Impervious Cover Assessment and Reduction Action Plan for Fair Haven, New Jersey

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Rutgers Cooperative Extension

Rutgers Cooperative Extension (RCE) helps the diverse population of New Jersey adapt to a rapidly changing society and improves their lives through an educational process that uses science-based knowledge.
The Water Resources Program is one of many specialty programs under Rutgers Cooperative Extension.

Our Mission is to identify and address community water resources issues using sustainable and practical science-based solutions.

The Water Resources Program serves all of New Jersey, working closely with the County Extension Offices.
The Impact of Development on Stormwater Runoff

More development → More impervious surfaces → More stormwater runoff
The **Urban** Hydrologic Cycle

- Condensation
- Much less infiltration
- Roofs, roads stop infiltration
- Low groundwater flow
- Soil
- More runoff:
  - More
  - No rain: streams dry up
  - Rain: streams flood
- Evaporation
Original ICM developed based on 200+ reports and papers

Green Infrastructure

...an approach to stormwater management that is cost-effective, sustainable, and environmentally friendly

Green Infrastructure projects:

• capture
• filter
• absorb
• reuse

stormwater to maintain or mimic natural systems and treat runoff as a resource
Green Infrastructure includes:

- green roofs
- rainwater harvesting
- tree filter/planter boxes
- rain gardens/bioretention systems
- permeable pavements
- vegetated swales or bioswales
- natural retention basins
- trees & urban forestry
- green streets
It’s all about managing impervious surfaces!

Eliminate it!

Change it!

Disconnect it!

Reuse it!
Impervious Cover Assessment
Impervious Cover Assessment

• Analysis completed by watershed and by municipality
• Use 2007 Land Use data to determine impervious cover
• Calculate runoff volumes for water quality, 2, 10 and 100 year design storm and annual rainfall
• Contain three concept designs
Barren Land 0.4%
Forest 2.5%
Wetlands 3.7%
Water 24.2%
Urban 69.2%
Medium Density Residential 61.2%
Low Density Residential 14.0%
Rural Residential 15.0%
Recreational Land 3.6%
Mixed Urban 0.9%
Commercial 5.3%
<table>
<thead>
<tr>
<th>Watershed</th>
<th>Total Area (ac)</th>
<th>Impervious Cover (ac)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Navesink River</td>
<td>2,632.0</td>
<td>546.9</td>
<td>27.6%</td>
</tr>
<tr>
<td>Shrewsbury River</td>
<td>39.6</td>
<td>5.9</td>
<td>15.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,671.6</strong></td>
<td><strong>552.9</strong></td>
<td><strong>27.3%</strong></td>
</tr>
<tr>
<td>Subwatershed</td>
<td>NJ Water Quality Storm (MGal)</td>
<td>Annual Rainfall of 44” (MGal)</td>
<td>2-Year Design Storm (3.3”) (MGal)</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------------------------</td>
<td>-------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Navesink River</td>
<td>18.6</td>
<td>653.4</td>
<td>50.5</td>
</tr>
<tr>
<td>Shrewsbury River</td>
<td>0.2</td>
<td>7.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Total</td>
<td>18.8</td>
<td>660.5</td>
<td>51.0</td>
</tr>
</tbody>
</table>
WE LOOK HERE FIRST:

- Schools
- Churches
- Libraries
- Municipal Building
- Public Works
- Firehouses
- Post Offices
- Elks or Moose Lodge
- Parks/ Recreational Fields

- 20 to 40 sites are entered into a PowerPoint
- Site visits are conducted
Fair Haven Township
Impervious Cover Assessment
Fair Haven Police Department, 35 Fisk Street

PROJECT LOCATION:

SITE PLAN:

1. BIORETENTION SYSTEMS: Rooftop runoff from the building can be captured, treated, and infiltrated by installing a bioretention system. Bioretention systems can reduce sediment and nutrient loading to the local waterway while providing beautiful landscaping.

2. POROUS PAVEMENTS: A section of the parking lot can be converted to porous pavement. This can allow runoff from the parking lot to infiltrate into the ground reducing the volume that enters the catch basin at the end of the driveway.

1. BIORETENTION SYSTEM

2. POROUS PAVEMENT
Fair Haven Township
Impervious Cover Assessment
*Fair Haven Volunteer Fire Company, 645 River Road*

**PROJECT LOCATION:**

**SITE PLAN:**

**1. BIORETENTION SYSTEMS:** A bioretention system can be installed in the turf grass off the east corner of the building to capture, treat, and infiltrate runoff from the rooftop and parking lot. The bioretention system can also provide habitat for birds, butterflies, and pollinators.

**2. RAINWATER HARVESTING SYSTEMS:** A cistern can capture a portion of the stormwater runoff from the building’s rooftop. Harvesting the runoff will allow the stormwater to be used for washing emergency vehicles.

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**1. BIORETENTION SYSTEM**

**2. RAINWATER HARVESTING SYSTEM**
Fair Haven Township
Impervious Cover Assessment
*Church of the Nativity, 180 Ridge Road*

**PROJECT LOCATION:**

**SITE PLAN:**

1. **BIORETENTION SYSTEM:** A bioretention system can be installed off the northern side of the building to intercept runoff where it can be treated and allowed to infiltrate. The rain garden can also provide habitat for birds, butterflies, and pollinators.

**RESTRICTIVE SOILS IN THIS REGION**
- Site specific soil testing must be conducted.
- Green infrastructure in this area may require underdrain systems.
Impervious Cover Reduction Action Plan
Water Resources Program

SITES WITHIN THE NAIVESINK RIVER SUBWATERSHED:

1. ACME Shopping Center/Fair Haven Martial Arts
2. Boynton & Boynton Insurance
3. Christ Church United Methodist
4. Church of the Nativity
5. Fair Haven Animal Hospital
6. Fair Haven Police Department
7. Fair Haven Volunteer Fire Company
8. Fisk Chapel AME Church
9. Kingdom Hall of Jehovah's Witnesses
10. Knights of Columbus
11. Knollwood School
12. Smart Start Preschool
13. Two Rivers Animal Hospital
Parking spots west of the building can be replaced with porous asphalt to capture and infiltrate stormwater. Rain garden adjacent to the building can capture, treat, and infiltrate roof runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

<table>
<thead>
<tr>
<th>Impervious Cover</th>
<th>Existing Loads from Impervious Cover (lbs/yr)</th>
<th>Runoff Volume from Impervious Cover (Mgal)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>For the 1.25” Water Quality Storm</td>
</tr>
<tr>
<td>%</td>
<td>sq. ft.</td>
<td>TP</td>
</tr>
<tr>
<td>39</td>
<td>51,406</td>
<td>2.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommended Green Infrastructure Practices</th>
<th>Recharge Potential (Mgal/yr)</th>
<th>TSS Removal Potential (lbs/yr)</th>
<th>Maximum Volume Reduction Potential (gal/storm)</th>
<th>Peak Discharge Reduction Potential (cu. ft./second)</th>
<th>Estimated Size (sq. ft.)</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioretention systems</td>
<td>0.023</td>
<td>4</td>
<td>1,773</td>
<td>0.07</td>
<td>225</td>
<td>$1,125</td>
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<tr>
<td>Pervious pavements</td>
<td>0.124</td>
<td>21</td>
<td>9,351</td>
<td>0.35</td>
<td>846</td>
<td>$21,150</td>
</tr>
<tr>
<td>Disconnected downspouts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$750</td>
</tr>
</tbody>
</table>
GREEN INFRASTRUCTURE RECOMMENDATIONS

Fair Haven Police Department
- disconnected downspouts
- pervious pavements
- bioretention / rain gardens
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS
Fair Haven Borough
Final Thoughts

• Plans promote action
• Plans are a conduit for funding
• Impervious cover reduction action plan provide sites for developers to offset impacts
• Wide range in cost of projects (Eagle Scout projects to economic stimulus money projects)
• Foundation for stormwater utilities, watershed restoration plans, stormwater mitigation plan, and/or integrated water quality plans
Next Steps

• Funding is available to implement some of the concept plans or other projects identified in the action plan

• Decide who will take ownership of the assessment and action plan
  – Township Committee
  – Township Engineer and Business Administrator
  – Environmental Commission
  – Sustainable Jersey Green Team
  – Local Watershed Association

• Form a Municipal Action Team
Questions?

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