

Comments on the Urban Forest Master Plan Technical Report

We applaud the thoughtful and comprehensive Urban Forest Master Plan technical report which describes both the canopy's practical, monetized benefits as well as its intangible assets that include aesthetic, health, and spiritual values. We see a thriving urban forest as a key factor in building Cambridge's resilience to climate change. Not only do healthy trees aid resilience, they also help to mitigate the climate emergency by holding and cycling carbon in a natural system. It is well-stated in the report (p.12) that the goal for Cambridge is a "brighter but more shaded future".

We agree that it is critical to shift the paradigm more towards a well-functioning urban ecosystem, rather than disconnected corridors of trees or solitary trees in wells. We also wholeheartedly agree that the tree canopy is not just an "environmental" issue, but rather one that cross cuts many city planning sectors: transportation, health, housing, and human rights. At the same time as citizens are calling for safer streets, affordable housing, and a thriving city with a robust economy, they also vote year after year (via the participatory budgeting program) for even more trees to be planted. The excellent strategies section of this report shows that many of these seemingly unconnected issues can be tackled together and are not mutually exclusive. The citizens, as well as the experts, are demanding bold action.

Our comments are offered below, organized by chapter and page number. We also offer a section on what we feel are some additional considerations that were omitted from the report. In our comments, we highlight the need for rapid action, including immediate measures such as back of sidewalk plantings, enlarging tree wells for soil volume, and depaving for permeability and planting. At the same time strategies such as reconfiguration of streets, design of productive urban landscapes with a diversity of species, and strong policies on protection and canopy growth should be rapidly set in motion in the coming months and years. As a coastal city surrounded by water, Cambridge must work on this in the urgent context of the global climate crisis.

Section 1 – Executive Summary

P. 11 – The 2-4 degrees of air cooling from shade (McDonald, R.I., et al) is lower than other estimates such as 2-9 degrees (EPA: <https://www.epa.gov/heat-islands/using-trees-and-vegetation-reduce-heat-islands>), or as much as 10 degrees (<https://www.sciencedaily.com/releases/2019/03/190325173305.htm>). It is also worth including the much higher rate of surface cooling that shade provides, up to 45 degrees on roofs.

P. 16 – Many trees in the city lack the understory layer that savannahs have, being planted in isolated tree wells. It would be a worthwhile experiment to underplant them with a nitrogen fixer like clover, or grasses to mitigate salt runoff, to try to provide trees with a symbiotic herbaceous layer.

P. 23 – Of the 89% of canopy loss on privately owned property, it is important to distinguish how much of it is driven by developers or corporate entities. While homeowners do remove trees for a variety of reasons, they are generally not the ones responsible for widespread cutting.

P. 23 – “Undue attention on individual trees may distract from larger shared goals”. On the other hand, don’t lose sight of the trees for the forest! Each healthy tree contributes to quality of life, and is worth every effort to save if it is reasonably possible. This is what is meant by enhanced tree protection.

P.29 -- Last paragraph states there is no single department or individual who speaks for the urban forest. While we understand that the urban forest is affected by many city departments, we feel that there should be such a person/position who will coordinate with a number of departments and state agencies (DCR, DOT) to protect and enhance the tree canopy. This is not to imply that any staff member is not doing their absolute best. On the contrary, this request underscores the urgency and complexity of the issue, and the need to address it with a commanding and unified voice across all departments and projects.

P. 34 – We recommend that when shade structures are used, they are designed as trellises and planted with vines that will thrive in urban conditions.

Section 2 – State of the Urban Forest

P. 51 – Table 2.1: Other cities in the same study have higher % of canopy cover than Cambridge and should be included for comparison. Minneapolis = 34.1%, Washington DC = 35%, and Atlanta = 53.9%. (Novak et al)

P. 57 – Figure 2.9 implies that the species are ranked in order of health. Some rankings seem contrary to empirical observation; if the random sample plot was elsewhere you would likely see different, even opposite results, so the sample is probably too small. It also lacks location context, e.g., is it a street tree, park, or in a natural area like Fresh Pond?

P. 59 – Noticeable that ROW trees in poor condition are in low canopy areas. Suggests that trees do better when they are with other trees.

P. 67 – “....many new projects have planted canopy trees which will over time create significant shade.” They will only provide significant shade if they are properly planted, and cared for during establishment period. So often trees are planted to fulfill requirements and then left to dry out, or are buried under too much mulch, etc. This occurs on private development but also affordable housing, etc. We recommend that the city work with all entities to require high standards of planting and ongoing maintenance; and follow up for compliance.

P. 67 – We encourage green roofs throughout the city for additional green infrastructure, but they should not *replace* open space and trees on the ground, by allowing buildings to have overly large footprints with minimal open space.

P. 72 – Totals reversed; numbers should read: “26 total genus, and 40 total species”

P. 74 – Re: flexipave – it sometimes looks compacted in high pedestrian areas, which suggests soil underneath is also compacted. Don’t care for it aesthetically. Also, should observe trees where it has been applied for signs of heat stress or slow growth.

P. 75 – Suggest the tree replacement fund be transparent and available to CPP and citizens.

P. 80 – Figure 2.30 is misleading. Only one neighborhood thinks there are enough trees, (and by only 1 %), yet the graph visually suggests that far more than half of all respondents think there are enough trees.

P. 81 – Striking that only 27% of respondents have volunteered to help take care of public trees. Believe that this can change dramatically with outreach/leadership from the city.

Section 3 - Risks to the Urban Forest

P. 92-95 -- While these maps are helpful to visualize overall patterns of canopy loss for different scenarios across the city, they are hard to read because of the scale presented. It would be beneficial to see this data visualized in other formats, potentially aggregated by neighborhood. This data would allow the comparison of the simulated changes between the planning horizons and get a rough idea of which neighborhoods could have more significant impacts to hazards in this study (canopy change, flooding impact, drought impact). A multi-hazard map/chart would also be helpful to see which areas are most susceptible to multiple impacts.

P. 97 -- Figure 3.5 - watersheds do not adhere to political boundaries.

P. 98 -- Since the 2030 flood impact is hard to see at the scale provided (as indicated in the text) could you show a zoomed-in example of an area where this does happen to better understand how the impact looks within the City.

P. 96-101 -- Impact of extreme climate events - based on the modeling results from the flooding scenario and drought, can you show the impacts (%) to both public and private parcels. In particular for the drought scenario.

Section 4 - Response Strategies

P. 116 -- Key point is that although the most tree canopy loss has been on private property, open space land use contributes the most canopy area per acre in the city, followed by ROW and then residential.

P. 131 -- Strongly support dividing the city into zones, with each zone having a person who can quickly respond and fix problems as they occur. This would also help build community around trees in neighborhoods, and provide direct communication with residents about trees.

P. 134 -- Policy Strategy 1B - Needs to include some street trees. Policy should also define BMPs for these large mature trees, include basic care and buffer requirements beyond protections from being cut down. Possibly eliminate adjacent parking or add chicane (to prevent damage to the trunk and roots), remove some sidewalk and asphalt if paved over, etc..

P. 136 -- Policy Strategy 1D -- Tree protection ordinance should have enough “teeth” to make large tree removal rare and for very good reason. The city arborist should be given license to be very stringent when reviewing permits, and have the ability to deny them. **There is urgency for action on this because of 1-year moratorium expiring in February 2020**

P. 138 -- Policy Strategy 2A -- Target priority areas for planting, maintenance, and care:

- Canopy corridors
- Heat island hot spots
- Social equity / environmental justice areas
- Proximity to community infrastructure: hospitals, schools, bus stops, senior centers, grocery stores, pharmacies
- Safe routes to school
- Develop a methodology that helps identify priority areas, can be regularly updated and easily integrated into existing DPW technology

P. 141-- Policy Strategy 2D -- The lack of active coordination and enforcement with utility companies has resulted in extreme pruning removing too much biomass for tree health

P.149 -- Policy Strategy 5A -- The Public Planting committee members welcome an enhanced role and opportunity to engage the community outside of regular monthly meetings. We are a liaison with the public, and field questions about city policies and tree health all the time. We look forward to being utilized as an asset and resource for the city, especially for outreach, advocacy, and monitoring efforts. We are an independent group, advocating trees throughout all neighborhoods in the city, and deeply committed to a thriving urban forest. Consider using this group for:

- Outreach and advocacy - tree walks, planting days, neighborhood coordination
- Liaising with other relevant committees
- Preparing recommendations for city council
- Monitoring some of the outcomes from the Urban Forest Master Plan and using the document as a blueprint
- Being integrated into the project design / development review and approval process
- Helping to develop outreach programs and engage stakeholders in the community
- Preparing letters, reports, recommendations so all monitoring does not fall to staff
- Developing and/or monitoring targets for policy, practice, design, locational and social equity
- Prioritizing pilot projects, helping with program design, advocacy and outreach
- Identifying and evaluating exceptional and significant trees and groves and finding alternatives to cutting and replanting.

P. 153 -- Table 4.4: Question the need for small trees under wires. Henry Arnold: Trees in Urban Design would indicate that certain large trees and wires can co-exist very well together.

P. 153-4 -- Planting List notes:

- Has *Celtis occidentalis* succeeded as a street tree here? Haven't observed this species in Cambridge, and when planted they seem very difficult to establish.

- *Sophora japonica (Styphnolobium)* is highly toxic to bees, especially native bees. Mr. Doug Bidlack, Middlesex County entomologist said this about the species : “I’m sure Andrew Gapinski has told you about their experience with *S. japonicum* and how they tend to find more dead bees under these trees than any others at the arboretum. I have collected dead bumblebees under *S. japonicum* trees at the Arnold Arboretum as well as from a number of these trees here in Waltham and we sent them to Dr. Sujaya Rao at Oregon State University where they are trying to understand why these bees are dying. They don’t yet know the reason. It might be a good idea to remove *S. japonicum* from your plant list at least temporarily if these bee deaths are of great concern to you.”
 - The species was also hit hard the year of the drought with significant dieback and has been slow to recover.
 - One additional observation about *Styphnolobium*: flocks of Cedar Waxwings eat the seeds in the spring as they migrate. It is a lovely and amazing sight. However, given the large scale collapse of bee populations, we recommend removing the species from the planting list.
- We urge the Arborist and Reed Hilderbrand to work to reinstate *Robinia psuedoacacia* to MA planting list. Its toughness, narrow form, and vigor suggest that it would be a valuable addition to our shrinking planting list.
- *Morus rubra* is a MA native, edible, pollinator species, and listed on the state’s endangered species list; does well in tough urban environment - should possibly be added to tree list. Can be opportunistic but can be hard pruned to shape.
- All of the trees in the planting list except *Cryptomeria* are deciduous. More evergreens such as pines, spruces, etc. would be appreciated in park settings. Several of these coniferous species have high carbon sequestration rates, as noted in the report.
- Add in arborized shrubs as good street trees where ROW is larger or on shared streets - increases species diversity and many tolerate harsh conditions (*Rhus, Rhododendron, Viburnum, Myrica*)
- Add edible fruit and nut species to tree planting list in low-traffic areas to promote community engagement and functional urban landscapes. (e.g. *Sambucus, Amelanchier, Lindera, Aronia, Vaccinium, Malus*)
- Consider adding in even more diversity for plantings by looking at one zone or one subzone higher in urban plantings to account for microclimates created

P. 155 -- Encourage the use of trees (and other plantings) as part of stormwater management systems, especially in areas like curb extensions where flooding is a recurrent, persistent problem. Underground cisterns may catch more volume but visible above-ground bioinfiltration installations promote awareness of and appreciation for plants and trees’ ecosystem services.

P. 158 -- These shared streets proposals could go further...instead of limiting shared streets to dead end and shorter streets, why not tie these street redesigns in with the Cambridge bike network plan where slow speed corridors and/or neighborways are indicated. This could be a great way to build momentum with many constituency groups, do more demonstrative projects with multiple environmental and community benefits: protect trees, prioritize pedestrians, provide green infrastructure, reduce vehicle speeds and volumes.

P. 167 -- Design strategy 2C -- Strongly agree with this proposal of adding chicanes or removing parking to create planting zones. This ties in with city-wide goals of reduced vehicle speeds, active transportation, and livable streets and neighborways. Develop a sensitive way to discuss the loss of parking - this is likely one of the more difficult aspects to the proposals in this document, other than private property rights. Framing is important, especially with seniors and people with disabilities who need reassurance that they can still park close to their homes.

P. 170 -- Design strategy 2C - Have noticed trees declining/dying with suspended pavement. Is there evidence that suspended grates are better for trees?

P. 183 -- Outreach and Education Strategy 1A - Strongly support tree education for children. Possibly establish public-private initiatives for this effort.

P. 197 -- Strongly support additional green infrastructure strategies. Would like more details on typology where it could be included in public areas and encouraged on private land, such as:

- Creation of mini urban ecosystems / food forests to increase engagement among all ages: Add in large nut trees, fruit-bearing trees, and shrubs for wildlife and for people, especially in parklets and larger parks (see suggested species lists)
- Green roofs for reducing energy consumption, cooling heat islands, and beauty
- Vegetated walls - great for demonstration and to engage the public about ornamental and edible plants; cooling

Section 5 - Scenario Models

The section could use more demonstration of where some of the more cutting edge cross-sections of streets identified in Section 2C could be applied. Protected bike lanes along Mass Ave incorporating street trees? Removal of parking along a strategic bike corridor? Creation of neighborways linking community assets (schools, community centers, grocery, daycare, city hall)? This is an opportunity to be bold and link big ideas (active transportation, climate resilience) together as indicated many places elsewhere in the text of this document.

Section 6 - Targets, Prioritization, and Next Steps

P. 236 -- Ensure method to get neighborhood input on best / most needed location for trees within each neighborhood - aim for distribution even within a given neighborhood. Listen to what each neighborhood requests and needs - even if tree canopy percentage is high, perhaps they need more traffic calming and buffers for exceptional street trees. Other neighborhoods may want cool corridors to coincide with safe routes to school.

P. 236 - Consider interim solutions to alternate street designs. What about placing a bike rack to prevent on-street parking just next to large street trees that need protection? Or planters? Over time, this could become a more permanent bump out. If we only follow the 5-year streets and sewers plan to

do anything about street trees, many mature trees will be lost. Already they are very damaged by constant curb action and scraping around the base of the trunk.

P. 238 -- Subcanopy trees, as well as succession trees, is a great idea. Also interplanting in tree wells to increase organic matter and biodiversity to benefit the trees.

P. 239 -- Engage DCR to increase plantings dramatically. It is part of their mission to promote environment, and much of Cambridge's borders (and flood-prone areas) are managed by DCR. That agency's financial ability to plant and maintain within Cambridge to meet planting targets and stem canopy loss is questionable. How can city best work with DCR? Is additional staff needed?

P. 240 -- Public open spaces (DCR, city) target could be increased to 15% if assumptions about DCR changed and they allowed denser tree cover?

P. 241 - What would be a realistic goal for curbing loss (0, 25%, 50%) and planting (0, 2000, 4000/year)? The city is currently planting 400/year, increasing to 600/year as a goal in 2019. Table 6.1 gives a good overview of the different planting scenarios. Curbing loss at 25%, planting 2000/year?

P. 245 -- Annual net loss 2009-2014 was 1%; from 2014-2018 it was 2.7%. Ouch. This is a shocking statistic. Biggest wakeup call is that the city cannot do this alone - they would need to employ incredibly large crews. They need to engage volunteers, nonprofits, citizens, universities, and corporate groups. This needs to be a community effort and cannot be one department's job to do all of the work and subcontracting that needs to be done in the coming years.

P. 247 -- Need moratorium data by beginning of the year - did it save trees? Take in money for the tree fund? What was lost? Consider changing the policy to prohibit removal and make every effort to save the tree rather than being allowed to pay money for the city to have to schedule replantings for a smaller tree in the future. The city has enough work to do planting ROW trees and administering programs. Require the person who cuts the tree down to mitigate it by doing the purchasing, replanting, and care for proper establishment or face continued fines; followup is also required to assure that the mitigation actually takes place.

P. 250 -- This is an ambitious program to put the city in charge of: each of these urban typology targets would require a new city outreach program to be developed and implemented, with the messaging differing for each audience, and then annual tracking. Consider the impact of such a program on staffing and monitoring.

P. 251 -- Create a menu of interim, quick-build methods to grow canopy, and especially to protect existing endangered canopy - there could be low-infrastructure methods, such as low fencing to create buffers around the base of exceptional trees, and enlarging tree wells. These things don't require waiting for the complete redesign of the street.

P. 252 -- Important to work on alternative design strategies for cooling the heat islands where there is limited permeable surface and planting options - light roofs, green roofs, green walls, permeable pavers.

P. 253-255 -- "Exceptional" tree category should be in all neighborhoods across the city, not just ones with higher than 26% tree cover.

P. 258 -- Re Interagency coordination: Could those agencies come to another existing meeting group for coordination? Or another existing departmental city meeting? More meetings and new committees may be bureaucratic and ineffective. Also include multiple committees to coordinate high level goals and targets? Rotate to one another's meetings?

P. 258 -- Urban Forestry Advisors - with several arborists and experts on staff and CPP members who all participate in continuing ed and best practices, is this necessary? Ensure staff goes to professional development events at ecological organizations as well as horticultural and trade show.

P. 259 -- Quantify value using ecological economics models that measure stormwater mitigation, energy reduction, health and well-being, and property value. Also include non-financial metric of success, e.g., neighborhood satisfaction, green score, disease rates, obesity rates, increase in active transportation rates.

P. 260 -- Identify highly visible pilot projects is an incredible idea. In addition to standalone projects, tie into existing street redesigns (Chestnut, River Street, Grand Junction) by inserting some of the strategies outlined in this document and highlighting them. Prioritize the exceptional trees and make a big deal about protecting them, giving them room to thrive, mapping them, and tagging them somehow, so they are less likely to be targeted for removal.

Omissions from Report and Additional Considerations

- Crusher run under sidewalks -- UMass Extension's lab analysis of the crusher run material found a high pH, and very high calcium, manganese and iron; low phosphorus. Should be kept away from tree roots.
- Earlier spring and fall planting and how this will need to adapt when faced with climate change
- Correct planting depth and method
- Care and protection of significant and exceptional trees. These should be identified and mapped in every city neighborhood, not just ones over 26% canopy cover. Even in lower canopy neighborhoods with no setbacks, many street trees have outgrown their tree wells. Prohibit parking immediately adjacent and create bump-outs.
- Prohibit well-meaning residents from building raised planters around the base of trees. Explain reasoning, and possibly offer them a large planter pot for growing flowers.
- Temporary fencing for new trees to protect them during establishment, and permanent low metal fencing for trees in especially vulnerable places.
- Move tree wells that are in handicap accessible parking spaces left or right rather than removing them altogether as is the current policy.
- While not prioritizing or being exclusively native, create a target for percentage of trees/shrubs that are natives relative to overall trees. Could be planted in open space areas.

- Require developers to replace with largest available nursery size for large trees that are removed - DPW or CPP designates desired species based on tree canopy diversity needs and most suitable species for site
- Address the role of the cemetery, golf course, the Fresh Pond Reservation and the adjacent DCR land within the Urban Forest as important spaces where trees can be planted and possibly even propagated for plantings in the city.
- Come up with interim solutions (tactical landscape urbanism) for streets that are not on the 5-year plan. Some of the mature trees in the neighborhoods with narrow sidewalk spaces present a mobility and rights-based issue for residents. Wheelchairs, walkers, strollers cannot traverse the sidewalk, and it is unsafe in the street. Develop a way to categorize exceptional or significant canopy street trees (some of which are the only shade on the whole block) and protect them with low fencing buffer, curb, a bike rack, a bench, etc.
- Identification of priority planting areas "...where significant canopy loss is anticipated..." (Ziter et al.) (e.g., aging tree population, anticipated insects/diseases).