Cambridge Urban Forest Master Plan

Public meeting #2

March 7, 2019

CAMBRIDGE DEPARTMENT OF PUBLIC THE WORKS

KLEINFELDER Bright People. Right Solutions.

clf conservation law foundation

BARTLETT TREE EXPERTS SCIENTIFIC TREE CARE SINCE 1907

APPLIED ECOLOGICAL SERVICES

REED HILDERBRAND

F² VJ ASSOCIATES

Data in this study has been modified
using an updated analysis of the loss rate
between 2009 and 2018 rather than 2014 and 2018.

Ongoing research by University of Vermont will provide a final analysis of 2018 canopy.

Today, Cambridge has **26%** of its land area covered by canopy.

Between 2009 and 2018, Cambridge's canopy declined on average by 16.4 acres* every year.

At this rate, canopy cover would be **21.6% in 2030**.

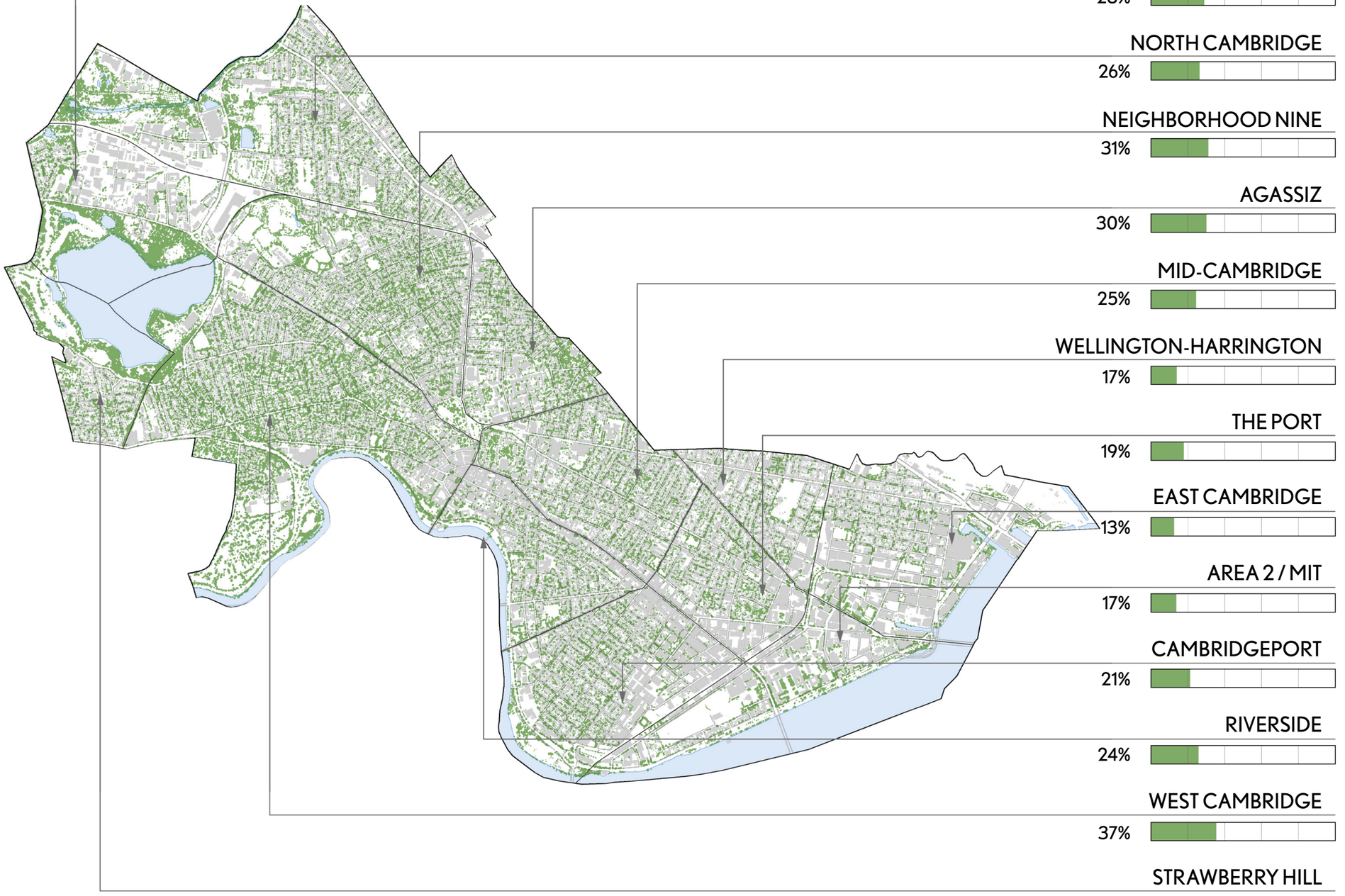
*per updated analysis for the period between 2009 to 2018.

The distribution of canopy across the city is **not equitable.**

More vulnerable populations tend to live in areas of Cambridge with **less canopy** cover.

TREE CANOPY COVER

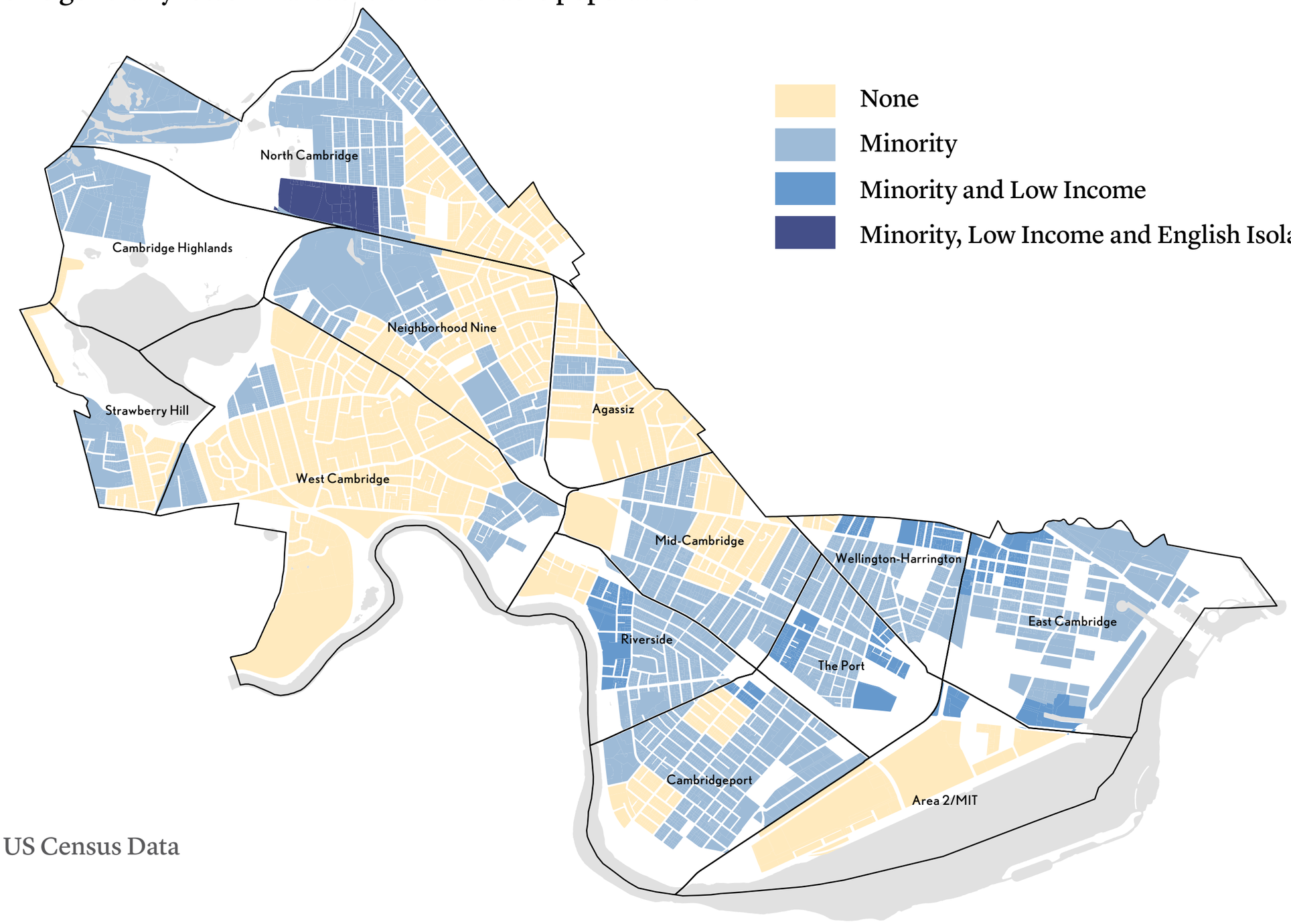
2018 canopy cover by neighborhood



Source: CUFMP 2018 canopy layer and City GIS data.

VULNERABLE POPULATIONS

Canopy cover is generally lower in areas with vulnerable populations

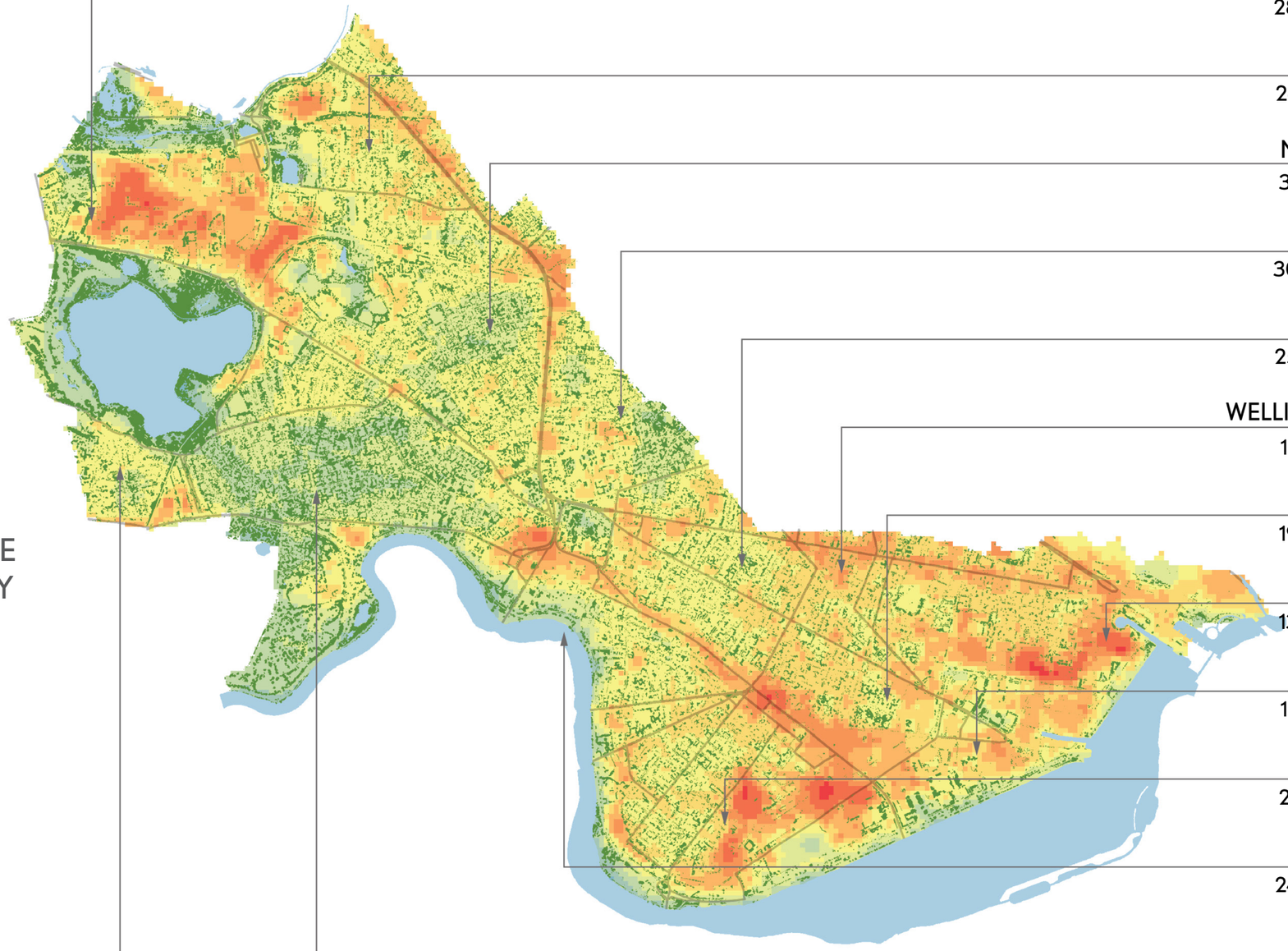


Source: 2010 US Census Data

As summer temperatures rise,
the impacts of the **urban heat island**
will be more intensely felt by the **most vulnerable.**

URBAN HEAT ISLAND AND CANOPY COVER

Predicted heat impacts 2030



ESTIMATED AMBIENT AIR TEMPERATURE OF A 90°F DAY

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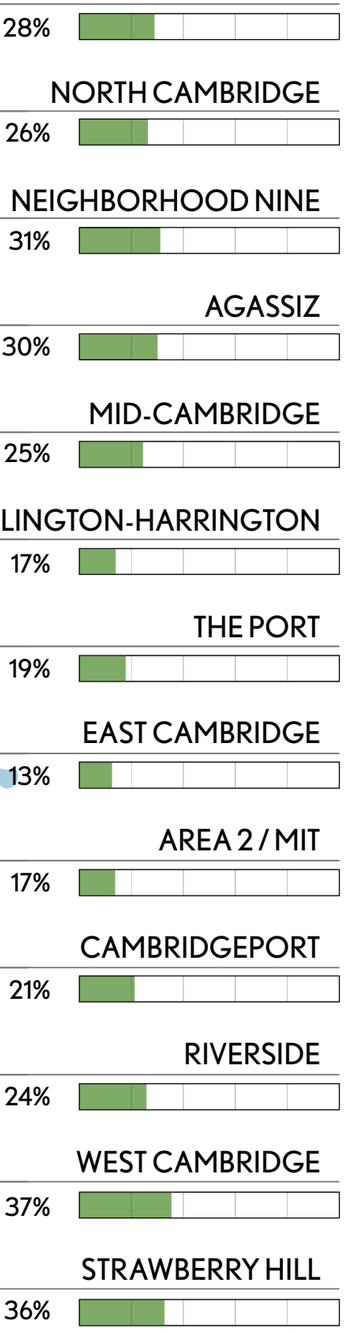
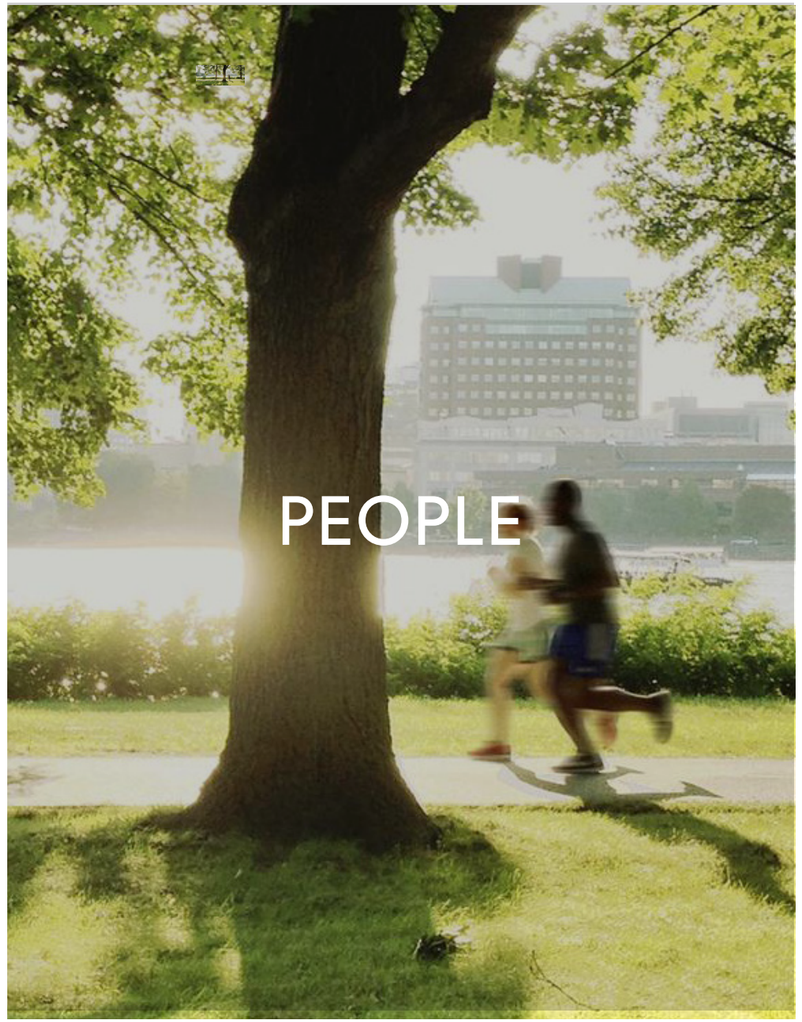
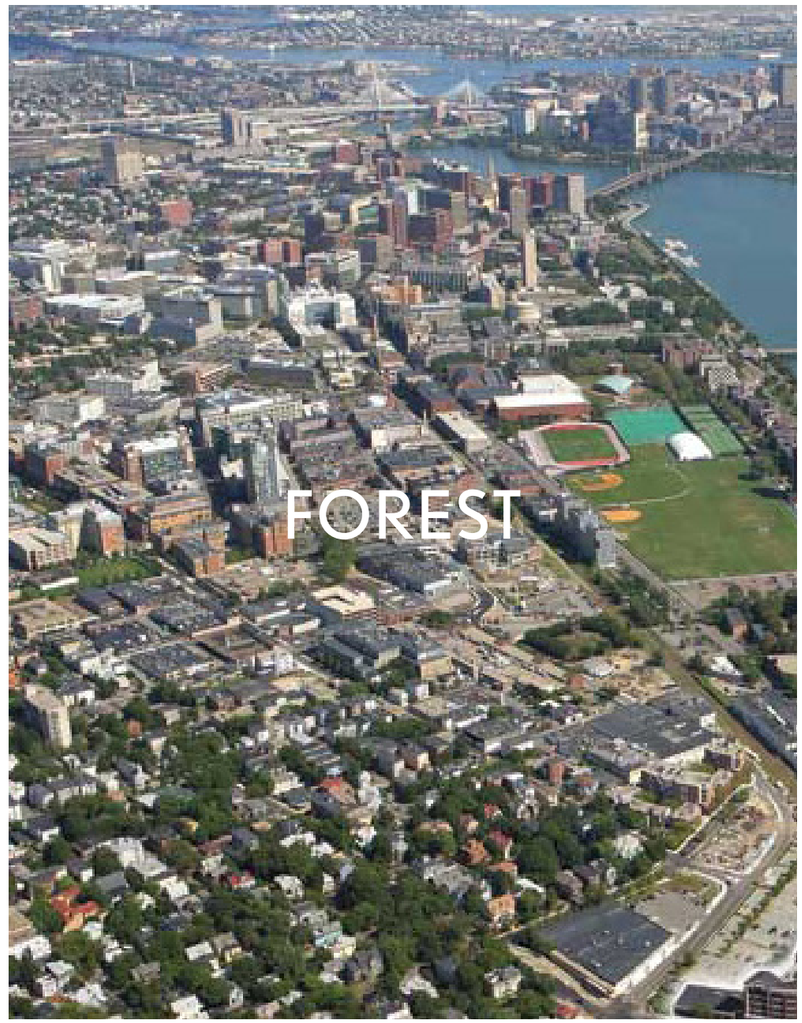
Source: CCVA



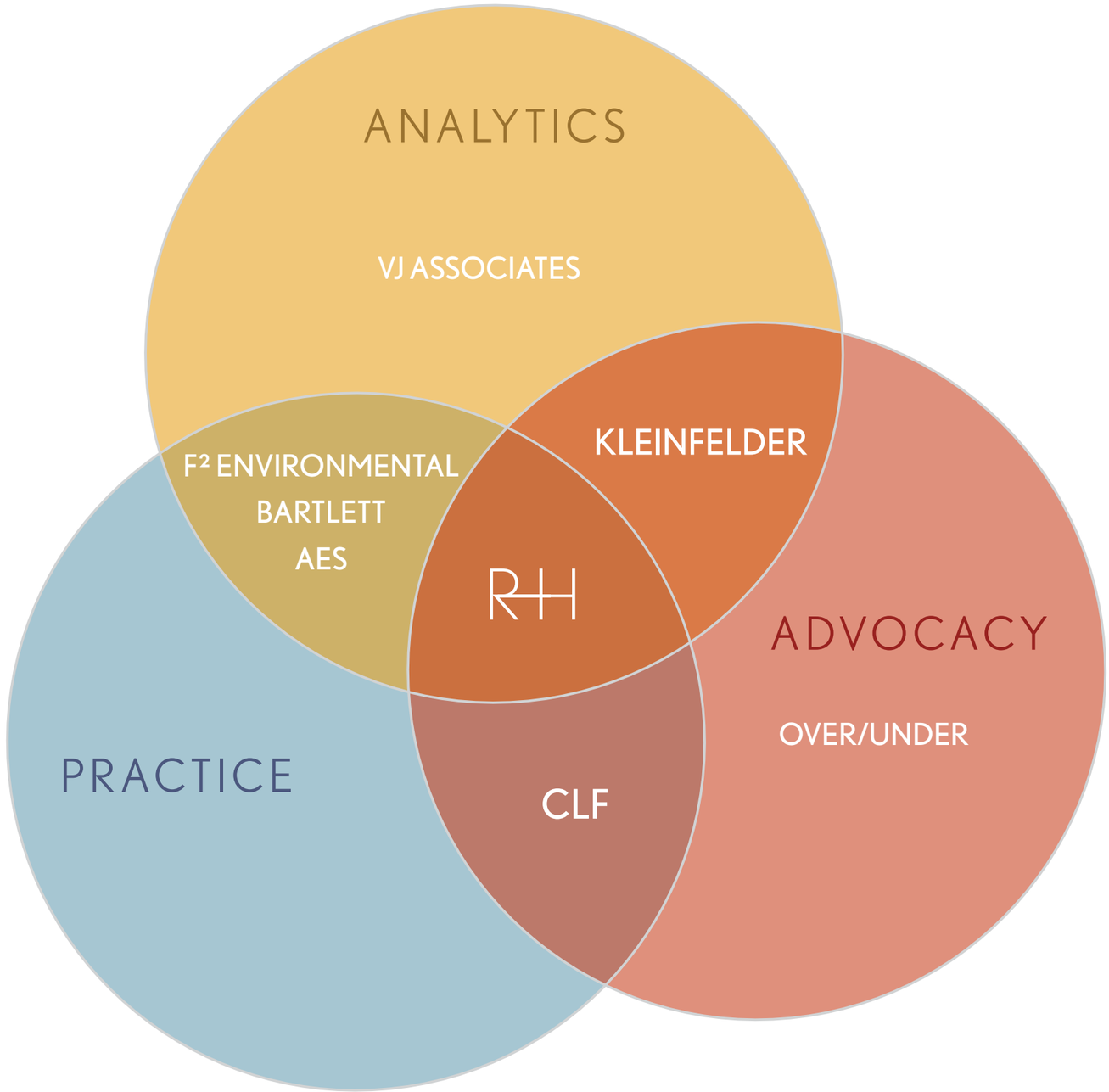
To maintain, plan, build, and sustain a healthy, connective urban forest at a time when the urban forest is more important than ever before.

APPROACH
Healthy and Connected Systems

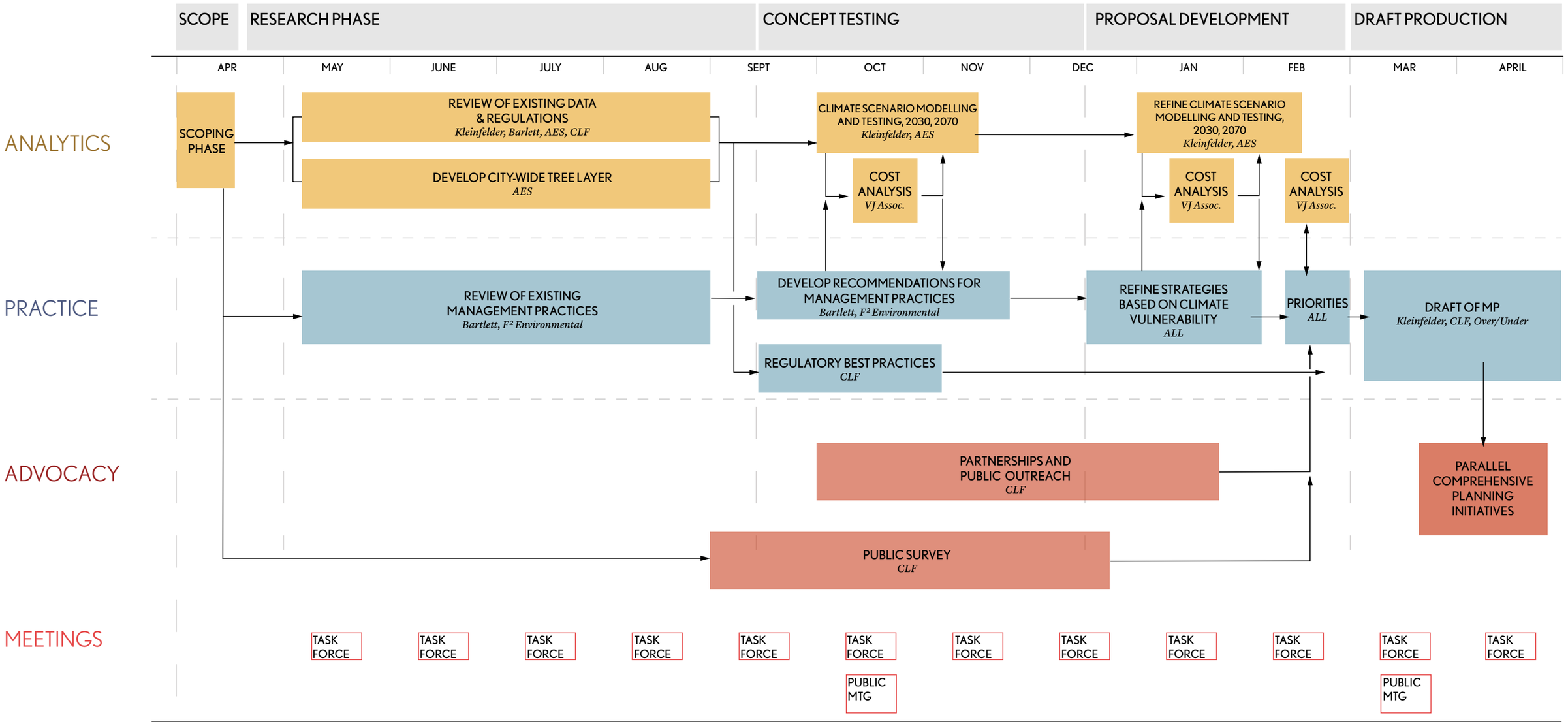




PROJECT TEAM



PROJECT SCHEDULE



RESEARCH FINDINGS

RESPONSE STRATEGIES

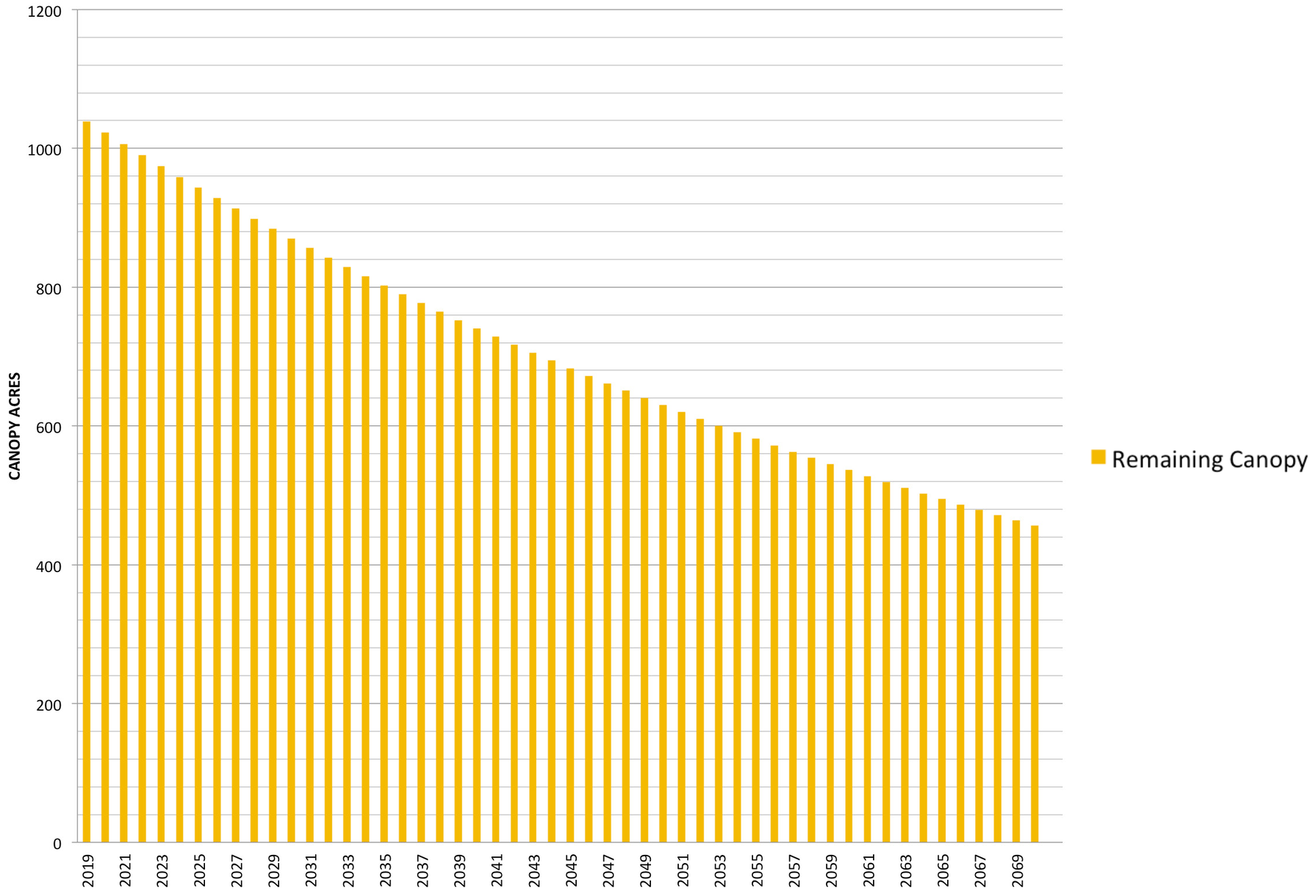
NEXT STEPS

OPEN HOUSE

The percent of the city covered by canopy is declining.

WHAT'S HAPPENING?

The trend is for continued loss (1.6%/year)



Graph assumptions: 1.6% annual net loss rate from 2009 to 2018 derived from CUFMP 2018 canopy analysis

WHAT'S HAPPENING?

Forest cover trends are regional

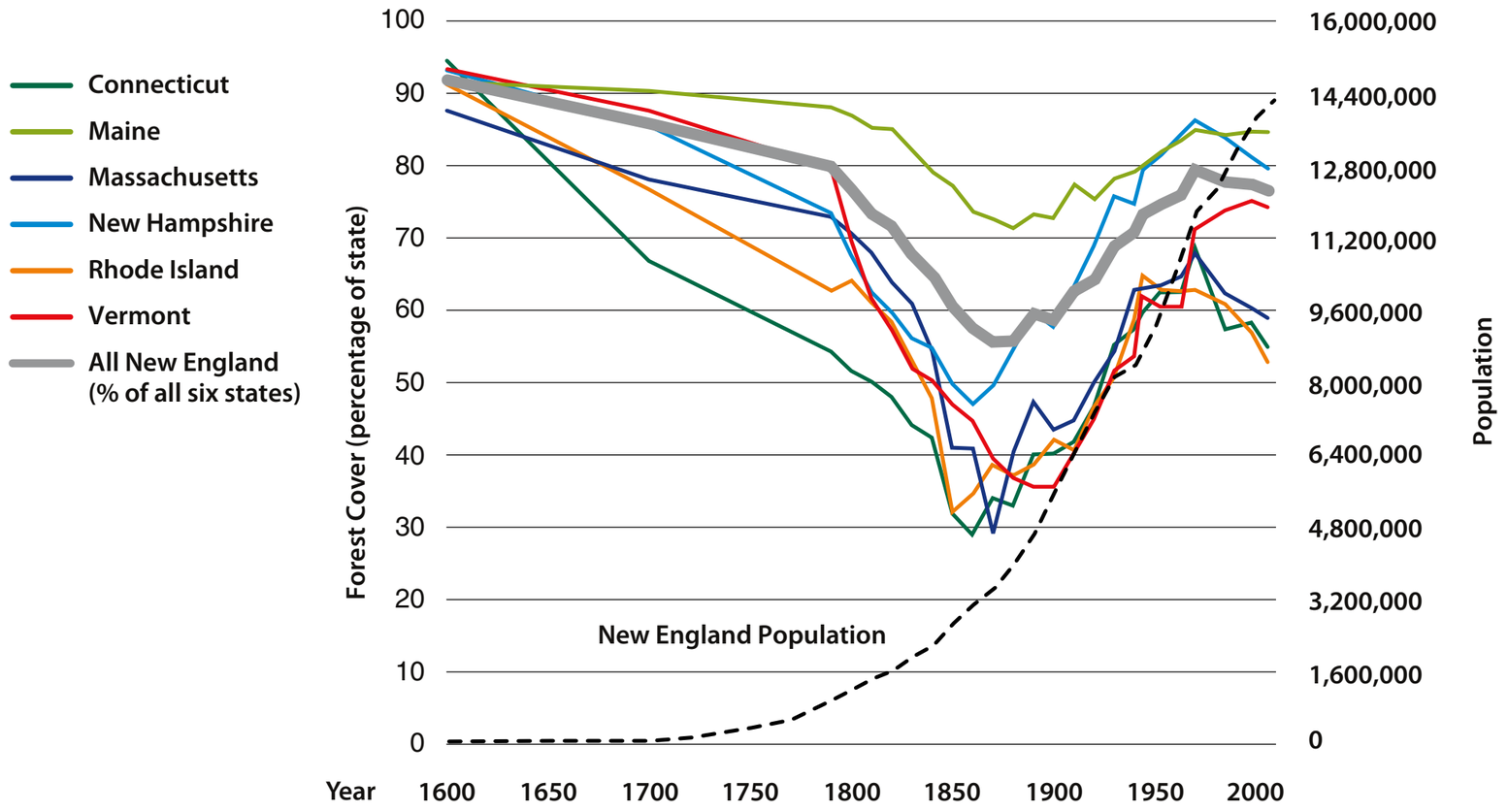
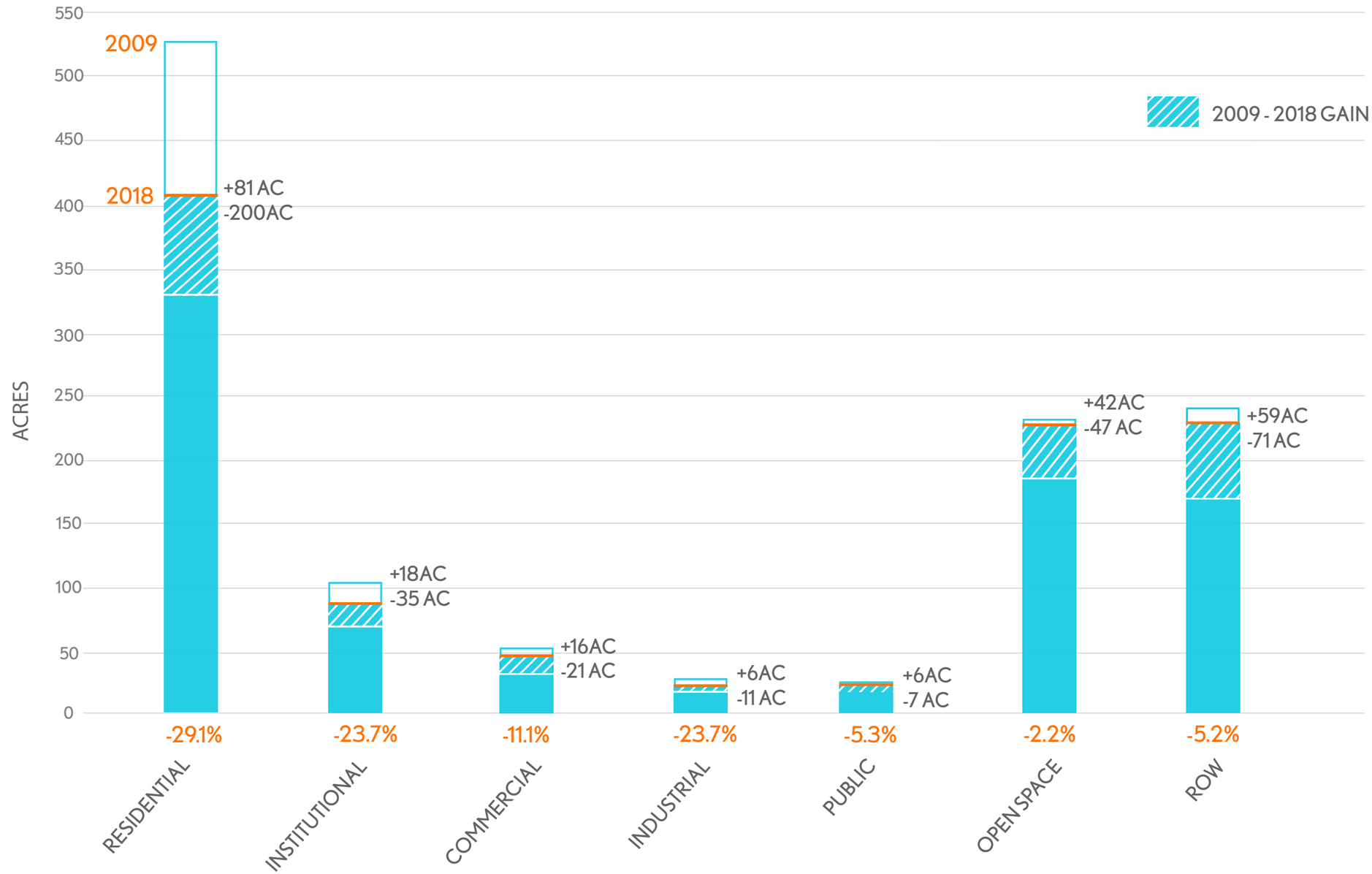


FIGURE 1: *Long-term trends in forest cover and human population in the six New England states shows that even as the population grew, forest cover increased between 1850 and the early 2000s. In recent years, forest cover has again declined due to conversion of forests to developed land.*

Source: "Changes to the Land: Four Scenarios for the Future of the Massachusetts Landscape", Harvard Forest, Thompson, et. al., 2014

WHERE IS IT HAPPENING?

The highest rates of loss are on Residential, Industrial, and Institutional land uses



Source: CUFMP 2018 canopy analysis and City GIS data.

There is no one reason for canopy decline

Causes are historical, systemic, and cumulative...

WHY IS IT HAPPENING?

Planting happens in cycles along with residential development

Properties with homes built around 1920 have unusually high percentage of tree canopy. These trees are now likely reaching maturity. Development tapered off after 1930 so we can surmise that the residential canopy will also begin to taper off as those trees age.

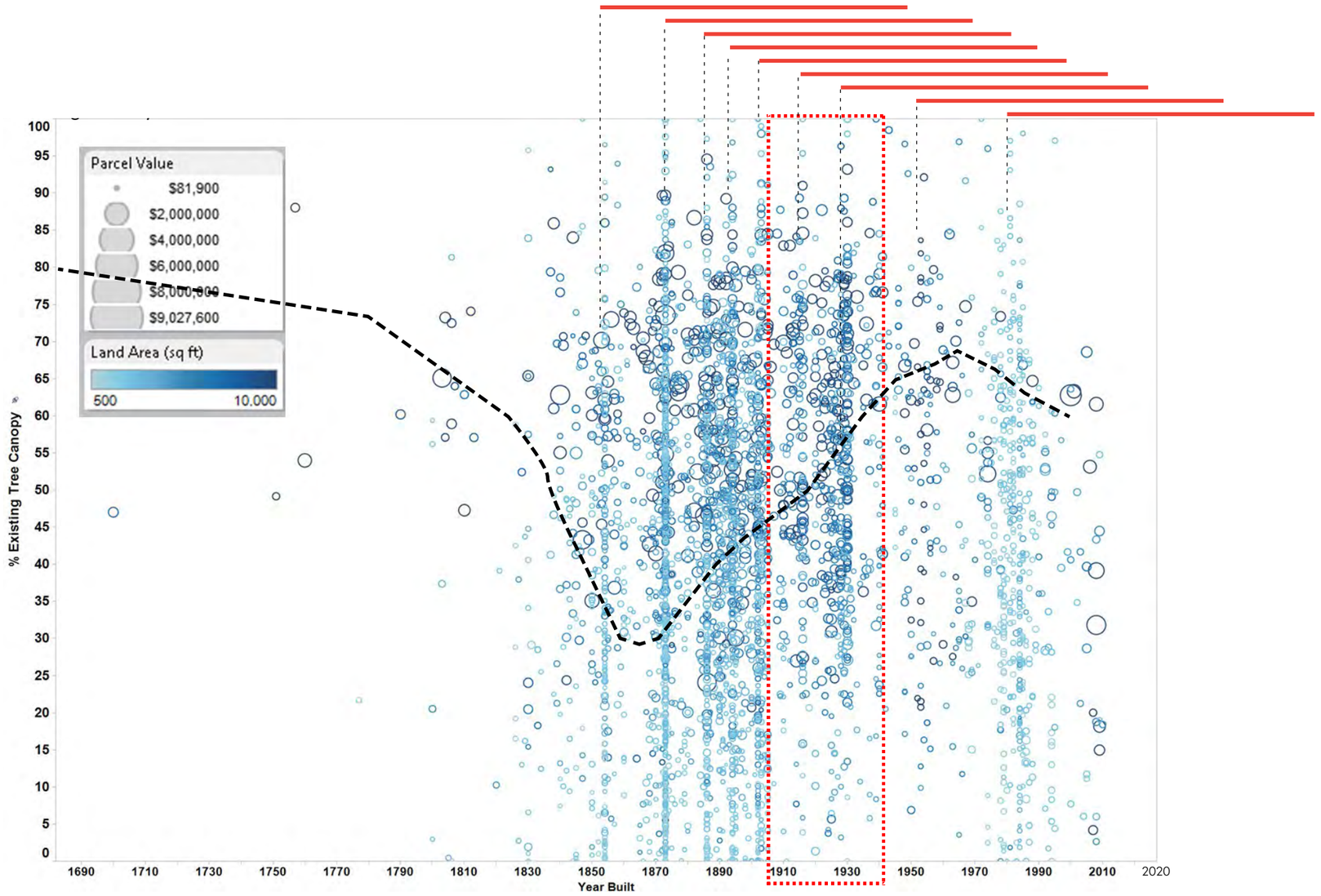
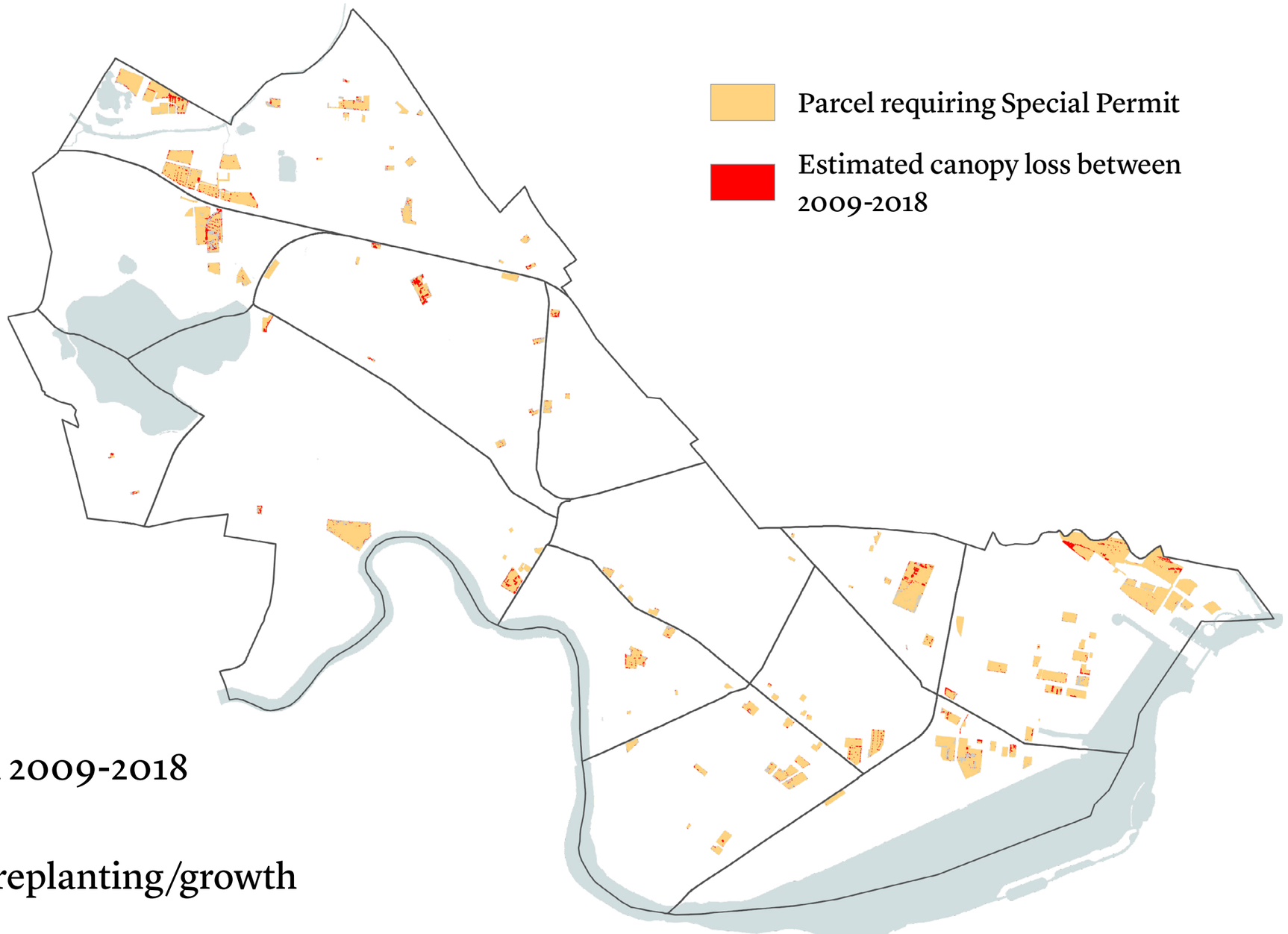


Figure 8: % Existing Tree Canopy in relation to year built, parcel value, and land area for single family residential parcels.

Source: UVM, "A Report on the City of Cambridge's Existing and Possible Tree Canopy", 6/1/12

WHY IS IT HAPPENING?

Special permits for large projects only account for 4.7% percent of loss over the last 10 years



207 acres (148 projects)

20.1 acres of canopy in 2009

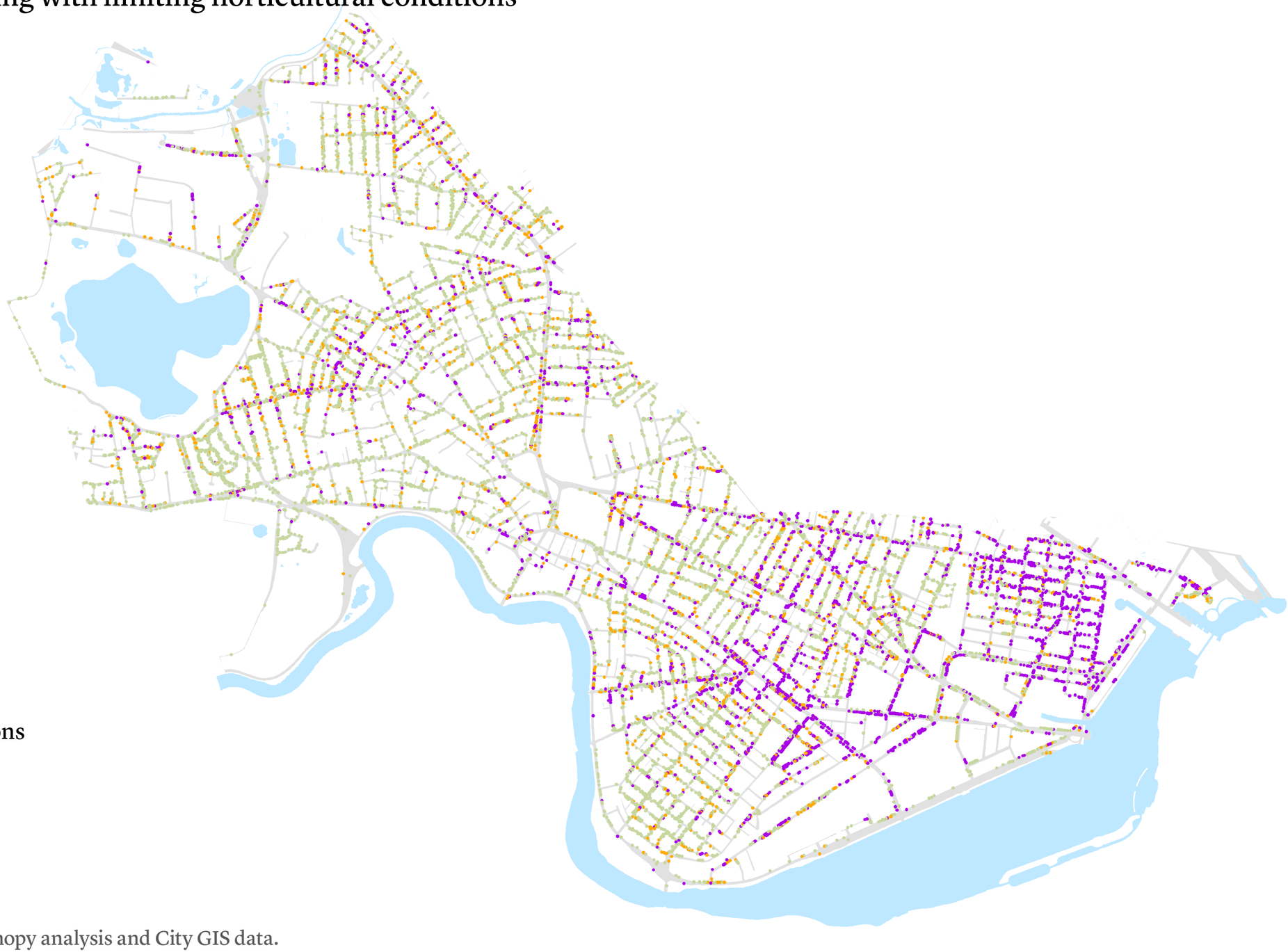
12.9 acres (~1,484 trees) removed 2009-2018

7.8 acres of net canopy loss after replanting/growth

Source: CUFMP 2018 canopy analysis and City GIS data.

WHY IS IT HAPPENING?

Trees are struggling with limiting horticultural conditions



Tree Health Conditions

- Fair
- Good
- Poor

Source: CUFMP 2018 canopy analysis and City GIS data.

WHY IS IT HAPPENING?

Soils are overly compacted, have low nutrient cycling and have limiting drainage

WHAT ARE FUTURE RISKS?

Existing species makeup is susceptible to climate risks of increased pests/diseases, drought and flooding

SPECIES	% OF CANOPY	SUSCEPTIBILITY TO CLIMATE RISKS
Norway Maple	13%	medium
Pin Oak	11%	medium
Honey locust	9%	low
Red Maple	7%	high
Red Oak	6%	high
Littleaf Linden	4%	medium
Callery Pear	4%	high
London Planetree	4%	medium
Ash	3%	high
Crabapple	3%	high
Other	36%	

Source: CUFMP 2018 canopy analysis.

RESEARCH FINDINGS

RESPONSE STRATEGIES

NEXT STEPS

OPEN HOUSE

There are two primary approaches to reversing the current trend of urban forest contraction —

Curb the loss of existing trees

Grow canopy by planting new trees

BALANCE COMPETING PRIORITIES

MAKE MORE SPACE FOR TREES

EXPAND TREE PROTECTION ORDINANCE

INCREASE COSTS TO REMOVE TREES

PRESERVE OPEN SPACE

ENHANCE MAINTENANCE PRACTICES

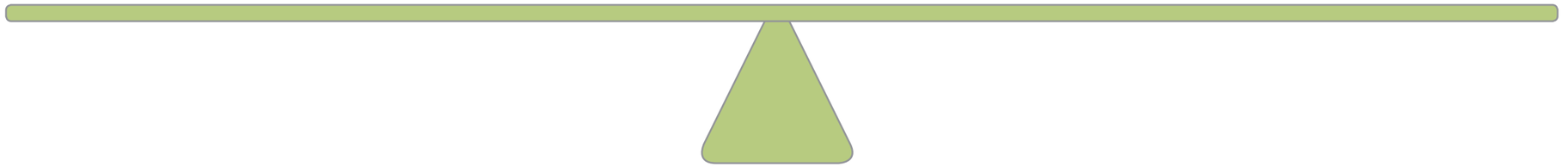
MAKE MORE SPACE FOR BIKES

DISCOURAGE PRIVATE PLANTING

IMPACT VULNERABLE POPULATIONS

EXACERBATE HOUSING COSTS

INCREASE STAFF AND OVERHEAD COSTS



— Value the forest as a public resource

— Invest in canopy in the public realm

— Share responsibility for a healthy forest

Value the forest as a public resource

The urban forest is a public resource and has **measurable value and impacts** everyone. It provides shade to cool our environment, gives scale and character to our streets, provides habitat for diverse species, improves our air quality, reduces stormwater impacts, and improves our health and well-being.

To shift the trend from increasing loss to sustainable growth, we must manage the urban forest as **urban infrastructure** (like water, sewer, power) investing for the long term, managing resources collectively, and understanding the value (ie., ecosystem services) of the canopy.

To balance the value of the forest with the complex needs of the city, we should focus on the performance of the **forest as a system** over the specific value of individual trees.

THE BENEFITS OF THE URBAN FOREST

Ecological, cultural and economic values

Table 5
Urban tree benefits reported in the 115 research papers on urban trees examined in this study.

Benefits	Discussed	Demonstrated
Social benefits	7	5
Making urban environment more pleasant to live, work and spend leisure time	3	2
Providing significant outdoor leisure/recreation opportunities	3	2
Providing nature in the city	1	1
Enhancing quality of urban life	5	3
Promoting environmental responsibility and ethics	1	–
Building stronger sense of community	1	–
Enhancing community's sense of social identity and self esteem	1	–
Providing settings for significant emotional and spiritual experiences	1	–
Providing opportunities for inner city children to experience nature	1	–
Economic benefits	28	27
Saving substantially on fuel expenditure	1	–
Increasing land value	3	3
Increasing property value	13	12
Increasing rental price	1	1
Increasing neighbouring property value	2	1
Reducing 'time on market' for selling property	1	1
Increasing property taxes	1	–
Increasing tourism revenue	1	–
Increasing business activity	1	–
Contributing to the economic vitality of the city	1	–
Providing annual returns on municipal investments	2	1
Alleviating the hardships of inner city living for low – income groups	1	–
Reducing expenditure on air pollution removal	7	6
Reducing expenditure on storm water infrastructure	4	3
Saving annual heating and cooling costs	2	2
Savings on electricity costs	1	1
Avoiding investment in new power supplies	3	2
Providing potential for future carbon offsetting trade	2	2

Table 6
Urban tree ecosystem services reported in the 115 research papers on urban trees examined in this study.

Ecosystem services	Discussed	Demonstrated
Carbon related ecosystem services	30	27
Storing/sequestering carbon	30	27
Air quality related ecosystem services	38	34
Producing oxygen	2	2
Filtering air	11	9
Removing ozone	18	16
Removing carbon monoxide	12	10
Removing sulphur dioxide	17	15
Removing nitrogen dioxide	15	14
Removing airborne particle matters/suspended particles	22	20
Removing dust	1	1
Reducing smog	3	3
Reducing carbon dioxide emissions	9	8
Storm water related ecosystem services	10	9
Reducing rate of storm water runoff	10	9
Reducing volume of storm water runoff	8	7
Reducing flooding damage	4	3
Reducing water quality problems	3	2
Recharging ground water	1	1
Energy related ecosystem services	20	18
Reducing annual energy use	14	11
Reducing summer time energy use	5	5
Reducing seasonal cooling energy	4	4
Reducing carbon dioxide emission from power plants	3	2
Habitat related ecosystem services	7	5
Providing habitat for wildlife	7	5
Enhancing biodiversity	1	–
Providing stability to urban ecosystems	1	–
Noise related ecosystem services	8	5
Reducing noise	8	5
Reducing apparent loudness	2	1
Micro climate related ecosystem services	25	25
Providing shade	16	16
Reducing solar radiation	4	4
Modifying microclimate	9	
Reducing relative humidity	1	1
Reducing air temperature	15	15
Reducing heat island effect	10	10
Reduction of glare/reflection	3	3
Controlling wind	6	6

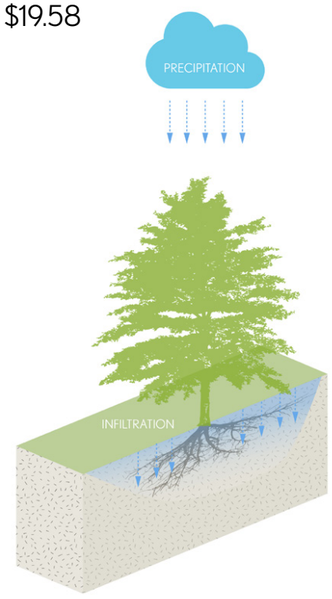
Source: Roy, et al., Urban Forestry and Urban Greening, 2012

THE BENEFITS OF THE URBAN FOREST

Infrastructure Performance

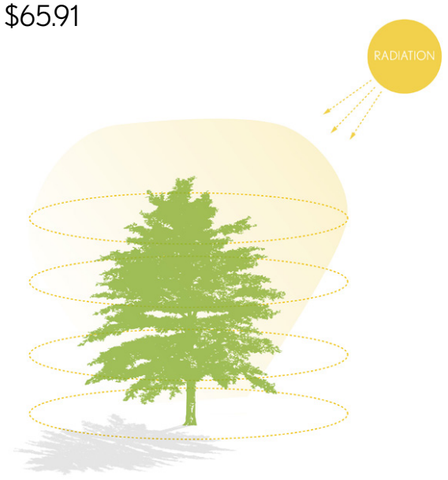
STORMWATER

Stormwater: $19.58



ENERGY SAVED

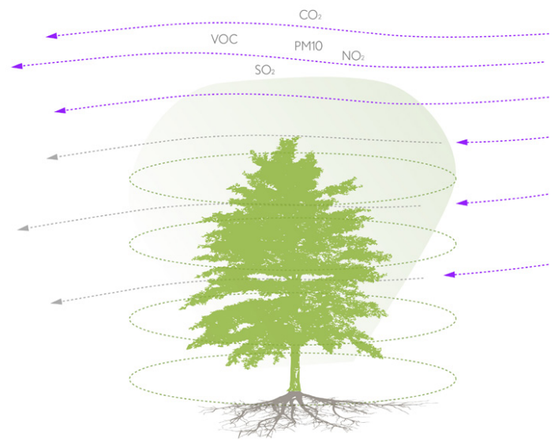
Energy: $65.91



CO_2 & AIR QUALITY

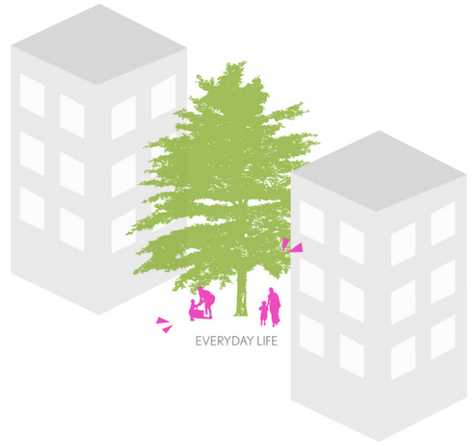
CO_2: $2.21

Air Quality: $12.81



PROPERTY VALUE

Add Value: $276.55



Ecosystem services for an average Pin Oak in Cambridge

Source: i-Tree Streets - Annual Savings for Average Pin Oak in Cambridge

THE BENEFITS OF THE URBAN FOREST

Physical Health and Mental Wellbeing

— Improved air quality and less urban heat

— Lower risk of diseases and mortality rate

— Lower stress levels

— Better cognitive function in students

— Improved attention among children

— Enhanced performance in the workplace

— Lower risk of mental health disorders

Source: Wolf, K.L., S. Krueger, and M.A. Rozance. 2014. Stress, Wellness & Physiology - A Literature Review.
In: Green Cities: Good Health (www.greenhealth.washington.edu). College of the Environment, University of Washington.

Invest in canopy in the public realm

The urban forest is felt most strongly in our **public realm and common spaces** (sidewalks, front yards, parks, schoolyards, and commercial and institutional campuses).

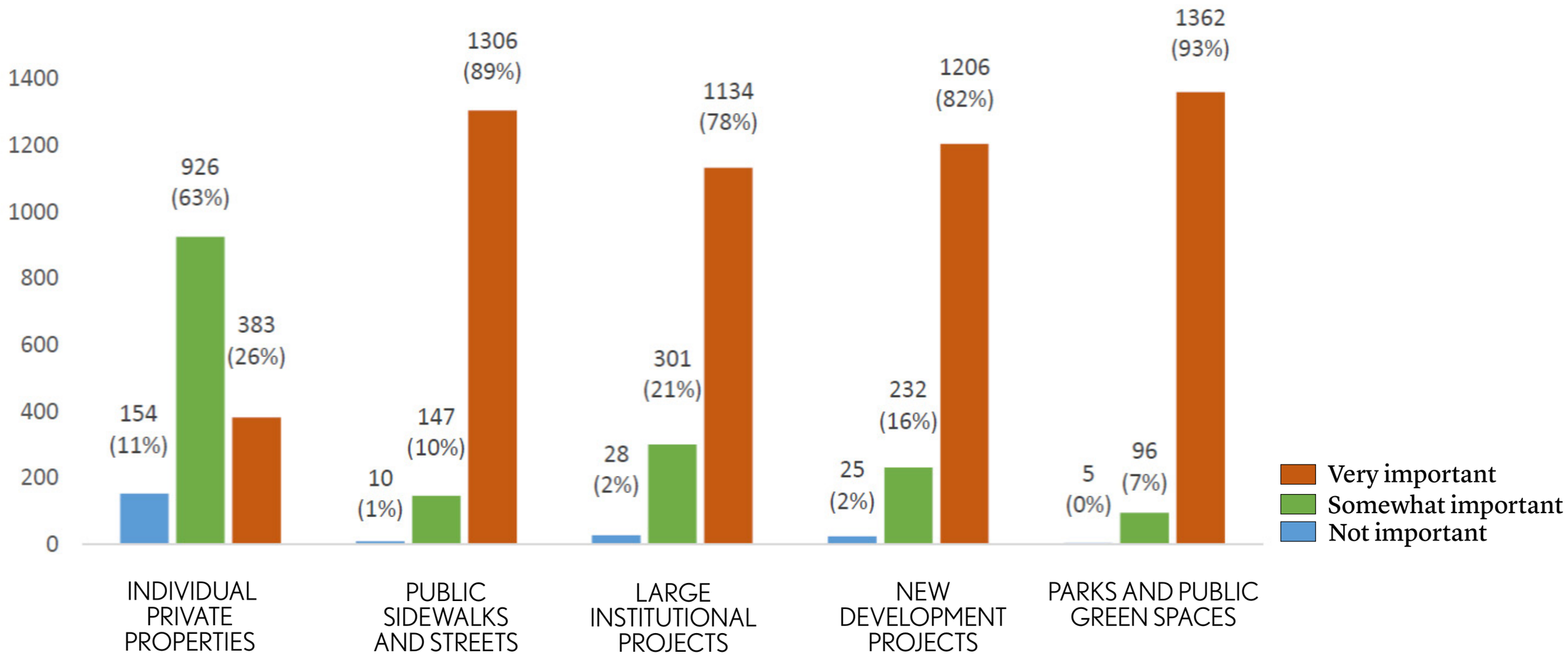
Enhancing the canopy within the public realm, where the impact of loss is felt most strongly and the significance of gain is most equitably distributed, deserves our **primary attention and investment**. Specifically prioritize:

Canopy corridor
A resilient, connected ecosystem that enhances shading and cooling along networks and connects green spaces across the City relies on thriving trees within the public right of way, publicly accessible spaces, and front yards and private lands that front on the public realm.

Areas of canopy deficit and inequity
A more evenly distributed forest increases equity in the distribution of canopy cover, reduces disproportionate impacts urban heat island effects, and increases the well-being of vulnerable populations.

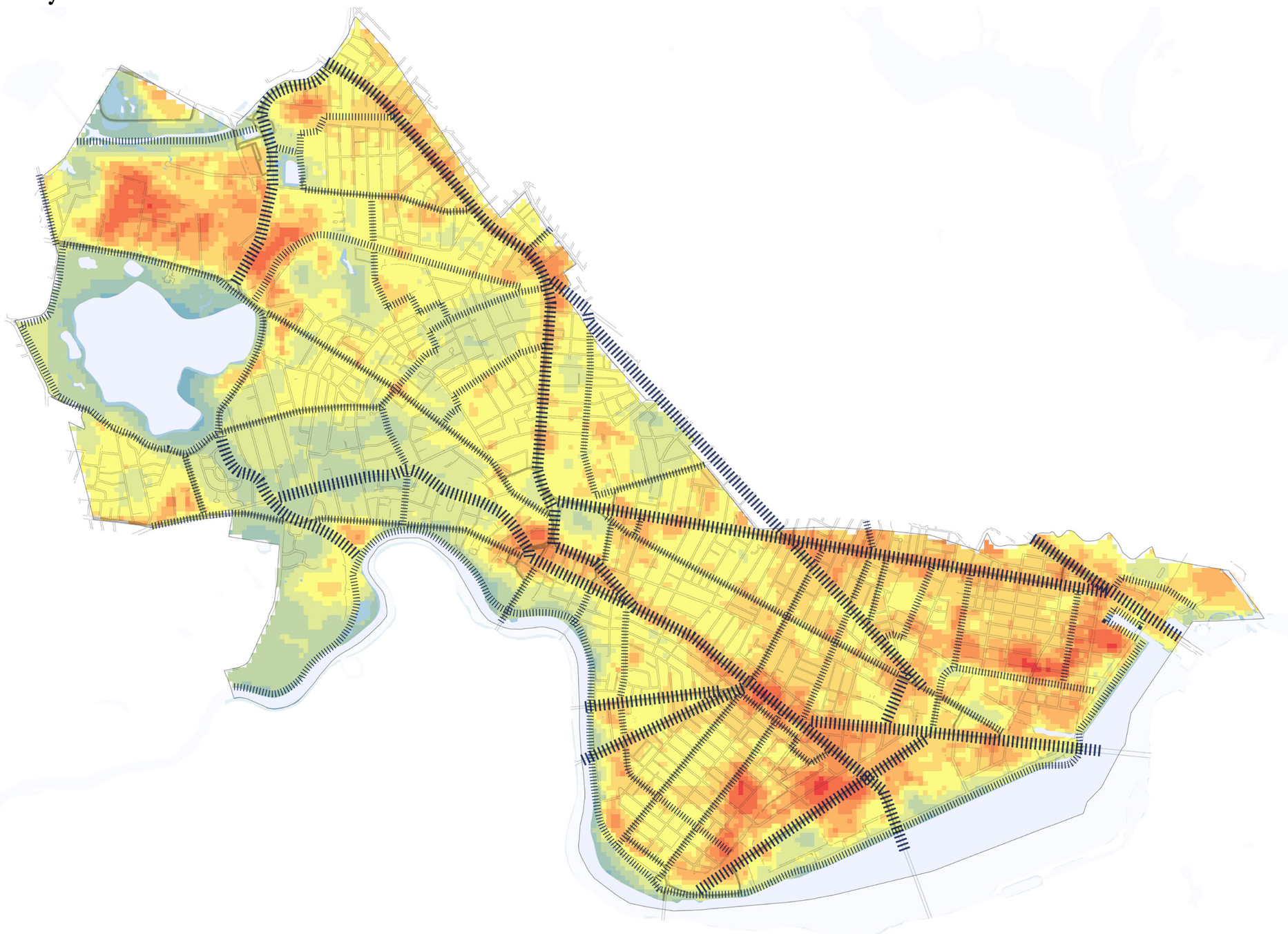
People value the trees in the public realm

A majority (55%) stated that **public sidewalks and streets** were the **single most important** location to plant new trees when asked a follow up question about the single most important location



HEAT ISLANDS AND CANOPY CORRIDORS

Improve connectivity with a network of shaded routes



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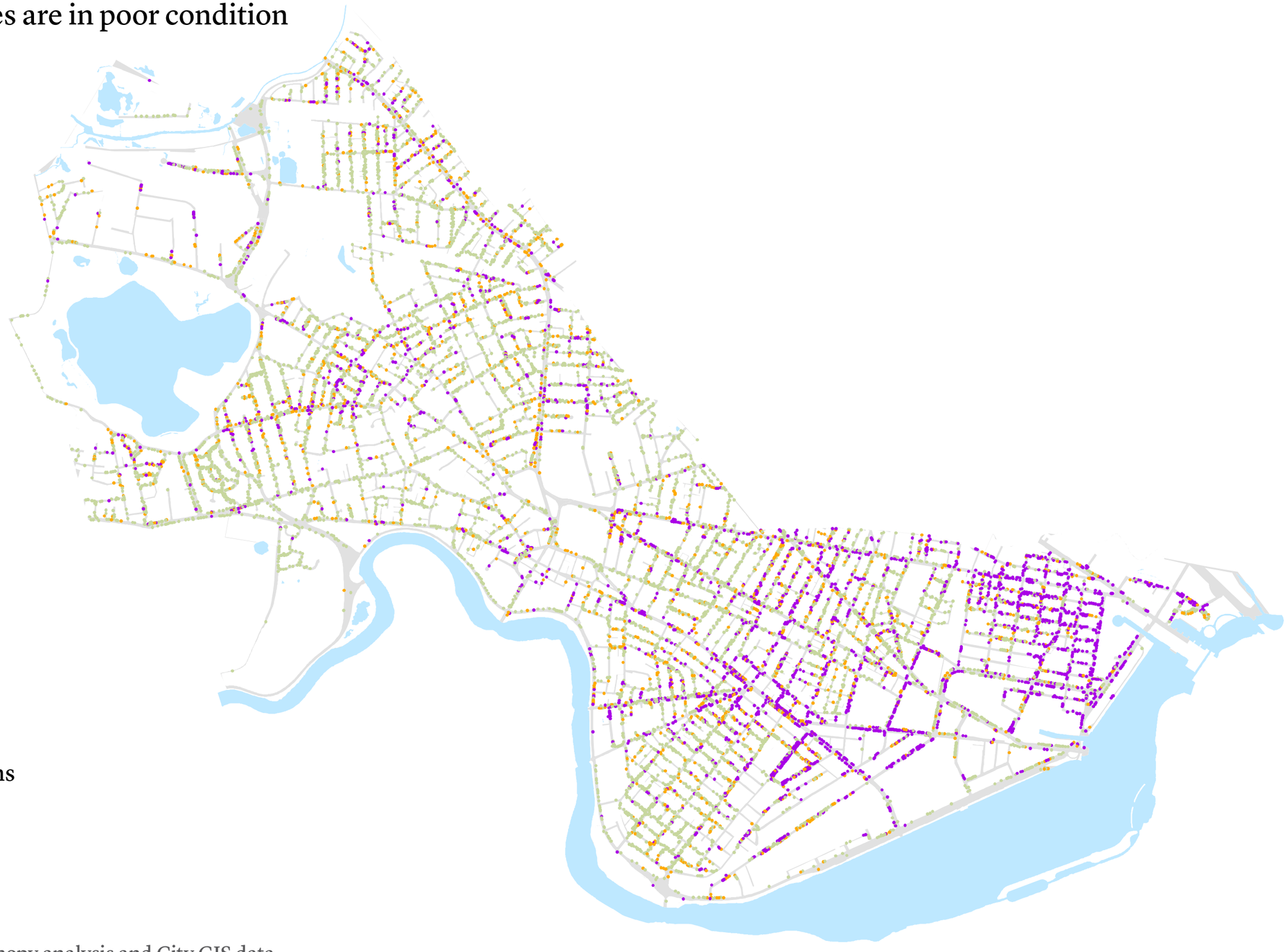
Source: CCVA

CONDITION OF STREET TREES

24% of street trees are in poor condition



Tree Health Conditions

- Fair
- Good
- Poor

Source: CUFMP 2018 canopy analysis and City GIS data.

CONDITION OF STREET TREES

39% of trees in sidewalks greater than 8’ are in poor condition.
Frequently these areas have no front yard setbacks

Tree Health Conditions

- Fair
- Good
- Poor

Source: CUFMP 2018 canopy analysis and City GIS data.

R.O.W. CANOPY

Areas without front yard setbacks rely on street trees for canopy

WEST CAMBRIDGE

EAST CAMBRIDGE

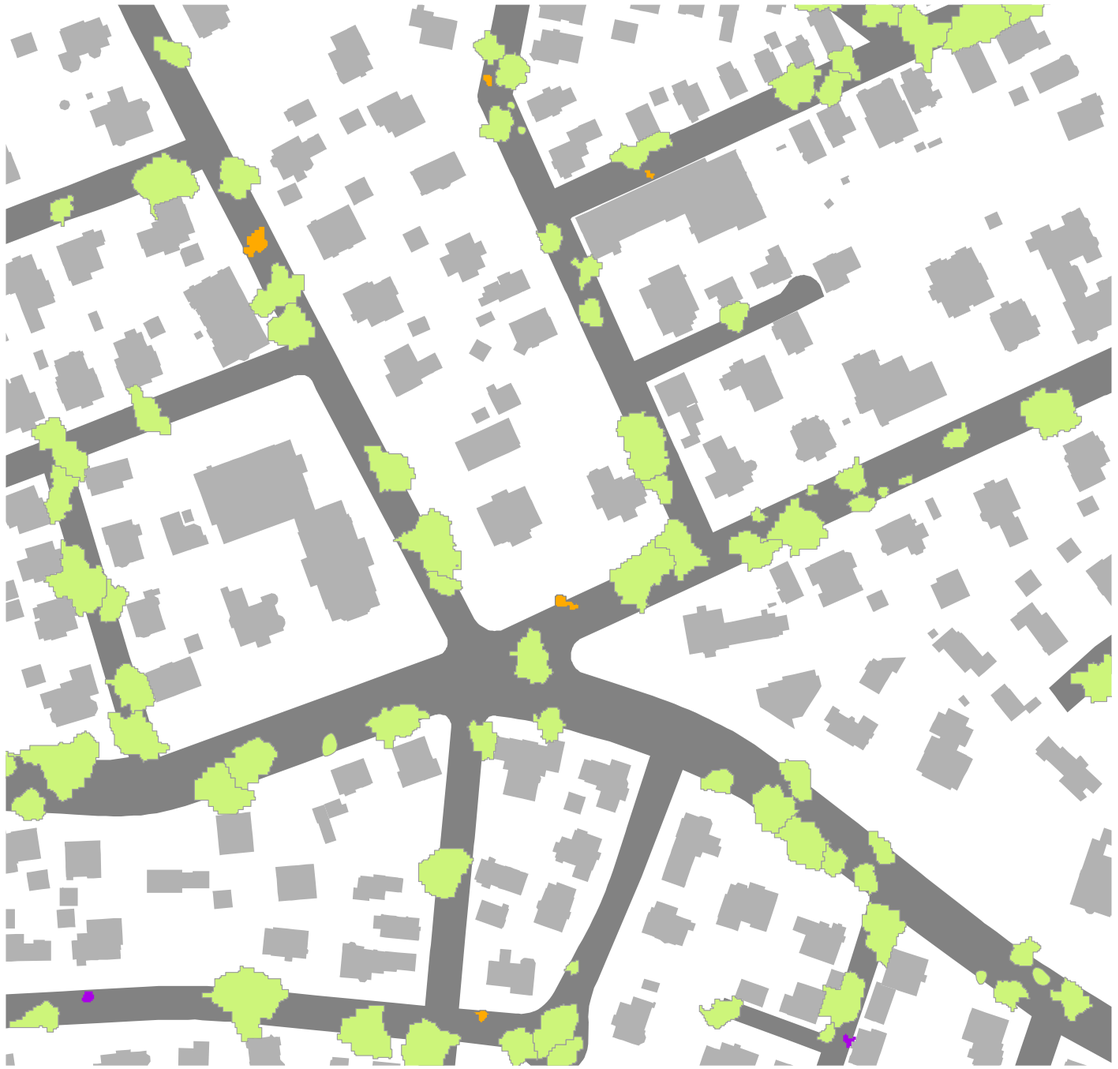
STREET TREE CANOPY

OTHER CANOPY

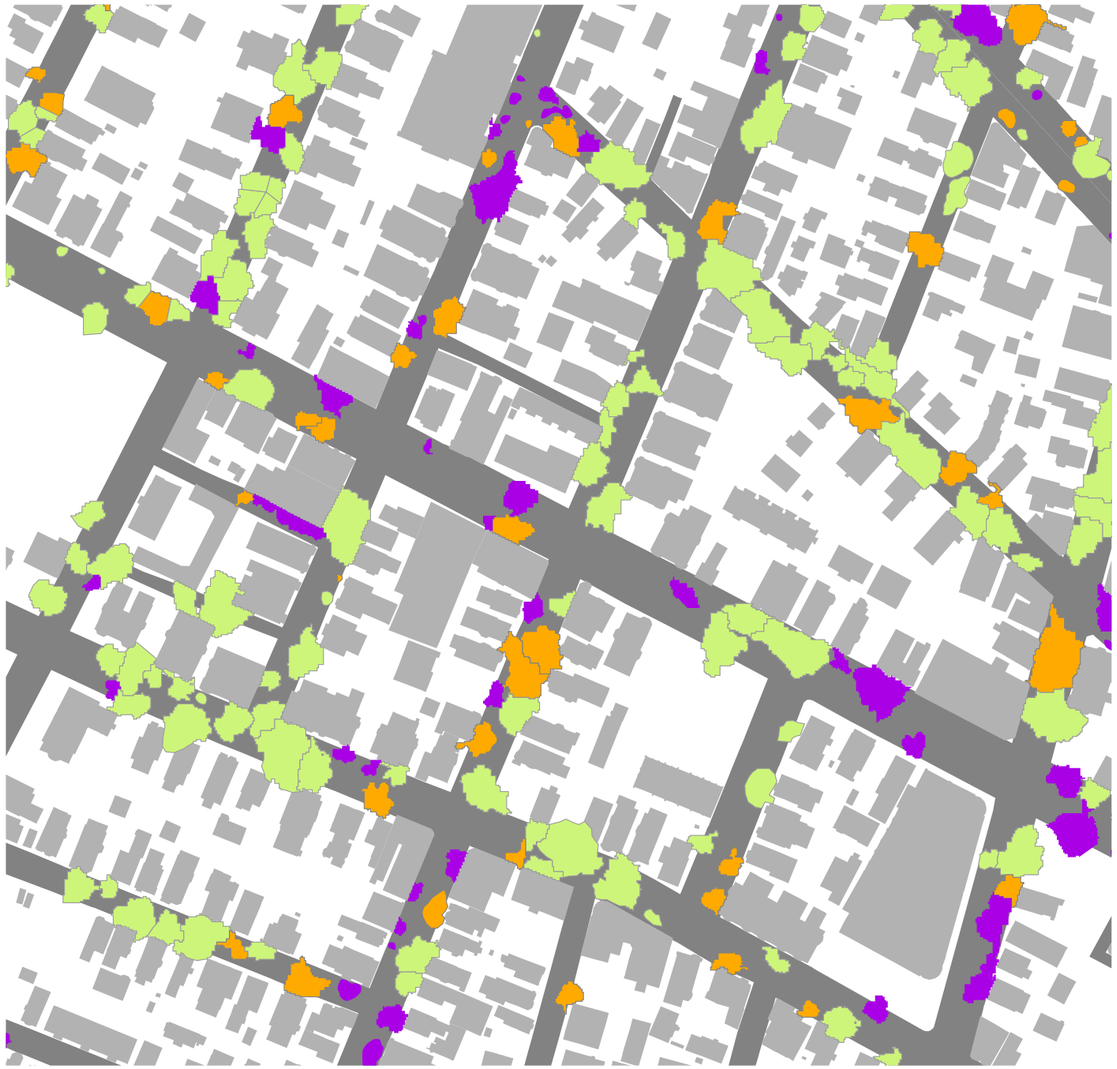
Source: CUFMP 2018 canopy analysis and City GIS data.

R.O.W. CANOPY

Street trees with setbacks are in better condition



WEST CAMBRIDGE



EAST CAMBRIDGE

GOOD CONDITION

FAIR CONDITION

POOR CONDITION

Source: CUFMP 2018 canopy analysis and City GIS data.

R.O.W. CANOPY
Front yard setbacks

WEST CAMBRIDGE

EAST CAMBRIDGE

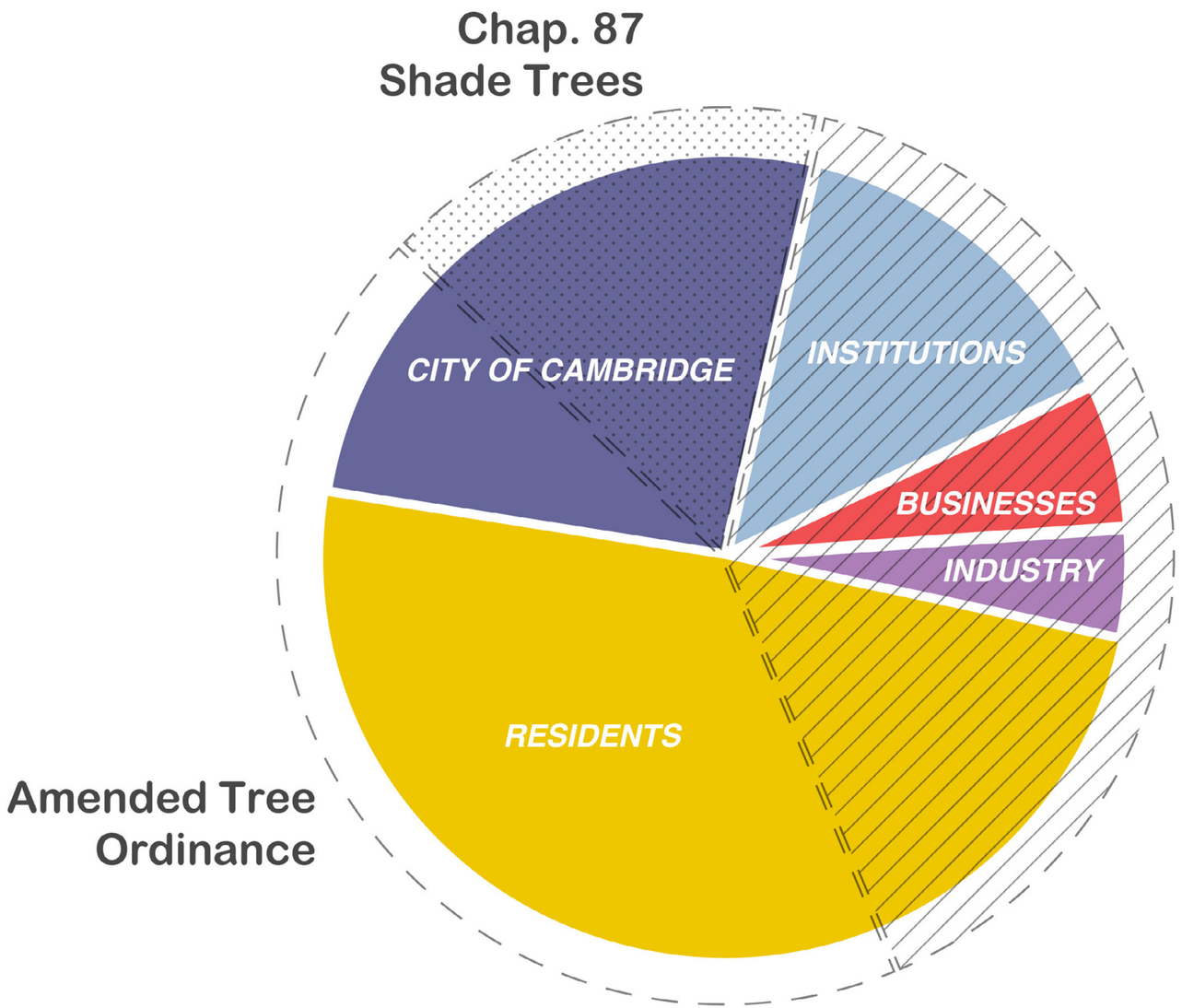
Share responsibility for a healthy forest

A thriving urban forest requires the **mutual care of many parties**, including city government, homeowners, businesses, developers, local organizations, institutions and state agencies.

Policy should be **balanced and fair**, linking the interests of all parties around smart solutions that encourage tree preservation, planting of new trees, and effective maintenance.

The city should support **education** efforts and as a catalyst for **partnerships** between interest groups to encourage stewardship of the urban forest.

SHARE RESPONSIBILITY + COMBINE ACTION



ENACT VALUES THROUGH A MULTI-PRONGED APPROACH

Curb loss

- Enhance management practices, especially around soil health, that improve tree vitality and longevity
- Protect exceptional trees of unique age and size
- Increase the cost of removals for large projects (de-incentivize removal and increase mitigation when retention is not possible)
- Enhance the city permitting and review process to track and seek alternatives to tree removals
- Educate residents on the value of their canopy as an important ecological/health resource for themselves and their community

Grow canopy

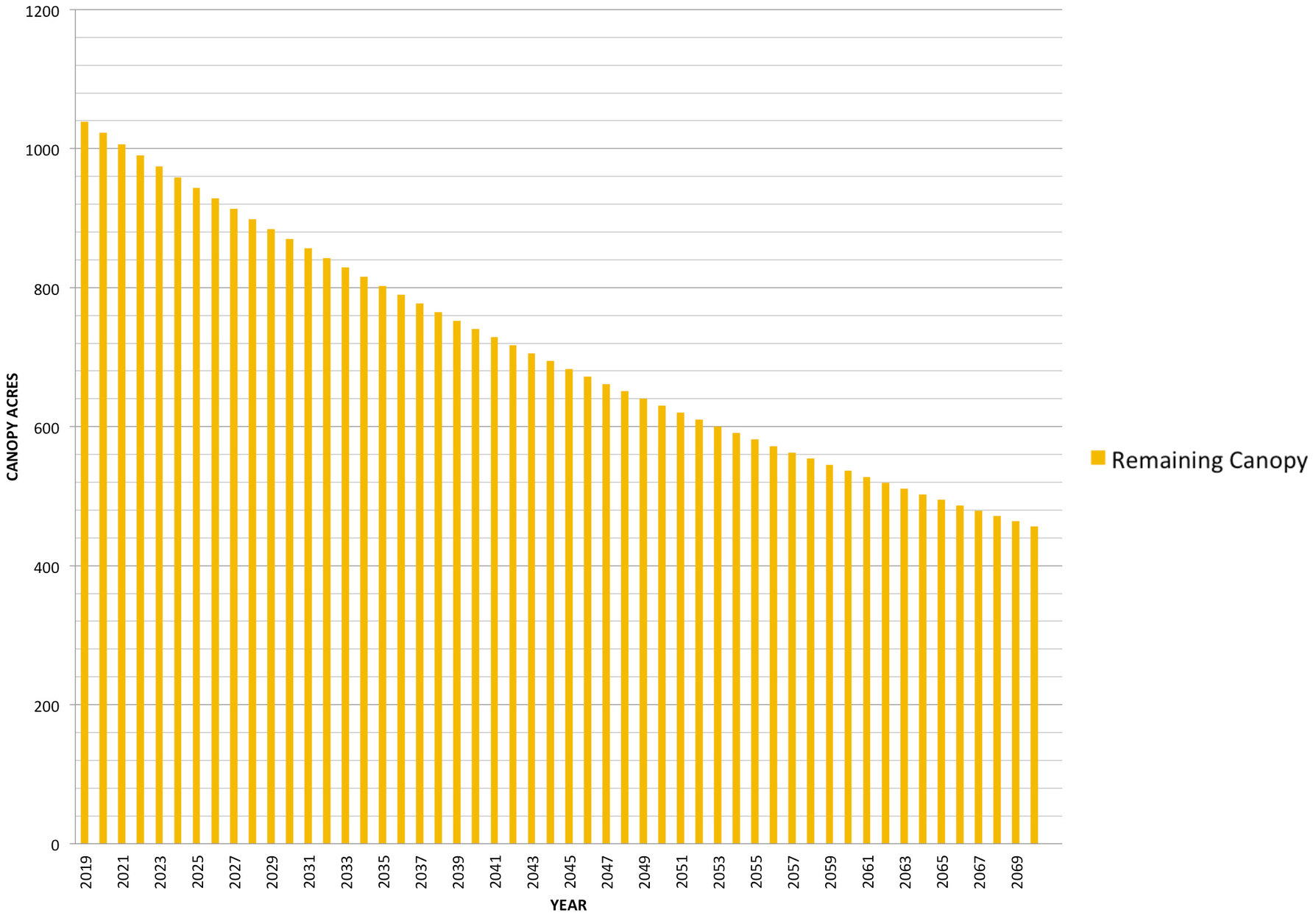
- Increase rate of planting within the public realm
- Enhance soil specifications and planting details to improve establishment and long-term success
- Develop alternative approaches to public realm design that increase opportunities, expand plantable areas, and enhance viability
- Provide resources for planting and maintenance to private landowners, especially in front yards
- Educate the public about the resources that are available and increase trust within the community
- Partner with local institutions and landowners to make commitments, set internal targets, and support community-wide goals
- Implement comprehensive zoning guidelines that represent the value of trees
- Modify recommended species and diversify forest to respond to a changing climate and increased risks of pests and diseases

Encourage alternative approaches that advance the goals of the Urban Forest Master Plan

- De-pave and enhance permeability
- Implement green roofs and living structures
- Encourage alternative shade structures where trees are not viable

CURBING LOSS AND GROWING CANOPY

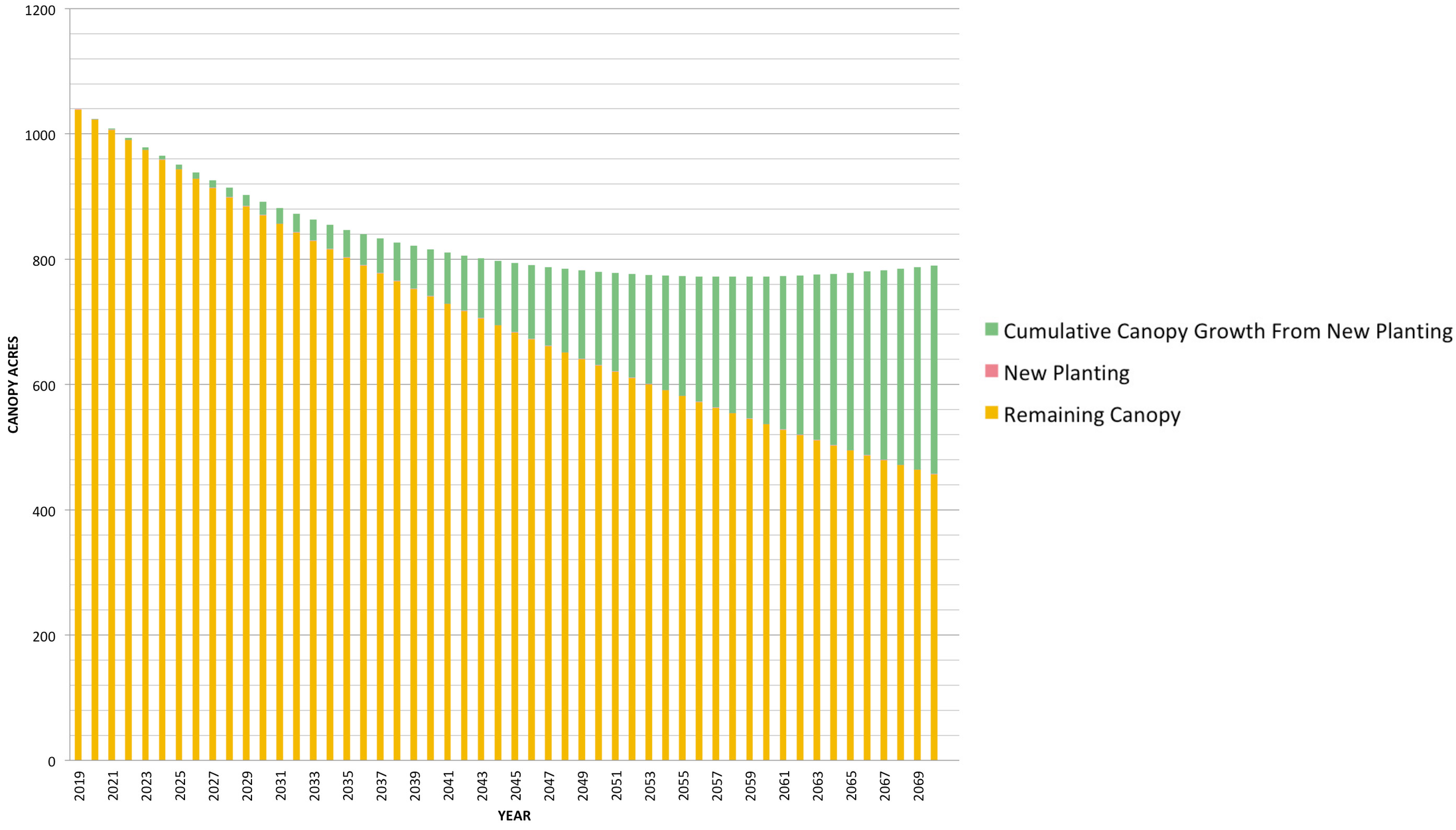
If the mortality rate remains unchanged with the current rate of planting ...



Graph assumptions: 1.6% annual net loss rate from 2009 to 2018 derived from CUFMP 2018 canopy analysis

CURBING LOSS AND GROWING CANOPY

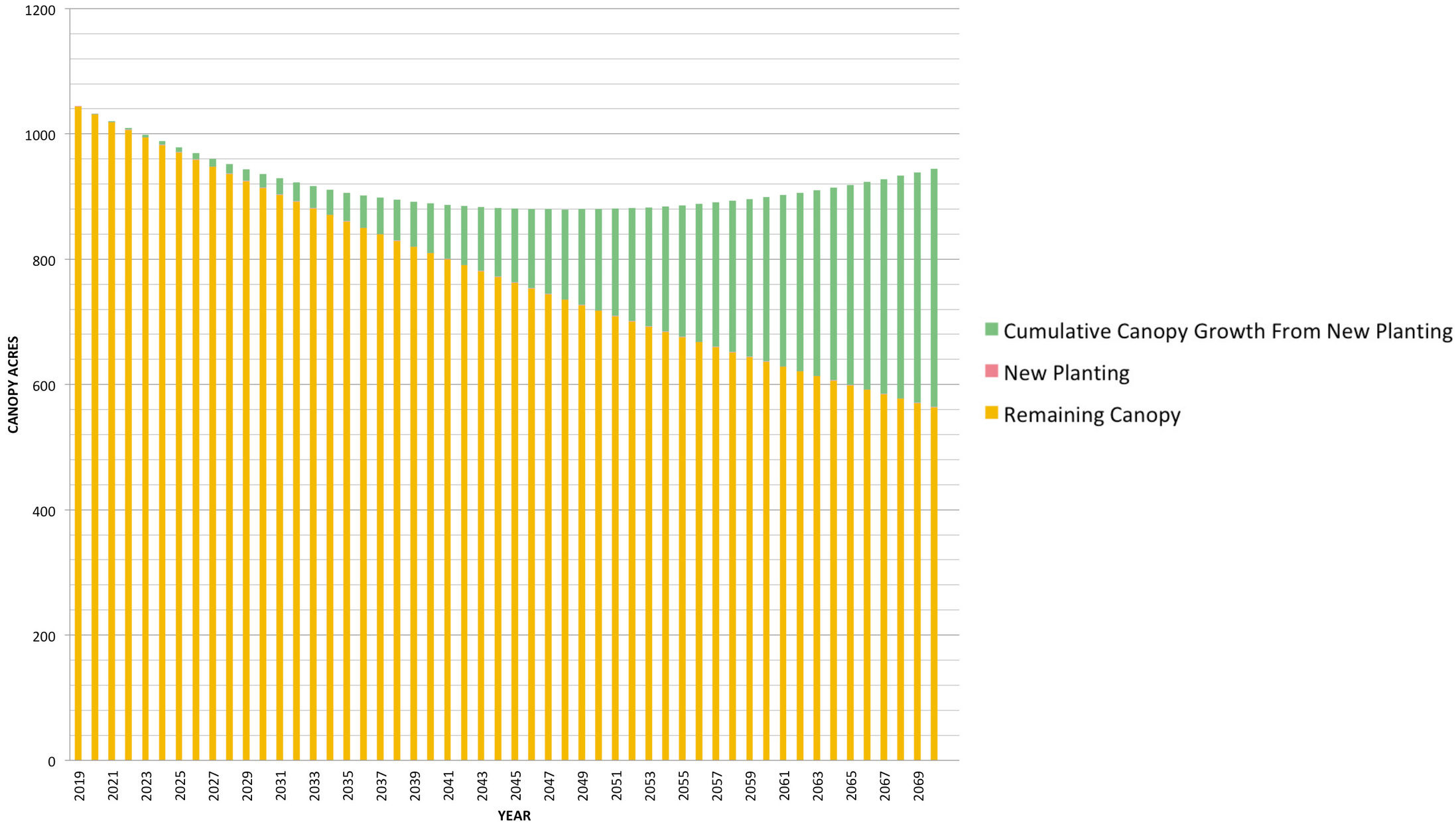
If the current mortality rate unchanged but plant 1,000 additional trees/yr citywide...



Graph assumptions: 1.6% annual net loss rate from 2009 to 2018 derived from CUFMP 2018 canopy analysis

CURBING LOSS AND GROWING CANOPY

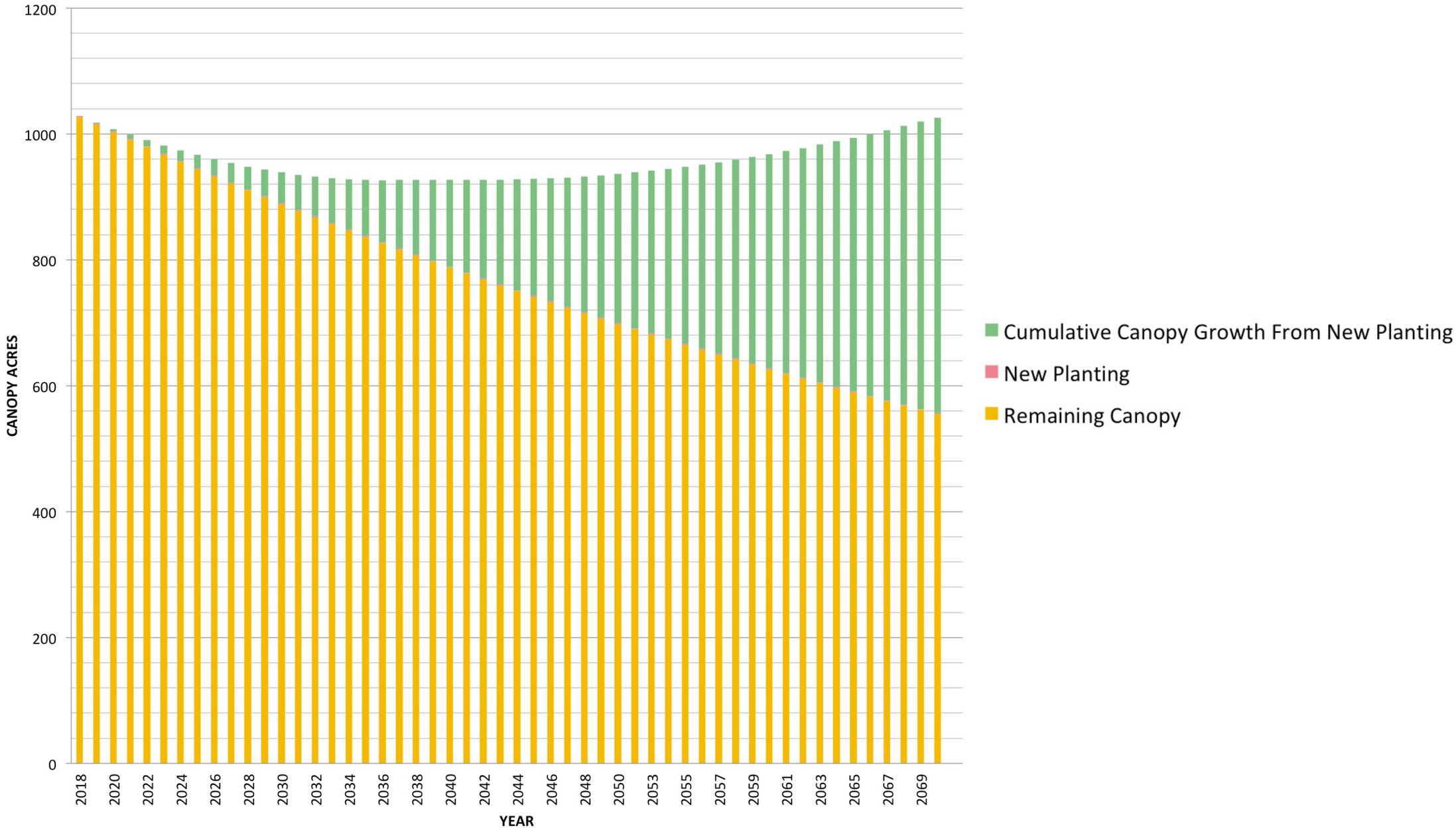
If we curb loss by 25% and plant 1,000 additional trees/yr citywide ...



Graph assumptions: 1.6% annual net loss rate from 2009 to 2018 derived from CUFMP 2018 canopy analysis

CURBING LOSS AND GROWING CANOPY

If we curb loss by 25% and plant 3,000 additional trees/yr for 5 yrs then 1,000 additional trees/yr citywide...



Graph assumptions: 1.6% annual net loss rate from 2009 to 2018 derived from CUFMP 2018 canopy analysis

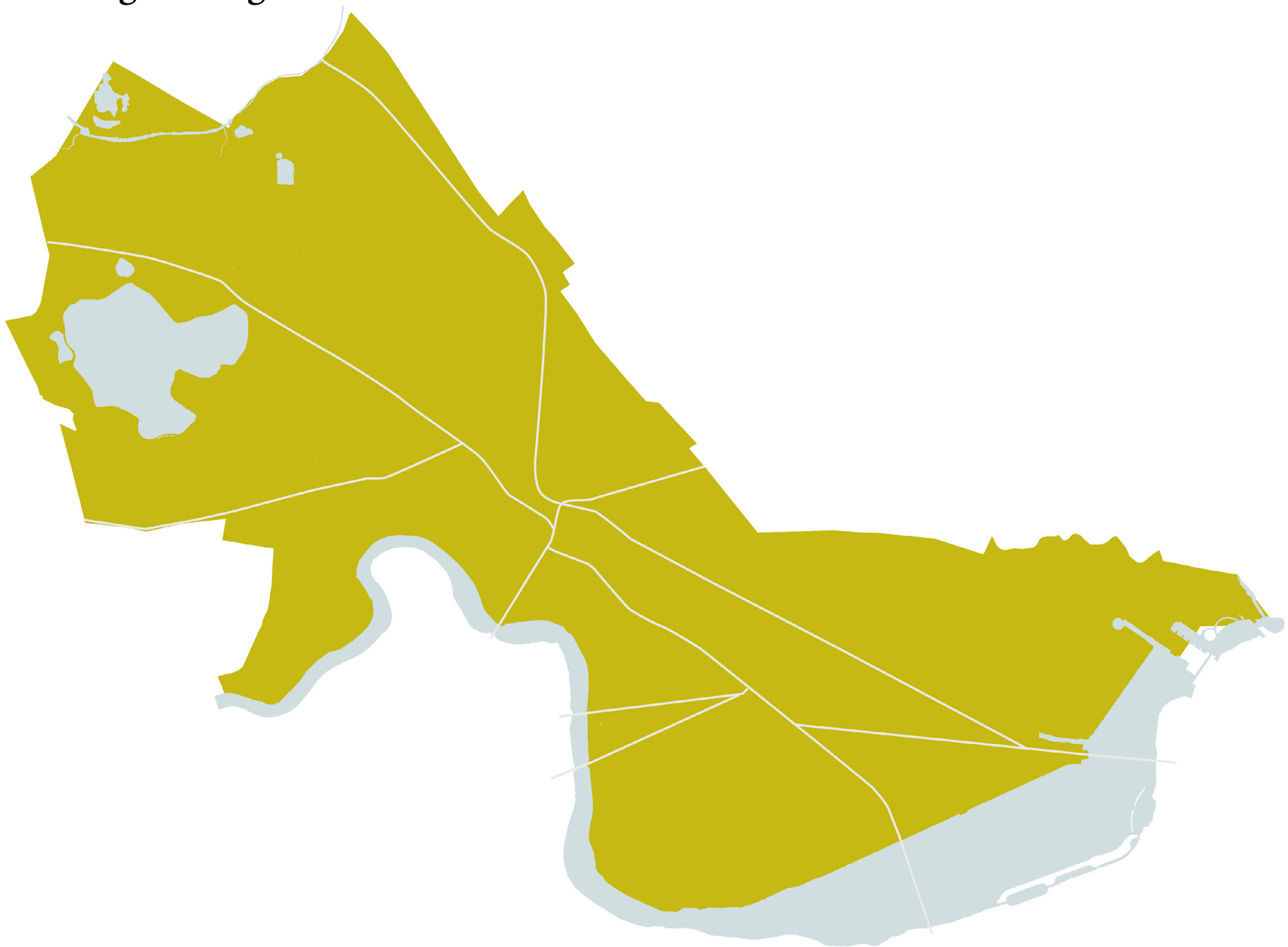
RESPONSE STRATEGIES

STRATEGIES

		Policy			Planning/Design					Practices				Outreach/Other		
		Enhance Current Tree Protection Ordinance	Formalize City Practices	Integrate Canopy Values into Planning and Zoning	Leverage Envision Cambridge and CCPR planning studies	Restrict Street Tree Planting to Only Suitable Areas	Create New Typologies for Street Tree Planting	Implement City-Wide Planting Plan to Focus Efforts	Site New Parks/Open Spaces Strategically	Improve City Planting Practices	Improve City Maintenance and Care Practices	Implement Soils Management Program	Monitor Tree Canopy and Adapt	Invest in Educational Programs	Build Community Partnerships	Seek Alternative Green Strategies
ACTION	**in response to …**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Curb loss	Mature canopy decline	•													•	
	Land conversion	•		•	•							•			•	
	Residential removals	•		•										•	•	
	Poor tree condition	•	•	•		•				•	•	•		•	•	
	Narrow sidewalks			•		•										•
	Inadequate soil volume			•		•				•		•				
	Understanding the value of trees													•	•	
Grow canopy	Equity in distribution of canopy cover	•	•	•	•		•	•	•	•	•	•	•	•	•	
	Shading and cooling / pedestrian thermal comfort	•	•	•	•		•	•	•	•	•	•	•		•	
	Environmental quality / wellbeing and public health	•	•	•	•		•	•	•	•	•	•	•		•	•
	Ecological connectivity	•		•	•		•	•	•	•	•	•	•			•
	Diversity of forest composition						•	•		•			•			
	Disaster response preparedness				•			•		•			•	•	•	•

PLANNING APPROACH

Curb loss by protecting existing trees



POLICY STRATEGIES

1. Enhance Tree Protection Ordinance
    a. Change the definition of Significant Trees
    b. Create an “Exceptional Tree” category
    c. Change mitigation requirements
2. Enhance the role of the Committee on Public Planting
3. Expand tree protections to private property
4. Earmark Tree Replacement Fund dollars for community grants
5. Align planting protocols with City’s commitment to equity
6. Increase oversight to ensure compliance
7. Strengthen zoning ordinance requirements
    a. Establish canopy coverage requirements
    b. Increase ratios for trees to parking spaces and/or dwelling units
    c. Increase setback and open space requirements in priority areas
    d. Establish flexible landscape mandate like Green Factor or Green Area Ratio
    e. Resilience Task Force zoning opportunity

ENHANCE PRACTICES

MONITOR

—Increase tree assessments

—Expand pest monitoring

—Expand Cartegraph tracking to monitor success of practices

REMEDIATE

—Manage soils

—Liquid biological amendments

—Decompaction/Aeration

—Treat private trees during severe pest outbreaks (EAB)

PLANT

—Enhance soil specs

—Ensure proper drainage

— Plant bare root trees

MAINTAIN

—Formalize a City-wide management plan

—Manage soils

—Mulching

—Liquid biological amendments

—Structural pruning for young trees

—Expand watering program

EDUCATION / OUTREACH STRATEGIES

Educate the public on the value of trees and how to be stewards of them.

Empower existing NGOs to plant and maintain more trees, including on private property.

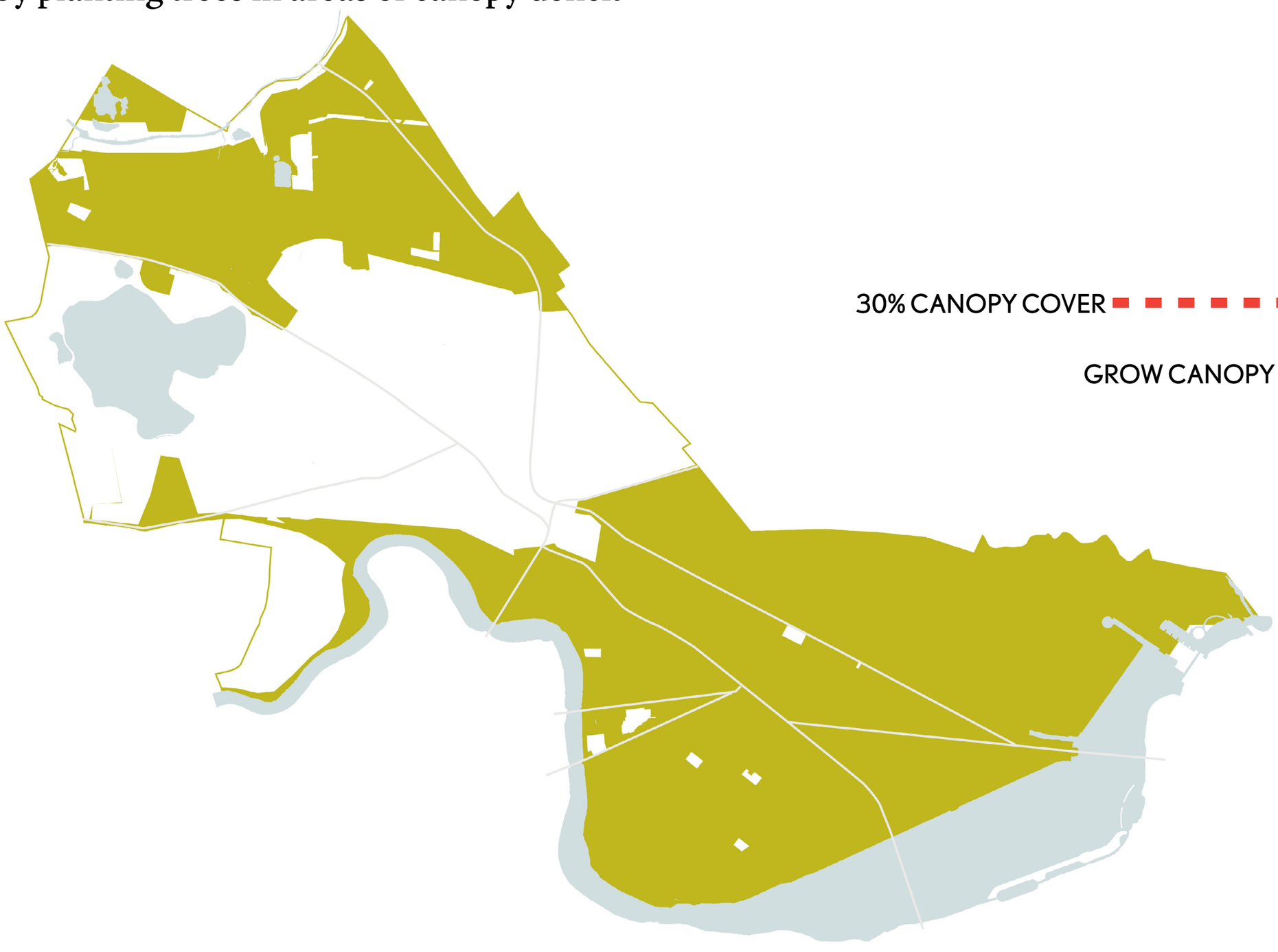
Educate city staff, institutions, and other grounds managers on the value of trees and how to be stewards of them.

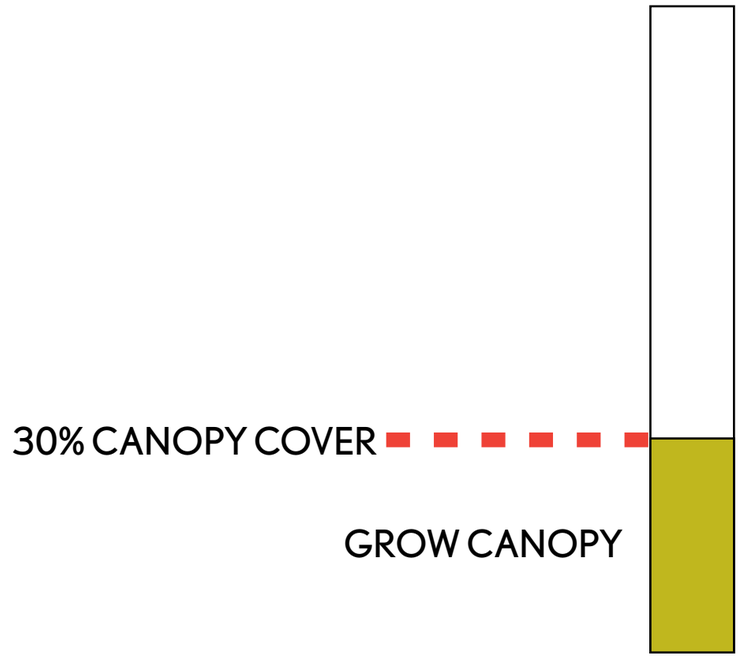
Support community employment and involvement in tree planting and constructing bioswales.

Build capacity of existing NGOs through partnerships with national organizations.

PLANNING APPROACH

Grow canopy by planting trees in areas of canopy deficit

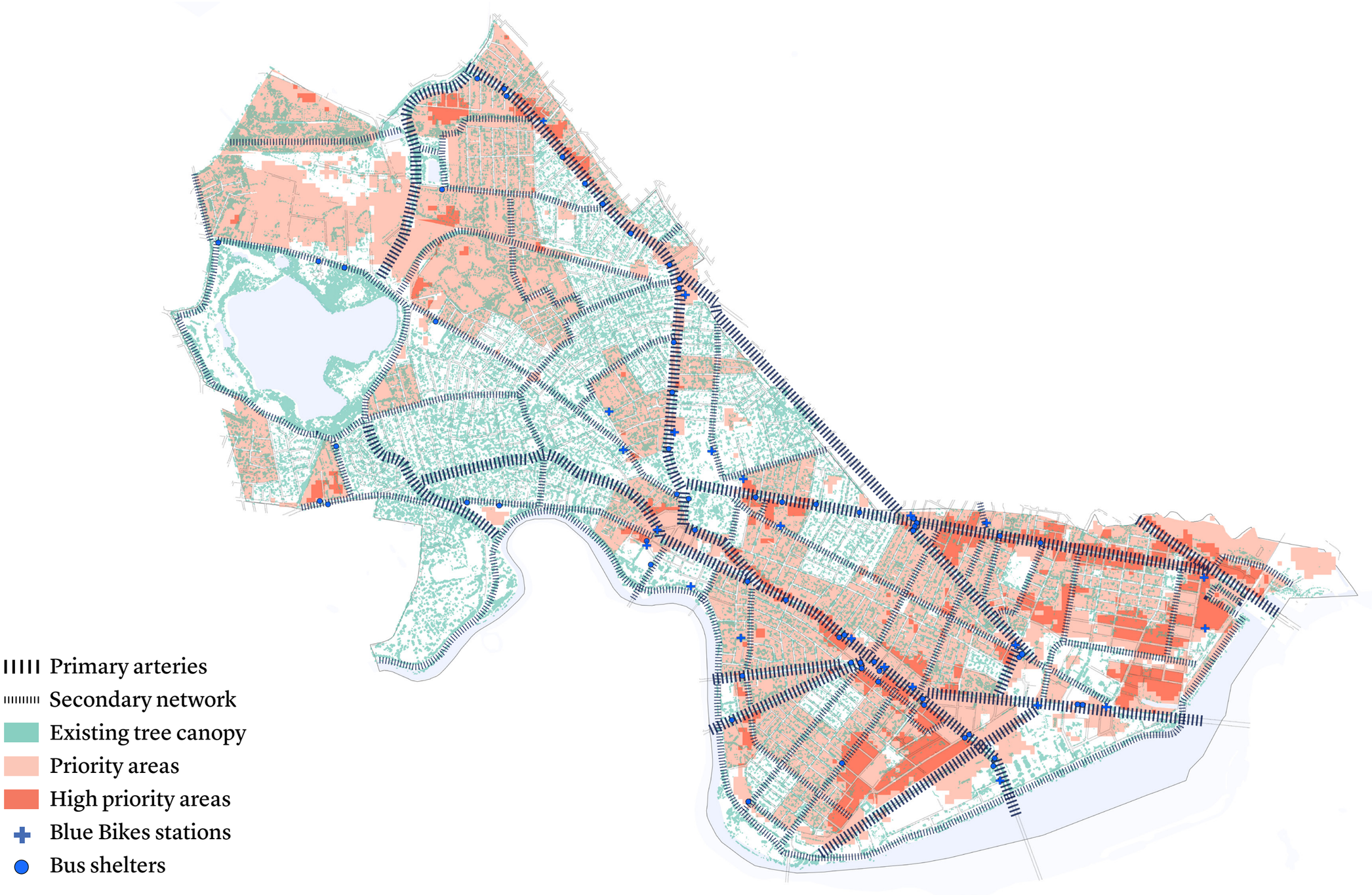




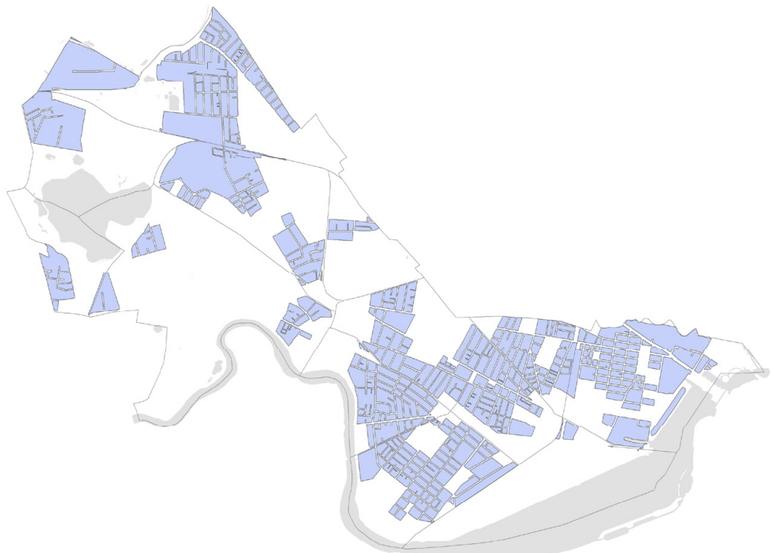
PLANNING APPROACH

Focus on creating robust canopy corridors

PRIORITIZE EFFORTS



PRIORITY AREA CRITERIA

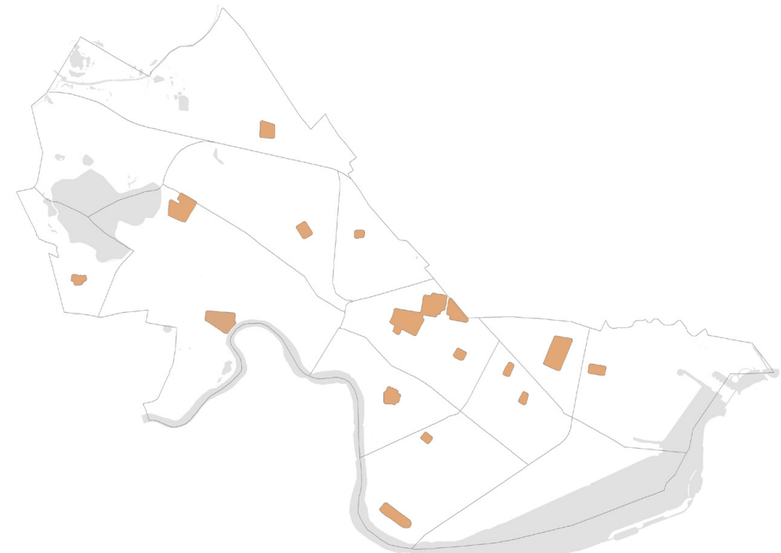


ENVIRONMENTALLY VULNERABLE POPULATIONS

Minority population
Low income population
Non English speaking population

HEAT ISLAND HOT SPOTS

Greater than 92 degrees
on a 90 degree day
as modeled by KLF for 2030
ambient air temperature

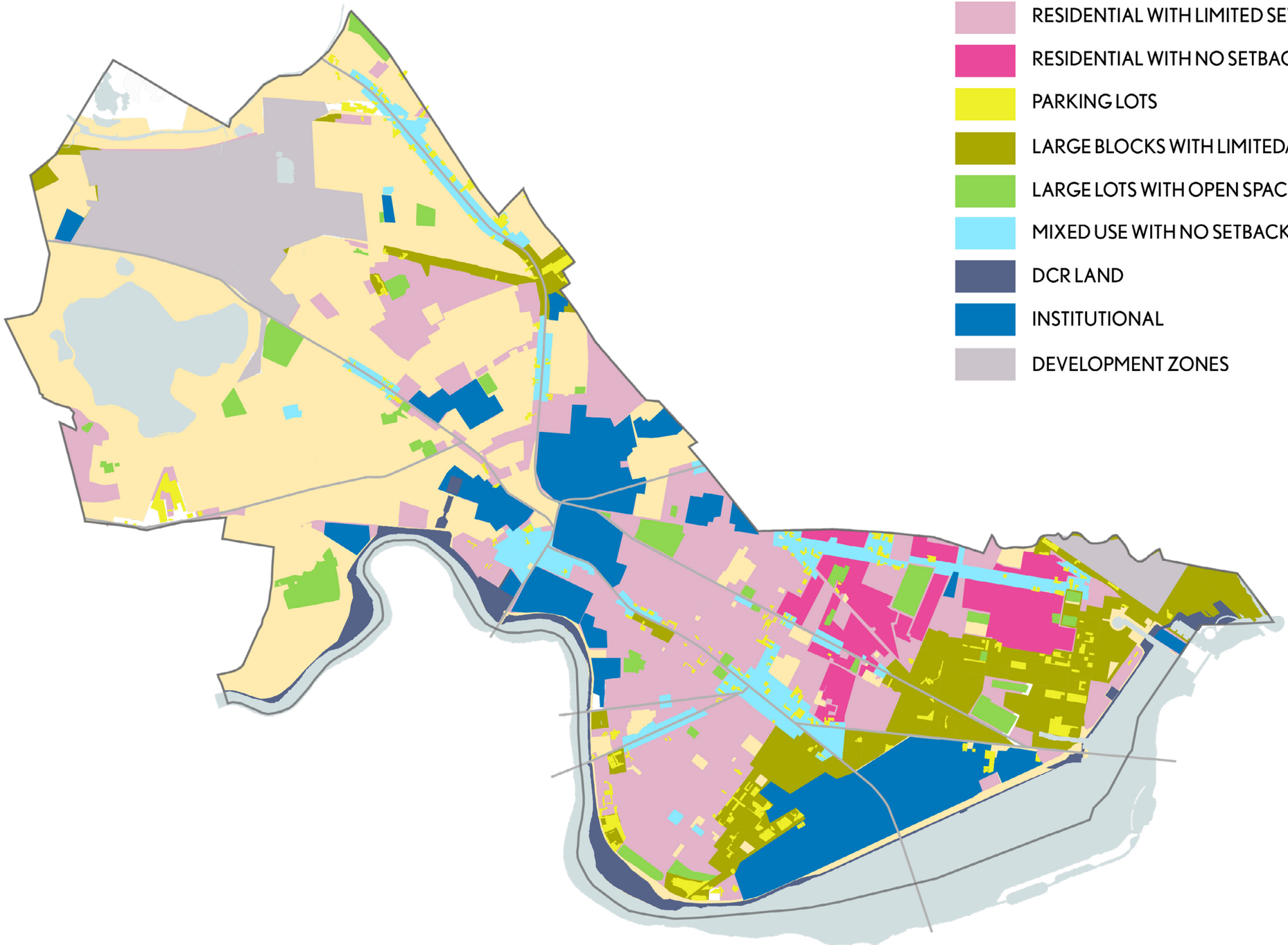


COMMUNITY INFRASTRUCTURE

Public Schools and Hospitals

GROW CANOPY

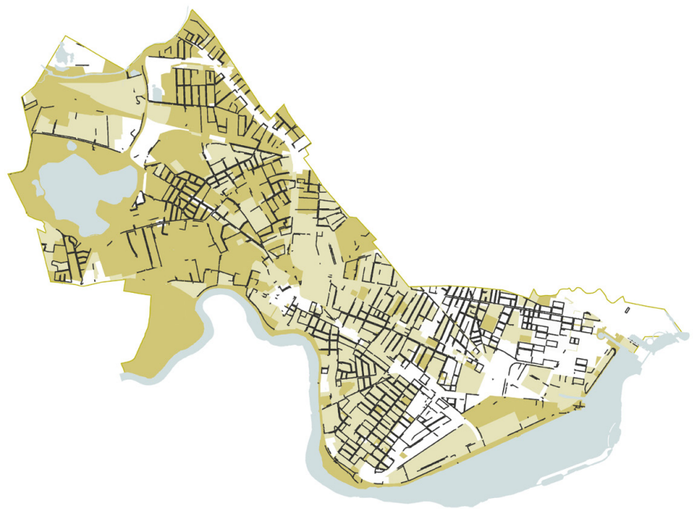
Align strategies with site conditions and uses



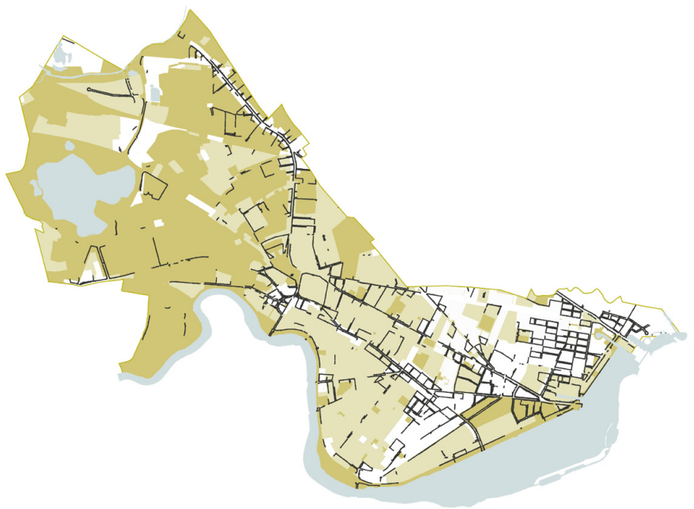
- MIXED USES WITH SETBACKS 10' OR GREATER
- RESIDENTIAL WITH LIMITED SETBACKS
- RESIDENTIAL WITH NO SETBACKS
- PARKING LOTS
- LARGE BLOCKS WITH LIMITED/NO SETBACKS
- LARGE LOTS WITH OPEN SPACE
- MIXED USE WITH NO SETBACKS
- DCR LAND
- INSTITUTIONAL
- DEVELOPMENT ZONES

SIDEWALK WIDTH + FRONT YARD SETBACK

SIDEWALKS LESS THAN 6’ WIDE



SIDEWALKS BETWEEN 6’ AND 8’



SIDEWALKS 8’ OR GREATER

FRONT YARD SETBACKS GREATER THAN 10’

LIMITED SETBACKS

NO REQUIRED SETBACKS

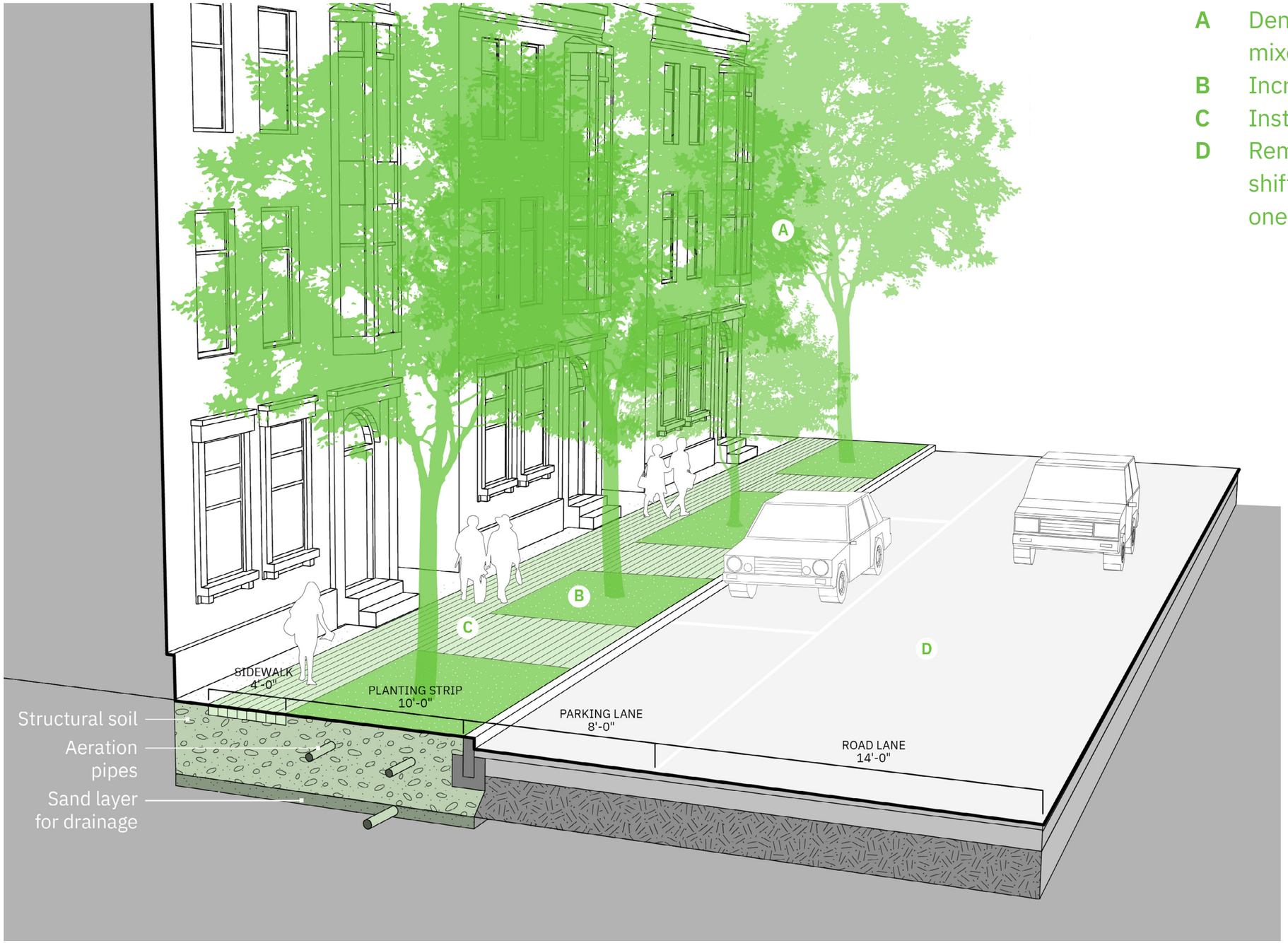
ALTERNATIVE DESIGN STRATEGIES: MAJOR STREETS, WIDE SIDEWALKS

Staggered trees with permeable paving

A Densify tree planting
B Install porous pavement
C Increase the soil volume
D Extend soil volume to the buildings

ALTERNATIVE DESIGN STRATEGIES: NARROW RESIDENTIAL STREETS, NO SETBACK

Lane diet, one-way travel



A Densify planting with mixed species

B Increase the soil volume

C Install porous pavement

D Remove pavement - shift two way traffic to one way

ALTERNATIVE DESIGN STRATEGIES: NARROW RESIDENTIAL STREETS WITH FRONT YARD

Planting area fit into parking lane

A Alternate canopy and understory trees

B Increase the soil volume

C Remove pavement - bump out planting areas into parking lanes

RESEARCH FINDINGS

RESPONSE STRATEGIES

NEXT STEPS

OPEN HOUSE

— Cost / Benefit Analysis

— Prioritization

— Refinement and Clarification

— Public Meeting #3

RESEARCH FINDINGS

RESPONSE STRATEGIES

NEXT STEPS

OPEN HOUSE

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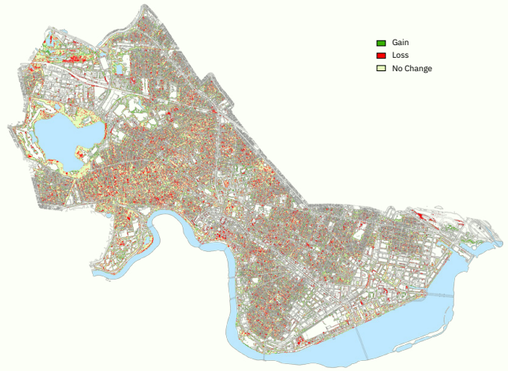
THE WORKS CAMBRIDGE DEPARTMENT OF PUBLIC

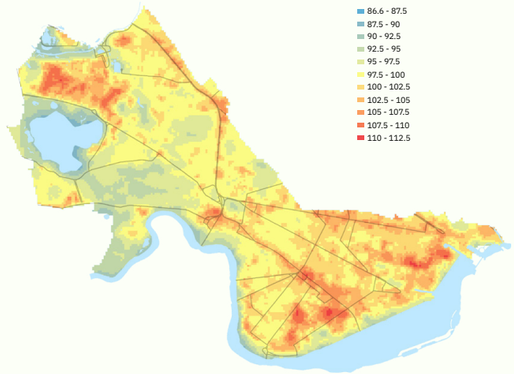
ANALYSIS

Cambridge Urban Forest Master Plan



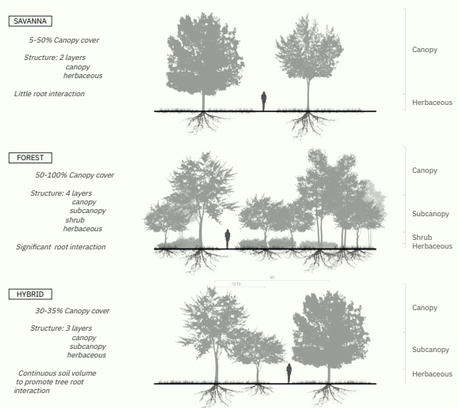
TREE CANOPY LOSS (2009-2018)

TREE HEALTH CONDITIONS



HEAT ISLAND
ESTIMATED AMBIENT AIR TEMPERATURE ON A 100°F DAY IN 2070
Source: CCVA 2070 Urban Heat Island

TREE CANOPY AND COOL CORRIDORS



PLANT COMMUNITIES

SPECIES	% OF CANOPY	SUSCEPTIBILITY TO CLIMATE RISKS
Norway Maple	13%	medium
Pin Oak	11%	medium
Honey locust	9%	low
Red Maple	7%	high
Red Oak	6%	high
Littleaf Linden	4%	medium
Callery Pear	4%	high
London Planetree	4%	medium
Ash	3%	high
Crabapple	3%	high
Other	36%	

SPECIES DISTRIBUTION

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THE CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

POLICY

Cambridge Urban Forest Master Plan

ENHANCE CURRENT TREE PROTECTION ORDINANCE

- **Change the Definition of Significant Trees**

  Today, only trees greater than 8" dbh require mitigation and only when part of new development projects.

- **Create an "Exceptional Tree" category**

  The addition of an "Exceptional Tree" category in the City's Tree Protection Ordinance would allow for a more stringent set of protections than those currently applied to Significant Trees in order to protect the city's most valuable trees.

- **Change Mitigation Requirements**

- **Enhance the Role of the Committee on Public Planting**

  Provide the Public Planting Committee with resources to extend the discussion of subjects raised by the UFMP, including
  — interpreting recommendations
  — updating analysis based on current research
  — reviewing pilot projects
  — reviewing progress toward targets

- **Expand Tree Protections to Private Property**

  Many cities locally and across the country have expanded the jurisdiction of local governments through tree protection ordinances by requiring a removal permit for all trees, regardless of whether they are on public or private property. Circumstances under which the city approves a tree removal permit vary in stringency but could range from approving every request to prohibiting removal of any healthy tree. However, the success of this approach has not been well established.

- **Earmark Tree Replacement Fund dollars for Community Grants**

  The city could earmark some of the funds in the Tree Replacement Fund for community-based grant making that could help fund operations to encourage planting on private property.

FORMALIZE CITY PRACTICES

- **Align Planting Priorities by City's Commitment To Equity**

- **Increase Oversight to Ensure Compliance**

  Currently, there is limited City oversight to ensure compliance. The Tree Protection Ordinance does not currently define standards for tree protection during construction.

  — Require increased offset from tree dripline to protect tree roots
  — Require periodic review per an order of conditions to improve tree protection measures (fencing, watering) during construction
  — Require city arborist/city engineer inspection prior to obtaining Certificate of Occupancy

INTEGRATE CANOPY VALUES INTO PLANNING AND ZONING

- **Broaden and Align Zoning Requirements**

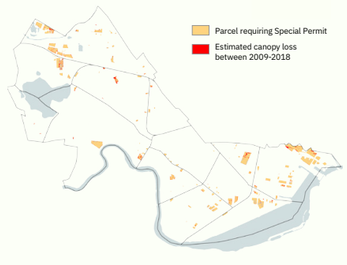
  — Establish canopy coverage requirements

  — Increase ratios for trees to parking spaces and/or dwelling units

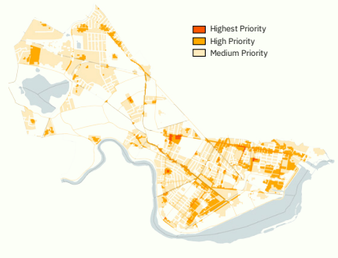
  — Increase setback and open space requirements in priority areas

  — Establish flexible landscape mandate like Green Factor or Green Area Ratio

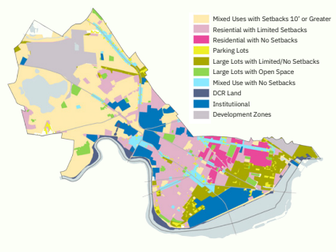
  — Resilient Task Force zoning opportunity



SPECIAL PERMITS (2009-2018)



PLANTING PRIORITY AREAS



SITE CONDITIONS AND USES

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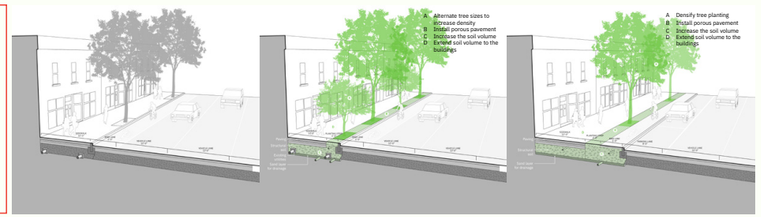
DESIGN

Cambridge Urban Forest Master Plan

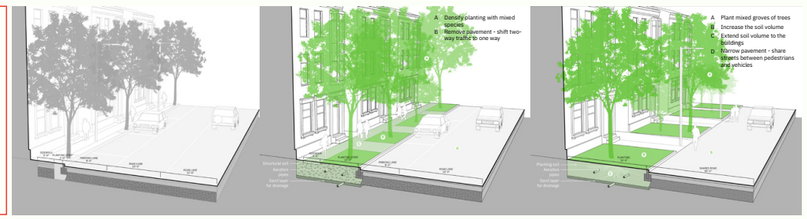
MAJOR STREETS WITH WIDE SIDEWALKS

MAJOR STREETS WITH NARROW SIDEWALKS

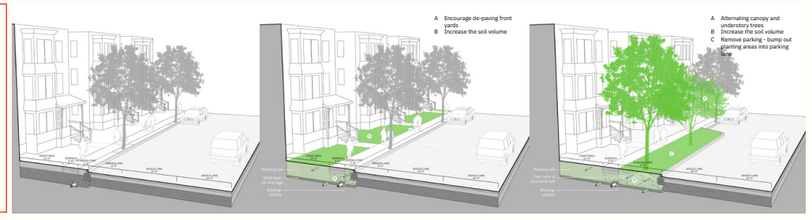


MAJOR STREETS WITH COMMERCIAL BUILDINGS

NARROW RESIDENTIAL STREETS, NO SETBACK



NARROW RESIDENTIAL STREETS WITH FRONT YARD



NARROW RESIDENTIAL STREETS WITH LARGE FRONT YARD

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THE WORKS CAMBRIDGE DEPARTMENT OF PUBLIC

PRACTICE

Cambridge Urban Forest Master Plan

MONITOR

—Increase tree assessments

—Expand pest monitoring

—Expand Cartegraph tracking to monitor success of practices

REMEDIATE

—Manage soils

Liquid biological amendments

Decompaction/Aeration

—Treat private trees during severe pest outbreaks (EAB)

PLANT

—Enhance soil specs

—Ensure proper drainage

— Plant bare root trees

MAINTAIN

—Formalize a City-wide management plan

—Manage soils

Mulching

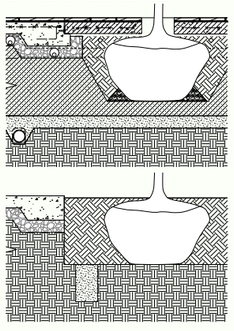
Liquid biological amendments

—Structural pruning for young trees

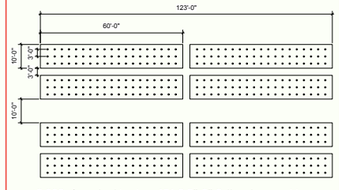
—Expand watering program

ENHANCE SOIL SPECS

ENSURE PROPER DRAINAGE

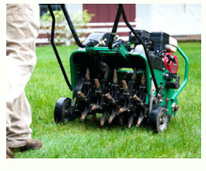


PLANT BARE ROOT TREES

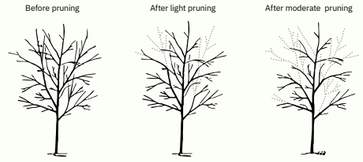


8,200 sf required to store 456 2.5"-3" Caliper bare root trees.

MANAGE SOILS

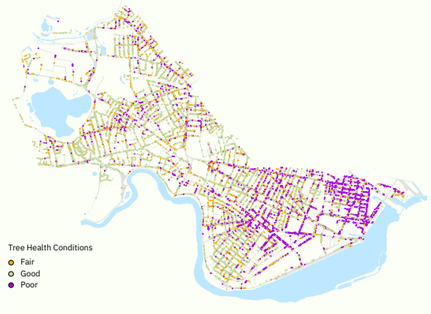


PRUNE YOUNG TREES FOR STRUCTURAL INTEGRITY



Graphic from "Structural Pruning of Shade Trees," Gilman and Eisner

MONITOR THE TREES



OUTREACH/EDUCATION

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OUTREACH

Cambridge Urban Forest Master Plan

Empower existing NGOs to plant and maintain more trees, including on private property.

- Hands-on tree care training, covering biology, identification, planting and proper care
- Tree Planting Opportunities Map for tree planting events
- Book Club
- Video Library

TREE TENDERS (PENNSYLVANIA HORTICULTURAL SOCIETY)

Support community employment and involvement in tree planting and constructing bioswales.

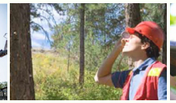
- Community Greenspace provides material supplies, technical advice, and classroom-based and hands-on training to support resident-driven community greening projects.
- GreenSkills is a local green jobs program that employs high school students and adults with employment barriers through the planting of trees.
- Green Infrastructure, a partnership with the City of New Haven to construct bioswales.

YALE URBAN RESOURCES INITIATIVE

Build capacity of existing NGOs through partnerships with national organizations.

- Nonprofit organizations, urban forest councils, municipalities and individuals can join the alliance.
- Offering education & training to its members and providing online tree planting and care resources.

A Strong Network Focused on Trees



Tree Health Guide

Pruning Guide

ABROR DAY FOUNDATION — ALLIANCE FOR COMMUNITY NETWORK

Educate city staff, institutions, and other grounds managers on the value of trees and how to be stewards of them.

- Employee education programs
- Supporting arboriculture and urban forestry education

Continuing Education at Davey

Davey Establishes Educational Endowment for TREE Fund

DAVEY TREE

Educate the public on the value of trees and how to be stewards of them.

Green City Teachers
a training program that enables educators to start school gardens

Garden Tenders
a training program for starting community gardens on vacant lots, in parks, around schools and churches etc.

City Harvest
thousands of seedlings are started at neighborhood-based greenhouses by nonprofit partners as well as by inmates of the Philadelphia Prison System at a prison greenhouse through a training program.

PENNSYLVANIA HORTICULTURAL SOCIETY

Educate the public on pests.

- Citizen science project helps to protect the forest and tree species

BACKYARD BARK BEETLE UNIVERSITY OF FLORIDA

Train citizens to survey trees in the city and for diagnosis and management of diseases.

Diagnosis and management include
- knowing the hosts and symptoms,
- best management practices,
- treatments and restoration options,
- sanitation measures to reduce the risk of spreading pathogen
- regulations
- response plans

SUDDEN OAK DEATH (SOD BLITZ)

Create a program that prevents the spread of pests from imported wood pellets.

Wood pellets

Asian long-horned beetle

OPEN HOUSE

FURTHER INFORMATION

www.cambridgema.gov/ufmp