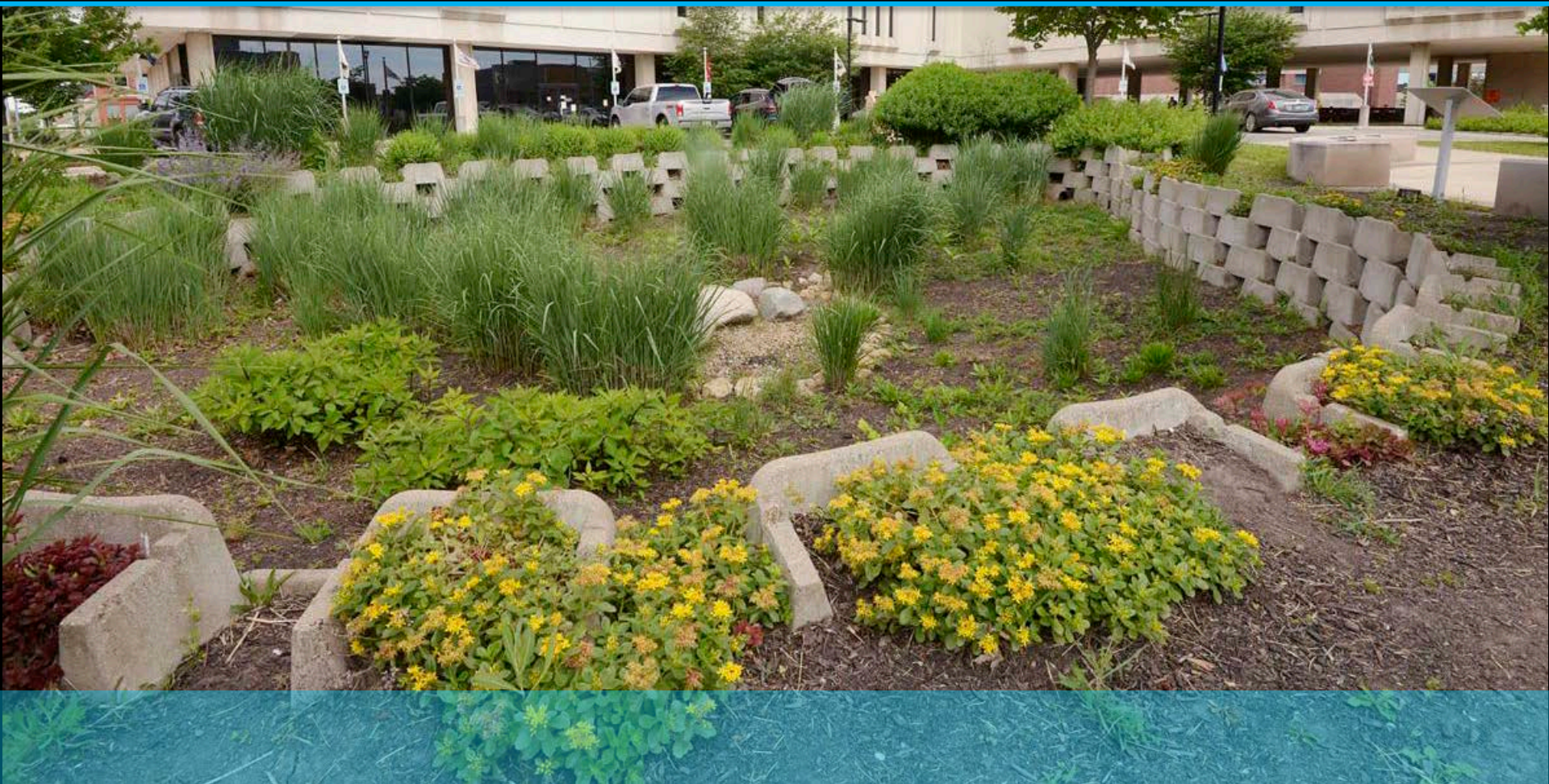


# Planning Infrastructure

## For Natural Resiliency & Green Solutions

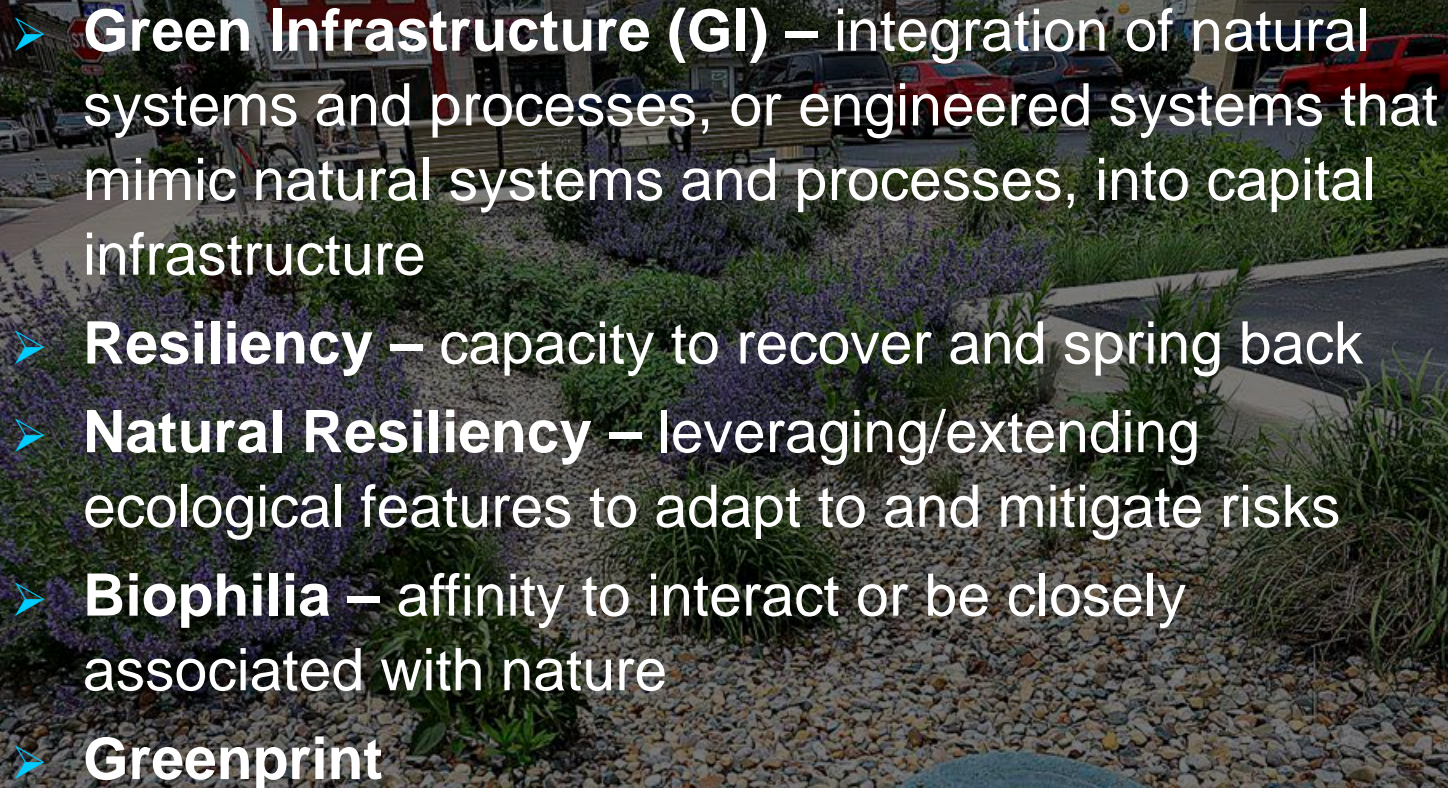


**DAVID P. GILMOUR, AICP**  
SENIOR PLANNER



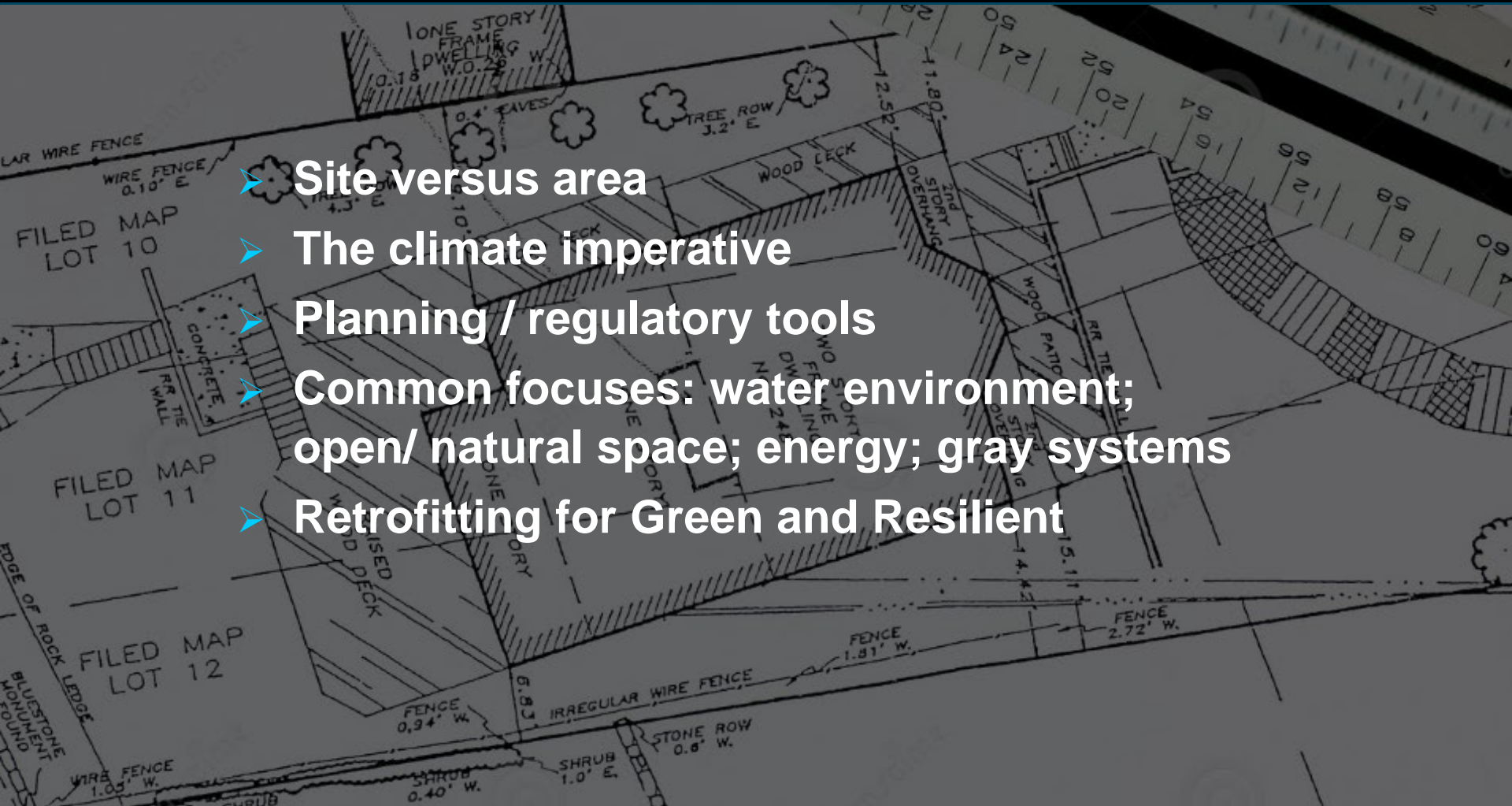


# GREEN SOLUTIONS/ NATURAL RESILIENCY

- 
- **Green Infrastructure (GI)** – integration of natural systems and processes, or engineered systems that mimic natural systems and processes, into capital infrastructure
  - **Resiliency** – capacity to recover and spring back
  - **Natural Resiliency** – leveraging/extending ecological features to adapt to and mitigate risks
  - **Biophilia** – affinity to interact or be closely associated with nature
  - **Greenprint**



# SESSION AGENDA

- 
- Site versus area
  - The climate imperative
  - Planning / regulatory tools
  - Common focuses: water environment; open/ natural space; energy; gray systems
  - Retrofitting for Green and Resilient

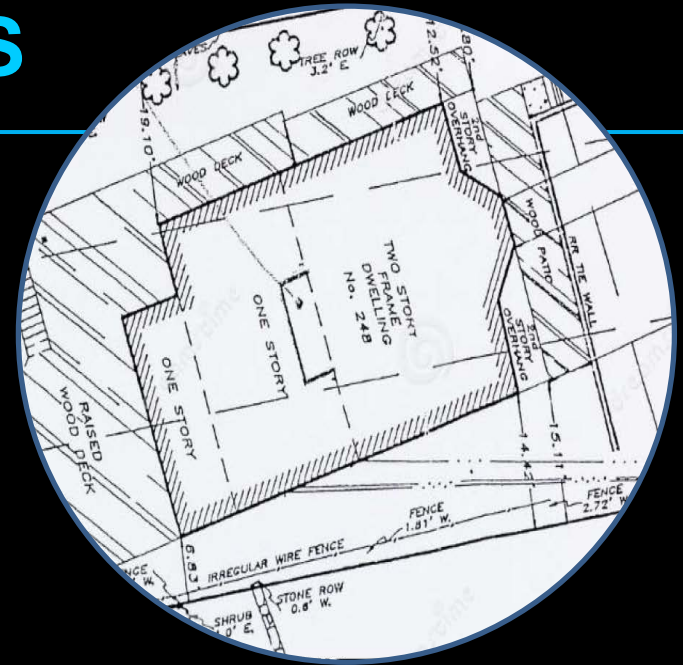
# OUTCOMES

## SCALES

- Onsite layouts
- Area infrastructure

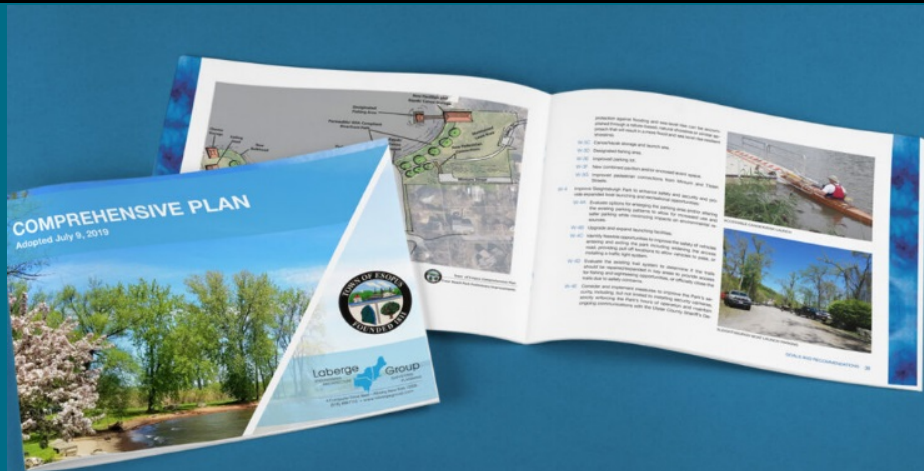
## ORGANIZE FOR:

- Safety / risk reduction
- Sustainability / functionality/ capacity utilization
- Quality Investment / Owner Value
  - USGBC Leadership in Energy & Environmental Design
    - Affirm sustainability objectives/ strategy
    - Market and fund projects



# HONING-IN

- Community development goals/ Comprehensive Plan
- Capital Improvement Plan (CIP)
- Area and subject-specific plans
- Policies – zoning, land use regulation, environmental policies





# WHAT'S CHANGING

- Average temperature
- Precipitation
- Sea level rise
- Extreme events including cold
- (Social values and physical and economic patterns will change a lot too!)



# ECOSYSTEM SERVICES

## PROVISIONING

Food/ water/energy

## REGULATING

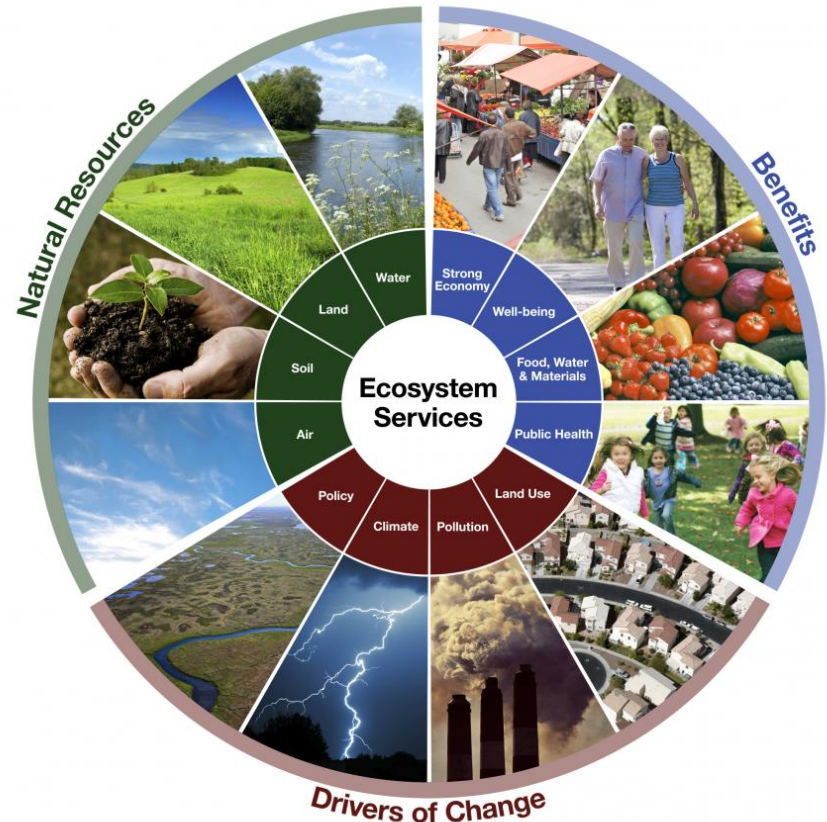
Clean air/ pollination/ sequestering carbon/ erosion control

## CULTURAL

Inherent to social/ knowledge systems: practices, art, architecture, beauty, recreation

## SUPPORTING SERVICES

Fundamental underlying processes: photosynthesis, nutrient cycling



# DECARBONIZATION & RESILIENCY

## WHAT WILL ECONOMIC RESTRUCTURING/ SHIFTS ENTAIL?

- Area avoidance? Strategic retreat?
  - Carbon pricing/ emission caps for more activities? Energy intensity measures?
  - Hardening your gray infrastructure?
  - New investment focuses?
  - Natural system restoration/ enhancement?
  - Technological changes?
- Are these topics in your master plan?
  - Site and capital planning provide points to coordinate on outcomes.





# CLCPA GOALS

40%

REDUCTION IN GHG BY 2030

80%

REDUCTION IN GHG BY 2050

**6 YEARS IS A RAPID PLANNING TIME HORIZON**

PLANNING INFRASTRUCTURE FOR NATURAL  
RESILIENCY & GREEN SOLUTIONS



# FRAMEWORKS/ GUIDELINES – LENS FOR AREA & SITE DEVELOPMENT

- Climate Leadership & Community Protection Act (& NYS Risk & Resiliency Act)
  - Climate Action Council scoping Climate Action Plan
- CLCPA influences local action
  - Climate Smart Communities
  - Clean Energy Communities
- New Smart Growth Comprehensive Planning Program CFA
- Federal? Sustainability? Readiness?

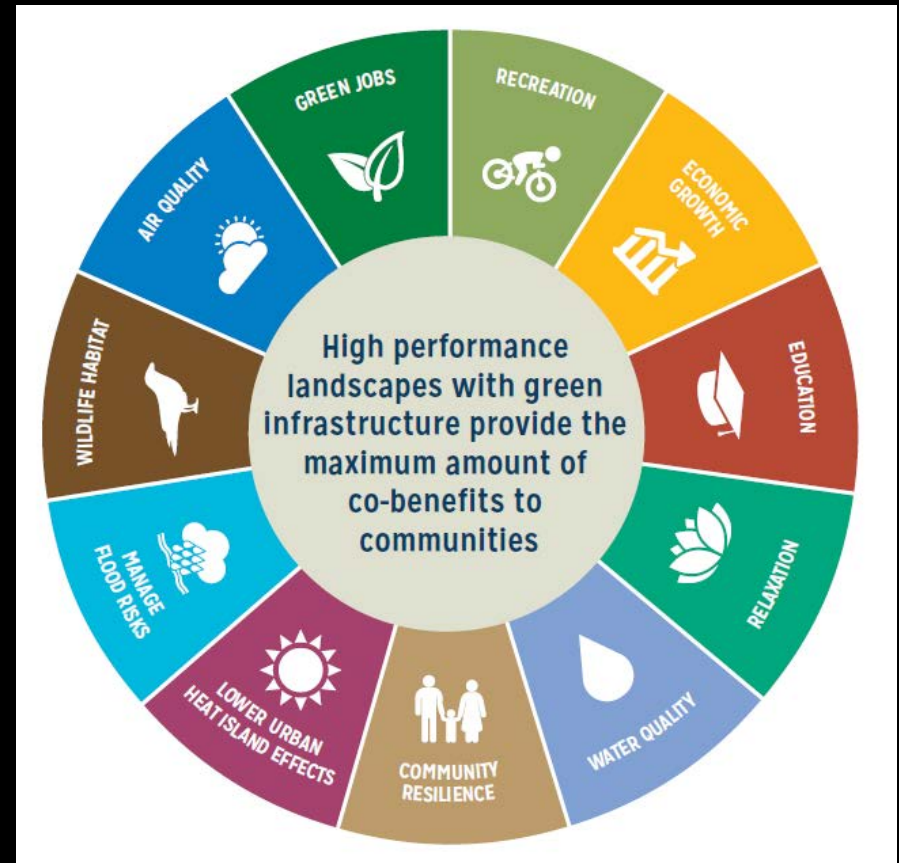




# NATURAL RESILIENCY / GREEN SOLUTION PLAYBOOKS

## ➤ Baselines

- Natural resources inventory
- Emissions inventories
- Energy assessments
- Vulnerability Assessments
- Open Space & Recreation
- State of operations / repair?
- Stormwater program
- Watershed plan



*Image from Resource Guide for Planning, Designing & Implementing Green Infrastructure in Parks, by NRPA & APA*

# WHAT SCENARIOS SHOULD YOUR COMMUNITY PREPARE FOR?

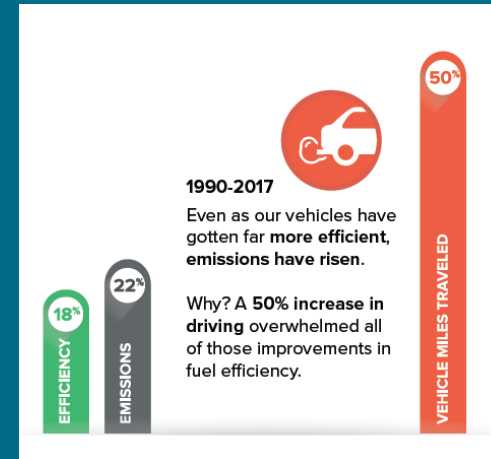
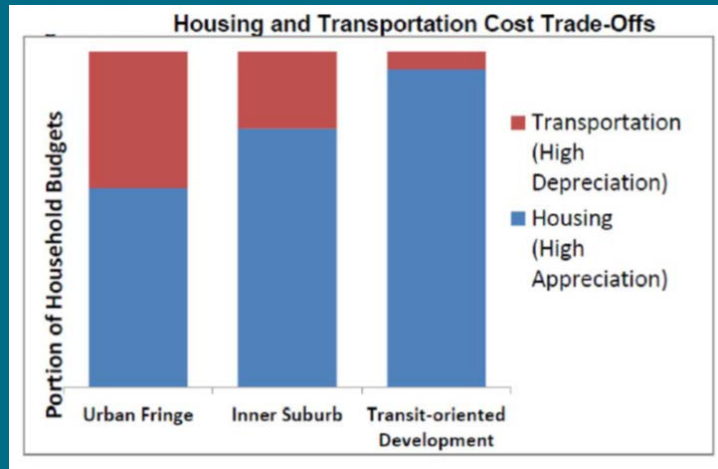
- Many natural/ manmade “hazards” possible
- Plan with flexibility and for contingencies
- Explore alternative best and good practice applications





# BUILDING VALUE / SMART LINKS

- Light / air / temperature
- Energy / power
- Transport linkage & access
- Water / Sewer
- Other?



*Selling Smart Growth by Todd Litman, VTPI, 2021 &  
Driving Down Emissions by Smart Growth America*

# NATURAL RESILIENCY / GREEN SOLUTION PLAYBOOKS

## ➤ Plans & Strategies

- Sustainable master plans
- Climate action plans
- Capital Improvement Plans
- District strategies
- Hazard Plans (Multi)
- Green Economic Development Plans (CSC)
- Operational Plans





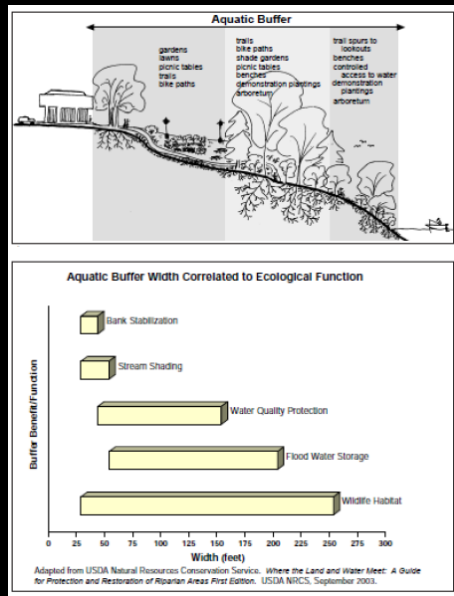
# SUSTAINABLE RISK MANAGEMENT – LOCATIONS TO SAVE

## SMART LOCATIONS FOR CONSERVATION & RESTORATION

- Water/ Wetland/ Floodplain
- Contamination?
- Habitat
- Other?



*A Guide to Aquatic Buffers  
– Westchester County*



*Smart Growth for Coastal  
& Waterfront Communities*

# VULNERABILITY & RISK ASSESSMENTS / BASE & ASSET EVALUATIONS

- Building on strengths / leveraging benefits
- Tools for understanding context
- Specific examinations into ways to mitigate and progress resiliency and enhance context
- Fuller-cost, triple bottom line and circular economy approaches seem to be gaining





# GI - REDUCE / ATTENUATE HAZARDS LIKE SEVERE RAINS

- So many benefits from green stormwater Infrastructure
- Laberge planners are often working on:
  - Interfaces with hard/ grey systems
  - Natural system and human settlement boundaries



VEGETATED BIOSWALES



PERMEABLE PAVEMENTS

# CONSIDERING AN INFRASTRUCTURE REPLACEMENT/ UPGRADE

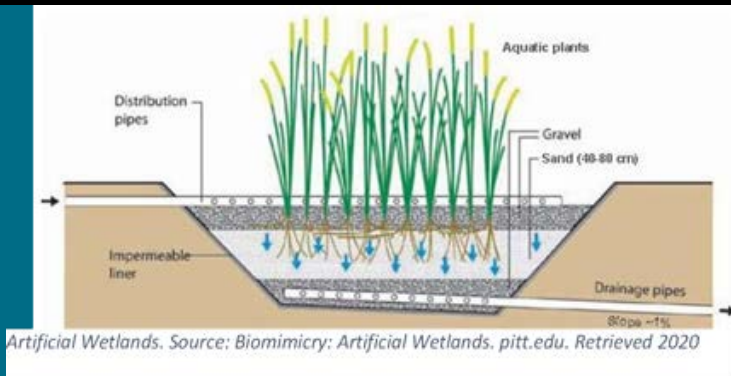
- Leverage/ obtain bang for buck
  - Corinth Streetscape Greening
    - Treatment BMPs to aid Hudson River quality
    - Systems correction and optimization
    - Streetscape enhancements

Village of Corinth Palmer Avenue Utility Reconstruction – 2021 Green Innovation Grant Program (GIGP) \$2.9 million

Green infrastructure practices including street tree planters and bioretention areas are part of stormwater improvements

# GREEN STORMWATER INFRASTRUCTURE POLICY TECHNIQUES

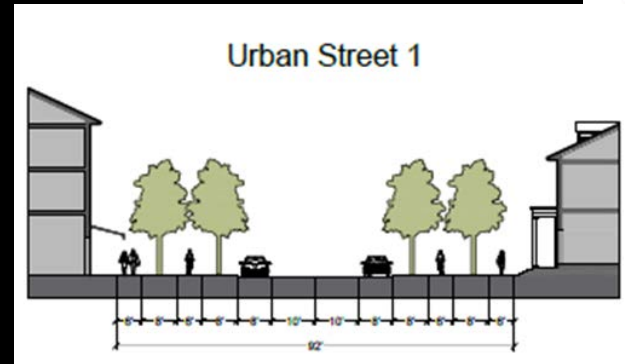
- Adjust local SWPPP threshold? (CSC: 1- 4 points for GI policy change/ incentives)
- Up to 14 points for “Using GI for Stormwater management in developed areas”
  - Capturing 5,000 cubic feet or more (4 points)
  - Documenting green stormwater infrastructure feasibility (2pts)





# ENSHRINING NATURAL & RESILIENCY FEATURES IN LOCAL POLICY

- Building, energy and fire codes – e-code stretch/ push?
- Wetlands/ buffers, floodplain and stream standards
  - 50% of wetlands in US have been lost
- Open space/ natural area preservation
- Landscaping criteria
- Subdivision / street codes
- Zoning and Form-Based Codes
  - district/ area treatments
- Spending



# RIGIDITY & INCENTIVES

## CONSIDER PERFORMANCE AIM AND TOOL

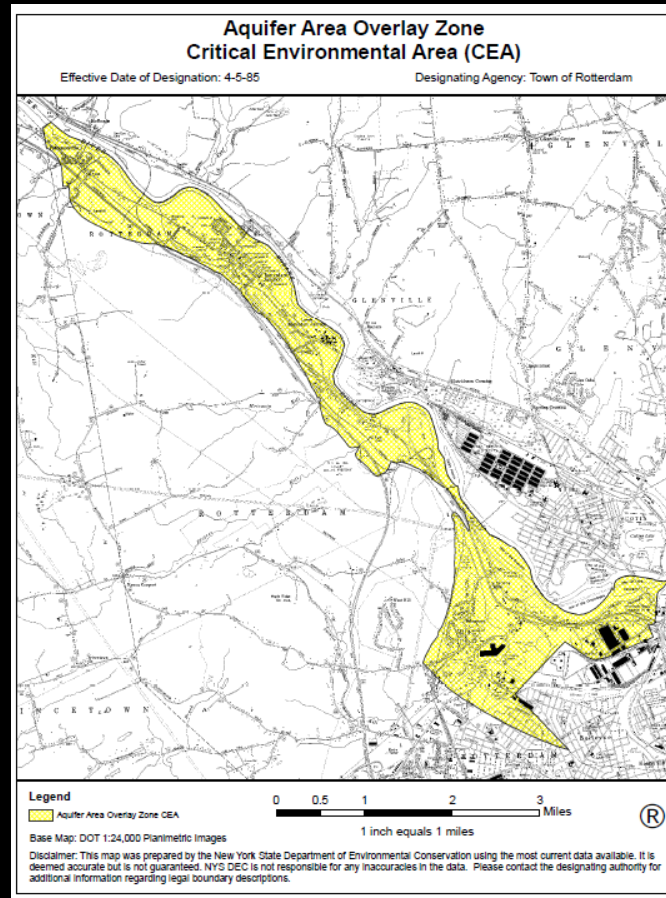
- Floodplains & Wetland
- Getting to yes with form, density and mixed-use
  - Define 'smart' and make it easier





# LANDSCAPE-LEVEL TOOLS

- Open space design / clustering
- Natural resource overlays
- Critical Environmental Area (CEA) designations



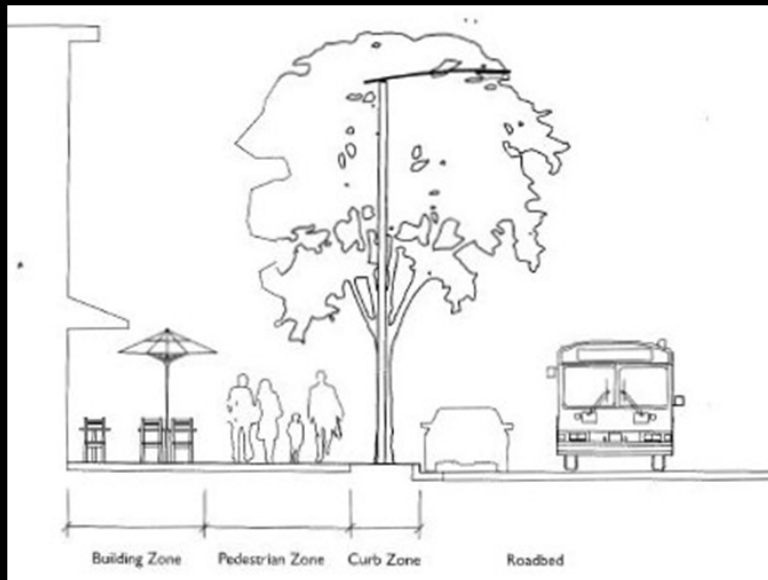
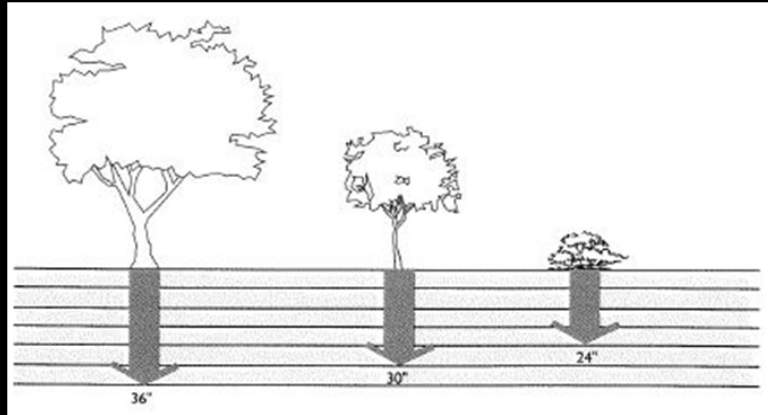
*Natural Resource Overlay District (NROD) protects habitat and functions of streams, riparian corridors, wetlands and the regulated wildlife habitat within the district.*



# LANDSCAPING

- Plantings/ natives
- Onsite xeriscaping/ edible gardens
- Manage wildland interface
- Lighting (nighttime)
- Character/ aesthetics/ civic realm

POSSIBILITY FOR  
LONG-TERM SAVINGS?



# TREES

## STREETSCAPES OFTEN DEFINED BY CANOPY, BUT MANAGEMENT AN AFTERTHOUGHT

- Takes decades / centuries to establish
- Shading and heat island attenuation
- Huge stormwater quantity and quality service

### NEED:

- Multiparty and qualified involvement, including Highway/ DPW
- Strategies for operation and maintenance and enhancement/ replacement

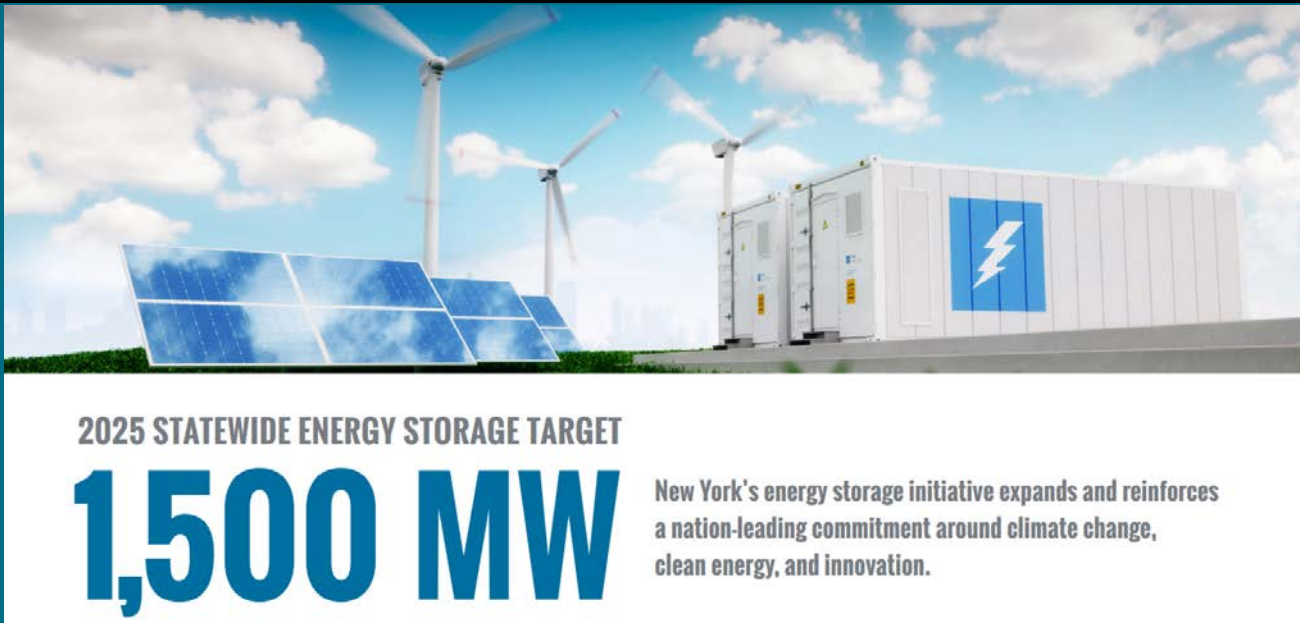
Resource: NYS Urban Forestry Program  
(CSC until July: undertake tree planting project/ program)



*Street Tree Wells & Stormwater Planters. Source: michigancompletestreets.wordpress.com. Retrived 2020.*

# ELECTRICAL GRID/ RENEWABLES

- Onsite power & battery storage
- Electrical lines layout - Underground?
- Electrical vehicles - Future role in distributed systems?
- Other emerging influences on spatial layouts?





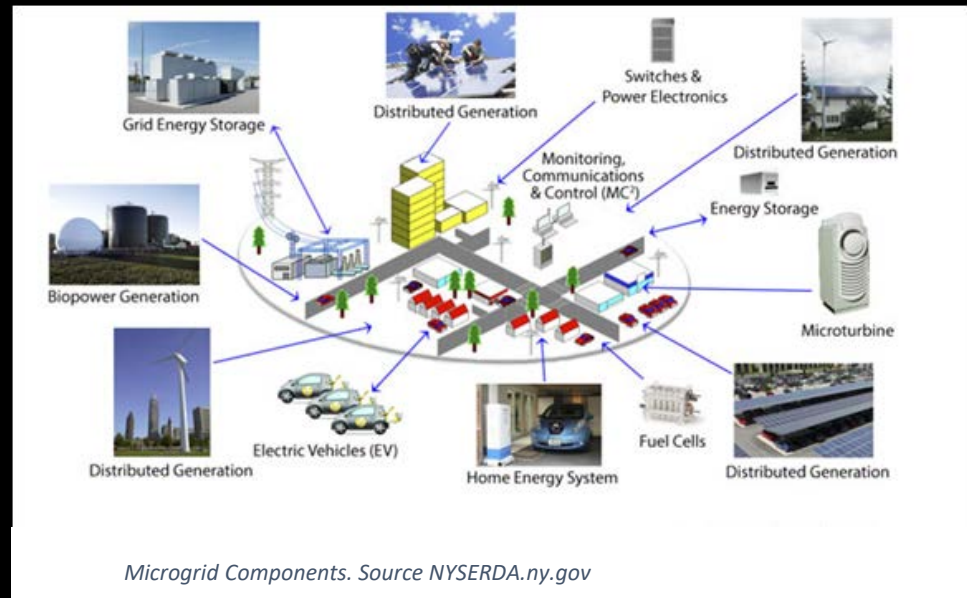
# MICRO-GRIDS & LARGE SCALE RENEWABLES

## NEIGHBORHOOD-SCALE INFRASTRUCTURE

- District heating & cooling
- Established or forge new networks? (Not a CSC/CEC emphasis)
- Tools to support and focus growth/ investment (may increase resilience)

## COMPLEX TO PLAN & IMPLEMENT

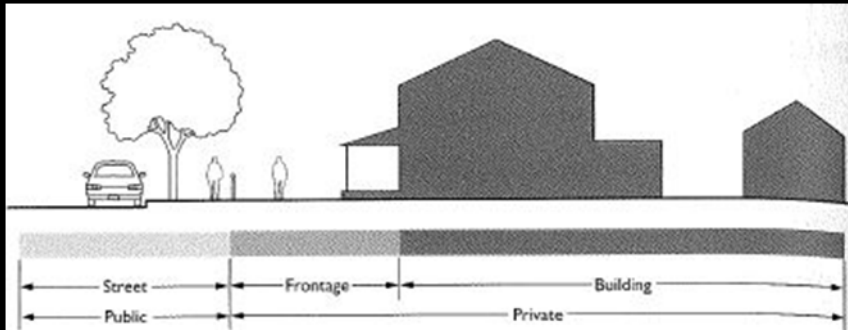
- Unique opportunities?
  - Existing systems: colleges, hospitals?
  - Grouped energy consuming uses?
  - Isolation or substantial growth?



# GAINING (GREEN) SPACE & RESILIENCY THE PARKING CONUNDRUM

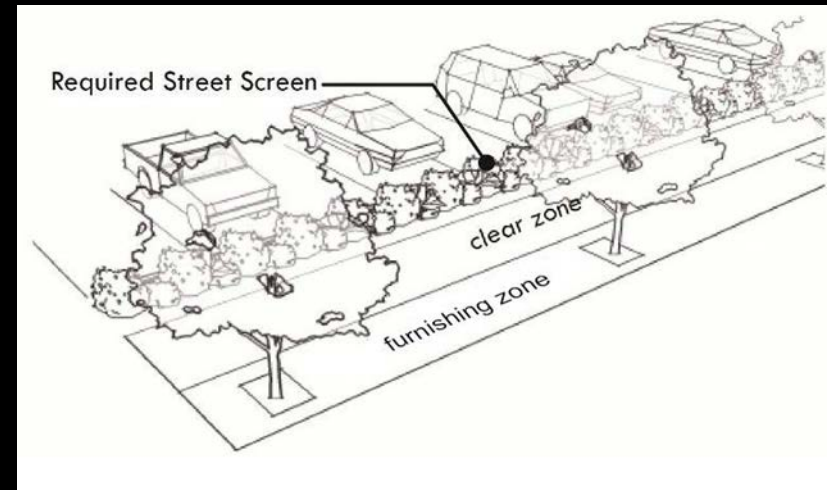
## DON'T DESIGN FOR AUTOS, DESIGN FOR PEOPLE

- Find balance/ right size: autos sit idle 95% of time/ parking spaces vacant most of time
- Free-up space to multipurpose
- On street: revenues; multimodalism?



## BENEFITS

- Fuller use of streets and curb
- Lower housing costs
- Gains in air quality and health



# COMPLETE STREETS

## DO YOU HAVE A POLICY?

### STREETS TYPICALLY LARGEST CAPITAL ASSET

- Perform complete streets assessment and plan – to make great streets happen
  - Walking
  - Bicycling
  - Transit
  - Personal transport / activity zones: taxis, loading, etc.
  - EVs / Other tech changes?
- Street and site plan standards
- Sidewalk/ multimodal investment plans



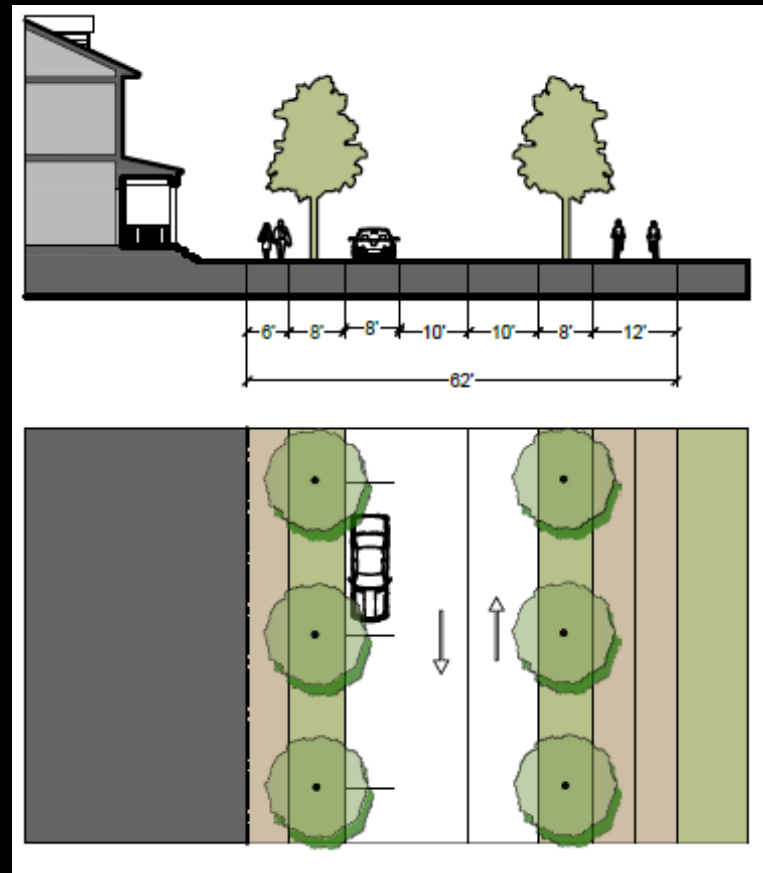


# RETROFITTING FOR RESILIENCY & GREEN - AREA PLANS

- 
- ✓ Local hazard mitigation plans / pre-disaster mitigation grants
  - ✓ Dust off / update plans ("evolving process of climate change action" CSC)
  - ✓ Laberge Group CSC Adaptation Implementation grants
  - ✓ Cohoes complete street sidewalk upgrades reinforced an urban core
  - ✓ Green innovation feasibility study (GIGP) - show readiness

# RETROFITTING FOR GREEN & RESILIENT

- Incentivize - Esopus Comprehensive Plan
  - affordable housing
    - Density increases;
    - Parking reductions
- Flexibility/ Permissibility - Where are commercial and office markets headed?
- Maximize utility/ value of existing infrastructure – Moreau sewer extension



# CONSIDERATIONS

- Take time to fit / optimize
- Assign policy preference for green and resilient
- Provide a role for conservation advisory bodies



*Photo by Dan Burden – Pedestrian & Bicycle Information Clearinghouse*



# CONCLUSION

- Mitigation = investment: Every \$1 in disaster mitigation saves \$6\*
- Green Infrastructure improves habitat/ livability
- Large-scale GI aids urban form and viability
- Right-sizing and greening helps manage long-term expenditures



\* Pew Charitable Trust



# *Questions & Discussion*

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