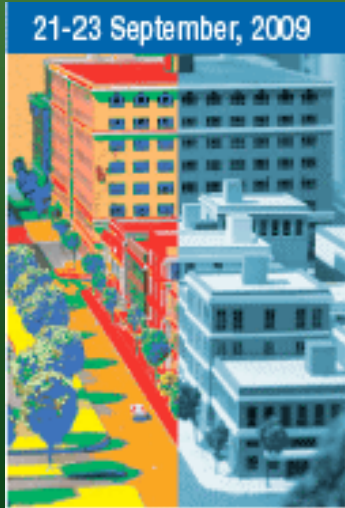# Increasing Green Infrastructure in Compact Developments:

Strategies for Providing Ecologically Beneficial Greenery in Modern Urban Built Environments

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Introduction

- Urban Forests "Green Infrastructure"

- Built Environments "Grey Infrastructure"

- Land-use Decisions
  - In a *coherent and supportive* physical framework

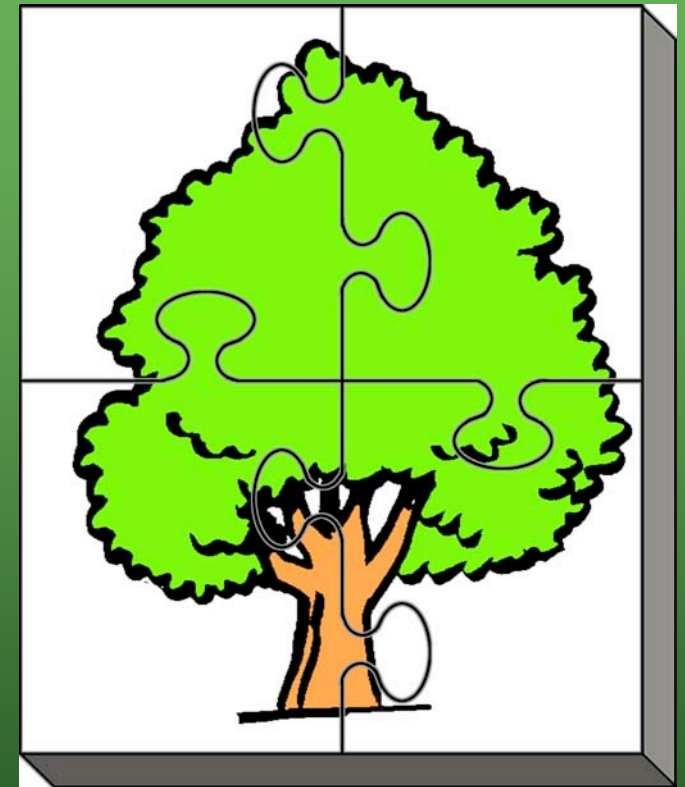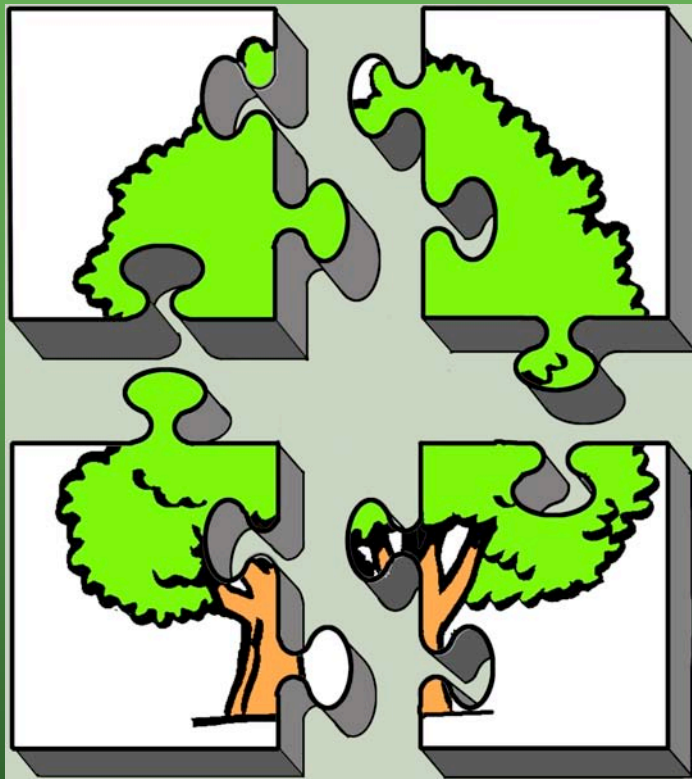 - <u>Durability</u> of Decisions

We don't have a density problem, we have a *design* problem.

Introduction

- Development Decisions
  - *Coherent and supportive* infrastructure
    - Mutually reinforcing
    - Pieces exist today

We don't have a density problem, we have a *design* problem.

Making space for Green Infrastructure:
By 2030, 50% of all buildings will have
been built in the last 50 years

Our Role - Opportunity

- Development Decisions
  - Haphazard
  - Rarely cohesive across scales
  - Rarely beneficial across scales
- Human Health
  - Impacted by built environment
    - Obesity, cardiopulmonary
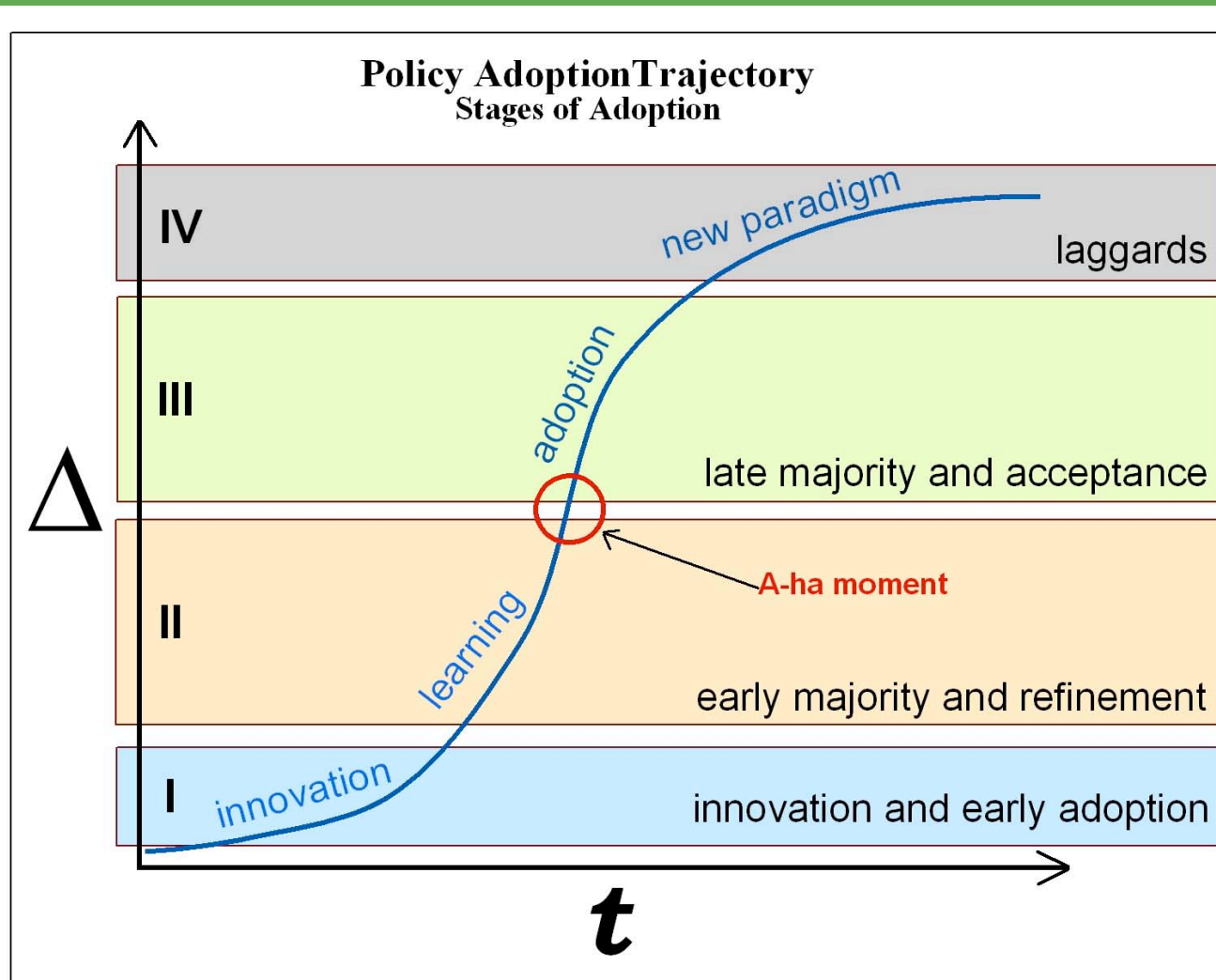   - Psychosocial: attention, quality of life

Urban Forest Resource

- Shade buildings and pavement
- Latent heat flux and evapotranspiration
- Intercept rainfall – peak flow
- Stormwater requirements
- Human health
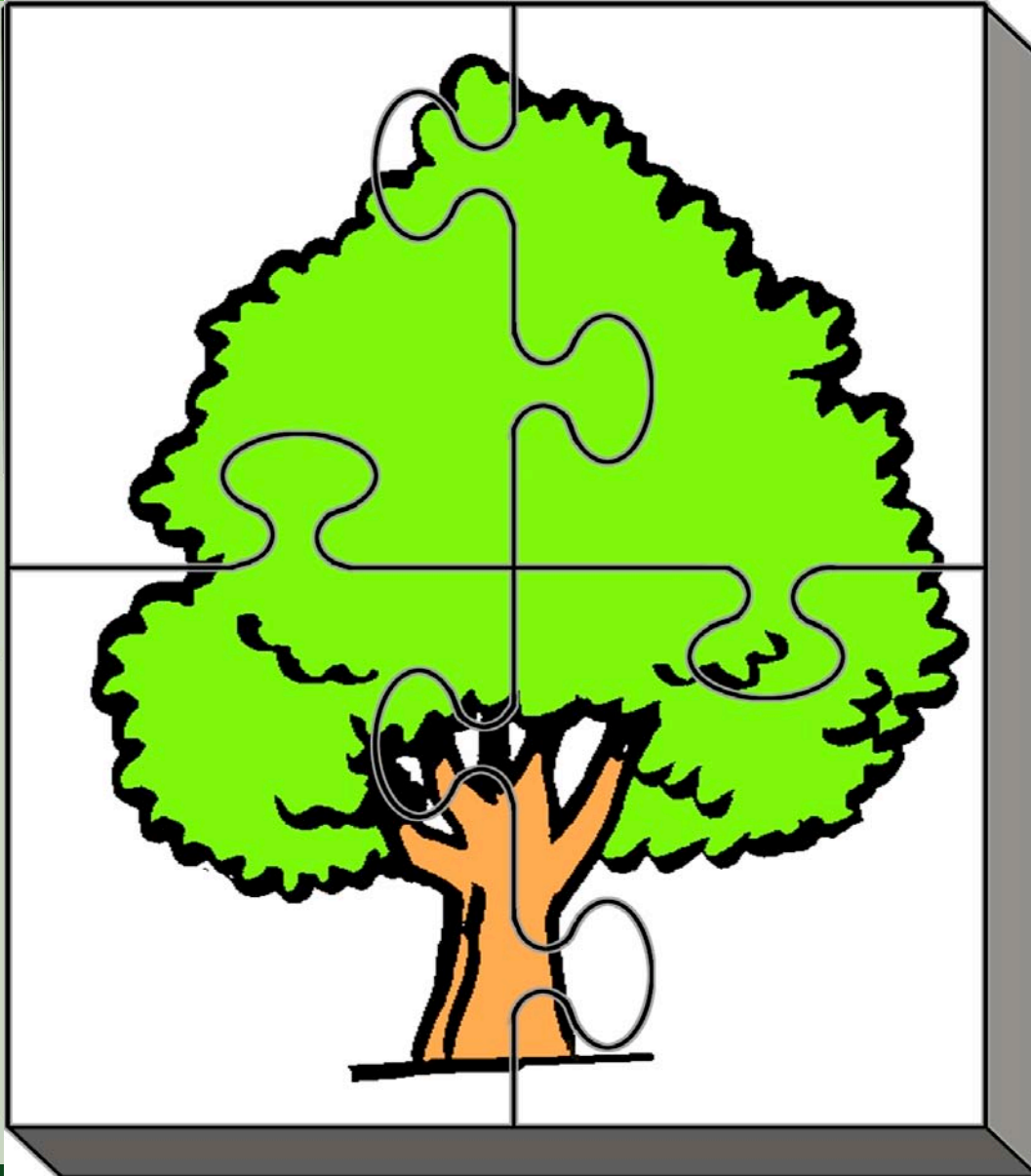 - Physical, psychosocial, equity

Society and Community

Information and change asymmetry

Policy AdoptionTrajectory
Stages of Adoption

America: "Smart Growth" is the return to built environment patterns found prior to WWII

Putting Together The Green Infrastructure Puzzle

Development Decisions

- Community Plans
- Land-use Plans
  - Zoning, uses, standards
- Development Codes
  - Architectural design, amenity, hazards
- Environmental Laws

Community Plans

- Comprehensive Plans
  - City, County, Prefect scales
- Set high-level goals
- Green Infrastructure as a goal
- Green Infrastructure supports many planning and community goals

Design Standards

- Trees must have adequate rooting volume
- Trees must have enough distance from infrastructure

Soil Volume Needed to Grow Big Urban Trees
english units

Example: A 16" Diameter Tree Trunk (35' Canopy Diameter) Requires 1000 ft³ of Soil

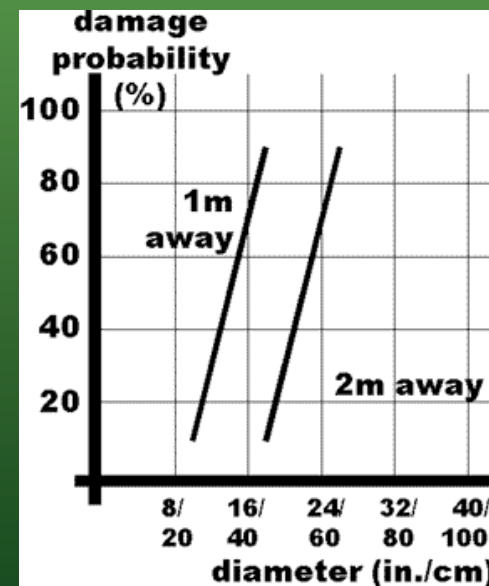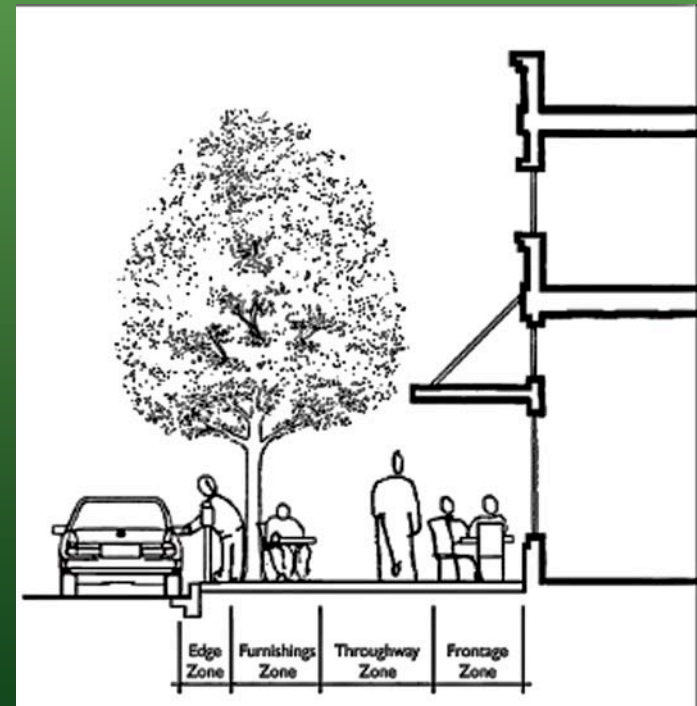

Figure 1: Infrastructure damage potential based upon tree diameter and distance away from infrastructure for one species. (21)
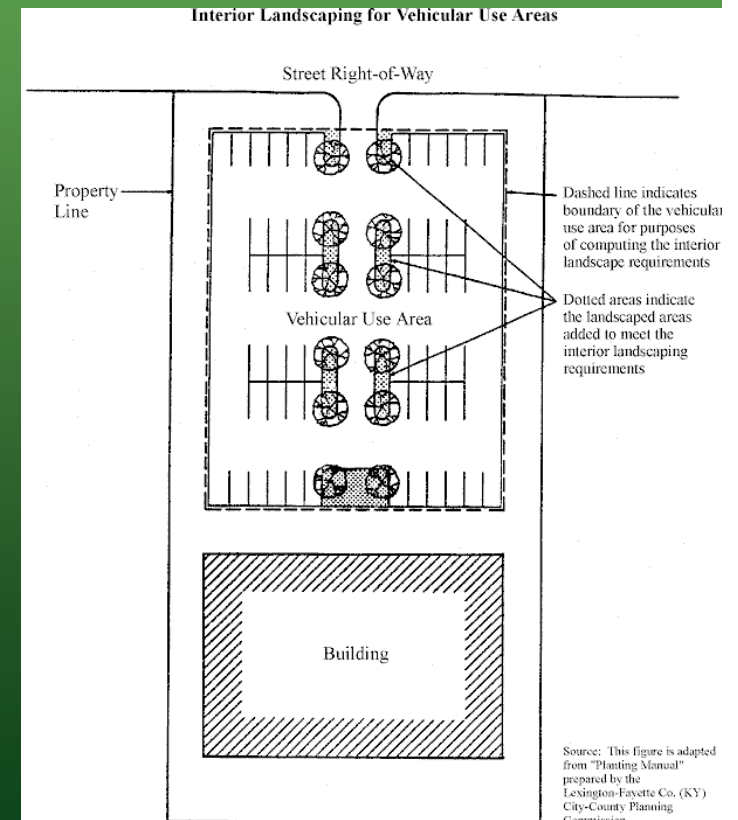
(1 MPa =100 kPa ≈ 1 bar)
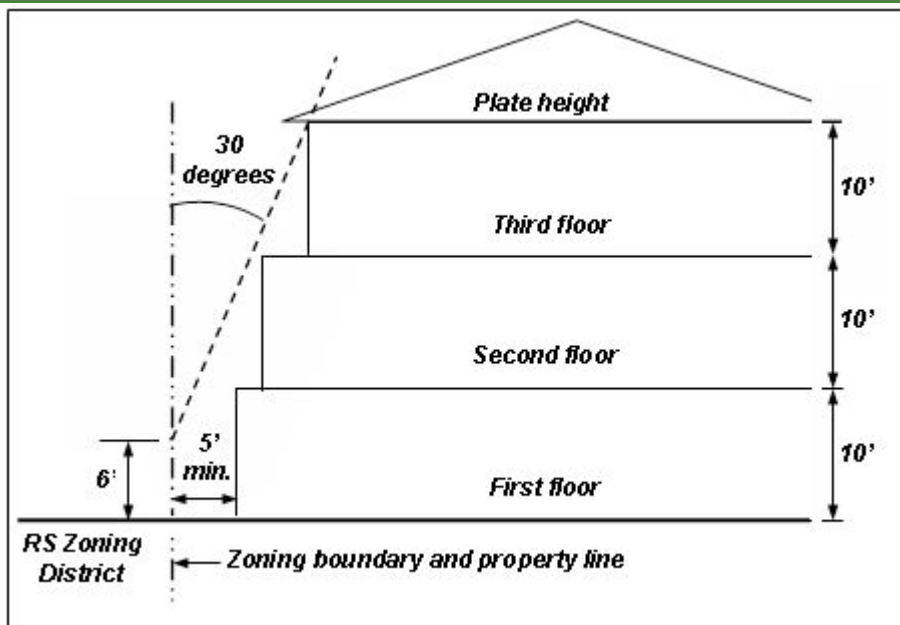
Design Standards

- Avoid Conflicts
- Trees doing work for many

REMOVABLE SIDEWALK PANELS TO EASE UTILITY MAINENANCE

TREE SHADE REDUCES DETERIORATION OF ASPHALT PAVING

| Edge Zone | Furnishings Zone | Throughway Zone | Frontage Zone |

Design Standards

- Increase shading
- More room for tree canopy

Interior Landscaping for Vehicular Use Areas

Source: This figure is adapted from "Planting Manual" prepared by the Lexington-Fayette Co. (KY) City-County Planning Commission.

Gray and Green Infrastructure

- Use Green Infrastructure as a Stormwater Utility

- Re-think how Grey Infrastructure is sited

- Green Infrastructure supports many planning and community goals

- Many actors have different pieces of a finished puzzle

Q&A

Thank you!