands, and urban.
- Pie chart and maps illustrating percentage breakdown of various types of urban land use for the entire municipality. This includes urban land cover types, such as Commercial, High Density Residential, Industrial, Low Density Residential, Medium Density Residential, Mixed Urban, Recreational Land, Rural Residential, and Transportation/Infrastructure.
- Maps illustrating subwatershed(s) (HUC14) and sewersheds (if available) within the municipality.

**3. Calculate the impervious cover area and create the following table (using the GIS data):**

Table depicting impervious cover analysis by subwatershed and sewershed (if available). The total area and percentage of impervious surfaces should be calculated for each subwatershed and sewershed within the municipality.

**4. Calculate the stormwater runoff volumes and create the following table (using the GIS data):**

Table showing the stormwater runoff volumes from impervious surfaces by subwatershed and sewershed for five storm scenarios: the 1.25 inch water quality storm; an annual rainfall total for your county; the 2-year design storm, the 10-year design storm, and the 100-year design storm. Rainfall totals for each county are presented in **Attachment 2**.

**Tier 2 Green Infrastructure Action Plan [5 Points]**

The second tier is the Green Infrastructure Action Plan, which includes the requirements of Tier 1, plus outlines immediate and short-term (i.e., <5 years) green infrastructure demonstration projects that can be used to manage stormwater runoff from impervious surfaces (i.e., capturing rainfall and infiltrating or storing it before it enters storm or combined sewer systems and waterways).

To earn points for Tier 2, the Green Infrastructure Action Plan must complete the following steps.

- 1. Complete the requirements of Tier 1.**
- 2. Engage the community in Green Infrastructure Planning.**

A public planning process should inform the development of the Tier 2 Green Infrastructure Action Plan, through various public engagement processes as appropriate for each municipality. Community surveys can also be used to evaluate community support for green infrastructure and to ensure that local goals are achieved.

**3. Set short-term (5 years) goal**

Impervious Cover Management Goal: The community should set a reasonable and feasible impervious cover management goal for the municipality to achieve within the next five years, over a short-term timeframe. This goal is either a percentage OR area of impervious surfaces where impervious surfaces will be converted to pervious surfaces and/or where runoff from impervious surfaces will be managed using green infrastructure measures. Each municipality must consider its own context and capacity when setting an impervious cover management goal, but the ranges of impervious cover reduction in Table 1 are recommended. The municipality should seek to achieve the recommended percentage goal, but that goal may be unrealistic in certain larger municipalities. In those cases, municipalities can opt for the recommended acreage of impervious cover managed instead.

**Table 1. Recommended Short Term Impervious Cover Management Goals**

Existing Municipal Impervious Cover	Recommended Short Term (less than 5 years) Impervious Cover Management Goal (%)	Recommended Impervious Cover Management Goal Area (acres)
0% to 10%	1%	10 acres
10.1% to 25%	2%	15 acres
>21.1%	5%	20 acres

When considering the achievement of these goals, typically the size of a bioretention system would be 20% of the drainage area. Therefore, two acres of bioretention is needed to manage 10 acres. While this is a simple rule of thumb and engineering is needed to determine the exact size of bioretention needed, this approximation may be helpful in planning. Setting the recommended impervious cover management goals in Table 1 will earn the community **10 points**.

*Note that to achieve significant stormwater management and water quality benefits, municipalities will need to manage a high percentage of the runoff from all impervious surfaces.*

#### 4. Identify potential sites for short-term (5 years) green infrastructure implementation

Green infrastructure provides benefits for stormwater management, flood mitigation, and climate adaptation; reducing combined sewer overflow (CSO) events and improving water quality; open space preservation; improving air quality and public health; economic benefits of greener neighborhoods; public safety associated with increased green infrastructure; and others. Sites should be prioritized that can accomplish these benefits, in coordination with all existing municipal plans. A preliminary list of potential sites for green infrastructure implementation projects should be generated that is reasonable for the specific municipality to complete over the immediate and short-term timeframes (i.e., < 5 years). The Tier 2 plan should ultimately include enough sites to meet the established impervious cover management goal. The following types of sites are often preferable for green infrastructure because they don't require property acquisition, easements, or other agreements with landowners; and may present potential partnerships for maintenance:

- Properties owned by public or non-profit entities, such as schools, churches, libraries, municipal buildings, public works, firehouses, post offices, fraternal/social organization lodges such as the Elks or Moose, and parks/recreational fields. Public rights-of-way, such as roads, sidewalks, pathways, and bike lanes. (See "Green Streets" in the Resources section) Parking lots with excess parking spaces, or opportunities to integrate green space.

The following site locations are often preferable for green infrastructure due to technical feasibility because they provide a suitable surface or subsurface conditions:

- Areas with significant depth to restrictive features (i.e., groundwater/water table or bedrock).  
*Note: areas with less than 5 feet to groundwater are not ideal for green infrastructure, although green infrastructure design measures may be able to incorporate subsurface detention and lining to overcome this challenge. Rainwater harvesting may be used in these areas.*
- Areas with well-drained soils and infiltration rate (i.e., the capacity of the most limiting layer to transmit water). [*Note: areas with compacted, poorly drained soils are not ideal for green infrastructure because they will not infiltrate water well. Rainwater harvesting may be used in these areas.*]
- During implementation, a site specific soil investigation should be conducted prior to completing the final design of the green infrastructure practice to confirm the infiltration rate and depth to groundwater.
- Among the preliminary list of potential sites for green infrastructure implementation projects, the following types of sites should be prioritized, as applicable, in order to achieve the established impervious cover management goal:
- Sites that would manage runoff from those large impervious areas with high runoff volumes identified in the Tier 1 Impervious Cover Assessment.
- Sites that are identified for green space or stormwater management in the municipality's master plan, open space master plan element, or other planning documents.
- Sites that provide opportunities for stormwater management and resiliency, such as areas upstream or uphill of floodprone areas, i.e. "flooding hotspots," or areas that have been developed without sufficient stormwater management capacity. [*Note: areas currently subject to frequent flooding or ponding, and areas that will become subject to more frequent flooding due to the effects of climate change, are not ideal for green infrastructure. Rainwater harvesting may be used in these areas.*]
- Sites that provide opportunities for targeted water quality improvement, such as areas that contribute to combined sewer overflows.
- Sites that could serve as mitigation under the municipality's stormwater management ordinance.
- Sites that facilitate opportunities for outreach and education, such as schools and community facilities.
- Consider selecting target neighborhoods for potential green infrastructure projects based on the preferable site locations noted above (e.g., neighborhoods with several municipally-owned properties and high impervious cover).
- Tools to identify sites and evaluate the considerations referenced above include public feedback during the public planning process, existing municipal plans or other planning documents, and available mapping tools. Mapping tools include (but not limited to):

[NJ Flood Mapper](#)

[NJ ADAPT](#)

[NJDEP Guidance Document for Green Infrastructure in Long Term Control Plans \(Chapter 2\)](#)

[NJGIN New Jersey Geographic Information Network](#)

[NJDEP GeoWeb Environmental Mapping Tool](#)

[NJDEP 3.0 HUD Environmental Review Tool NJDEP Municipal recreation and open space inventory \(ROSI\)](#)

[Google Maps](#)  
[EPA Stormwater Calculator](#)  
[USGS Web Soil Survey](#)  
[Climate Central Surging Seas](#)  
[NOAA Sea Level Rise Viewer](#)  
[Environmental Protection Agency Climate Ready Water Utilities](#)

*Note: The resources section provides sample planning documents that illustrate potential sites for green infrastructure, and the typical scope or scale of green infrastructure projects completed by a variety of municipalities.*

## **5. Conduct desktop research and field visits to potential sites and determine feasibility for green infrastructure**

- Green infrastructure feasibility is largely dependent on the ability of green infrastructure practices to infiltrate or store stormwater runoff and can be largely limited by surficial topography or subsurface geology (i.e., depth to water table or bedrock, and soil permeability).
- Soil quality and drainage capability information should be obtained from the [United States Department of Agriculture Web Soil Survey](#) and should be included on the concept plans.
- Field visits should be conducted to potential sites to assess ground level conditions for green infrastructure implementation.
- Notable site characteristics include the location of existing stormwater management practices, direction and size of drainage areas, and feasibility of new green infrastructure practice installation.
- Opportunities to eliminate, reduce, or disconnect directly connected impervious surfaces should be identified and documented with detailed notes and photographs.
- Options for green infrastructure practices include downspout disconnections, porous pavements, rain gardens, rainwater harvesting systems, stormwater planters, and downspout planter boxes, among others ([see Attachment 2](#))
- Chapter 2 of the [NJDEP Guidance Document for Green Infrastructure in Long Term Control Plans](#) provides guidance on locating and assessing the feasibility of green infrastructure.
- Green Infrastructure Practices can be identified and sited using the Green Infrastructure Guidance Manual for New Jersey.

## **6. Develop green infrastructure concept plans for selected sites**

- At least three candidate sites should be selected from the identified potential sites for green infrastructure implementation (see "Green Infrastructure Implementation" Action to earn points for implementation).
- The Tier 2 Green Infrastructure Action Plan should include a concept for each of the three (or more) selected sites.
- A green infrastructure concept plan should include aerial imagery of the site, ground level site photos, and a depiction that delineates the locations of proposed green infrastructure practices. Descriptions and sample photographs for each green infrastructure practice should be included.
- NJDEP standards require systems to be designed for the New Jersey water quality storm (1.25 inches of rain over 2-hours), which is, therefore the minimum required for this action. The more conservative use of the 2-year design storm (3.3 inches of rain over 24-hours) is recommended so that these systems will be able to handle the increase in storm intensities that are expected to occur due to climate change, only if feasible and also if in compliance with NJDEP permitting requirements.
- Green infrastructure guidance, including Technical Details for Construction, are available in the [Green Infrastructure Guidance Manual for New Jersey](#).
- Implementation of specific green infrastructure projects (beyond the scope of this action) will require site-specific engineering feasibility analysis and technical drawings.

## **7. Prepare green infrastructure information sheets for selected sites**

- The Tier 2 Green Infrastructure Action Plan should include green infrastructure information sheets for each selected site.
- A green infrastructure information sheet should include existing site conditions and issues, proposed green infrastructure solutions, anticipated benefits, stormwater capture rates per green infrastructure practice, potential funding sources and partners, and estimated costs.
- Stormwater capture rates and benefits can be developed using the [EPA National Stormwater Calculator](#).

## **8. Assess the costs and benefits of the recommended green infrastructure projects**

- Develop an investment/funding strategy for the green infrastructure projects, identify potential funding sources, and outline how green infrastructure will be included in capital planning.
- Benefits and costs should be assessed to address both financial and non-financial issues (e.g., aesthetic improvement, reduce nuisance flooding, socioeconomic benefits, and decrease CSO events).

*It is important to note that completing this action does not absolve municipalities of any obligations related to their stormwater or CSO permits, and does not guarantee that a municipality meets or exceeds their permit requirements.*

**Tier 3 Green Infrastructure Strategic Plan [10 Points]**

The third tier is the Green Infrastructure Strategic Plan, which includes the requirements of Tiers 1 and 2, plus identifies long-term (i.e., 5-20 years) green infrastructure projects and policy recommendations for community-wide green infrastructure implementation. The Green Infrastructure Strategic Plan should provide a holistic and community-wide strategy for achieving the maximum benefits from green infrastructure, including long-term green infrastructure projects as well as land use and zoning policy changes. To earn points for Tier 3, the Green Infrastructure Strategic Plan must complete the following steps.

**1. Complete the requirements of Tier 1**

**2. Complete the requirements of Tier 2**

**3. Identify green infrastructure siting opportunities and constraints.**

For each subwatershed and sewershed, identify green infrastructure siting opportunities and constraints. These should be identified based on factors such as parcel ownership (including public property, such as parks, buildings, parking areas, and roads, vacant lots, and private property), slope, parcel size, soil type, groundwater contamination, land use and community input. This evaluation should incorporate a combination of available data with selective field evaluations, especially for major opportunity sites. Follow the guidance for technical feasibility provided in Tier 2 - Section 4) Identify Potential Sites.

**4. Set long-term (5-20 years) goals**

Impervious Cover Management Goal: The community should set a reasonable and feasible impervious cover management goal for the municipality to achieve within a long-term timeframe (i.e., 5-20 years) (Note: Tier 2 sets immediate and short-term goals, while Tier 3 adds long-term goals). This goal is a percentage of impervious surfaces where impervious surfaces will be converted to pervious surfaces and/or where runoff from impervious surfaces will be managed using green infrastructure measures. Each municipality must consider its own context and capacity when setting a long-term impervious cover management goal, but the ranges of impervious cover reduction in Table 2 are recommended. As with Tier 2, the municipality should seek to achieve the recommended percentage goal, but that goal may be unrealistic in certain larger municipalities. In those cases, municipalities can opt for the recommended acreage of impervious cover managed instead.

**Table 2. Recommended Long-Term Impervious Cover Management Goals and Green Infrastructure Goals**

Existing Municipal Impervious Cover	Recommended Long Term (5-20 years) Impervious Cover Management Goal (%)	Recommended Impervious Cover Management Goal Area (acres)
0% to 10%	2%	25 acres
10.1% to 25%	5%	50 acres
>21.1%	10%	80 acres

Typically, volume of stormwater managed by green infrastructure is measured in cubic feet (ft<sup>3</sup>), but gallons (gal) are more widely understood by the public. (1 ft<sup>3</sup> = 7.48 gal).

Additional long-term goals and objectives related to flooding, MS4 pollution (if applicable), combined sewer overflows (if

applicable), and community objectives should be included, as determined through a community engagement process as described in Tier 2.

#### **5. Identify potential sites for long-term (i.e., 5-20 years) green infrastructure implementation**

Identify potential sites for long-term green infrastructure implementation, using the guidance from Tier 2. (Note: Tier 2 identifies potential sites for immediate and short-term green infrastructure projects, while Tier 3 adds sites for potential long-term green infrastructure projects). Follow the guidance for site identification provided in Tier 2, Section 4) Identify Potential Sites.

#### **6. Identify policy recommendations for green infrastructure implementation**

The plan should include policy recommendations that enable the municipality to incentivize or require green infrastructure. Such policy recommendations could include modifications to the municipal site plan review requirements, zoning code, or stormwater ordinance, among others. A model green infrastructure/stormwater ordinance is under development by New Jersey Future that will provide a guide for integrating green infrastructure into stormwater ordinances. The plan should identify the green infrastructure measures that provide highly obtainable benefits at low lifecycle costs at various scales for specific project sites, areas, watersheds, and sewersheds.

#### **7. Assess the water quantity benefits (stormwater runoff retention/detention) and water quality benefits (reduced non-point source pollution) of the recommended green infrastructure projects and policy measures**

Hydrologic and hydraulic modeling should be used to assess the runoff volume and water quality benefits of implementing green infrastructure, inform site selection, evaluate locations to identify optimal sites for green infrastructure interventions and establish performance metrics. The Tier 3 Green Infrastructure Strategic Plan should identify the potential for reduction of CSOs and MS4 pollution, as applicable, by subwatershed and sewershed, utilizing the optimum green infrastructure measures.

#### **8. Develop an Implementation Agenda for the recommended green infrastructure projects and policy measures**

The Tier 3 Green Infrastructure Strategic Plan should include a table that identifies funding sources, responsible parties, and timeframes for implementing each recommended green infrastructure project and policy measure. The Strategic Plan should identify maintenance requirements for green infrastructure projects, including frequency and responsible parties. It should also discuss the need for monitoring of green infrastructure projects.

### **What to submit to earn points for this action**

In order to earn points for this action, the following documentation must be submitted as part of the online certification application in order to verify that the action requirements have been met.

Description of Implementation – In the text box provided on the submission page for this action provide a short narrative of what has been accomplished, the impact it has or will have on the community.

#### ***Tier 1 Impervious Cover Assessment [5 Points]***

UPLOAD a copy of your Tier 1 Impervious Cover Assessment Report, which includes the following sections:

- Introduction to municipality and community context, pervious and impervious surfaces, water resources issues, and the need for an impervious cover assessment.
- GIS data-generated tables, maps, and pie charts illustrating general land use types and urban land uses in the municipality; impervious cover analysis for each subwatershed; and stormwater runoff volumes from impervious surfaces by watershed.

#### ***Tier 2 Green Infrastructure Action Plan [5 Points]***

UPLOAD a copy of your Tier 2 Green Infrastructure Action Plan which includes the following information:

- The previously completed Impervious Cover Assessment Report (Tier 1 requirement)
- Introduction to the municipality and community context, pervious and impervious surfaces, water resources issues,

baseline impervious cover as determined in the Tier 1 report, green infrastructure practices recommended, and the need for an impervious cover reduction action plan / green infrastructure feasibility study.

- Summary of community engagement activities.
- Immediate and short-term (i.e., < 5 years) goals.
- Preliminary list and map of potential sites for green infrastructure implementation, including any photos of field visits to potential sites, as needed.
- Final list and map of at least 3 selected sites for green infrastructure implementation, with a summary of calculations for potential impervious cover/runoff/pollution reduction and cost estimates.
- Green infrastructure concept plans and information sheets for each selected site illustrating the recommended green infrastructure practices and calculations for potential impervious cover/runoff/pollution reduction and cost estimates.

### ***Tier 3 Green Infrastructure Strategic Plan [10 Points]***

UPLOAD a copy of your Strategic Plan, which includes the following information:

- The previously completed Impervious Cover Assessment Report and Green Infrastructure Action Plan (Tiers 1 and 2 requirements)
- Additional long-term (i.e., 5-20 years) goals.
- Green infrastructure siting opportunities and constraints evaluation.
- Preliminary list and map of additional potential sites for long-term green infrastructure implementation, including any photos of field visits to potential sites, as needed.
- Final list and map of selected sites for long-term green infrastructure implementation, with a summary of calculations for potential impervious cover/runoff/pollution reduction and cost estimates.
- Hydrologic and hydraulic analyses documenting the water quantity benefits (stormwater runoff retention/detention) and water quality benefits (reduced non-point source pollution) of the recommended green infrastructure projects and policy measures.
- Funding strategy and cost-benefit analysis of recommended green infrastructure projects and policy measures.
- Implementation agenda with policy recommendations and incentives, funding or financing mechanisms, responsible parties, timeframes, and maintenance for capital projects.

### **Approved Action Expiration Date**

Approved actions will be set to expire 5 years from the date the plan was completed.

### **IMPORTANT NOTES:**

**There is a limit of six uploaded documents per action and individual files must not exceed 30 MB. Excerpts of relevant information from large documents are recommended.**

**All action documentation is available for public viewing after an action is approved. Action submissions should not include any information or documents that are not intended to be viewed by the public.**

### **Spotlight: What NJ towns are doing**

The Rutgers Water Resources Program completed Impervious Cover Assessments for 54 municipalities in the Raritan Basin, six municipalities in Warren County, three municipalities in Salem County, seven coastal communities in Monmouth County, and Hamilton Township in Mercer County. The Stony Brook Millstone Watershed Association is currently preparing Impervious Cover Assessments for 19 municipalities in the Millstone River Watershed. Many of these municipalities are using the concept plans in the Impervious Cover Assessments to begin implementing green infrastructure in their communities. Rutgers Water Resources and the Passaic Valley Sewerage Commission have completed Green Infrastructure Action Plans for all municipalities in their service area. The City of Hoboken has completed a Green Infrastructure Strategic Plan.

### **Resources**

The Rutgers Water Resources Program is available to assist communities in all three tiers of green infrastructure planning. Additionally, the Rutgers Water Resources Program offers training on how to identify green infrastructure

opportunities for volunteers to learn to identify sites for concept plans. Many of the NJDEP Americorps Watershed Ambassadors take this training and could help municipalities develop Tier 1 Impervious Cover Assessments.

Engineering/environmental consulting firms throughout New Jersey can provide support through professional services contracts.

Grant and foundation funding sources for green infrastructure are rapidly evolving. Previous green infrastructure planning documents have been funded by a variety of sources, such as the National Fish and Wildlife Foundation, NJDEP, New Jersey Sea Grant Consortium, the William Penn Foundation, and individual municipalities.

***Technical Resources:***

[New Jersey Green Infrastructure Guidance Manual](#)

[New Jersey Rain Garden Manual](#)

[Rutgers Water Resources Introduction to Green Infrastructure](#)

[Rutgers Water Resources Green Infrastructure Fact Sheets](#)

[US EPA Green Infrastructure Information](#)

[NJDEP Green Infrastructure Information](#)

[NJDEP Guidance Document for Green Infrastructure in Long Term Control Plans](#)

***Mapping Resources and Resiliency Planning Tools:***

[NJ Flood Mapper](#)

[NJ ADAPT](#)

[Getting To Resilience](#)

[NJGIN New Jersey Geographic Information Network](#)

[NJDEP GeoWeb Environmental Mapping Tool](#)

[NJDEP 3.0 HUD Environmental Review Tool](#)

[NJDEP Municipal recreation and open space inventory \(ROSI\)](#)

[Google Maps](#)

[EPA Stormwater Calculator](#)

[USGS Web Soil Survey](#)

[Climate Central Surging Seas](#)

[NOAA Sea Level Rise Viewer](#)

[Environmental Protection Agency Climate Ready Water Utilities](#)

***Sample Planning Documents:***

[New Brunswick Impervious Cover Assessment](#)

[Hillsborough Impervious Cover Assessment](#)

[Impervious Cover Assessments and Reduction Action Plans for Raritan River Basin Municipalities](#)

***Sample Green Infrastructure Action Plans:***

Camden Green Infrastructure Feasibility Study

Trenton Green Infrastructure Feasibility Study

Newark Green Infrastructure Feasibility Study

Paterson Green Infrastructure Feasibility Study

Impervious Cover Assessments and Reduction Action Plans for Raritan River Basin Municipalities

***Sample Green Infrastructure Strategic Plans:***

New York City Green Infrastructure Plan

Milwaukee Metropolitan Sewerage District Fresh Coast Green Solutions Plan

Hoboken Green Infrastructure Strategic Plan

Vermont Green Infrastructure Strategic Plan

Lancaster Green Infrastructure Plan

***Green Streets:***

Green Streets: A Conceptual Guide to Effect Green Streets Design Solutions Residential Streets, Commercial Streets, Arterial Streets, Alleys

National Association of City Transportation Officials Urban Street Stormwater Guide

Promoting Green Streets – A Recipe for Integrating Water and Transportation Infrastructure Investment (River Network)

EPA's Learn About Green Streets