



Tree Retention



Sam Morton



In the face of increasing development throughout the Commonwealth, how can we influence developers to keep mature trees during construction?
Which municipalities/states/countries are doing this well and how are they doing it?

The Commonwealth is committed to reducing its CO2 emission levels by 25% by 2020 and 80% by 2050.

Potential Influences

1. Promotional Value
2. Property Value
3. Energy Cost Savings



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Promotional Value



LEED Certification

- Rainwater management
- Optimization of energy performance
- Heat island reduction
- Site assessment
- Protection of habitat
- Thermal comfort



Construction activity pollution prevention

Sustainable sites

Prerequisite | Required



Site assessment

Sustainable sites

Credit | 1 point



Site development - protect or restore habitat

Sustainable sites

Credit | Up to 2 points



Open space

Sustainable sites

Credit | 1 point



Rainwater management

Sustainable sites

Credit | Up to 3 points



Heat island reduction

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Light pollution reduction

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Minimum energy performance

Energy & atmosphere

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ASSESSING THE BENEFITS AND COSTS OF THE URBAN FOREST

by John F. Dwyer, E. Gregory McPherson, Herbert W. Schroeder, and Rowan A. Rowntree

“Savings in stormwater management costs from trees in Tucson were calculated at \$0.18 per tree per year or \$600,000 over 500,000 trees



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“Annual space air conditioning and heating costs for a typical home in Madison, Wisconsin increase from \$671 for an energy-efficient planting design, to \$700 for no trees, to \$769 for trees that block winter sunlight and provide little summer shade”

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Evaluation of impacts of trees on PM_{2.5} dispersion in urban streets

Sijia Jin ^{a, b}, Jiankang Guo ^a, Stephen Wheeler ^b, Liyan Kan ^a, Shengquan Che ^{a, *}

^a Department of Landscape Architecture, School of Agriculture and Biology, Shanghai Jiao Tong University, Shanghai 200240, PR China

^b Department of Human Ecology, University of California, Davis, CA 95616, USA

“A single large tree can transpire 450 liters of water per day. This consumes 1000 MJ of heat energy to drive the evaporation process. In this way city trees can lower summer temperatures of the city markedly”



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- Tax deductions for Green Building certification have been proposed on the state and federal level. These would be influential in developer retention decisions.



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Aesthetic Appeal

Construction sites that retain trees during the development process benefit from the promotional value of the aesthetic appeal

- This can be summed to a monetary value- amenity value- which the city of Melbourne, Australia has created a formula for calculating
- Advertises to the community that they care about the aesthetic and environmental appeal of their products
- Significantly increases property values...

83% of realtors believe that mature trees have a 'strong or moderate impact' on the salability of homes listed for under \$150,000; on homes over \$250,000, this perception increases to 98%

- Arbor National Mortgage & American Forests

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Property Value

Green Cities: Good Health

Wolf, K.L. 2010. Community Economics - A Literature Review. In: Green Cities: Good Health (www.greenhealth.washington.edu). College of the Environment, University of Washington.

“Homes that are adjacent to naturalistic parks... are valued at 8-20% higher than comparable properties, with the positive price effect declining to near zero about ½ mile away”

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Price Increase	Condition	Price Increase	Condition
18%	building lots with substantial mature tree cover ¹⁶	2%	mature yard trees (greater than 9-inch dbh) ⁸
22%	tree-covered undeveloped acreage ¹⁷	3%	larger street trees ⁹
19-35%	lots bordering suburban wooded preserves ¹⁸	3-5%	trees in front yard landscaping ¹⁰
37%	open land that is two-thirds wooded ¹⁹	6-9%	good tree cover in a neighborhood ¹¹
		10-15%	mature trees in high-income neighborhoods ¹²

Property Value

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“A conservative estimate of a 5 percent increase in property values due to trees and forests on residential properties (several studies suggest higher values) represents \$25 per year on a conservative property tax bill of \$500, and quickly adds up to \$1.5 billion per year over the 62 million single family detached housing units in the USA.”

Property Value

- In 1967 Boulder voters approved a proposal to establish a fund for purchasing and managing greenbelts, financed by a 0.4% city sales tax, which generates over one million dollars per year in revenue
- Purchased about 8,000 acres in and around the city
- “The average value of properties adjacent to the greenbelt would be 32% higher than those 3,200 walking feet away”
- “Distance from the greenbelt has a very strong depressing impact on the price of residential property in neighborhood 1. In particular, price decreases \$10.20 for every foot one moves away from the greenbelt.”
- The increase in property values led to an increase in tax revenue for the city

The Effects of Greenbelts on Residential Property Values:

Some Findings on the

Political Economy of Open Space

Mark R. Correll, Jane H. Lillydahl and Larry D. Singell

TABLE 2
VALUE OF THE AVERAGE HOUSE
AND GREENBELT PROXIMITY*

Walking Distance from Greenbelt	Average Value of House
30 feet	\$54,379
1,000	50,348
1,283	49,172
2,000	46,192
3,200	41,206

* These results are calculated using the partial regression coefficient on *DGB* and by assuming that the sample's average value property is located at the average distance for the sample.

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Energy Cost Savings

Research done by Massachusetts Greening The Gateway Cities Program

- Sudden loss of mature canopy trees sees a...
 - 40% increase in electricity usage during cooling season
 - 66% increase in wind speed (causes heat loss in winter)
 - Greendale neighborhood, Worcester, MA:
 - 2007: 40% tree cover
 - 2010: 4% tree cover
- Saw 30% rise in summer electricity usage

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Educate buyers so home purchases are done in an informed and responsible manner → The market will adjust

Overall Cost Savings For Developers

- Reduces long-term tree maintenance and replacement costs
- Reduces site preparation and grading costs
- Provides immediate aesthetic and economic benefits because properties with more mature trees and greater tree canopy cover sell faster and accumulate property value faster in comparison to properties without extensive tree canopy
- Potential to provide tax deductions and other building incentives
- Reduces particulate matter control costs

Policy





ENVIRONMENTAL
LAW • INSTITUTE®

According to the Environmental Law Institute, the following elements should be integrated into ordinance in order to support biodiversity:

1. Define requirements for minimizing the amount of forest cover removed in connection with development.
2. Establish priorities for retention of undisturbed forest in particular areas that have value for biodiversity, including riparian areas, wetlands areas, and areas connecting other forested areas.
3. Require submission of a forest delineation in connection with the submission of any subdivision or land development plan.
4. Contain provisions that reach back for a period of years to prevent forest removal under the guise of commercial logging. This can be done through notice provisions or through the application of delineation and mitigation requirements to development applications
5. Forest cover and reforestation objectives should be spelled out explicitly by formula so that it is clear what should be retained or reforested.
6. Provide for compensatory mitigation on-site where possible and, where forest retention or reforestation cannot be fully accomplished on-site, in preferred areas such as off-site riparian areas.



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“Define requirements for minimizing the amount of forest cover removed in connection with development”



Town of
Lexington
Massachusetts

- ❖ Requires replanting or fee payment to the tree fund – based on number of inches of protected tree(s) diameter removed
 - Protected trees: trees 6” DBH or larger
 - For large trees with diameter 24” or larger, mitigate (replant) twice as many inches as were removed.
- ❖ Must pay fees for unplanted trees
 - \$100 per replacement inch of removed trees not re-planted
- ❖ Incentive to replant using large shade tree species
 - When planting from list of approved large shade trees, replant ½” of new tree for each replacement inch of tree removed



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“Require submission of a forest delineation in connection with the submission of any subdivision or land development plan”



Maryland
Department of
the Environment

Forest Conservation Act of Maryland

- ❖ Forest Stand Delineation (FSD): a catalogue of the site’s environmental features in order to identify areas that are significantly “sensitive” to development
 - “Sensitive” sites include...
 - specimen trees (trees larger than 30 inches in diameter)
 - champion trees (largest individual of a species in the state)
 - streams, steep slopes, and endangered species
- ❖ Then a Forest Conservation Plan (FCP) is developed, which plans how the existing forest and sensitive areas will be protected during and after development.



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- ❖ Canopy requirements are based on development types and number of lots per units



Type of Development	Minimum Required Tree Canopy Coverage of Development Site (gross site area)
Subdivisions for Single Family Residential 10 or more lots	30 percent
Short Subdivisions for Single Family Residential 4 to 9 lots	25 percent
Short Subdivisions for Single Family Residential Less than 4 lots	20 percent
Single Family Detached Units, Cottage Housing, Townhouse, Multi-family 10 or more units	20 percent
Single Family Detached Units, Cottage Housing, Townhouse, Multi-family Less than 10 units	15 percent
Urban Center (residential and mixed use projects only)	15 percent



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Recompense

- ❖ If the DBH is > 6 inches, then developers must replant an equal number of trees as those removed during construction or landscaping
- ❖ Replacement trees shall be overstory (> 80 ft at maturity) planted at a minimum of 35 ft from the center or mid-canopy (60-80 ft at maturity) planted at a minimum of 25 ft from the center
 - No undesirable species (small canopy trees or invasives) may be planted as recompense

“Provide for compensatory mitigation on-site where possible and, where forest retention or reforestation cannot be fully accomplished on-site, in preferred areas such as off-site riparian areas”



**CITY OF
MELBOURNE**

A – Removal Costs	Amounting to the fees incurred by Council for physically removing the tree
B – Amenity Value	Calculated in accordance with Council’s Amenity Formula.
C – Ecological Services Value	Calculated in accordance with the i-Tree valuation tool
D – Reinstatement Costs	Calculated in accordance with the greening required to replace the loss to the landscape incurred by the removal.

$A + B + C + D$ = The amount paid by the property owner to the City of Melbourne

“Provide for compensatory mitigation on-site where possible and, where forest retention or reforestation cannot be fully accomplished on-site, in preferred areas such as off-site riparian areas”



**CITY OF
MELBOURNE**

Amenity Value (V) = Basic Value (\$) x Species (S) x Aesthetics (A) x Locality (L) x Condition (C)

1. **Basic Value** is determined by matching the trunk diameter at breast height (DBH) with its corresponding base value
2. **Species** are assessed according to its known natural life span and its rate of growth in a particular environment
3. **Aesthetics** are determined by the impact on the landscape if the tree were removed
4. **Locality** is determined by the tree's geographical situation (ex: Main Street, etc.)
5. **Condition** is determined by the corresponding total score of the assessment criteria (Trunk, Growth, Structure, Pests and Diseases, Canopy Development, Life Expectancy)

Incentives



Canopy bonuses for retaining individual significant trees, stands of five or more trees, stands of five or more significant trees, and significant trees qualified to receive flow control credits for drainage

Reductions in required on-site open space in exchange for preserving 40 percent of the existing tree canopy

Exemption from landscape requirements when at least 45 percent of the gross site area's existing tree canopy is retained and the majority retained are evergreen species

Reducing the minimum lot area required in subdivisions when at least 20 percent of the site is put into separate tracts that have at least 20 significant trees per acre and where at least 60 percent of the significant trees within the tracts are retained

Incentives...outside of the metropolitan area

Carbon Credits

Would allow private landowners with a minimum of 1,000 acres of forest to sell carbon credits for conserving their forests through preserving mature trees and practicing sustainable forestry. This would provide an annual income for forest owners and protect forests from clearcutting or irresponsible forestry practices.



Mass.gov

Conclusions

1. Required Delineation Submission

- Must submit a catalogue of the site's environmental features in order to identify areas that are significantly "sensitive" to development



Conclusions

1. Required Delineation Submission
2. Set Minimum Tree Canopy Coverage Based On Type of Development
 - i.e Minimum 30% coverage for subdivisions of 10 lots or more



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 3. Required Replanting Or Fee Payment For Trees Of Defined Size
-

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 2. Set Minimum Tree Canopy Coverage Based On Type of Development
 3. Required Replanting Or Fee Payment For Trees Of Defined Size
 4. Appropriate Incentives for Developers
-

Sources

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