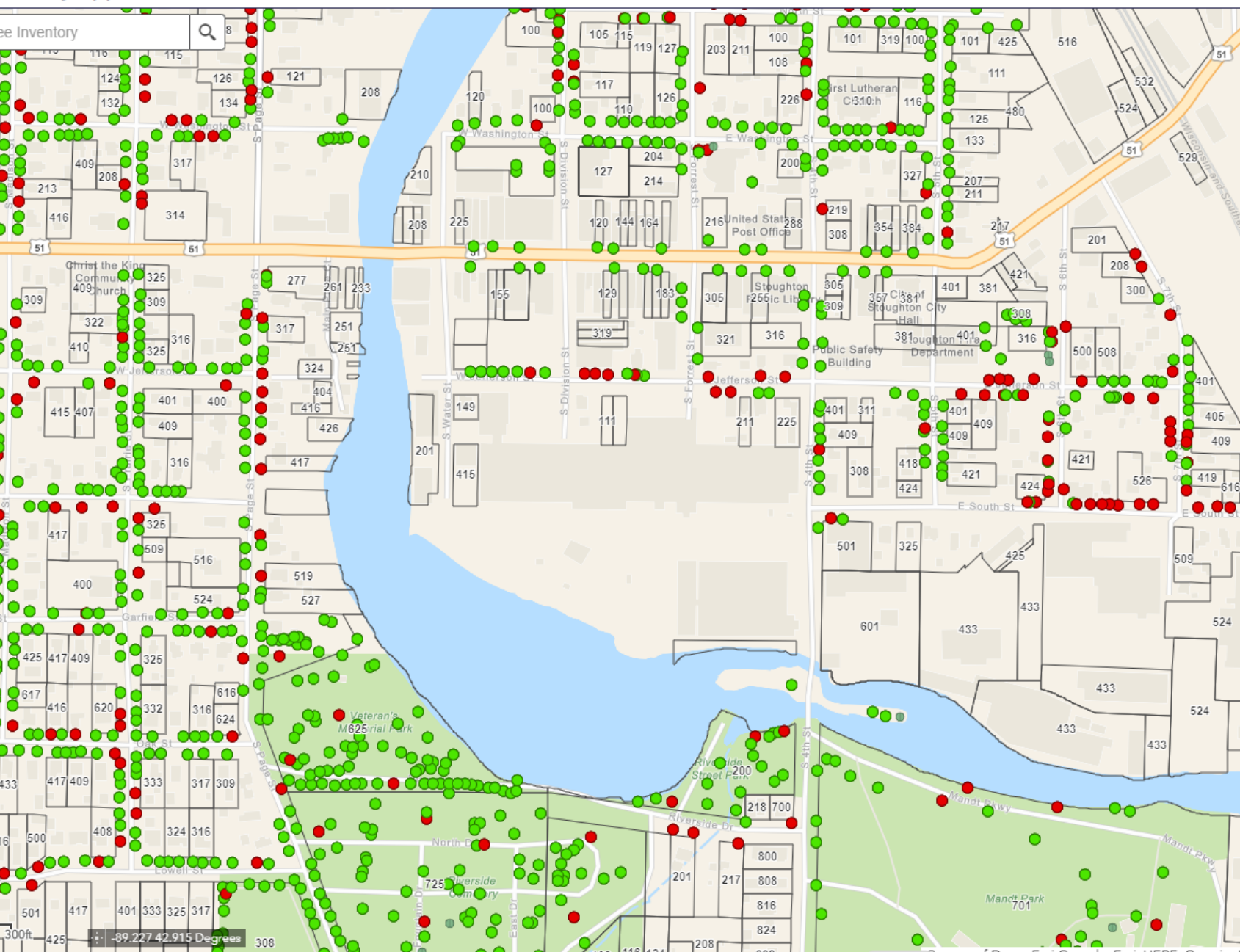




"HE WHO PLANTS
A TREE PLANTS A
HOPE."

- LUCY LARCOM

La Crosse has been a Tree City USA Community for 31 years



TREE INVENTORY

- Individual tree assessment, ground based visual of tree's crown, trunk, and above-ground roots; as well as species, age, condition, defects, and recommended actions with priority rating (high, medium, low priority)

<https://www.cai-illinois.org/tree-inventory-community-benefits-seeing-forest-trees/>

<http://www.ctforestry.uconn.edu/TreeInventory.html>

PLANNING STEPS

Pre-planning

WORK PLAN

The work plan information that you gather will be included in the "Introduction" part of the UFMP. See sample **Table of Contents** of UFMP

Why do you need to develop a plan?

Who are the people whose support you will need?

Where will the geographical limits be?

What areas/trees will be addressed?

When will the plan be developed, and how long will the plan cover?

How is the plan going to be developed? (e.g. personnel - funding)

Plan Development

URBAN FOREST MANAGEMENT PLAN

Vision

What do you want?

Inventory and Assess

What do you have?

Collect data to understand the current state of the urban forest and its management.

Strategic Plan

How do you get what you want?

Analyze data and identify issues and trends over time.

Prioritize needs and opportunities.

Goals, objectives, actions based on your vision and analysis.

Implementation (Action) Plan

Who will take action and when?

Monitoring Plan

How will you know when you're achieving your goals?

Compile the documents for public review, revise as needed, and obtain approval.

See sample **Table of Contents** of UFMP.

Post-planning

ADAPTIVE MANAGEMENT

Monitor, evaluate progress, and revise as needed. *Are you getting what you want?*



CURB EXTENSIONS, BUMP OUTS, BULB OUTS

- Benefits:
 - Safer, shorter crossing for pedestrians
 - Traffic calming
 - Bioretention
 - Space for trees, benches

- Range from \$2,000-\$20,000

CONSIDERATIONS

- street sweeping,
- turning needs of large vehicles (busses, emergency vehicles),
- street utilities (pipes, wires),
- and runoff and drain situations.

<https://nacto.org/publication/urban-street-stormwater-guide/stormwater-elements/green-infrastructure-configurations/stormwater-curb-extension/>

<https://nacto.org/publication/urban-street-stormwater-guide/stormwater-elements/green-infrastructure-configurations/stormwater-curb-extension/>

http://pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=5

CURB BULBS



EXPECTED USEFUL LIFE

M Y D C
CENTURY

COST

\$\$\$ - \$\$\$\$



Tool addressed in
Seattle ROWIM

A curb bulb is a radial extension of a sidewalk at an intersection used to shorten the crossing distance for pedestrians. Curb bulbs may be landscaped and provide additional root growth area for trees, and can improve pedestrian crossings. Designs that include trees and landscaping must ensure proper sight lines are maintained.

BEST USED IF

- Additional planting space would likely reduce further sidewalk damage by tree roots.
- Existing planting strip does not have enough space for desired tree species.
- Parking restrictions already exist at location (e.g., within 30' of a crosswalk).

DON'T USE IF

- Relocating the curb will not work due to drainage or other infrastructure conditions.
- Curb bulb will not work due to traffic conditions.
- Other street uses may be planned for the existing roadway width (such as bicycle facilities, etc).

PROACTIVE / RESPONSIVE

- Proactive - Curb bulbs may be used to create a larger planting area for a new tree.
- Responsive - Curb bulbs may be used to give an existing tree more space to grow.

NOTE

- Certain conditions must be in place, including curbs, drainage, and proper location of utilities.
- Curb bulbs are generally a costly solution, but may be particularly appropriate where they serve other purposes (such as traffic calming/pedestrian improvements).

ESTIMATED COST

- \$50 / linear foot (excludes drainage and ramps)

REFERENCES

- Seattle Right-of-Way Improvements Manual

TREE PITS, SOIL STRUCTURES



The Stockholm system (structural soil with biochar)



[Image courtesy of Davies Landscape Architects]

www.stockholmtreepits.co.uk



Diagram notes:

- 1 Standard paved surface with base course (this does not need to be permeable)
- 2 Channel to divert rainwater into the tree pit
- 3 Inlet for water ingress and gaseous exchange (available from www.stockholmtreepits.co.uk)
- 4 Silt trap at base of inlet
- 5 Tree grille
- 6 Concrete frame (available from www.stockholmtreepits.co.uk)
- 7 The concrete frame is filled with topsoil
- 8 Separation geotextile
- 9 Levelling layer, 8-11mm crushed rock
- 10 Aeration layer, 32-63mm crushed rock. Water from the inlet(s) is also distributed through this layer
- 11 Structural soil made up of crushed rock (32-63mm) combined with a 1:1 mix of nutrient-enriched biochar and compost (15% volume)

These submerged tree pits extend beneath areas that are used by pedestrians and cars, but allows the tree to have root space, adequate water, nutrients, and oxygen. Range between \$1,500 to \$10,000 https://www.crwa.org/uploads/1/2/6/7/126781580/crwa_tree_pit.pdf

CONSIDERATIONS

TREE PIT SIZING



Tree pits are typically used as an alternative to planting strips in business districts where additional sidewalk width is important to accommodate pedestrian volumes. In Seattle, when permitted as an alternative to planting strips, tree pits shall be constructed per Standard Plan dimensioned to meet or exceed the minimum size requirement. The minimum square footage for a tree pit is 24 square feet of open area (typically 4' x 6' or 5' x 5'). Any proposed variations shall be subject to site-specific review to ensure that (1) conditions justify the variation; (2) the design meets public safety standards; and (3) the design provides adequate conditions, including soil volume, to support trees.

BEST USED IF

- A continuous planting strip is not a good option for the site (e.g., in a busy/pedestrian setting, or adjacent to curbside parking with frequent turnover).

DON'T USE IF

- Continuous planter strips are more appropriate for the site.

PROACTIVE / RESPONSIVE

- Proactive - Tree pits for new plantings should allow adequate room for trunk and root growth for the size of tree being planted.
- Responsive - In some cases tree pits may be enlarged to alleviate constrained root or trunk space and provide better growing conditions for an existing tree.



EXPECTED USEFUL LIFE

M	Y	D	C
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DECADES

COST

\$



Tool addressed in
COS Standard Plans

ESTIMATED COST

- Proactive - No added cost if included in design
- Responsive - \$15 / square yard

REFERENCES

- City of Seattle Standard Plan 424
- City of New York Parks & Recreation. February 2014. Tree Planting Standards. <http://www.nycgovparks.org/pagefiles/53/Tree-Planting-Standards.pdf>

https://www.seattle.gov/Documents/Departments/UrbanForestryCommission/2014/2014docs/SDO_TreesSidewalksOperationsPlan120814.pdf

<https://stockholmtreepits.co.uk/assets/downloads/tree-pits-with-structural-soils-practice-note-v1-2.pdf>

<https://stockholmtreepits.co.uk>

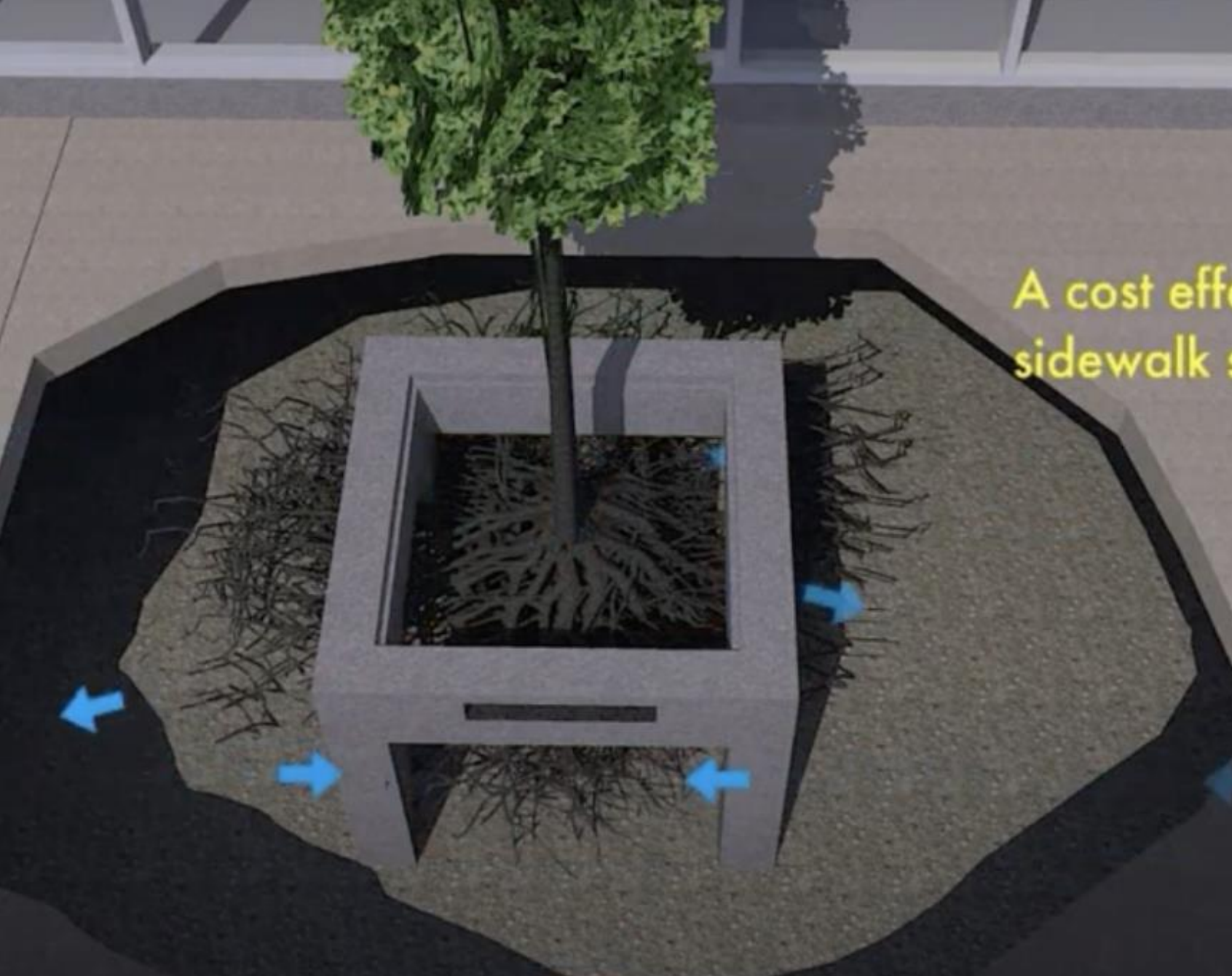
SILVA CELLS -TREE PIT EXAMPLE

Specific tree pit product through
DeepRoot



<https://nysnla.com/helping-trees-thrive-in-the-concrete-jungle>

<https://nysnla.com/helping-trees-thrive-in-the-concrete-jungle>



A cost effective
sidewalk s

STORM TREE -TREE PIT EXAMPLE

- <https://www.storm-tree.com> for full video

OTHER POSSIBILITIES

EASEMENT



An easement may allow construction of a sidewalk on private property in order to provide more space for existing or new trees. The width of easements is site specific.

BEST USED IF

- Adequate planting space is not available in the right-of-way.

DON'T USE IF

- Topography requires new structures, such as walls, in the right-of-way.

PROACTIVE / RESPONSIVE

- Proactive - Can provide a larger planting area for new trees, particularly if larger species are desired.
- Responsive - May provide larger root zone for existing trees, to prevent future damage after any repairs and potentially prolong life of the tree.

NOTE

- This requires coordination between the property owner and SDOT.

ESTIMATED COST

- Market value or dedication from property owner

REFERENCES

- Seattle Right-of-Way Improvements Manual

EXPECTED USEFUL LIFE



SUSPENDED PAVEMENT SYSTEMS



Suspended pavement systems may be used in new tree plantings where there is not an adequate volume of soil available for tree root growth. These systems provide structural support for pavement while allowing the use of planting soil as fill, which provides space for roots to grow, promoting healthy trees and preventing pavement damage by roots near the surface.

BEST USED IF

- Adequate soil volume for the size of intended tree species is not available within the tree pit and adjacent planting strip.
- An area below pavement between the planting strip and back of sidewalk is desired for root growth while avoiding pavement damage.

DON'T USE IF

- Cannot work within grading requirements for site-specific conditions.

PROACTIVE / RESPONSIVE

- Proactive - Should be used for new tree plantings, particularly in urban conditions with limited planting area within the streetscape.

ESTIMATED COST

- \$15 - \$25 / cubic foot (depending on depth)

REFERENCES

- Seattle Right-of-Way Improvements Manual

EXPECTED USEFUL LIFE



COST

\$\$\$-\$\$\$\$



Tool addressed in Seattle ROWIM

ROOT PATHS

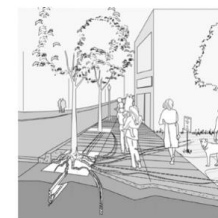


Photo Credit: Arlington, WA, Department of Community Planning, Housing and Development



Photo Credit: Casey Trees, Tree Space Design Report

Root paths are narrow trenches, roughly 4" wide by 1' deep, installed in compacted subgrade before the gravel base for pavement is added. A commercially available strip drain material could be added to the trench to support drainage, and the remaining space backfilled with planting soil. Root paths extend radially from tree pit locations, and may connect to adjacent tree pits, and/or other nearby planting areas (lawns, etc.).

BEST USED IF

- Underlying (native) soil supports some rooting even when it is somewhat compacted.

DON'T USE IF

- Positive drainage out of / away from root path cannot be achieved.

PROACTIVE/RESPONSIVE

- Proactive - Root paths should be installed for new plantings during construction, at the time of subgrade preparation (before paving).

NOTE

- Root paths may be most applicable in urban areas where tree roots need to be directed around utilities and planting space is limited.

ESTIMATED COST

- \$600-\$800 per tree [Costello & Jones 2003]

REFERENCES

- Casey Trees. 2008. Tree Space Design: Growing the Tree Out of The Box. <http://caseytrees.org/resources/publications/treespacedesign/>
- Costello, L. R. and K. S. Jones. 2003. Reducing Infrastructure Damage By Tree Roots: A Compendium of Strategies. Western Chapter of the International Society of Arboriculture.

EXPECTED USEFUL LIFE



COST

\$-\$\$



Tool NOT addressed in Seattle standards

- <https://www.seattle.gov/Documents/Departments/UrbanForestryCommission/2014/2014docs/SDOTTreesSidewalksOperationsPlan120814.pdf>

PARKING LOT BEAUTIFICATION

- Green Infrastructure Plan
 - All large developments and redevelopments are required to capture the first 1/2 inch of rainfall using green infrastructure.

<https://city.milwaukee.gov/GreenLots>



SCREENING FROM PUBLIC STREETS OPTION B

A continuous 5-foot wide landscape area between the parking lot and the street filled with closely spaced low shrubs, perennials and/or ornamental grasses, or ornamental metal fence of least 2 feet in height and one canopy tree per 20 linear feet.





OVERALL

- Benefits of Trees!
 - Stormwater management
 - Build stronger ties between neighborhood, community
 - Healthier, stronger environment
 - Energy conservations
 - Aesthetically
 - Provide opportunity for education about value of tree and sustainable management

<https://www.arboday.org/programs/treecityusa/benefits.cfm>

<https://canopy.org/tree-info/benefits-of-trees/>