

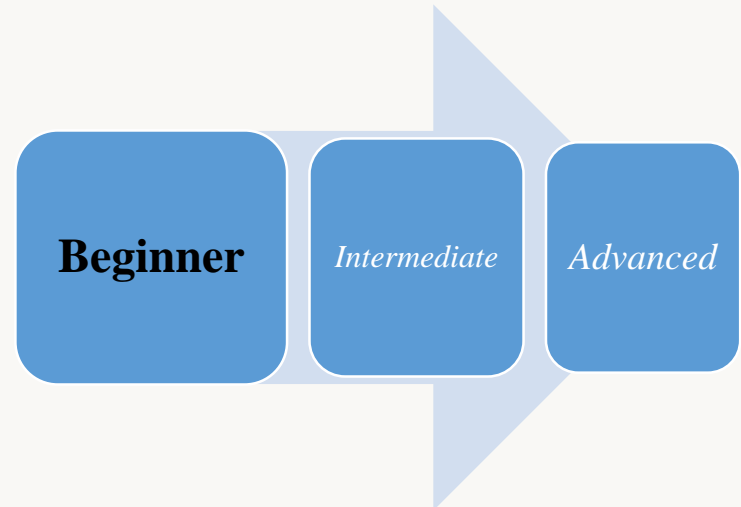
# **Green Infrastructure Policy and Ordinances: Local Planning Tools for Green Infrastructure**

*Planning documents, programs and ordinances*

Stacy Krause, PP/AICP

# Beginner's approach to GI in municipal planning

- Lower in cost
- More easily garner public support and acceptance
- Low tech/easily understood by the general public
- Public can participate in the planning and implementation processes



# Incorporate GI into Streetscape Design

- Examples: Stormwater planters, bump-outs, street trees
- Benefits aside from SWM: public space enhancement, traffic calming
- Resources:
  - Seattle Streetscape Design Guidelines
  - Philadelphia Green Streets Design Manual
  - Philadelphia Water Dept. Stormwater Bumpout
  - Cranbury, NJ Landscaped Cul-de-sac Ordinance
  - Chicago Green Alley Program
  - Passaic County Green Streets Program

# A Deeper Look: Cranbury, NJ Landscaped Cul-de-sac Ordinance



# Adopt an Ordinance Implementing a Community Gardens Program

- Examples: individual plots, cooperative gardens, youth programs, market gardens (sell produce)
- Benefits aside from SWM: environmental sustainability, local agriculture enhancement, may spur job creation
- Resources:
  - Cherry Hill, NJ Plant-A-patch Program
  - Jersey City, NJ Adopt-A-Lot Community Gardening Program Ordinance 15.088

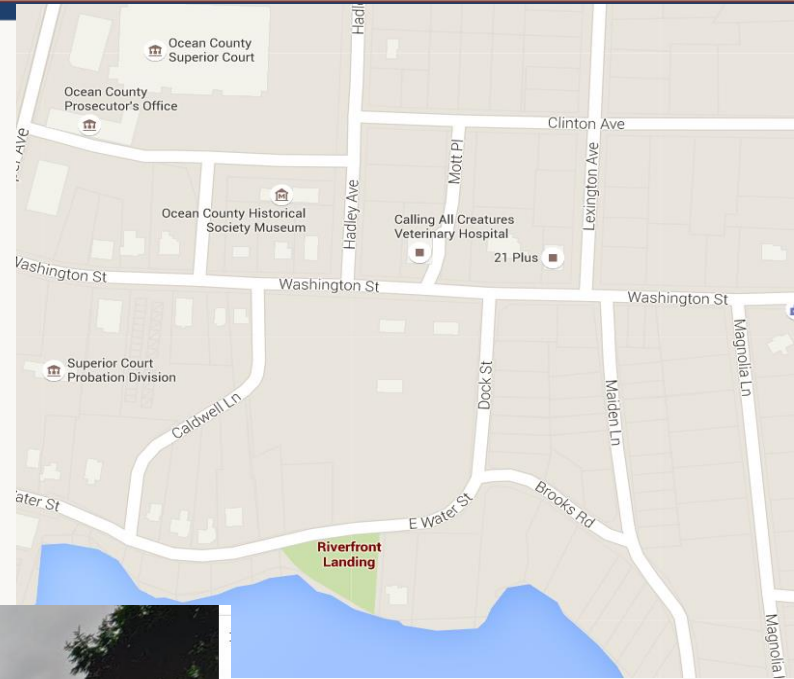
# A Deeper Look: Jersey City Adopt-A-Lot Community Gardens Program – Riverside Community Garden



# Implement a Pocket Parks Initiative

- Examples: youth program sponsored, corporate “adopt a spot”, community group sponsored (Rotary), municipal open space
- Benefits aside from SMW: public health and pedestrian atmosphere enhancement
- Resources:
  - Riverfront Landing: Toms River, NJ
  - J. F. Collins Park: Philadelphia
  - National Recreation and Park Association Issue Brief

# A Deeper Look: Riverfront Landing, Toms River, NJ





# Reconsider Current Parking Requirements

- Examples: shared parking, lot size reduction, space size reduction
- Benefits aside from SWM: pedestrian atmosphere enhancement, traffic calming
- Resources:
  - Hanover, NJ Ordinance 166-157
  - Portland Off-Street Parking Management and Guiding Policies
  - Camden, NJ Ordinance 577

## A Deeper Look: Camden, NJ Parking and Loading Design Standards

- Reduces mandatory parking spaces where vehicles overhang landscaped areas
- Allows for permeable materials for overflow parking
- Allows for reduced parking rations for various reasons, including where mass transit exists
- Allows for shared parking and provides a model agreement



# Analyze and Preserve/Enhance Your Tree Cover

- Examples: Municipal Tree Inventory, Tree Preservation Program
- Benefits: stormwater management, carbon sequestering
- Resources:
  - High Bridge, NJ Tree Preservation Code Chapter 380
  - Montclair, NJ Preservation of Shade Trees Ordinance 0-12-44
  - US Forest Service i-Tree Assessment Tool

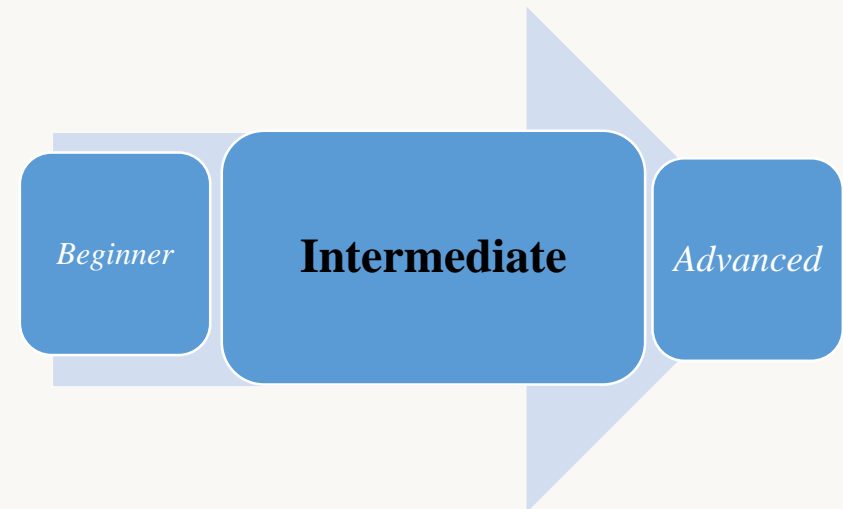
## A Deeper Look: Montclair, NJ Preservation of Shade Trees Ordinance 0-12-44

- Requires tree removals to be done by licensed contractors and mandates permits for removals on private property
- Defines what is a township tree and if and how to prune
- Regulations for residents planting in the right of way
- Tree replacements or contribution to tree fund



# Intermediate/Tier 2 Approaches to GI in Municipal Planning

- Increased cost
- May need more public education on topic
- More intricate/requires more planning
- Public can participate in the planning and implementation processes, after adequate education



# Include GI in the Circulation Element

- Examples: walking/biking trails, GI at ride share, taxi lots, and rail stations
- Benefits: reduced impervious surface/increased permeable, pedestrian atmosphere enhancement, traffic calming, public health enhancement
- Resources:
  - West Windsor, NJ Circulation Plan
  - Philadelphia Integrated Stormwater Management Resources (Section 3.5.4 Trails)
  - Rt. 32 Park and Ride Lot Pilot Project, Richmond, VA
  - Metrolink Stations TOD Plan, St. Louis

# A Deeper Look: Philadelphia Integrated Stormwater Management Resources (Section 3.5.4 Trails)

- Defines a trail based on stormwater regulations
- GI actions include:
  - Suggests pervious pavement, gravel, or mulch
  - Grading impervious towards pervious for disconnection
  - Tree disconnection



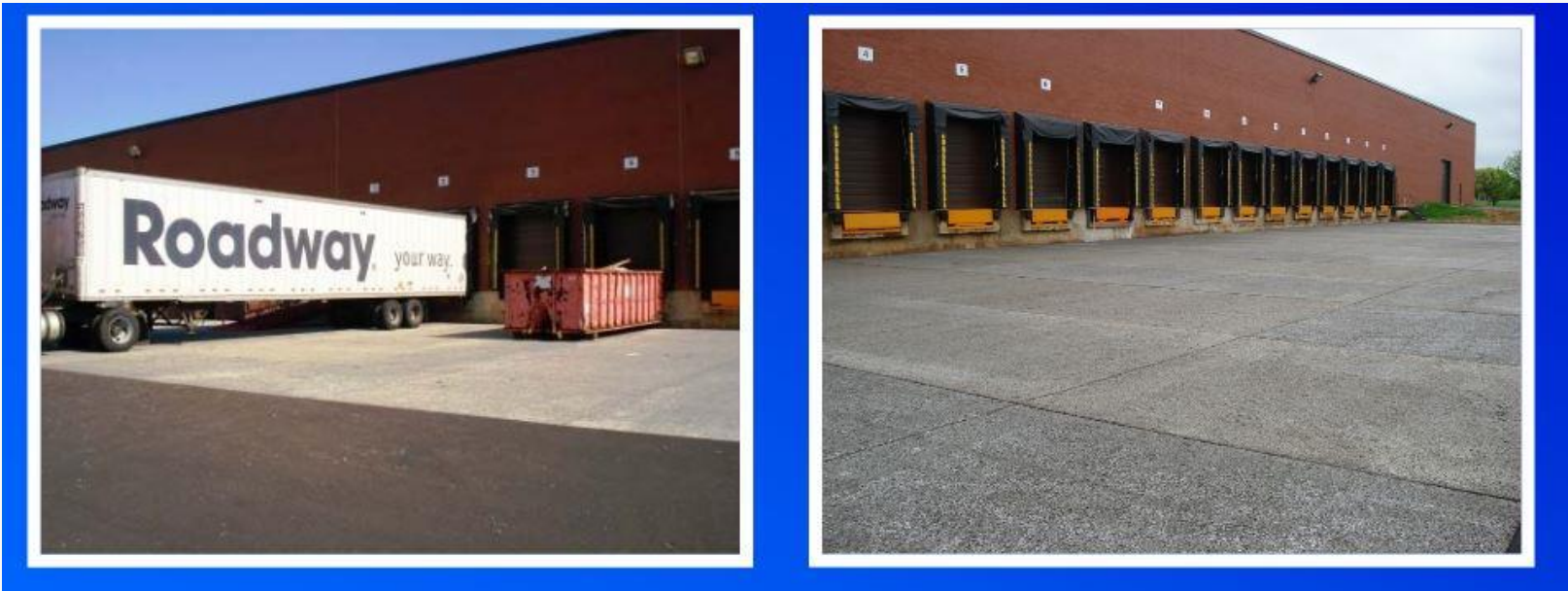
Trails are well-suited for installation of pervious surfaces such as pervious pavement, gravel, or mulch.

# Include GI in Curb and Sidewalk Design and Regulations

- Examples: curb cuts, flush curbs, wheel stops, permeable sidewalks
- Benefits: reduced impervious surface/increased permeable
- Resources:
  - Cranbury, NJ Ordinance 04-08-09 Land Development to Implement Low Impact Development, Nonstructural Best Management Practices for Stormwater Runoff
  - Franklin Lakes, NJ Stormwater Management Ordinance
  - San Francisco Green Landscaping Ordinance



## A Deeper Look: Cranbury, NJ Ordinance 04-08-09 Land Development to Implement Low Impact Development, Nonstructural Best Management Practices for Stormwater Runoff



- Mandates all parking lots with a capacity of 40 or more vehicles be designed to include pedestrian walkways constructed with pervious paving systems and have landscaped dividers
- Upstream parking areas to have flush curbing

# Encourage the use of Green Walls and Roofs

- Examples: façade improvement, commercial redevelopment, on bus shelters
- Benefits: reduced impervious surface/increased permeable, urban heat island mitigation, aesthetics, biodiversity, sound control, energy savings
- Resources:
  - Fairfield, NJ Ordinance #2013-19, Route 46 Special Highway District Zoning
  - Edgewater, NJ Ordinance 240-117.3
  - Princeton, NJ Green Development Information Statement/Checklist
  - Philadelphia Water Department Green Roof Bus Shelter

## A Deeper Look: Philadelphia Water Department Green Roof Bus Shelter

- Filled with vegetation, an engineered water retention fabric, a root barrier, and a reinforcement layer
- Private firms donate their services for constructions and City offers advertising on the bus shelter to help pay for future projects



# Include GI in Historic Preservation Planning

- Examples: façade improvement, block-scale design, assistance to those living in a historic district
- Benefits: stormwater management while maintaining structural integrity and historic design
- Resources:
  - Block-Scale GI Design for the Historic Northwest Quadrant, City of Beaufort, SC
  - GI for Historic Districts in Ontario County, NY

# A Deeper Look: Block-Scale GI Design for the Historic Northwest Quadrant, City of Beaufort, SC

- Vegetated GI
- Permeable Pavement
- Stormwater Wetland



Figure 5-1. Available green infrastructure practice area on Duke Street.

# Development Incentives for GI

- Examples: Increased FAR with GI, excluding GI infrastructure from FAR
- Benefits: manage development and growth, increased use of GI
- Resources:
  - Ocean City Residential Mechanical Ordinance
  - Portland Ecoroof Floor Area Ratio (FAR) Bonus Option

## A Deeper Look: Portland Ecoroof Floor Area Ratio (FAR) Bonus Option

- Developer can earn larger development footprint or additional FA if ecoroof included in design

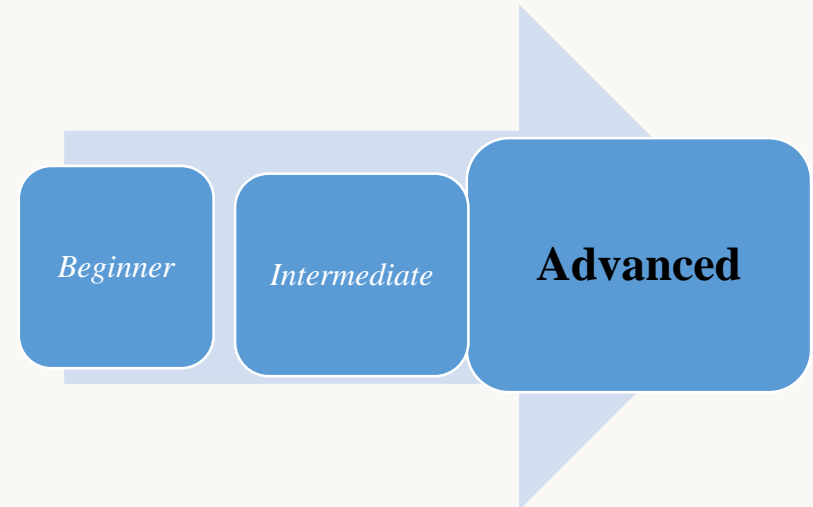
*working green for clean rivers*

**Ecoroof  
Floor Area Ratio  
Bonus Option**



# Advanced/Tier 3 Approaches to GI in Municipal Planning

- Increased cost
- Greater public education on topic
- More intricate/requires professional assistance
- Not common for public to participate in the planning and implementation processes





# Monetary Incentives for GI

- Examples: Rain Barrel Rebate Program, Green Roof Tax Credit, Permeable Pavement Credit
- Benefits: increased use of GI, cost savings to property owners
- Resources:
  - Raritan River Rain Barrel Rebate Program
  - Philadelphia Commercial Green Roof Tax Credit
  - Permeable Pavement Credit, LaCrosse, WI

## A Deeper Look: Raritan River Rain Barrel rebate Program

- Rebates up to \$200 to residences in Somerville, Bridgewater and Raritan that install rain barrels meeting program criteria



# Incorporate GI Actions into Large-Scale Land Use Plans

- Examples: Brownfields Redevelopment, Waterfront Public Access, School Facilities Planning, Age-Restricted Housing, Low Income Housing
- Benefits: increased use of GI through mandated planning
- Resources:
  - Jersey City Canal Crossing Redevelopment Planning
  - Waterfront South Rain Gardens – Camden, NJ (Brownfields)
  - Fort Washington Park, NY (Waterfront Public Access)
  - Sustainable Jersey Certification Program for Schools
  - NYC Soil and Water Conservation District (Age-Restricted and Low Income Housing)
  - Bronx River Houses, NY (Low Income Housing)
  - Amsterdam Houses, NYC (Low Income Housing)

## A Deeper Look: Waterfront South Rain Gardens - Camden, NJ

- Brownfields project on former gas station site
- Help to reduce flooding, reduce combined sewer backups and overflows, improve air water and climate quality, add open space and beautify neighborhoods.



# In conclusion.....

- Municipalities can start by completing small actions that are generally lower cost and can incorporate public participation
- Areas for the inclusion of GI in local planning in this presentation included:
  - Streetscape Design
  - Community Gardens
  - Pocket Parks
  - Parking Requirements
  - Street Trees
  - Circulation Element
  - Curbs and Sidewalks
  - Green Wall and Roof Technology
  - Historic Preservation Design Elements
  - Development and Monetary Incentives
  - Large-Scale Land Use Plans

# Further Resources for GI Planning and Implementation

- Rutgers SEBS Impervious Surface Assessment (ICA) E-learning tool  
<http://water.rutgers.edu/Projects/NFWF/NFWF.html>
- Rowan “Changing Landscapes in the Garden State” online GIS tool (Impervious Surface)  
[http://gis.rowan.edu/projects/luc/map\\_imperv.html#](http://gis.rowan.edu/projects/luc/map_imperv.html#)
- Impervious Surface Growth Model (USEPA) <http://www2.epa.gov/smart-growth/impervious-surface-growth-model>
- Stormwater to Street Trees: Engineering Urban Forests for Stormwater Management (USEPA, 2013) <http://water.epa.gov/polwaste/green/upload/stormwater2streettrees.pdf>
- i-Tree and i-Tree hydro (US Forest Service) <https://www.itreetools.org/index.php> and <http://www.itreetools.org/hydro/>
- Green Infrastructure Plan Element: Hoboken, NJ  
<https://onedrive.live.com/view.aspx?resid=2F0F556D773BC90F!2343&app=WordPdf>

# Further Resources for GI Planning and Implementation

- Open Space and Recreation Plan for the Township of South Harrison, NJ (DVRPC, 2009 <http://www.dvrpc.org/reports/08036.pdf>)
- Belmar: A Natural & Historical Treasure, Borough of Belmar, NJ (2008) <http://www.belmar.com/search.php>
- Manual of Build-Out Analysis (University of Massachusetts – Amherst, 1990) [http://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1023&context=larp\\_ms\\_projects](http://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1023&context=larp_ms_projects)
- Build-Out Analysis within a Hazard Mitigation Plan: Town of Saugus, Massachusetts Hazard Mitigation Plan (2011) [http://www.saugus-ma.gov/pages/SaugusMA\\_Fire/4\\_21\\_11%20DRAFT%20Saugus%20PDM.pdf](http://www.saugus-ma.gov/pages/SaugusMA_Fire/4_21_11%20DRAFT%20Saugus%20PDM.pdf)
- Hoboken Resiliency and Readiness Plan (2013) <http://www.hobokennj.org/docs/publicsafety/Hoboken-Resiliency-Plan.pdf>
- Sustainable Haworth, NJ (Sustainability Act of the Master Plan, 2012)
- The Madison Sustainability Plan: Fostering Environmental, Economic and Social Resilience  
“<https://www.cityofmadison.com/sustainability/documents/SustainPlan2011.pdf>”
- GI 101 – USEPA  
[http://water.epa.gov/infrastructure/greeninfrastructure/gi\\_what.cfm](http://water.epa.gov/infrastructure/greeninfrastructure/gi_what.cfm)

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