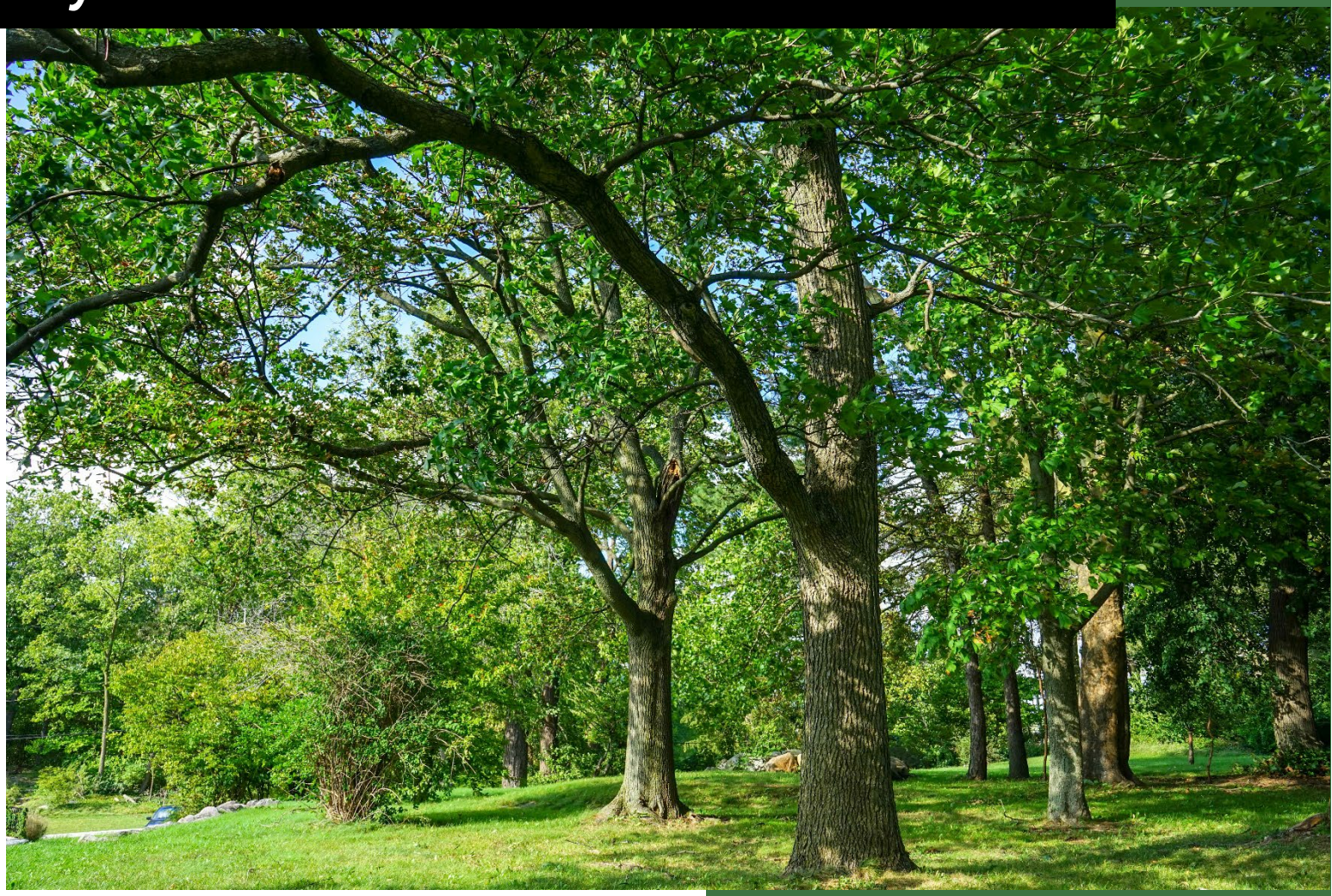
2023

City of Kalamazoo Tree Manual



THE CITY OF Kalamazoo

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INTRODUCTION

Trees of Kalamazoo's urban forest – which include trees growing along streets, in parks and other public spaces, and on private property – deliver the city's residents with a multitude of environmental, economic, and societal benefits. As a significant part of Kalamazoo's urban infrastructure, it is critical to maintain and protect these trees to preserve and grow the collective benefits they provide.

The City of Kalamazoo Tree Manual ("manual") intends to guide the community in the best practices for planting, maintaining, and protecting trees of the urban forest, and provides information about the City's tree-related policies. The City has jurisdiction over all trees located within the public right-of-way (ROW), or the city-owned easement for public infrastructure, such as roads, sidewalks, utilities, and other public services, which typically extends from the street to beyond the curb or sidewalk. So while the manual can be used as guidelines for trees on private property, **the following specifications are requirements for those contracted to conduct tree work or construction within the ROW or on City of Kalamazoo property**. These trees are referred to as 'street trees' and 'city trees' in this manual.

This manual is organized into five sections:

- **Section I: Tree Planting** defines the required planning, preparation, and installation requirements for contractors planting on City property.
- **Section II. Early Tree Care** summarizes industry standard guidelines for properly maintaining newly installed trees.
- **Section III. Tree Pruning** outlines the approved options for irrigating newly installed trees.
- **Section IV. Tree Protection** guides contractors performing construction on City property on best practices for preserving and protecting trees from damage.
- **Section V. Tree Removal Policies** presents the City's mitigation requirements and exceptions for tree removal and the consequences of violation.
- **Section VI. Tree Permits** guides readers to the City's Right-of-Way Permit application.

SECTION I: TREE PLANTING

In order to support the City of Kalamazoo Master Plan's goal of increasing the tree canopy throughout the City along streets downtown and in neighborhoods,[1] an increase in tree planting is warranted. Trees planted in the urban forest face a wide variety of challenges, and proper planting practices can significantly increase a young tree's chances of long-term survival. Proper planting practices can also minimize potential public safety hazards caused by improperly planted trees.

Tree planting on City property, such as within street right-of-way (ROW), parks, cemeteries, curblawns and other public spaces shall be performed and specified according to the following standards. Property owners, contractors, or volunteers planting trees on private property are not required to follow these specifications, but are encouraged to consider these industry standard guidelines to increase the longevity and health of their tree.

1. Planting Site Selection

1.1 Assess Planting Space

Proper selection of tree species for a given site must consider the presence of other street elements that would adversely impact trees or be adversely impacted by trees, such as signs, light posts, and overhead or underground utilities, as well as sight line visibility at intersections and proximity to crosswalks.[3] Table 1 lists the minimum distances required for trees to be planted away from varying infrastructure. It is critical to also assess distance from nearby road signage to avoid future obstruction.

Table 1. Required minimum distances from tree trunk.

Object	Min. distance from center of trunk
Stop sign/red light	30 feet
Traffic signs (speed, yield)	20 feet
Street signs (parking, sweeping)	10 feet
Streetlight or utility pole	20 feet
Alley, driveway, or other vehicular entrance	10 feet
Crosswalk	10 feet
Corner of street intersection[2]	25 feet
Fire hydrant[3]	5 feet
Building	15 feet
Underground utilities	10 feet
Storm drain	15 feet
Smart cell technology	30 feet

Do not plant street trees adjacent to loading zones due to potential conflicts with delivery vehicles; unless adequate space is provided for the tree canopy to grow without contacting delivery trucks.[4] Sidepaths should have a 2-foot clear zone on both sides of the main travel path. This clear zone may be paved or a

[1] Kalamazoo City Master Plan, Page 146
[2] Kalamazoo Ordinance, Page 42.6
[3] Kalamazoo Street Design Manual, Page 206
[4] Kalamazoo Street Design Manual, Page 109

maintained lawn area. This clear zone should be free from signage, posts, tree trunks, or other obstructions.[5] No trees may be planted any closer to any curb or sidewalk than the following distances: small trees, two feet; medium trees, three feet; and large trees, four feet.[2]

1.2 Overhead Utilities

No large trees may be planted under or within 10-lateral feet of any overhead primary electric wire. Selection of small or medium size trees should carefully consider wire height. The height of lower hanging non-electric wires (cable, telephone, etc.) should also be considered when selecting tree species.[6,2]

1.3 Locate Underground Utilities

The location of utilities and other below and above ground obstructions must be assessed prior to planting. At least three working days prior to any digging, the responsible party (contractor, property owner) shall dial Miss Dig at 1-800-482-7171. All "Miss Dig" participating utilities will thus be routinely notified, and their representatives will visit the site and mark the location of underground utilities to highlight any conflicts that may exist. Adjust planting location based on minimum distance recommendations to avoid damage while planting and in the future from growing roots (see Table 1).[7]

1.4 Tree spacing

Distance between existing and planned trees must be assessed before planting. Table 2 lists the minimum distances between different classes of trees based on their size at maturity that are required for plantings on City properties and recommended for other sites. Certain City landscape plantings may be excepted from the minimum spacing distances upon written approval by the Public Works Department.[2]

Table 2. Minimum distance required between trees

Tree size (height at maturity)	Min. spacing distance[Error! Bookmark not defined.]
Large (>40 feet)	45 feet
Medium (31-40 feet)	35 feet
Small (≤30 feet)	25 feet

1.5 Soil Volume and Type

Providing ample soil volume for a tree's roots to grow is especially relevant for street tree plantings. The following minimum soil volumes, by mature tree size, are recommended:

[5] Kalamazoo Street Design Manual, Page 127
[6] Kalamazoo Street Design Manual, Page 205
[7] Kalamazoo 2023 Sidewalk Repair Project Bid

- Small Trees: 300 cubic feet
- Medium Trees: 600 cubic feet
- Large Trees: 1,000 cubic feet

These are minimum soil volumes – the amount of uncompacted soil for trees to grow should be as large as possible.

Soil pH, structure, texture, density, nutrients, and percolation should also be assessed prior to planting to ensure adequate drainage and growth potential for roots. Solving drainage issues is essential for long-term tree health, as saturated soil restricts the tree root's ability to access oxygen necessary for growth and survival. Methods for addressing drainage issues include:

- If a well-drained layer of soil exists beneath a poorly drained layer, drill a vertical hole through the poorly drained layer and fill it with gravel or coarse sand to provide a path for water to flow to the well-drained layer.
- Use a perforated pipe or other product designed to create drainage channels. This approach works well for trees on a slope – a 3-inch fall per 100 feet of pipe is the minimum slope needed for adequate water flow.
- If excess water cannot be drained away, it is best to choose a species tolerant of poorly drained soil or to forgo planting at the site.

Open space around the base of trees should be a minimum of 5 feet by 5 feet with 5ft by 10 ft the ideal minimum. Open space may be greater if it can be accommodated with adjacent uses.

2. Planning for Tree Planting

2.1 Planting Season

Trees should be planted in their dormant season before bud break or after leaf drop. Early spring and late fall are recommended due to cool temperatures and ample moisture. Trees planted during the active growing season may require additional care to become established.

2.2 Species Selection

Selecting the right tree for the right place is critical to ensure tree health and limit future conflicts with infrastructure. Various site factors must be considered when choosing a tree for different location types; considerations include site-specific environmental conditions, exposure, surrounding utilities and other possible obstructions to root, stem, or crown growth, maintenance requirements, and availability at local nurseries. Tree selection should be varied

and include hardwood and ornamental selections and be based upon conditions of planting site.[8] Preference should be given to native species as appropriate.[8]

The existing tree species growing in the area must be considered to support high levels of biodiversity in the urban forest. A diverse array of tree species ensures that no one threat can cause significant canopy loss of a street, in a neighborhood, or throughout the city. Different tree species also provide distinct benefits to the community and the ecosystem. An industry guideline recognized as ideal is to maintain tree species diversity at levels of no more than 5% of one tree species, 10% of one genus, and 15% of one family to promote a resilient urban forest. The importance of species diversity is demonstrated in the City's Master Plan goal of evaluating the City by neighborhood to determine species for infill strategy.**Error! Bookmark not defined.**

Table 3 lists approved species suited to Kalamazoo's current and future climate. Species on Kalamazoo's prohibited species list (Table 4) shall not be planted on City property, and are not recommended to plant elsewhere. Tree species selection for planting on City property must be approved from the City of Kalamazoo Forestry Supervisor (henceforth referred to as 'Forestry Supervisor').[8]

2.3 Tree Stock

The following standards are required for planting on City property, and are recommended for other sites:

- Trees shall meet or exceed the recommendations and requirements set forth in ANSI Z60.1-2014 *American Standard for Nursery Stock*.
- Trees shall be obtained from a nursery licensed by the Michigan Department of Agriculture and Rural Development.
- Plant material must be one of the following: container grown, balled and burlapped, or tree spade stock.
- All trees are to have a minimum caliper of 2" (as measured 6" above the top of the root ball).
- Plant material shall:
    - Have been grown for at least 2 growing seasons within 200 miles of Kalamazoo in conditions of similar climate to hardiness zone 5 and 6.
    - Have been pruned to encourage single main stem growth, compact crowns, abundant lateral branching and symmetrical branch structure. No material with codominant stems will be accepted.[9]
    - Are in good health and free from: disease, injury, general abrasions, disfigurement, freeze damage, sunscald, or insect infestation of any kind.[8]

[8] Kalamazoo Tree Planting Bid, Page 13

[9] Kalamazoo Tree Planting Bid, Page 12

- Root systems shall not be excessively root bound or have any kinked or circling root at the time of planting. The rooting medium will be free of other plant material. Refer to ANSI Z60.1-2014 for root ball to caliper size requirements.[8]
- Have not been treated with neonicotinoids or like substances.

The City of Kalamazoo reserves the right to inspect all nursery stock at the planting site for species, size, structure and vigor. The City of Kalamazoo reserves the right to reject plant material once delivered to the planting site as specified in MDOT Standards for Construction Section 815.[9] See Appendix B for detailed specifications for trees grown in containers and balled and burlapped.

2.4 Tree Delivery and Storage

Extreme care must be used in the delivery process as to avoid wind damage or excess drying of the root system.[8] All trees shall be tarped during transport to the planting site. Trees shall be offloaded using appropriate machinery or by hand, and shall not be dropped any distance from the truck or trailer to the ground. Trees shall not be delivered to the planting site more than 48 hours prior to planting. Trees stored on site during this time must be located so as not to endanger the public and be separated physically from any nearby construction activities. Trees must be watered as needed while awaiting planting.

3. Tree Planting

Tree plantings on City property must be performed by experienced personnel, well versed in accepted horticultural practices, and under the supervision of a qualified tree planting foreperson. Tree planting must follow ANSI A300 *standards on Planting and Transplanting* and MDOT Standards for Construction Section 815.[8] See Appendix A for a visual representation of the City's tree planting specifications.

3.1 Identify Trunk Flare

The trunk flare (also called the root flare) is where the tree's trunk expands to form roots. The flare's location determines the depth of the planting hole, making its identification a critical first step. It can be found by identifying the highest non-fibrous root. Sometimes the trunk flare is buried beneath soil—if this is the case, remove the soil above the trunk flare.

3.2 Prepare Hole

The depth of the hole shall be from the bottom of the trunk flare to the bottom of the ball and shall not exceed the depth of the root ball. Planting too deeply deprives the tree of oxygen,

causing stress and the potential for the growth of unsupportive adventitious roots. The soil directly beneath the root ball should be undisturbed or compacted to prevent settling. The width of the hole should be at least 1.5 times the width of the root ball, and wider in poor-quality soils. The sides of the planting hole should be loose soil, which can be achieved using a shovel. If holes are dug with an auger, hand tools must be used to break up glazing on the sides of the hole.

If there is a stump at a planting site location on City property, the City of Kalamazoo will remove it at no cost prior to planting.[8]

3.3 Prepare Tree for Planting

Do not remove a tree from its container by pulling its trunk, but rather by bending, wiggling, or cutting the container. Any fabric and burlap present should be cut away after being placed in the hole.

Inspect the tree's roots. Prune any girdling roots growing around the trunk flare, fibrous roots above the trunk flare, or circling roots that cannot be straightened, removing no more than 20% of the roots. To avoid moisture loss, do not leave the exposed root ball out for an extended period of time, especially in direct sunlight. Inspect the crown, pruning any dead or damaged branches.

3.4 Place the Tree

Place the tree in the hole, ensuring that it is centered, then check that the bottom of the trunk flare is at or just above grade. Add or remove soil beneath the root ball as needed to align the bottom of the root flare with grade. Always move the tree by its root ball to avoid damage to its roots.

3.5 Fill Hole

Stabilize the root ball by tamping soil firmly around its base. Add the remaining backfill soil in layers, about 6 inches at a time. Lightly tamp or thoroughly water each layer to limit future settling and prevent air pockets. If the soil is dry, apply water after each layer is tamped. Backfill shall not be compacted to a density that inhibits root growth. Backfill soil should be similar to the soil at the planting site or amended if needed. Incorporated organic amendment should not exceed 10% by volume.

3.6 Build Berm

Build a berm circling the outside edge of the root ball with the remaining soil. The berm must be a minimum 3 inches high and 3 inches wide. This structure will encourage water to stay close to the root ball and will act as a barrier from lawnmowers and foot traffic. Berms should be monitored routinely and weeded or rebuilt as needed.

3.7 Stake Tree as Necessary

Trees establish more quickly and develop stronger root systems and trunks without stakes. If the site is windy or vandalism is a concern, stake the tree with two wooden stakes placed on opposite sides of the tree outside of the root ball (Figure 1), or as agreed upon with the Forestry Supervisor prior to the tree planting date. Attach jute webbing to the stake and around the tree. Ties should be loose enough so the tree crown moves up to three times the trunk diameter in the wind, in order to develop a strong taper, and taut enough that the trunk cannot rub the stakes. Stakes and straps should be consistently adjusted as needed and removed after one year or one full growing season. Straps that are tied around the trunk too tightly or are left on the tree too long may girdle fast-growing young trees. Damage caused by improper placement or use of stakes/straps may require replacement of the tree.

Figure 1. New street tree plantings with stakes.

3.8 Water

Immediately following installation, apply water using low water pressure until the root ball is thoroughly moist. Lawn sprinklers are not an acceptable method of irrigation for newly planted trees; hose, soaker hose, or bucket are recommended to ensure deep-root watering. Stationary watering methods, such as gator bags or Tree Diapers®, may be considered as a long-term watering method, following an initial hand-watering immediately after planting.

Providing adequate water to young trees is the single most beneficial action that can be taken to ensure establishment. Trees require consistent, thorough watering for at least three years after planting. Underwatering or overwatering trees often causes irreversible damage, so it is recommended to test the soil's water holding capacity in order to establish an effective irrigation plan. However, the amount and frequency of watering will change with species, soil type, seasons, and stage of establishment, making it important to check moisture levels continually. In hot summer months, up to 10 gallons of water per 1 inch caliper (trunk diameter) may be needed; that amount can typically be reduced by 50% in cooler months.

3.9 Mulch

Apply organic mulch 2-4 inches deep over the filled hole and berm, leaving 5 inches around the trunk clear from mulch to avoid excess moisture against the trunk. Mulch shall be free of any extraneous material such as soil, stones, plastic, construction debris, or any other deleterious matter. Replenish mulch as needed to keep soil moist, nutrient-rich, and temperature regulated. Do not apply more than 4 inches of mulch.

4. Post-Planting

At the completion of each planting, the tree must be straight, firmly in place, thoroughly watered and mulched. Any excess soils or debris shall be removed from the planting site immediately upon completion of each planting operation.[8]

Post-planting care should consist of watering, mulching, integrated pest management, soil management, and adjustment and removal of stakes. Formal written acceptance from the Forestry Supervisor is required within 30 days of tree installation, stating that tree(s) were properly planted in accordance with the specifications.

Table 3. Tree species approved for planting on City of Kalamazoo property (subject to change). Only species indicated as 'ROW Approved' may be planted in the city's Right-of-Way; species not approved for planting in the ROW are suitable for parks or other city properties.

Common name	Botanical name	ROW Approved?	Size
Trident maple	*Acer buergerianum*	Y	M
Hedge maple	*Acer campestre*	Y	M
Paperbark maple	*Acer griseum*	Y	M
Miyabe maple	*Acer miyabe*	Y	L
Red maple	*Acer rubrum*	Y	L
Sugar maple	*Acer saccharum*	N	L
Freeman maple	*Acer x freemanii*	Y	L
Yellow buckeye	*Aesculus flava*	Y	L
Ohio buckeye	*Aesculus glabra*	Y	L
Red buckeye	*Aesculus pavia*	N	S
Common horsechestnut	*Aesculus hipposcastanum*	Y	L
Red horsechestnut	*Aesculus x carnea*	Y	M
Downy serviceberry	*Amelanchier arborea*	Y	S
Allegheny serviceberry	*Amelanchier laevis*	Y	S
Apple serviceberry	*Amelanchier x grandiflora*	Y	S
European hornbeam	*Carpinus betulus*	Y	L
American hornbeam	*Carpinus caroliniana*	N	S, M
Pecan	*Carya illinoinensis*	N	L
Pignut hickory	*Carya glabra*	Y	L
Shagback hickory	*Carya ovata*	Y	L
Mockernut hickory	*Carya tomentosa*	Y	L
Common hackberry	*Celtis occidentalis*	Y	L
Eastern redbud	*Cercis canadensis*	Y	S
Yellowwood	*Cladrastis kentukea*	Y	M, L
Dogwood spp.	*Cornus spp.*	N	S
Turkish filbert	*Corylus colurna*	Y	M

American smoketree	*Cotinus obovatus*	N	S
Thornless cockspur hawthorn	*Crataegus crus-galli* var. *inermis*	Y	S, M
Green hawthorn	*Crataegus viridis*	Y	S, M
Hardy rubber tree	*Eucommia ulmoides*	Y	M
American beech	*Fagus grandifolia*	N	L
European beech	*Fagus sylvatica*	N	L
Ginkgo (male)	*Ginkgo biloba* (male)	Y	L
Thornless honeylocust	*Gleditsia triacanthos* var. *inermis*	Y	M
Kentucky coffeetree	*Gymnocladus dioicus*	Y	L
Japanese pagodatree	*Styphnolobium japonicum*	Y	L
Eastern redcedar	*Juniperus virginiana*	N	L
Goldenrain tree	*Koelreuteria paniculata*	Y	M
Sweetgum	*Liquidambar styraciflua*	N	L
Tuliptree	*Liriodendron tulipfera*	Y	L
Amur maackia	*Maackia amurensis*	Y	M
Magnolia spp.	*Magnolia spp.*	Y	S, M, L
Crabapple spp.	*Malus spp.*	Y	S
Dawn redwood	*Metasequoia glyptostroboides*	N	L
American hophornbeam	*Ostrya virginiana*	Y	M, L
White spruce	*Picea glauca*	N	L
Blue spruce	*Picea pungens* var. *glauca*	N	M, L
London planetree	*Platanus x acerifolia*	Y	L
Purpleleaf plum	*Prunus cerasifera*	Y	S
Amur chokecherry	*Prunus maackii*	Y	M, L
Japanese flowering cherry	*Prunus serrulata*	Y	S
Chokecherry	*Prunus virginiana*	Y	S
Yoshino cherry	*Prunus* x *yedoensis*	Y	S
Sawtooth oak	*Quercus acutissima*	Y	M

White oak	*Quercus alba*	Y	L
Swamp white oak	*Quercus bicolor*	Y	L
Scarlet oak	*Quercus coccinea*	N	L
Shingle oak	*Quercus imbricaria*	Y	L
Chinkapin oak	*Quercus muehlenbergii*	N	L
English oak	*Quercus robur*	Y	L
Shumard's oak	*Quercus shumardii*	Y	L
Japanese pagoda tree	*Styphnolobium japonicum*	Y	L
Peking lilac	*Syringa pekinensis*	Y	S
Japanese tree lilac	*Syringa reticulata*	Y	S
American linden	*Tilia americana*	Y	L
Littleleaf linden	*Tilia cordata*	Y	L
Silver linden	*Tilia tomentosa*	Y	L
Accolade elm	*Ulmus davidiana* var. *iaponica* 'Morton'	Y	L
Prospector elm	*Ulmus davidiana* var. *japonica* 'Prospector'	Y	L
Frontier elm	*Ulmus* 'Frontier'	Y	M
Zelkova	*Zelkova serrata*	Y	M

Table 4. Tree species prohibited from planting in the City of Kalamazoo's Right-of-Way (ROW), parks, or other city properties (subject to change by the review of City staff and the Tree Committee).

Common name	**Botanical name**
Boxelder (female)	*Acer negundo (*female*)*
Tree of heaven	*Ailanthus altissima*
Silver maple	*Acer saccharinum*
Norway maple	*Acer platanoides*

Alder spp.	*Alnus spp.*
Birch spp.	*Betula spp.*
Catalpa spp.	*Catalpa spp.*
Russian olive	*Elaeagnus angustifolia*
Ash spp.	*Fraxinus spp.*
Ginkgo (female)	*Ginkgo biloba* (female)
Walnut spp.	*Juglans spp.*
Juniper spp.	*Juniperus spp.*
Osage orange	*Maclura pomifera*
Mulberry	*Morus alba*
Populus spp., including hybrid poplars, cottonwoods, aspens	*Populus spp.*
Black cherry	*Prunus serotina*
Bradford flowering pear	*Pyrus calleryana 'Bradford'*
Black locust	*Robinia pseudoacacia*
White willow	*Salix alba*
Sassafras	*Sassafras albidum*
Tamarisk	*Tamarix ramosissima* or *Tamarix parviflora*
Yew spp.	*Taxus spp.*
Cedar spp.	*Thuja spp.*
Winged elm	*Ulmus alata*
American elm	*Ulmus americana*
Cedar elm	*Ulmus crassifolia*
Siberian elm	*Ulmus pumila*
Slippery elm	*Ulmus rubra*
Rock elm	*Ulmus thomasii*
Multi-stemmed trees	
Weeping or pendulous trees	
Any large conifers	*Picea spp., Pinus spp., Abies spp.*
Fruit producing trees	

SECTION II: EARLY TREE CARE

The City of Kalamazoo Master Plan has a goal of increasing the size and condition of the urban forest to improve key diseases that are affected by the conditions in which we live, including the rates of asthma, diabetes, and cardiovascular disease.[10] The most critical aspect to supporting the long-term health and survival of newly planted trees is with proper tree care and maintenance.

All maintenance performed on trees located on City property will be performed by the City or its agent unless an exemption is made in writing by the Director of Public Sercices.**Error! Bookmark not defined.** All tree maintenance work performed for the City are required to follow the specifications outlined below, as well as conform to the safety specifications of the ANSI Z-133.1 *Safety Requirement for Pruning, Trimming, Repairing, Maintaining, Removing Trees, and for Cutting Brush*.

1. Monitoring

Trees should be monitored throughout their lifetimes for declining health and signs of pests and diseases. Monitoring a tree's condition allows for proactive care to address identified issues, such as adjusting water levels for drought-stressed trees, pruning a damaged branch before it peels off the trunk's bark, or providing Integrated Pest Management for trees affected by a pest. If treatment for pests or diseases is required, it is recommended to use the least invasive methods. If treatment is for City-owned trees, the City must approve any chemical pesticide application in advance.

OAK WILT

Oak wilt, caused by the fungus *Ceratocystis fagacearum*, is a serious disease that affects oak trees. Once a red oak becomes infected with the oak wilt fungus, the tree will die regardless of treatment; white oaks can also be affected but are more resistant and less vulnerable to mortality from the disease. To mitigate oak wilt the following measures can be taken:

- *Prevention*: Prevention is key to managing oak wilt. Avoid transporting firewood or wood from infected oak trees to limit the movement of the disease. Oak wilt can spread through root grafts between neighboring trees – to prevent root graft transmission, maintain a minimum distance of 50–100 feet between healthy oaks and infected trees or stumps. Avoid pruning or damaging oaks during the growing season, which is typically from April to October. This helps to minimize the risk of infection through open wounds.
    - If pruning is necessary, it should be done during the dormant season when the disease-causing beetles are not active. Prune oaks between November and March to reduce the chances of oak wilt infection. If pruning is required between

[10] City Master Plan, Page 147

April and October due to damage, use latex pruning paint to close wounds to infection.[11]

- *Fungicide Treatment*: Once an oak wilt infection is confirmed, treatments are available to save surrounding oaks and stop the spread of this disease. Fungicide injections can be used as a preventive measure in high-value oak trees or to manage oak wilt in the early stages. Consult with an ISA Certified Arborist or tree care professional for appropriate fungicide treatment options and timing.
- *Tree Removal and Disposal*: Infected trees should be removed and destroyed promptly to prevent the spread of oak wilt. Properly dispose of the infected wood by chipping, burying, or burning it to eliminate the fungus.
- *Public Awareness and Reporting*: Raising awareness about oak wilt and the importance of early detection and reporting can help to prevent future spread.

2. Irrigation

In general, the watering season is from May 1 through October 31, or at the discretion of the City, and during long periods without precipitation in the winter months upon request of the Forestry Supervisor. Watering frequency and duration should be adjusted depending on plant species, soil type, and weather.

Newly planted trees should receive approximately 10 gallons of water per 1 inch of trunk diameter once weekly during the watering season for the establishment period. The tree watering basin should be maintained to a height of 3-4 inches high along the perimeter of the planting hole and kept free of weeds and debris.

There are several methods of irrigation that can effectively water trees:

- Irrigation bags
  - Irrigation bags wrap around the bottom half of a tree's trunk or sit on top of tree's basin in a doughnut shape.
  - Bags must have a capacity of at least 15 gallons and no more than 20 gallons of water and be made of durable PVC tarpaulin material. Bags must be approved by the Forestry Supervisor.
  - At the end of the watering period the Contractor shall remove all watering bags for winter storage. Bags must be removed upon termination of the contract.
  - At the time of watering, both the drip irrigation bag and the tree basin shall be filled to capacity.
- Hand-watering
  - Consists of a simple hose and manual shut-off valve. Water can be directly placed where needed and shut-off to prevent over-watering and run-off.
- Drip irrigation pipes

[11] Keeping oak trees healthy by helping prevent oak wilt disease. (2023). Michigan Department of Natural Resources

- Perforated flexible pipes or hoses laid directly around the root zone soak soil from the ground level. Water pressure is controlled by emitters; the number of emitters used for each plant and the flow rate for each emitter will depend on the size of the tree.

- Bubblers
  - *Subsurface bubblers*. A 12–36-inch perforated mesh tube delivers water below-ground, allowing water, air, and nutrients to bypass compacted soil and directly reach tree root systems. An added benefit is that subsurface bubblers provide excellent aeration, which helps release trapped gases that may increase plant stress.
  - *Above-grade bubblers.* Similar to subsurface bubblers but without the aeration tubes. They are often used with existing trees to avoid damage to an established root zone during installation. Because they are placed above grade, they can be easier to maintain than subsurface bubblers.

3. Berm and Mulch

Berms should be monitored routinely and rebuilt as needed to retain water close to the tree's critical root zone and act as a barrier to foot traffic and lawn mowers. Berms should be a minimum of 3 inches high and 3 inches wide and must be kept clear of unwanted vegetation and other debris. Unwanted vegetation must be removed by hand; chemical weed control is not permitted for use on or around City-owned trees.

Mulch is very important for retaining moisture in the soil, improving the soil biology, regulating soil temperature, and reducing weeds. Mulch should be replenished within the berm as needed to maintain a layer 2-4 inches deep, leaving 5 inches around the trunk clear from mulch to avoid conditions favorable to decay, disease, and insects (Figure 2).

Figure 2. Tree Mulching. Source: USDA Forest Service – Tree Owner's Manual.

4. Fertilization

Although fertilization is not required during establishment, it may be beneficial to a tree's condition, appearance, and ability to withstand drought, minor insect and disease issues, and other stresses. Newly planted trees are encouraged to develop a healthy root system when fertilized, allowing them to retain water. However, fertilizer should not be applied directly to newly planted trees for the first year of establishment. All fertilizer used on City-owned trees must be organic.

5. Young Tree Pruning

Young trees need periodic pruning, also known as training, to develop good form and branching structure – reducing future public safety risks and increasing the tree's longevity. See Section 3.2 for young tree pruning specifications.

6. Stakes

Stakes should provide support for young trees while not inhibiting them from moving in the wind and developing trunk taper and a stable root system. The efficiency of installed stakes should be monitored, adjusted and stakes should be removed as needed. Typically, stakes may be removed after one year or one full growing season, once they are capable of supporting themselves.

SECTION III: TREE PRUNING

Maintaining a sustainable and resilient urban forest necessitates the crucial practice of tree pruning. There are many reasons for pruning young and mature trees, including:

- Clearance
- Dead, dying, or decayed branch
- Crown raising
- Improved structure (Figure 3)
    - Branch spacing, removal of crossing branches, correct tight branch unions and codominant branches.
    - Tree species are different shapes at maturity, yet often their form when young is very dense. This dense shape is desirable to the nursery industry but should be corrected after planting.
- Infrastructure or utility conflict
- Aesthetics
- Crown reduction for aging trees
- Crown thinning to control disease

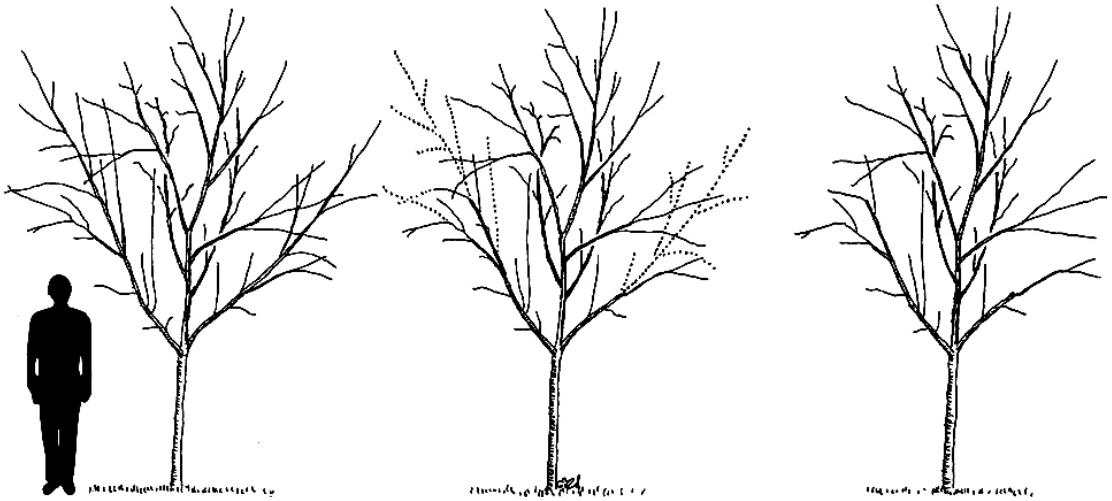


Figure 3. Reduction or removal of stems competing with the leader, shown above, improves a tree's structure. Source: Urban Tree Foundation.

It is necessary to identify and clearly establish the pruning objective(s) to inform the appropriate approach to pruning. Within this manual section, you will find guidelines and recommendations that ensure the implementation of appropriate pruning methods and adherence to industry standards. By adhering to the outlined best management practices, Kalamazoo can effectively manage tree health, develop/improve structure, mitigate risk, provide clearance, and improve aesthetics.

All maintenance performed on trees located in street rights-of-way, parks, cemeteries, curblawns, and other public places will be performed by the City or its agent unless an exemption is made in writing by the Director of Public Works. Pruning will be conducted according to the ANSI A30 and Z133 Standards. At least one ISA Certified Arborist must be on site overseeing or performing the work.[12]

Figure 4. An ISA Certified Arborist must be on site overseeing or performing all tree pruning of City trees.

1. Proper Tools and Equipment

1. All pruning equipment shall be kept reasonably sharp and in good working condition.
2. All tools used on disease-infested trees shall be thoroughly cleaned and disinfected before being used on any other plant material. Tools shall also be cleaned and sterilized before pruning cuts between infected and uninfected portions of the same tree.
3. Use the most precise tool that is appropriate and efficient for the job to reduce wounding, tearing, stubs, and improper cuts. For example, a handsaw can easily be used to remove a 3-inch limb that will result in a clean, precise cut, versus a chainsaw that is harder to control and may result in a messier cut with bark tearing.

[12] Tree Maintenance Bid, Page 14

4. When removing limbs, pruning should be done in a way to prevent damage to infrastructure, property, persons, or the tree itself. This may require the use of ropes, lines, or other supports.
5. Pruning wound paint or sealant should not be used with the exception of oaks in the season when they are vulnerable to oak wilt (see Section 2.1).
6. Tree climbing with spikes or any equipment that can damage the tree is prohibited.

2. Young Tree Training

Pruning should be kept to a minimum for the first year after tree installation to allow the tree to use its existing foliage to manufacture carbohydrates for growth. Trees should be pruned once they are established, approximately two years after planting, in order to develop ideal structure and address defects that may become problems in the future. Young trees should be pruned on a three-year cycle.

All pruning of the City's trees will be conducted according to the National Arborist Association's Pruning Standards for Shade Trees, revised 1988. Future revisions to the National Association's Pruning standards will be accepted as the current revised standard.[2]

To structurally prune a young tree, the first step is to identify the stem that will make the best dominant leader. Although there may be several options, the selected leader should be centered, upright, and free of damage or other defects that could compromise its strength. The leader's identification steers the following pruning decisions, as branches and stems in competition should be removed or subordinated. Competition includes stems similar in height, and stems and branches that are larger than half the diameter of the trunk.

Another step is to visualize which branches will become permanent branches and plan the systematic removal of temporary branches to allow for clearance and provide appropriate branch spacing. The ideal spacing between branches on young trees is 4–6 inches. Branches that are clustered together and growing from the same point on the trunk, or crossing, should be removed as well. Temporary branches may be retained along the trunk of young trees to encourage trunk strength and protect trees from vandalism and sun scald. They should be pruned annually to slow their growth and should be removed eventually.

Trees should be pruned of all dead, diseased, and dying branches in addition to their structural pruning. Suckers and stump sprouts should be removed. Branches that have poor branch angles, including branches with included bark, should be subordinated or removed.

3. Utility Pruning

Trimming shall be conducted in accordance with this chapter and the direction of the Director of Public Works.

All line clearance tree trimming or other construction work requiring tree trimming to trees located in public places, curb lawns or street rights-of-way by any utility shall be conducted in

accordance with the standards set forth in § 42-6B. Acts of God, the loss of utilities services due to weather and like emergencies constitute an exception to this subsection.[2]

4. Tree Pruning Specifications

Extreme care must be taken to prevent limbs and branches from falling and inflicting damage on adjacent homes, driveways, sidewalks, streets, and other property, both public and private. Unacceptable pruning practices include peeling or tearing of the bark, flush cuts, topping (or pollarding), lion's tailing, rounding-over, or shearing. No person, utility, or other party may top any street tree, City tree, or tree located at a public place. Trees severely damaged by storms or other causes, or certain trees under utility wires or other obstructions where other pruning practices are impractical, may be exempted from this subsection at the determination of the Director of Public Works.[2]

The following specifications shall be followed:

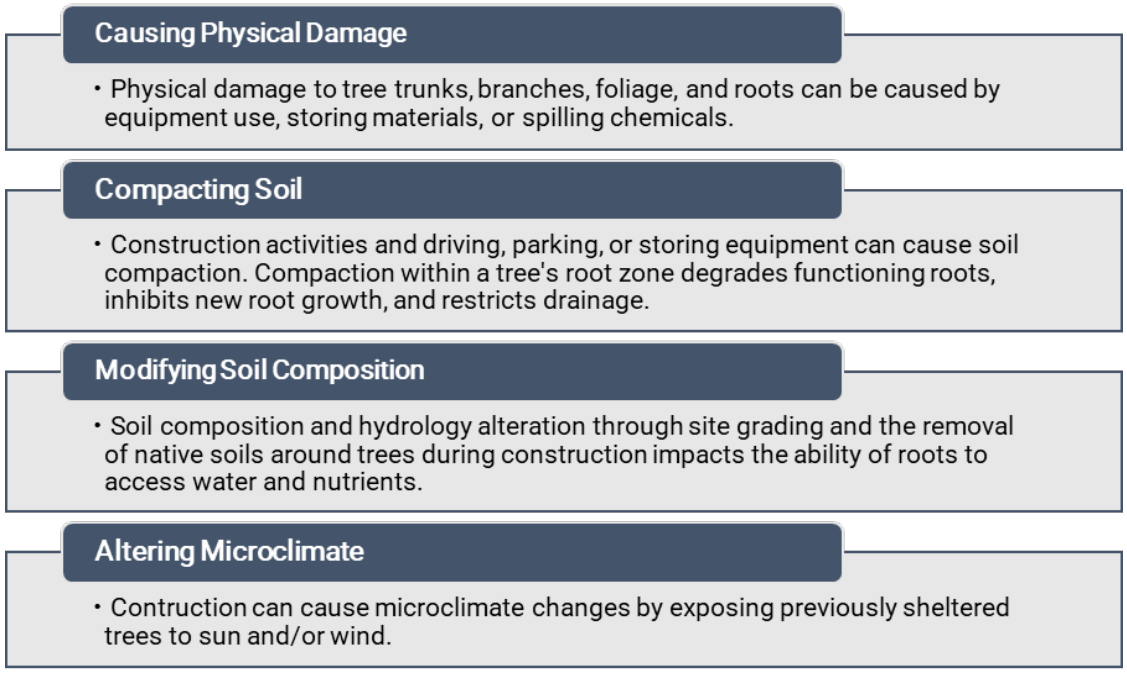
1. Pruning should be performed during the dormant season. Oak (*Quercus* spp.) and elm (*Ulmus* spp.) should not be pruned during the growing season.
2. A natural pruning system shall be utilized. Live branches shall be removed to maintain the natural form and appearance of the tree. Mutilation and loss of characteristic shape of the tree is prohibited.
    a. Pruning activities should remove no more living material than is necessary to achieve the tree pruning objectives outlined in these specifications.
    b. No more than 20% of the living branches shall be removed within one year from healthy trees—less for aging, stressed, or declining trees.
3. Trees should be pruned to remove all dead, diseased, broken, and crossing branches that are 2" in diameter or larger. All deadwood larger than 2" diameter in tree canopy must be removed.**Error! Bookmark not defined.**
4. Trees shall be pruned to provide clear, unobstructed views of street signs, traffic signs and traffic signals. When street tree limbs are overhanging structures or in conflict with private trees, trees shall be pruned to provide clearance.
    a. When raising lower branches for clearance, care should be given to maintain symmetry. Cuts shall not be made that are so large that they prevent normal sap flow. Prune enough to maintain several years of clearance; before smaller secondary and tertiary limbs will be below the required clearance height. The minimum clearance of any overhanging portion of a tree must be:
        i. 8 feet over sidewalks.[2]
        ii. 15 feet over all streets except major thoroughfares which shall have a clearance of 16 feet.[2]
        iii. 6 feet of roof or structure clearance; traffic signal lights must be clearly visible.**Error! Bookmark not defined.**
5. All branches must be trimmed back to the trunk or scaffold branch or to a leader at least one-third of the size of the branch being cut.**Error! Bookmark not defined.**
6. Remove old stubs, leaving the branch collar intact.

7. No hanger shall be left in a tree after pruning is complete.
8. “Natural” or “drop-crotch” technique shall be used when removing or shortening branches.
9. Limbs and branches larger than 4 inches in diameter shall be lowered to the ground using ropes or other mechanical devices.
10. All necessary precautions should be taken to prevent unnecessary damage to the remaining tree.
    a. To allow for proper wound closure to occur, all cuts shall be made sufficiently close to the trunk or parent limb without cutting into the branch bark ridge or branch collar or leaving a protruding stub. Clean cuts shall be made at all times.
    b. Branches shall be pre-cut when necessary to prevent splitting or peeling of the bark.
    c. To avoid unnecessarily large cuts, do not remove limbs that are greater than one-third (1/3) of the diameter of the trunk, unless directed by the City.
11. All brush and debris must be cleaned up and removed immediately.

SECTION IV: TREE PROTECTION

Trees are an important part of the city's infrastructure, due to the environmental, economic, and societal benefits that they provide to the community. Therefore, the City seeks to encourage the protection of large, mature trees when making planning decisions and conducting construction projects. One of the goals of the City of Kalamazoo's Master Plan is to prepare for climate resilience by protecting the urban forest and tree canopy.[13]

The purpose of this section is to provide guidance about how the City's tree-related ordinances apply to residents, developers, contractors, utilities, and City staff in Kalamazoo and to minimize impacts to trees during construction activities that may negatively affect them. All construction activities within the City of Kalamazoo must adhere to the standards set forth in this section and state and local laws and regulations as they apply.



1. Planning and Design

Every effort must be made to include existing, healthy, mature trees in the landscape design plans, unless otherwise approved by the City of Kalamazoo Forestry Supervisor if it is proven that the site development demands it. The following steps must be taken prior to construction on City property, and are encouraged on other sites.

[13] City Master Plan, Page 145

1.1 Coordination

Engineering and design project teams shall work with the Forestry Supervisor at the project's initial design stage. The Contractor shall retain the services of an ISA Certified Arborist with demonstrated experience in construction protection. Prior to the start of work, the Contractor must submit the Arborist's name and certification number to the Forestry Supervisor.

The Contractor and Arborist shall walk the site with the Forestry Supervisor to identify potential tree impacts, trees of special concern for preservation, and trees that are in poor/dead condition that will require removal.

Figure 5. Following planning protocols is the first step to protecting trees during construction.

1.2 Required Submittals for Approval

All projects will require a permit from the City. To obtain a permit, the existing conditions plan sheet and tree protection plan created by the Arborist, as detailed below, shall be submitted to the Forestry Supervisor for review.

Tree Survey & Existing Conditions Plan Sheet

The Arborist must complete a tree survey of all trees on site and create an existing conditions plan sheet for the approval of the Forestry Supervisor. In the case of wooded areas, trees 4-inches or greater diameter at standard height (DSH - 4.5-feet from the ground) are to be inventoried. Each inventoried tree shall be numbered and tagged with either a small, metal numbered tag affixed to tree trunk with an aluminum nail (for any project that may take longer than one-year to complete from the date of tree survey), or flagging tape with the tree number written on it with non-fading marker (for projects that will take less than one year to complete). Tree survey data will be valid for 3 years. The following shall be included in the plan sheet:

- Map showing the limits of project disturbance
- Tree data, to be provided in a chart (Table 5)
    - Tree tag number or tree inventory number
    - Location (GPS, map reference, coordinates)
    - Species (common and botanical names)
    - Size (DSH)
    - Condition

- Suitability for preservation per the Arborist's judgment.

Table 5: Example data from tree survey presented for a plan sheet.

Tree Tag #/ Tree Inventory #	Species (Botanical)	Species (Common)	Size (DSH)	Condition	Suitability for Preservation
11466	*Gleditsia triacanthos* f. *inermis*	Thornless Honeylocust	6"	Fair	Moderate
29350	*Quercus palustris*	Pin oak	13"	Good	High
63225	*Acer campestre*	Hedge maple	4"	Poor	Low

Tree Protection Plan

All trees are to be protected unless otherwise approved for removal. The following requirements shall be included in the Tree Protection Plan. For detailed specifications to assist with tree protection plan development see Section 2 (Tree Protection Details, Specifications, and Requirements):

- Map identifying:
  - Trees proposed for preservation and location(s) of their tree protection zones (TPZ).
  - Identification of trees proposed for removal.
  - Location and description of protection measures required for reduced tree protection zones, if approved.
  - Utility and drainage corridors
  - Grading and excavation
  - Material, soil storage and debris piles
  - Limits of disturbance/ equipment routes on site
  - Construction area access (exit and entry points)
  - Parking for construction and personal vehicles
  - Fueling, mixing, and concrete washout areas
  - Sediment control barriers (silt fence)
- Tree care and maintenance plan with proposed activities to improve conditions before, during, or after construction (e.g., pruning to provide clearance, root pruning, mulching, irrigation)
- Required mitigation for trees to be removed, if applicable
- Language that addresses responsibility for tree damage mitigation, tree valuation, and tree replacement, with consequences for non-compliance

- Each tree shall be given a numerical value ($) by the Forestry Supervisor prior to the start of work based on its size, species, condition, and significance. If a tree is killed during the construction process, the Contractor must pay this value into the City's Tree Fund.

Tree Protection Zone (TPZ)

A TPZ is an area established to prevent injury to a tree's critical root zone (CRZ), or the area extending from the trunk that encompasses the roots that are most vital to the tree's health. The radius of the CRZ is approximately 1.5 feet for every 1 inch in trunk diameter, as measured from the outside of the tree trunk.

A TPZ must be specified around all trees being retained and protected during construction. The size of the TPZ should be site specific, defined based on species tolerance, expected impact of construction activities, tree size, age, health, and the site's soil conditions (moisture, texture, density). However, the TPZ is typically defined as the outline of a tree's CRZ (Figure 6) or a combined set of CRZ areas.

In the case of street trees with limited space, the outline of a tree well or planter strip in a paved area may be the TPZ (Figures 7 & 8). The Forestry Supervisor retains the discretion to extend or modify the TPZ at any time. When the minimum TPZ radius cannot be achieved, appropriate mitigation shall be recommended. TPZ barriers shall be installed in the specified locations with signs to alert contractors about the protected status of the TPZ.

The following activities are prohibited within the TPZ of public street and park trees unless approved by the Forestry Supervisor:

- Trenching, grading, excavation or digging
- Root cutting
- Storage of vehicles, construction equipment, debris, or soil
- Exhaust or excessive heat directed towards tree foliage, branches, or trunks
- Foot or vehicular traffic
- Disposal of wash water, fuels, chemicals, or other harmful substances
- Attaching signs to or wrapping materials around trees

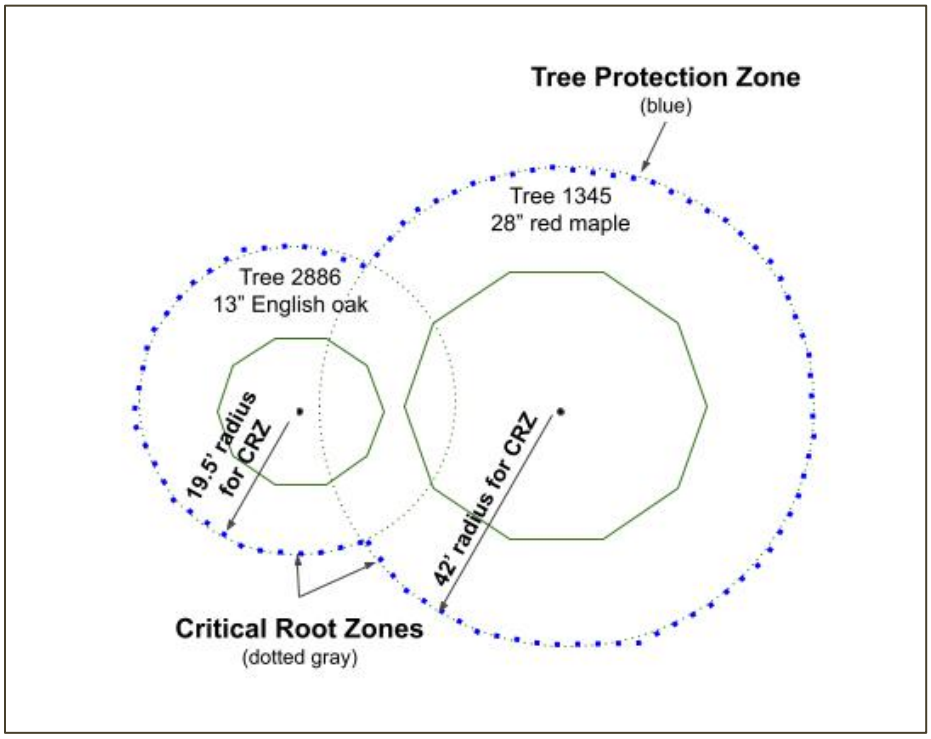


Figure 6. Standard CRZ and TPZ areas.

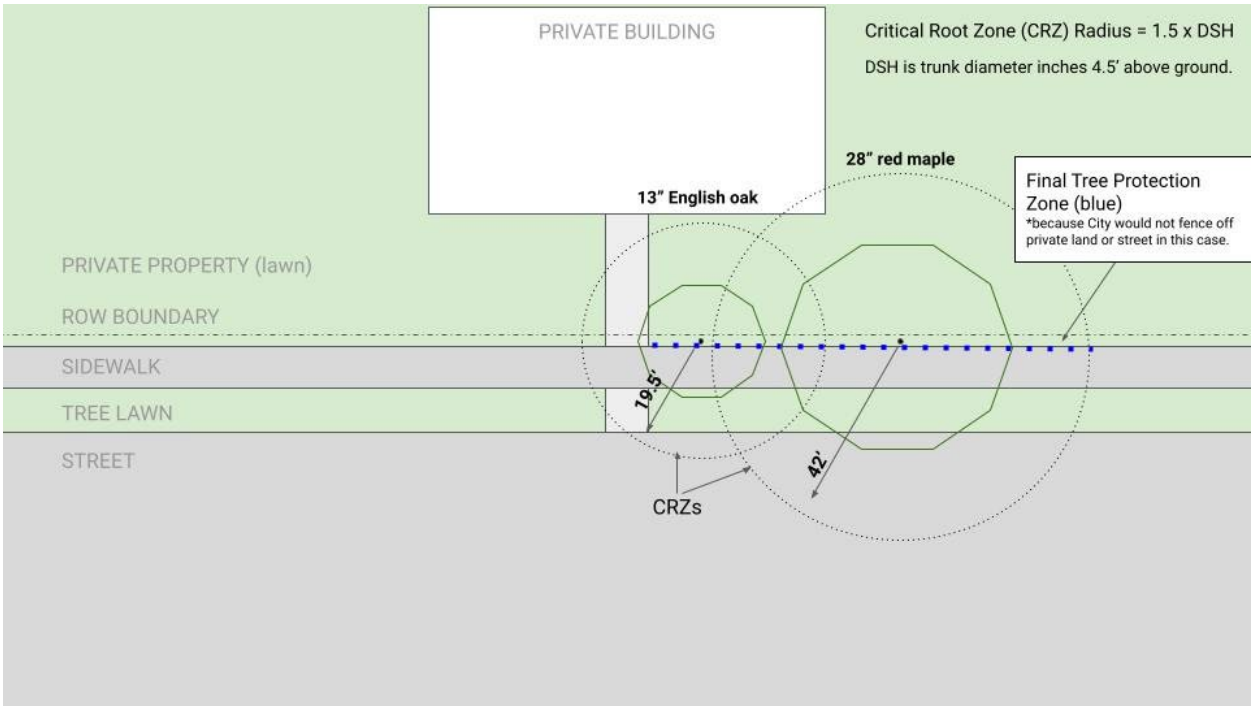


Figure 7. Scenario 1: CRZ and modified TPZ of a tree located in a right-of-way site abutting private property.

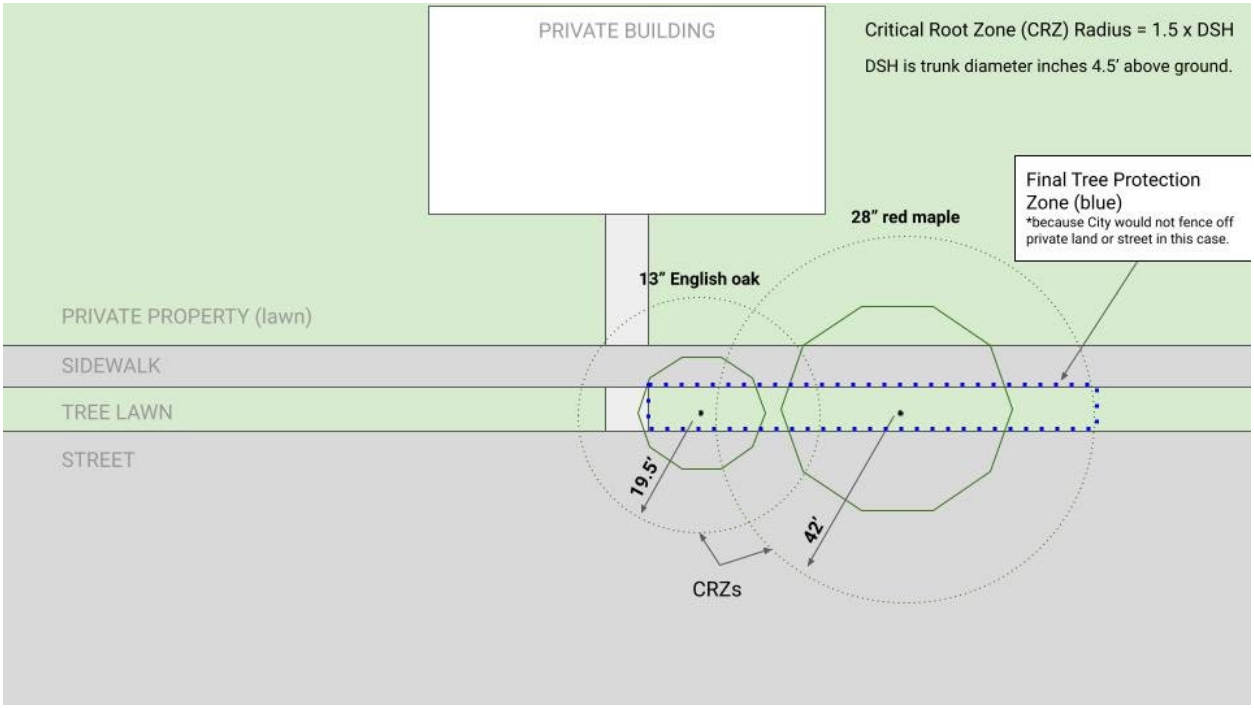


Figure 8. Scenario 2: CRZ and modified TPZ of a tree located in a tree lawn within the right-of-way site.

2. Tree Protection Details, Specifications, and Requirements

Trees in or near construction zones or work areas should receive protection to ensure they are not damaged or otherwise injured and impacted by construction and maintenance activities. See Appendix C for a visual representation of the City's tree protection specifications. All tree protection measures must be installed and inspected by the City of Kalamazoo prior to the start of any construction activities.

2.1 Tree Protection Fencing

Tree fencing must be erected before construction begins and remain in place until final inspection of the project. The following fencing standards may be modified with approval from the Forestry Supervisor.

- Plastic or Metal Fencing: Fencing may be plastic, heavy duty barrier fencing in high-visibility orange color or chain-link metal, with a minimum height of 4 feet. Plastic fences must be attached to posts with a zip tie at the top and bottom and have a minimum of three ties for a fence that is 4 feet high fence or four ties for a fence that is 6 feet high.
- Posts: Safety fence posts must be not more than 8 feet apart, set or driven 1–1.5 feet deep into the ground without concrete footings. Where a post is located on existing paving or concrete that is to remain, provide appropriate means of post support.

- Entrances: For visibility, access entrances/gates should be a different color than the tree protection fencing and clearly marked with signage.
- Signage: Prominent signage displayed on each fence shall state that entrance and removal of the fence are prohibited without authorization. Signs shall be posted along the tree protection fence at regular intervals every 30 feet, or centered if the fence is less than 50 feet in length. *Do not* affix signs to trees themselves.

2.2 Erosion and Siltation Control

If a tree is in the immediate proximity to a grade slope of 8% (23º) or more, then approved erosion control or silt barriers shall be installed outside a TPZ to prevent siltation and/or erosion within the TPZ.

2.3 Temporary Irrigation

Irrigation must be provided for plants in the construction area that will have exposed root systems for any period during construction. Within the construction area where work is in progress, water each tree to the depth of its roots, generally within the upper 6–18 inches of the original soil surface. Acceptable irrigation methods include gator bags, bubblers, soaker hoses, injection of water into the soil, or flood irrigation with the creation of a berm. A temporary irrigation system with a specified operating schedule may be installed within a TPZ only if included in the Tree Protection Plan. Irrigation should be continued until sufficient root growth has been shown. Trees should be monitored for signs of drought including leaf curling, wilting, leaf drop, early fall color, and dieback of branches or leader and mitigated with supplemental irrigation as recommended by the Arborist.

2.4 Tree Pruning

Prior to construction, it is recommended that dead, diseased, or dying branches are removed to reduce the risks of limb failure. Crown raising may be necessary for construction equipment to gain access to an area; other options include lifting lower branches with ropes, cables, or straps or supporting with props. All approved pruning must adhere to the following standards:

- An ISA Certified Arborist must perform any cutting of limbs.
- All cuts shall be clean and executed with an approved tool.
- Wounds shall not be painted with the exception for oaks during the oak wilt season.
- No more than 20% of the functioning leaf and stem area may be removed within one calendar year from any protected tree, or removal of foliage so as to cause the unbalancing of the tree. Maximum pruning should only occur in rare situations that are approved by the Forestry Supervisor.

2.5 Root Pruning

Prior to mechanical excavation, root pruning may be needed to minimize damage to a tree's root system. All root pruning must be approved by the Forestry Supervisor, who may determine that the extent of required root pruning may jeopardize the health or structural integrity of the tree. In such cases, it may be required that a tree is removed and replaced with a tree that is more suitable for the space.

Any root >1 inch in diameter should be pruned rather than torn or crushed. The two allowable methods of root pruning are:

- Using air excavation tools, pressurized water, or hand tools to excavate soil, followed by selectively cutting roots. This method allows the arborist to examine the roots and determine the best places to cut.
- Using a clean, sharp tool designed to cut roots, cut through the soil along a predetermined cross-sectional line on the surface.

For most tree species, a significant reduction in stability and long-term health can occur when roots are cut within their CRZ – the farther a root is cut away from the tree's trunk, the better. Root pinning or stapling and directional changes should be considered to minimize root damage.

All approved root pruning shall be performed according to the following standards:

- The Contractor shall retain the services of an ISA Certified Arborist to perform any cutting of roots.
- Exposed tree roots shall be protected by dampened burlap at all times until they can be covered with soil.
- Backfill the areas where root pruning has occurred and immediately water the area with 10 gallons of water per 1 inch of tree diameter.

Branches shall not be removed from a tree to compensate for root pruning – it is best to wait for the tree to respond and act accordingly.

2.6 Tree & Stump Removal

Removal of identified trees shall be done by an ISA Certified Arborist in a skillful manner to avoid above- or below-ground damage to the trees that remain. Before performing stump extraction, the roots that may be entangled with trees that are to remain should be considered – these stumps shall have their roots severed before extracting the stump. Removal shall include the grinding of the stump and roots to a minimum depth of 18 inches below sidewalk grade. Any root material within the sidewalk is considered part of the stump and should therefore be removed.

2.7 Tree Health Monitoring During Construction

Monitoring the site on a specified schedule is necessary during the construction phase to ensure compliance with tree protection measures. Monitoring tree health, soil moisture, and/or tree damage should be a priority during these site visits so damage can be documented, mitigated, and work plans can be adjusted as needed.

- **Mulch.** Organic mulch such as wood chips is an effective way to protect tree health by conserving soil moisture, moderating soil temperature, eliminating turf competition, promoting soil nutrients, and reducing soil compaction. If mulch is used, it should be maintained at 2–4 inches deep within each TPZ throughout the duration of construction activities and *not* piled against the trunk.
- **Foliage.** If leaves begin to yellow, wilt, or die, collect foliar samples to determine causes. If nutrient deficiencies are found, consult with the Forestry Supervisor to determine mitigation activities (i.e., fertilization).
- **Pests and Diseases.** The stress induced by construction has been shown to increase the susceptibility of certain tree species to pests. Integrated Pest Management strategies should be employed where a non-lethal pest population exists, to minimize damage to trees left vulnerable from the stressors of construction. Tree species that are known to be susceptible to mortality should be monitored during construction.

Figure 2. Sidewalk construction can cause major negative impacts to a tree's health.

3. Tree Protection for Approved Changes in TPZ

All changes to the size of a TPZ or any construction activities within a TPZ must be approved by the Forestry Supervisor. Where grading or other disturbance is permitted within a TPZ, extra protection measures must be implemented to protect the roots of the tree(s).

3.1 Tree Protection Fence

Required fencing specifications are detailed above. See Figures 5 and 6 for fence placement on sites without space for full TPZ to be fenced.

3.2 Trunk Protection

Trunk protection is necessary when construction activities are close enough to cause mechanical damage to tree trunks or buttress roots. Trunk protection should be 2 feet x 4 feet cladding, at least 8 feet in length from the tree's base, clad together with wire. No fasteners may be driven into the tree. Burlap must be used to separate trunk cladding from bark. The barrier can be installed at an angle to protect the trunk, trunk flare, and buttress roots. Adjustments may be needed if protection is needed during periods of trunk growth.

> **Trunk Injury Mitigation**
> In most cases of trunk or branch damage, it is best to remove loose bark, cutting jagged edges with a sharp knife or chisel and being careful to leave as much firmly attached bark intact as possible. This can be performed during the post-construction phase.

3.3 Surface Protection

If construction activities cannot be kept outside a TPZ, surface protection measures shall be established to reduce soil compaction and prevent root damage. Measures may vary depending on equipment type and frequency of use. Measures may include, but are not limited to:

- Applying 6–12 inches of wood chip mulch to the area.
- Laying >3/4-inch thickness plywood, beams, commercial logging, or road mats over a >4-inch thick layer of wood chip mulch.
- Applying 4–6 inches of gravel over a taut, staked, geotextile fabric.
- Any of the above actions shall be performed manually. Any mulch, plywood, or other material used that exceeds 4 inches must be removed from the TPZ immediately after the potentially hazardous activity has concluded.

Soil Compaction Mitigation

Soil that is damaged or compacted shall be loosened or aerated to promote root growth and enhance tree vitality. One of the following aeration methods shall be specified an in effort to correct compacted soil conditions, as specified by the Arborist:

- Vertical mulching, by augering holes (2–4 inches wide, 12–18 inches deep, and 1–3 feet apart, starting approximately 2–3 feet from the trunk and extending to the dripline) and backfilling with porous material such as gravel, sand, perlite, or peat moss.
- Radial trenching using an air excavator to excavate a soil trench (3–6 inches wide and >12 inches deep, starting approximately 3 feet from the trunk and extending to the dripline) and add a 2–3 inches application of organic mulch. Trenches shall radiate out from one foot apart at the closest point.
- Soil fracturing and subsurface injections with a pneumatic air-driven device to increase pore space in the soil.

3.4 Excavation

Where excavation within a TPZ is unavoidable, the Contractor shall use equipment and methods that minimize damage to the tree roots, per recommendations of the Arborist. Excavation methods permitted inside a TPZ are limited to hand digging and hydraulic or pneumatic air excavation. Roots >2 inches in diameter must be tunneled under. Boring machines that can tunnel under root systems are the preferred alternative to trenching when installing pipes or wires. If possible, these machines should be set up outside the drip line of the tree, because they often require a hole to be dug for operation. Prior to soil excavation near trees, roots should be pruned or cleanly cut at the excavation limit, outside the TPZ.

If boring from one side of a tree to the other, the boring hole needs to be offset from the trunk's center to avoid damaging its tap or oblique roots. The distance of offset (Table 6) and the length of the boring hole are based on the tree's diameter. The length of the bored hole should be at least 1.5 feet per 1 inch of trunk diameter, with the midpoint based on the location of the trunk. Excavation should then be performed below root depth at 2–3 feet.

If boring cannot be used and trenching is required, the following specifications must be met:

- All trenching shall be located outside TPZs. If a reduction in a TPZ's size has been approved, a minimum distance will be determined.
    - Open trenching for new utility lines and services in the curblawn, street right-of-way, or public place shall not occur within one half the crown radius of the tree and never closer than one foot of any tree. Boring will be required within those limits.[2]
    - Under no circumstances shall excavation in a TPZ be made with mechanical equipment that might damage existing root systems. Equipment and methods that minimize damage to the tree roots, per recommendations of the Arborist, must be

used. Such methods may require root pruning prior to, as well as during, any excavation activities.

- Excavation within a TPZ should be avoided during hot, dry weather. Utilities that cannot be routed outside a TPZ should be installed by tunneling under or other methods to avoid root damage. Utilities should be installed far enough from existing trees to avoid future tree damage during utility repair and should be routed in a common trench or conduit or grouped as closely as permitted.

Table 6. Minimum distances for offset of boring hole relative to tree's DSH.

Tree Diameter (DSH)	Minimum Offset Distance from Trunk
2”	3 ft
3”	4.5 ft
5”	7.5 ft
10”	15 ft
15”	22.5 ft
20”	30 ft

3.5 Grading

Grade changes, even if slight, have the potential to greatly impact a tree's health. Grade changes outside of a TPZ must not significantly alter drainage to the tree. Grading within a TPZ is prohibited unless approved by the Forestry Supervisor. For circumstances where grade changes have been approved within a TPZ, the following specifications shall be followed for each activity:

- Soil Fill: method of placing native soil where existing grade is <2 inches below elevation of finish grade.
  - Place soil in a single uncompacted layer and hand grade to the required finish elevation. It is important to keep fill soil as far from the trunk and in as thin a layer as possible.
  - Coarse-textured soil is best for water and air movement. Soil moisture should be monitored and remain hydrated.
  - No more than 6 inches of fill is allowed unless mitigated. Mitigation can include a retaining wall that is three times the diameter of the tree, permanent aeration systems, or other approved alternatives.

- Soil Cut: method of building a retaining wall around (or on the one side being graded) the tree to maintain the grade within TPZ.
  - Refer to Table 6 for minimum radius of distance from trunk to retaining wall.
  - Walls that encircle a tree may eliminate soil volume available to roots outside, therefore trees may need supplemental irrigation.
  - No more than 4 inches of existing soil shall be removed from natural grade (cut) unless mitigated by retaining wall or an equivalent technique.

4. Post-Construction Inspections and Oversight

Failure to comply with the standards, restrictions, conditions, and mitigation measures of this Tree Manual on City property will result in the issuance of a stop work order and may result in the imposition of fines and/or penalties.

All fencing, trunk protection, branch protection, and mulch shall be maintained throughout the duration of the contract. The Contractor of work on City property shall be held responsible for the health and survival of the existing trees in the immediate vicinity of the construction area. Damage that can be remedied by corrective measures shall be repaired immediately per the Forestry Supervisor's judgment.

After all other construction activities are complete, all materials must be removed and disposed of off-site. For projects on City property, a city arborist will conduct a site inspection at project completion to ensure that all preserved trees are in good condition. After construction, during the 2-year establishment period, the health and condition of preserved trees shall continue to be monitored by the contractor's Arborist. Treatments such as fertilization or pruning may be required at the direction of the Forestry Supervisor. If tree removal is necessary, the Arborist shall recommend replacement species suited to the site for approval by the Forestry Supervisor. The City may require development of a long-term tree maintenance plan for preserved and newly planted trees.

SECTION V: TREE REMOVAL POLICIES

1. Tree Removal Process

Removal requirements apply to trees, defined as single- or multi-stem woody plants that attain a minimum mature height of ten (10') feet, with a minimum mature trunk diameter of four (4) inches as measured 4.5 feet above the ground (Diameter at Standard Height, or DSH). It shall be unlawful for any person or entity on any public or private property within the city to remove a tree without first having obtained a written permit from the city to do so. For purposes of this section, "removal" means the destruction or displacement of a tree by cutting, bulldozing, or other mechanical or chemical means that results in the physical transportation of the tree from its site and/or death of the tree. "Removal" shall also mean pruning more than 33% from any tree within any 365-day period.

Figure 10 & 11. Tree removal can reduce risks to public safety.

Upon receiving a request from the public, reviewing a development plan, or observing a tree issue on site, a city arborist performs tree health and risk assessments and assigns the tree a risk rating following industry standards. Based on the results, the Forestry Supervisor or their designee will determine whether a removal is warranted. However, risk may be mitigated through pruning, and removal is not always necessary.

Only the City or its agent may remove street trees or City trees. Any other person requesting to remove street trees or City trees must obtain a permit from the Public Works Department. Permits for the removal of public trees shall be granted by the city under the following conditions:

- Where the tree is at least 90% dead
- Where the tree constitutes a public hazard. Moderate, high, or extreme-risk trees may be removed, while low-risk trees may be removed if unlikely to survive or if there's an infrastructure conflict or safety concern
- Where the tree is diseased or shows pest infestation
- The overcrowding of trees at a specific location threatens their health and makes the requested removal appropriate
- Where necessary for the installation of public streets, infrastructure improvements or driveways after review by the Tree Committee and the Director of Public Works;
- Where unique circumstances exist, and request is made for the removal upon the recommendation of the Tree Committee and the Director of Public Works.
- Visibility concerns, e.g., tree blocks traffic light and cannot be effective pruned to mitigate concern
- Accessibility concerns, e.g., property's wheelchair ramp cannot be easily accessed due to tree's location
- Conflicts with construction, e.g., tree location interferes with site design after necessary measures have been taken to reduce the conflict

The City of Kalamazoo values the public tree population as essential infrastructure that benefits the entire community. In an effort to preserve and expand the city's public tree canopy, the following reasons are not justifiable reasons for removing a public tree:

- Mess: Most trees prove to be a slight nuisance at certain times of year. Some trees drop fruit, twigs, or leaves, and result in a mess that often falls on the property owner to clean up. The City of Kalamazoo recognizes this inconvenience; however, the City and its residents believe the benefits to the community outweigh this inconvenience in most cases.
- Shade: Although shade cast over gardens, buildings, or solar panels is not always welcome, shade provided by public trees lowers surface temperatures during hot months, mitigates climate change, and helps reduce energy costs.
- Species or location preferences: A healthy urban forest exhibits a diverse palette of tree species, genera, and families.
- Pollen allergies: Studies indicate that because tree pollen can be carried long distances by the wind. As such, an individual tree's pollen affects both adjacent residents and all

other properties in the neighborhood; therefore, an allergenic tree in front of a property is no more of a concern than other neighborhood trees.
- Private sewer/water line: A public tree that is said to interfere with a sewer or water line on private property will not be removed.
- Surface roots: Trees whose roots lift sidewalks or driveways shall not be removed unless it is not possible to remedy the problem by relocating the sidewalk or by cutting and removing roots. Contractors shall provide 15 days' notice to the Director of Public Services before commencing such operation. Street trees may not be removed for the installation of new driveways without a permit from the Department of Public Services.[2]

When removing a tree, the Contractor shall cut the tree to the lowest possible level the surrounding landscape will allow. Trees shall be cut into sections and lowered in a manner that prevents damage to surrounding structures, landscapes, and City and private property. All brush and debris must be cleaned up and disposed of by the Contractor at each site immediately. All wood must be removed within a 48-hour period.

1.1 Stump Grinding

Stumps must be ground to a minimum depth of 18 inches below sidewalk grade. Any root material within the curb lawn area is considered to be part of the stump and should therefore be removed. Stump chips are to be completely removed from the site and disposed of by the Contractor. Contact MISS DIG at least 72 hours prior to starting stump grinding work.

2. Tree Removal Mitigation

Mitigation measures are not intended to supplant tree preservation; planning and design of a site must consider all existing trees and ecological features. Mitigation for tree removals will be considered only after all feasible design alternatives to preserve trees have been exhausted.

The following tree removal activities are exempt from mitigation requirements upon approval from the Forestry Supervisor:
- Removal of trees that pose a risk of immediate danger to life and property due to an accident, fire, storm, or other act of nature
- Removal of diseased or dying trees as determined by an arborist, with written notice to be shared with the City
- Selective and limited removal or pruning of trees or vegetation necessary to obtain clear visibility within sight triangles

Replacement of trees removed is strongly encouraged.

SECTION VI: TREE PERMITS

No person, organization, business, agency, or city department shall plant, remove, prune, cable, brace, spray, or cut the roots of any city tree without a permit and approval of the Tree Committee or the Director of Public Services.[Error! Bookmark not defined.]

1. Report an Issue with City Trees

The City of Kalamazoo is responsible for maintaining trees that are located in the public right-of-way, along city streets, and on City-owned property. Report fallen or dangerous limbs, a stump that needs to be removed, or other issues related to city trees by calling 311.

The City is only responsible for city trees. Trees located on the house side of the sidewalk or in a side or rear yard are usually privately owned. Property owners are responsible for maintaining trees on private property. The City is also not involved in resolving disputes between neighbors regarding property lines or the responsibility of private trees. In these cases, you may need to reach out to an attorney for guidance.

The portal on the city's website (found by navigating to https://www.kalamazoocity.org/ Home> Residents > Solve a Problem with 311 > Report an Issue with City Trees) can be used to report an issue with a city tree, such as dangerous or fallen limbs or a stump that needs to be removed. Issues can also be reported by calling 311 or (269) 337-8000. If a tree is, or will potentially be touching a power line or impacting service, report it to Consumer's Energy at (800) 477-5050.

The service time for tree issues varies based on the type of request. Reported branches are generally removed within three days. Stump removal requires several steps and specialized equipment: the City does these in batches after a certain number are ready to be removed. As such, it can take several months before a stump is removed. After severe weather, the city's Forestry team will address these issues as quickly as possible, but service may be delayed if there is a large number of fallen branches.

2. Tree Removal

Any person requesting to remove street trees or City trees must obtain a permit from the Public Works Department.[14] The person, firm, or corporation receiving a tree removal permit shall abide by the specifications and standards of practice in this chapter. Before a permit is issued, each applicant shall first file evidence of possession of liability insurance in the minimum amounts for bodily injury and property damage that are prescribed by the City. Further, liability

[14] Kalamazoo Ordinance, 42.7

insurance shall indemnify the City or any person that is injured or damaged resulting from authorized tree removal activities.[14]

Figure 12. The city of Kalamazoo removed three dead trees from city hall in Sept. 2022. Source: Brad Devereaux, mlive.com.

3. Tree Pruning

Any tree, shrub, or other planting on private property that physically obstructs the public right-of-way, public street, sidewalk, street lights, traffic signs, or the vision of vehicular traffic shall be pruned by the City.[2] Property owners shall maintain trees, shrubs, hedges, and other vegetation to heights no more than 3 feet above the surface of the street within a distance of 25 feet from the street right-of-way line, or as otherwise determined by the City traffic engineer at an intersection corner. It is prohibited to have trees, shrubs, hedges, or other vegetation on private property that interferes with the clear view of traffic of drivers approaching an intersection.[2]

Failure to prune private trees, shrubs, hedges, or other plantings as required above may result in a written notice to comply from the Director of the Public Works Department. The written notice to comply shall be served by certified mail to the last known address of the property owner. The

property owner shall have 21 days from receipt of the notice to comply. Prosecutions for violations may result in issuance of an appearance ticket. The Director of Public Services or his/her designee is authorized to issue and serve such appearance tickets.[2]

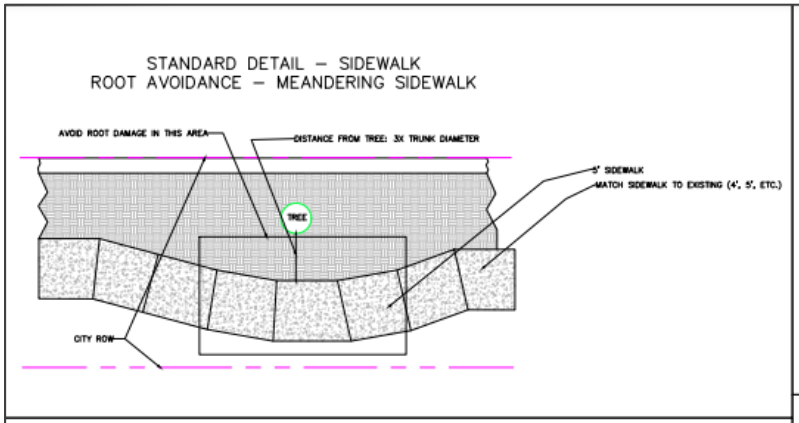
4. Utility Pruning

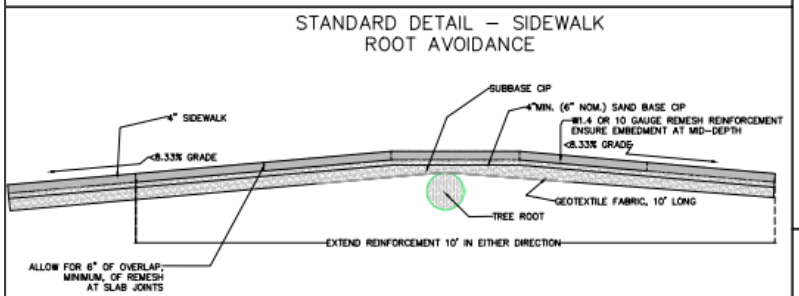
For non-emergency pruning of trees by a utility company, the utility shall provide written notice to the Director of Public Services at least 15 days in advance of the tree pruning. Written notice shall provide the exact location of the proposed pruning. Pruning shall be conducted in accordance with this chapter and the direction of the Director of Public Services.[2]

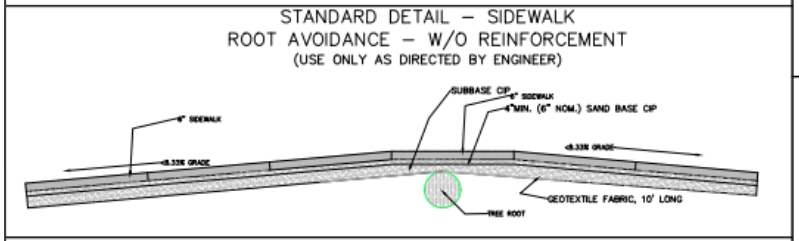
5. Root Pruning

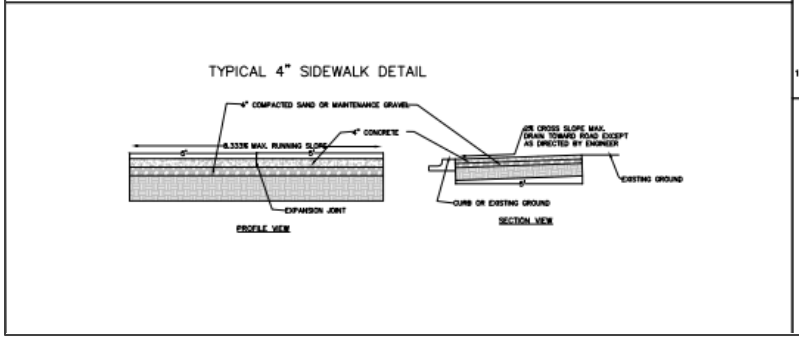
Avoid root pruning to ensure the well-being and long life of trees. Instead, consider the following alternatives whenever feasible:

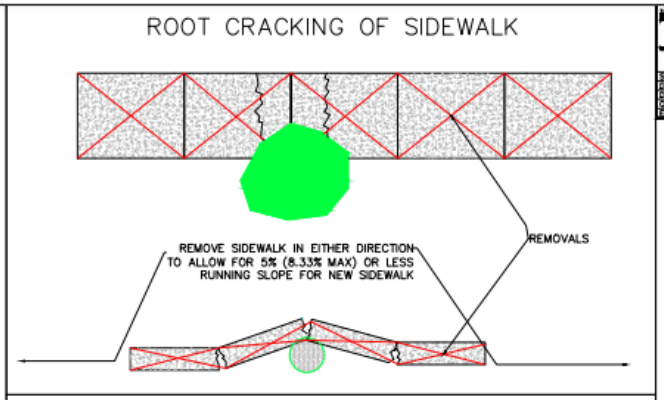
- Redirect sidewalks to bypass tree roots.
- Grind raised sidewalk edges to create an accessible path.
- Ramp or bridge sidewalks over tree roots, incorporating a layer of sand between the roots and the elevated section to prevent immediate lifting.
- Utilize flexible sidewalk materials, such as bricks or interlocking pavers, instead of concrete in areas where tree roots have caused sidewalk lifting.

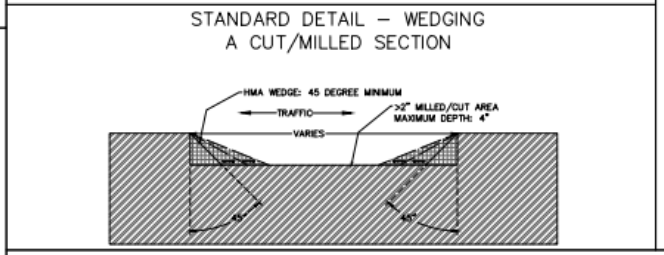

STANDARD DETAIL – SIDEWALK
ROOT AVOIDANCE – MEANDERING SIDEWALK
AVOID ROOT DAMAGE IN THIS AREA
DISTANCE FROM TREE: 3X TRUNK DIAMETER
5' SIDEWALK
MATCH SIDEWALK TO EXISTING (4', 5', ETC.)
TREE
CITY ROW


STANDARD DETAIL – SIDEWALK
ROOT AVOIDANCE
SUBBASE CIP
4" SIDEWALK
4" MIN. (6" NOM.) SAND BASE CIP
#3.4 OR 10 GAUGE REMESH REINFORCEMENT
ENSURE EMBEDMENT AT MID-DEPTH
<8.33% GRADE
<8.33% GRADE
GEOTEXTILE FABRIC, 10' LONG
TREE ROOT
EXTEND REINFORCEMENT 10' IN EITHER DIRECTION
ALLOW FOR 6" OF OVERLAP, MINIMUM, OF REMESH AT SLAB JOINTS

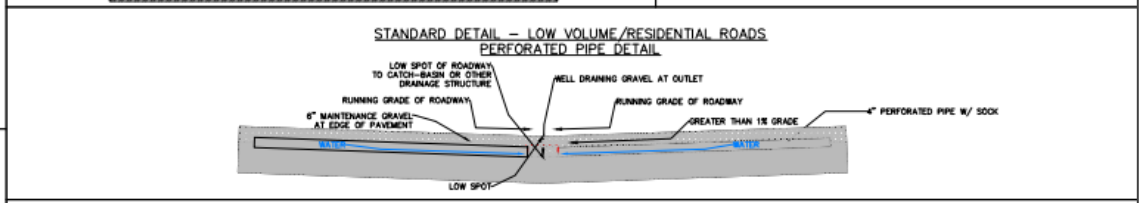

STANDARD DETAIL – SIDEWALK
ROOT AVOIDANCE – W/O REINFORCEMENT
(USE ONLY AS DIRECTED BY ENGINEER)
SUBBASE CIP
4" SIDEWALK
4" MIN. (6" NOM.) SAND BASE CIP
<8.33% GRADE
<8.33% GRADE
GEOTEXTILE FABRIC, 10' LONG
TREE ROOT

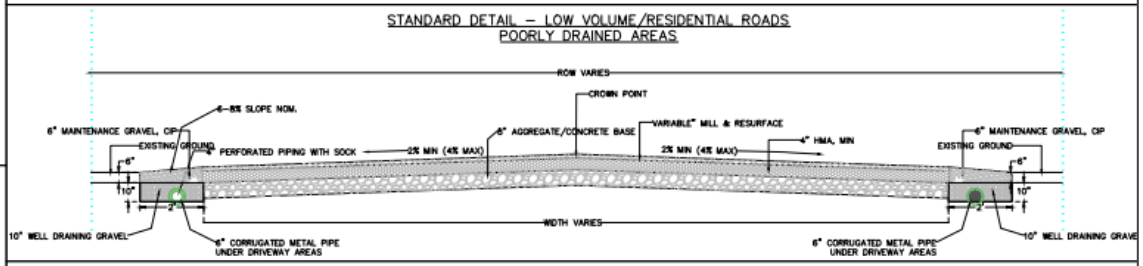

TYPICAL 4" SIDEWALK DETAIL
4" COMPACTED SAND OR MAINTENANCE GRAVEL
4" CONCRETE
<8.333% MAX. RUNNING SLOPE
5'
EXPANSION JOINT
PROFILE VIEW
<8% CROSS SLOPE MAX. DRAIN TOWARD ROAD EXCEPT AS DIRECTED BY ENGINEER
EXISTING GROUND
CURB OR EXISTING GROUND
SECTION VIEW

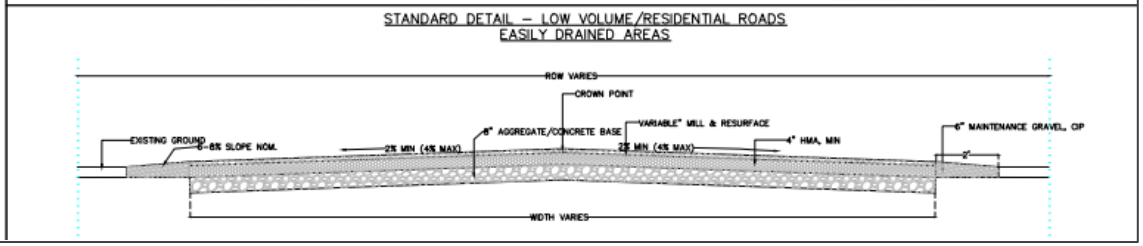

ROOT CRACKING OF SIDEWALK
REMOVALS
REMOVE SIDEWALK IN EITHER DIRECTION TO ALLOW FOR 5% (8.33% MAX) OR LESS RUNNING SLOPE FOR NEW SIDEWALK

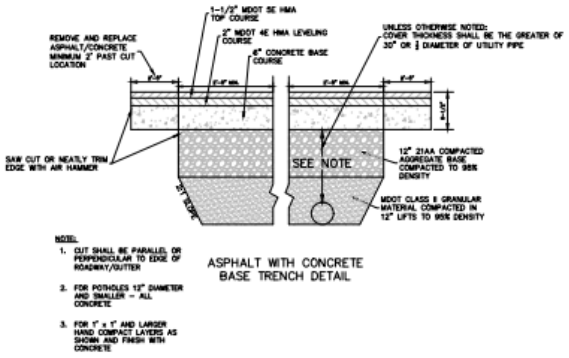

STANDARD DETAIL – WEDGING
A CUT/MILLED SECTION
HMA WEDGE: 45 DEGREE MINIMUM
TRAFFIC
>2" MILLED/CUT AREA MAXIMUM DEPTH: 4"
VARIES
45°
45°


DEPARTMENT OF PUBLIC SERVICES - Engineering
STANDARD DETAILS
CITY OF KALAMAZOO
SURVEYED N/A
DESIGNED DHW
DRAWN DHW
CK/DC AL
SCALE
VERTICAL NOT TO SCALE
HORIZONTAL NOT TO SCALE
DATE 11/27/2020
REVISIONS
1. 12/16/20 – Agg base depth & option of 2C base
1. 12/17/21 – General updates plus MDOT HMA upda
GENERAL NOTES:
– MDOT STANDARD PLANS R-28-J, R-29-I, R-30-G, AND R-44-F SHALL BE FOLLOWED IN CONJUNTION WITH THESE STANDARD PLANS
– ALL SAW CUTTING SHALL BE DONE PERPENDICULAR AND PARALLEL TO THE DIRECTION OF TRAVEL
– SAW CUTTING SHALL PROVIDE A STRAIGHT, CLEAN, EDGE TO ENHANCE BONDING
– ALL CUTS SHALL BE RECTANGULAR AND NEATLY CUT TO AVOID SPALLING OF PAVEMENT
– IN GENERAL ALL ROAD/UTILITY CUTS OF AN AREA GREATER THAN 25SFT (5FTX5FT TYPICAL) SHALL EXTEND THE FULL WIDTH OF THE TRAVEL LANE
– FOR PAVEMENT WITH LOAD TRANSFER DOWEL RODS OR REINFORCEMENT: NEW LOAD TRANSFER DOWELS/REINFORCEMENT SHALL BE PLACED TO MAINTAIN BEARING CAPACITY OF ROADWAY
– CUTS LESS THAN 12" SHALL BE PATCHED WITH PCC. IF GREATER THAN 12", ENSURE CUT IS IN ACCORDANCE WITH STANDARD DETAILS AND MATCHING EXISTING ROADWAY
– BUMPS/CUTS/MILLED AREAS WITH EDGE GREATER THAN 2" DEEP/HIGH MUST BE WEDGED WITH HMA BEFORE OPEN TO TRAFFIC. SEE STANDARD DETAIL.
– MEANDERING SIDEWALK SHALL ONLY BE PLACED IN THE CITY'S ROW OR WHERE AN EASEMENT IS ESTABLISHED
– NEW SIDEWALK CONSTRUCTION SHALL MEET OR EXCEED CURRENT ADA AND ACCESSIBILITY STANDARDS
– REPLACED SIDEWALK SHALL, TO THE EXTENT PRACTICABLE, MEET OR EXCEED ADA AND ACCESSIBILITY STANDARDS
– SIDEWALK, DRIVEWAY OPENINGS & APPROACHES SHALL CONFORM TO MDOT STANDARD PLAN DETAILS R-28-J AND R-29-I
– MARSHALL MIX 13A (BASE/LEVELING) MAY BE SUBSTITUTED FOR SUPERPAVE HMA BASE MIX DESIGNS WITH CITY OF KALAMAZOO APPROVAL IF DEEMED APPROPRIATE BY THE ENGINEER
– ASPHALT BINDER SHALL BE INCLUDED IN THE PAY ITEM FOR HMA
– MDOT PCC P1 MIX DESIGN SHALL BE USED FOR ALL CONCRETE UNLESS OTHERWISE STATED OR DIRECTED BY THE ENGINEER
– OPENING TO TRAFFIC STRENGTHS (2012 STANDARD SPECIFICATIONS FOR CONSTRUCTION, TABLE 603-1):
-- <72 HOURS, GRADE P-NC, 300 psi
-- 72 HOURS +, GRADE P1, P1M, 550 psi

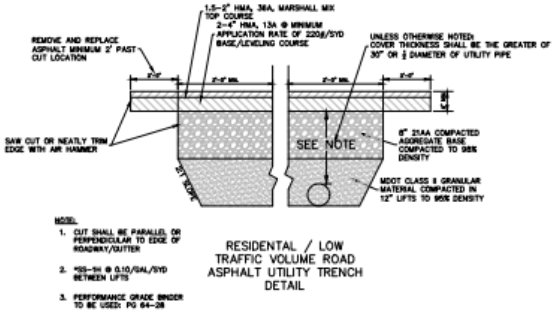

STANDARD DETAIL – LOW VOLUME/RESIDENTIAL ROADS
PERFORATED PIPE DETAIL
LOW SPOT OF ROADWAY TO CATCH-BASIN OR OTHER DRAINAGE STRUCTURE
WELL DRAINING GRAVEL AT OUTLET
RUNNING GRADE OF ROADWAY
RUNNING GRADE OF ROADWAY
6" MAINTENANCE GRAVEL AT EDGE OF PAVEMENT
GREATER THAN 1% GRADE
4" PERFORATED PIPE W/ SOCK
WATER
WATER
LOW SPOT


STANDARD DETAIL – LOW VOLUME/RESIDENTIAL ROADS
POORLY DRAINED AREAS
ROW VARIES
CROWN POINT
6" MAINTENANCE GRAVEL, CIP
6-8% SLOPE NOM.
EXISTING GROUND
PERFORATED PIPING WITH SOCK
2% MIN (4% MAX)
6" AGGREGATE/CONCRETE BASE
VARIABLE" MILL & RESURFACE
2% MIN (4% MAX)
4" HMA, MIN
6" MAINTENANCE GRAVEL, CIP
EXISTING GROUND
6"
10"
2
2
10"
WIDTH VARIES
10" WELL DRAINING GRAVEL
6" CORRUGATED METAL PIPE UNDER DRIVEWAY AREAS
6" CORRUGATED METAL PIPE UNDER DRIVEWAY AREAS
10" WELL DRAINING GRAVE

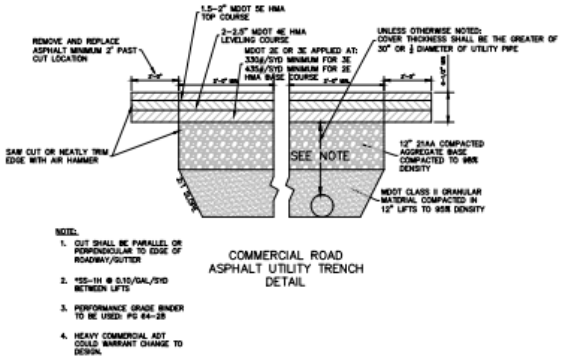

STANDARD DETAIL – LOW VOLUME/RESIDENTIAL ROADS
EASILY DRAINED AREAS
ROW VARIES
CROWN POINT
EXISTING GROUND
6-8% SLOPE NOM.
2% MIN (4% MAX)
6" AGGREGATE/CONCRETE BASE
VARIABLE" MILL & RESURFACE
2% MIN (4% MAX)
4" HMA, MIN
6" MAINTENANCE GRAVEL, CIP
2"
WIDTH VARIES



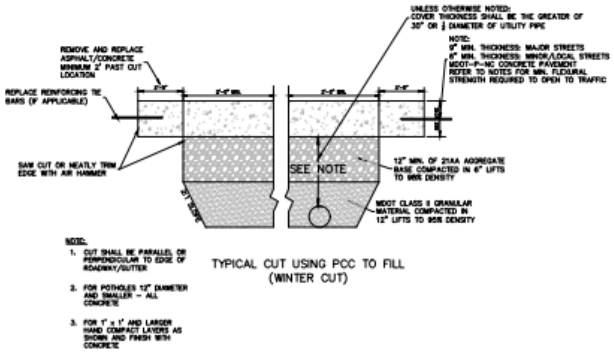
ASPHALT WITH CONCRETE BASE TRENCH DETAIL



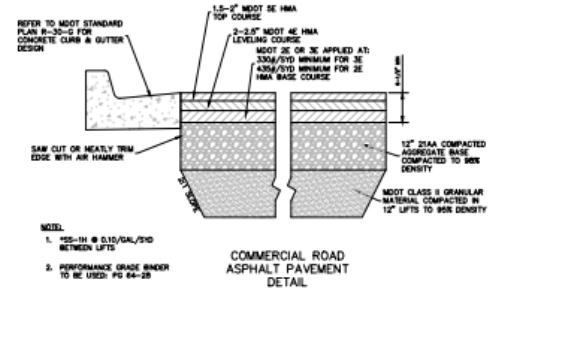
RESIDENTAL / LOW TRAFFIC VOLUME ROAD ASPHALT UTILITY TRENCH DETAIL



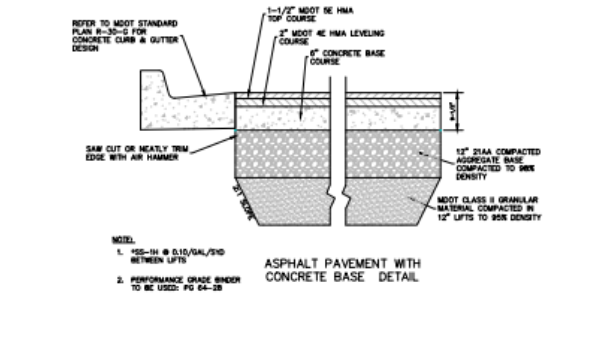
COMMERCIAL ROAD ASPHALT UTILITY TRENCH DETAIL



TYPICAL CUT USING PCC TO FILL (WINTER CUT)



COMMERCIAL ROAD ASPHALT PAVEMENT DETAIL



ASPHALT PAVEMENT WITH CONCRETE BASE DETAIL

DEPARTMENT OF PUBLIC SERVICES - Engineering

STANDARD DETAILS

CITY OF KALAMAZOO

		SCALE	REVISIONS
SURVEYED	N/A		
DESIGNED	GHW		
DRAWN	GHW	VERTICAL NOT TO SCALE	1. 12.18.20 – Agg base depth & option of 2C base
QA/QC	AL	HORIZONTAL NOT TO SCALE	2. 12.17.21 – General updates plus MDOT HMA update
ENG PROJ # XXX-XX		DATE 11/23/2020	

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- BUMPS/CUTS/MILLED AREAS WITH EDGE GREATER THAN 2" DEEP/HIGH MUST BE WEDGED WITH HMA BEFORE OPEN TO TRAFFIC. SEE STANDARD DETAIL.
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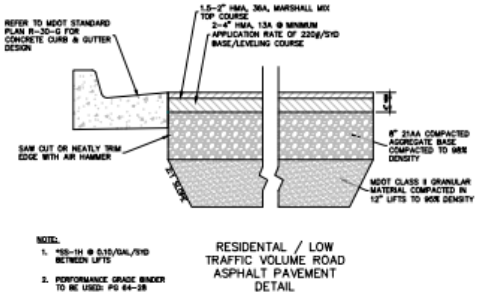


RESIDENTAL / LOW TRAFFIC VOLUME ROAD ASPHALT PAVEMENT DETAIL

6. Permit

A Right-of-Way Permit is required for tree planting, pruning, removal, or other activities of a tree in the ROW. Residents may submit a permit application through the Business & Development webpage of the City's website. An application for a Right-of-Way Permit must be submitted a minimum of 10 business days before approval is needed. You may need to include plans or specifications and a traffic control plan, if applicable.

THE CITY OF Kalamazoo
Department of Public Services
Stockbridge Facility
Public Works
415 Stockbridge Avenue
Kalamazoo, MI 49001
(269) 337-8601 FAX: (269) 337-8533

PUBLIC RIGHT-OF-WAY

APPLICATION

To construct, operate, maintain, use and/or remove within the City right-of-way and/or City Controlled Easement

For City Use Only
Code_____
Email ☐ Invoice ☐
Permit Fee $_____
Type _____

Permit Application can take up to 10 days to approve. Please plan accordingly.

If applicant hires a contractor to perform work, BOTH shall assume responsibility for the provisions of this Application and Permit. All permit requests must be accompanied by a drawing showing the work to be performed, including dimensions.

APPLICANT—Please Print Clearly		
Name (Company Name)		
Address		
City	State	Zip
Primary Phone	Secondary Phone	Email

CONTRACTOR—Please Print Clearly		
Name (Company Name)		
Address		
City	State	Zip
Primary Phone	Secondary Phone	Email

WORK TO BE PERFORMED (Check all that apply)

☐ Residential Driveway
☐ Commercial Driveway

Are there any City Trees that will be removed?
☐ No
☐ Yes (City Tree Committee approval required prior to issuance of the permit. If unsure, contact Public Works Dept. at 337-8601)

☐ Curb & Gutter

☐ Temporary Encroachment
☐ Dumpster
☐ Storage Container (PODS)
☐ Other _____

☐ Sidewalk
☐ Utility Permit
☐ Sanitary Sewer Conn.
☐ Storm Water Conn.
☐ Other _____

I make application for a permit for the purpose indicated as detailed below and/or as provided in the attached plans and specifications at the following location:

Construction Address	Date work to begin	Date work to be completed
Purpose (Description of work to be performed/completed):		Attached Plans and Specifications ☐ Yes ☐ No
		Bond Current ☐ Yes ☐ No

I understand and accept the following conditions:

1. **Commencement of the work set forth in the permit application constitutes acceptance of the permit as issued.**
2. **The undersigned agrees to perform the above designed work under his/her license and in accordance with the provisions of the ordinances of the City of Kalamazoo, and the rules and specifications of the Department of Public Services for such work.**
3. **The undersigned agrees to follow and observe the Key Requirements and Conditions set forth on the back of this Application and Permit**

APPLICANT/AUTHORIZED AGENT SIGNATURE — If Authorized Agent, I certify that I am acting as Authorized Agent of behalf of named Applicant.		
Signature	Printed Name &Title	Date

FOR CITY OF KALAMAZOO OFFICE USE ONLY

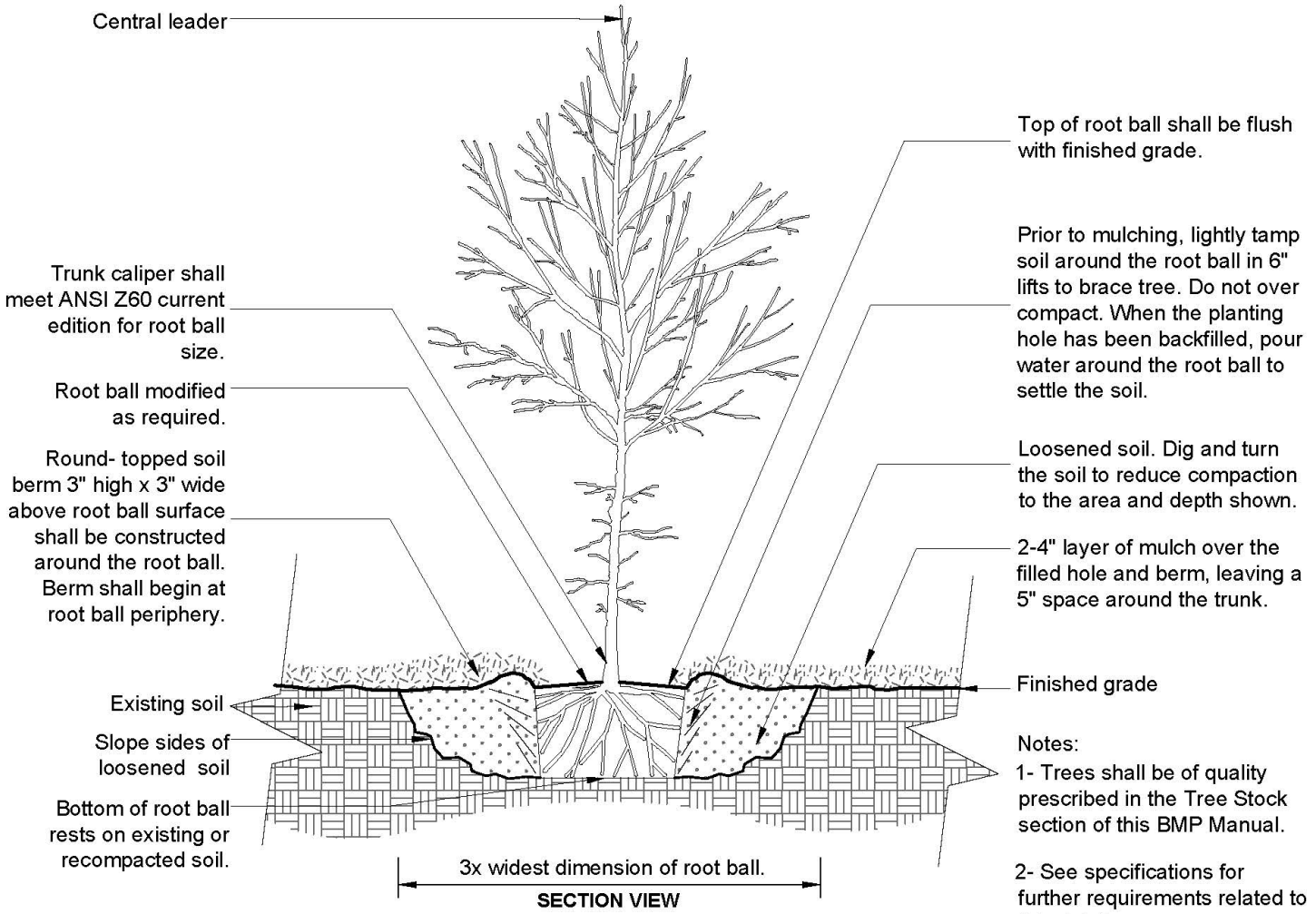
Sign Off / Review:

Traffic	Water	Sanitary/Storm
Additional City of Kalamazoo Requirements:		

APPLICATION AND PERMIT – KEY REQUIREMENTS AND CONDITIONS

1. **On Site Permit Possession:** Contractor must have a copy of the approved permit at the work location and available for inspections by any representative of the City of Kalamazoo (CoK). Failure to have a valid permit on site may constitute immediate work suspension in the Right of Way (ROW).
2. **Specification:** All work performed under this permit must be done in accordance with the plans, specifications, maps, and statements filed with and approved by the CoK and must comply with the CoK's current requirements and specifications.
3. **Fees and Costs:** The permittee shall be responsible for all fees incurred by the CoK in connection with this permit and shall pay estimated fees and costs as determined by the CoK at the time the permit is issued.
4. **Bond:** The permittee shall provide a bond, as is required, in a form and amount acceptable to the CoK at the time permit is issued.
5. **Indemnification:** The permittee shall hold harmless and indemnify and keep indemnified the CoK, its officers, board members, agents, and employees from all claims, suits and judgments to which the CoK, its officers, board members, or employees may be subject and for all costs and actual attorney fees which may be incurred on account of injury to persons or damage to property, including property of the CoK, whether due to the negligence of the permittee or the joint negligence of the permittee and the CoK, arising out of the work under this permit, or in connection with work not authorized by this permit, or resulting from failure to comply with the terms of this permit, or arising out of the continued existence of the work product which is the subject of this permit.
6. **Miss Dig:** The permittee must comply with the requirements of PA 53 of 1974, as amended. CALL MISS DIG AT 811 OR (800-482-7171) AT LEAST THREE (3) FULL WORKING DAYS, BUT NOT MORE THAN TWENTY-ONE (21) CALENDARS DAYS BEFORE YOU START WORK. The permittee assumes all responsibility for damage to or interruption of underground utilities.
7. **Notification of Start and Completion of Work:** The permittee must notify the CoK at least 72 hours before starting work and must notify the CoK when work is completed by calling 269-337-8601.
8. **Restriction of Construction During Winter season:** Without authorization from City Engineer, new construction activities shall not begin before March 1 nor after November 1. However, emergency repair of existing utilities will be permitted.
9. **Safety:** The permittee agrees to work under this permit in a safe manner and to keep the area affected by this permit in a safe condition until the work is completed. All work site conditions shall comply with Michigan Manual of Uniform Traffic Control Devices.
10. **Restoration and Repair of Road:** The permittee agrees to restore the road and right-of-way to a condition equal to or better than its condition before the work began; and to repair any damage to the road or right-of-way, which is the result of the facility whenever it occurs or appears.
11. **Soil Erosion and Sedimentation:** The permittee shall comply with the requirements of the Natural Resources and Environmental Protection Act, Part 91 or PA 451 of 1994, as amended, and implement all applicable measures controlling soil erosion and sedimentation.
12. **Limitation of Permit:** This permit does not relieve the permittee from meeting other applicable laws and regulations of other agencies. The permittee is responsible for obtaining additional permits or releases, which may be required in connection with this work from other governmental agencies, public utilities, private entities and individuals, including property owners. Permission may be required from the adjoining property owners.
13. **Revocation or Violation of Permit:** This permit may be suspended, revoked at will, and/or immediately become null and void if the permittee violates the terms of this permit. The permittee shall surrender the permit and CoK may require alteration, relocation and/or removal all facilities for which permit was granted, all at the permittee's expense.
14. **Assignability:** This permit may not be assigned without the prior approval of the CoK. If approval is granted, the assignor shall remain liable and the assignee shall be bound all the terms of this permit.

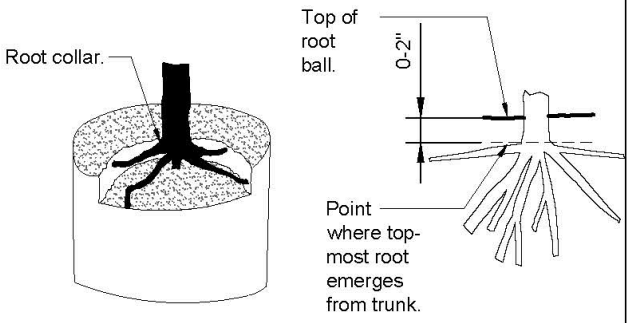
APPENDIX A: CITY OF KALMAZOO TREE PLANTING SPECIFICATIONS



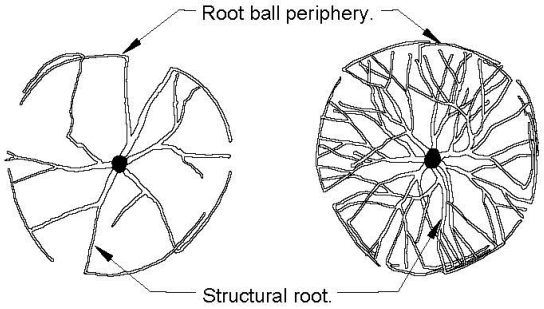
APPENDIX B: CITY OF KALAMAZOO NURSERY STOCK SPECIFICATIONS

Container grown trees:

ACCEPTABLE

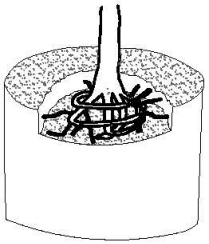


The point where top-most root(s) emerges from the trunk (root collar) should be within the top 2" of substrate. The root collar and the root ball interior should be free of defects including circling, kinked, ascending, and stem girdling roots. Structural roots shall reach the periphery near the top of the root ball.

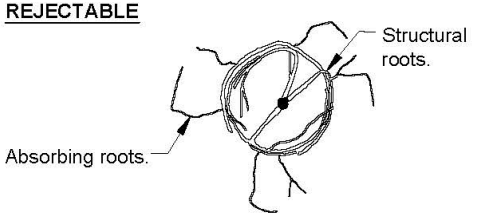


Roots radiate from trunk and reach side of root ball without deflecting down or around.

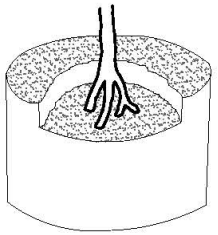
REJECTABLE



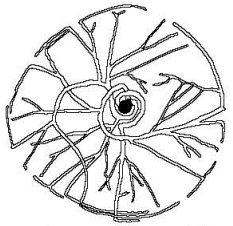
Structural roots circle interior of root ball. No structural roots are horizontal and reach the root ball periphery near the top of the root ball.



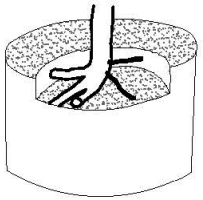
Only absorbing roots reach the periphery near the top of the root ball. Structural roots mostly wrap or are deflected on the root ball interior.



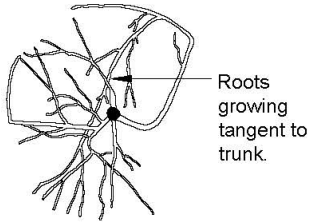
Structural roots descend into root ball interior. No structural roots are horizontal and reach the root ball periphery near the top of the root ball.



Structural roots circle and do not radiate from the trunk.



Structural roots primarily grow to one side.



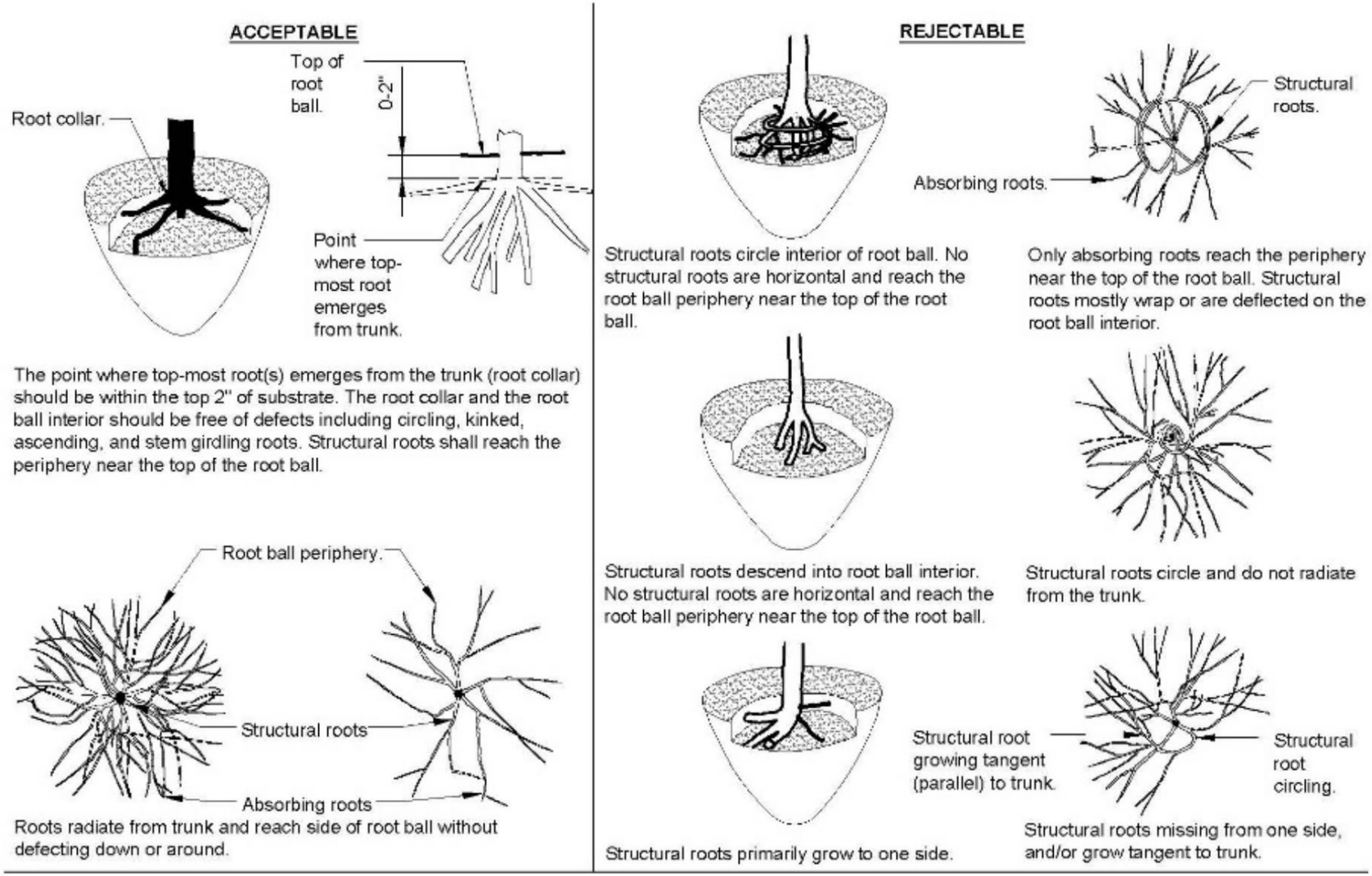
Structural roots missing from one side, and/or grow tangent to trunk.

Notes:

1- Observations of roots shall occur prior to acceptance. Roots and substrate may be removed during the observation process; substrate/soil shall be replaced after observation has been completed.

2- Small roots (¼" or less) that grow around, up, or down the root ball periphery are considered a normal condition in container production and are acceptable however they should be eliminated at the time of planting. Roots on the periperhy can be removed at the time of planting.

Balled and burlapped grown trees:



Notes:
1- Observations of roots shall occur prior to acceptance. Roots and soil may be removed during the observation process; substrate/soil shall be replaced after the observations have been completed.

APPENDIX C: CITY OF KALAMAZOO TREE PROTECTION SPECIFICATIONS