



Region of Waterloo



# REGION OF WATERLOO STREETScape PLANTING GUIDELINES

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# **1. STREETScape PLANTING GUIDELINES OVERVIEW**



## 1.1 Introduction

Trees are a critical and integral part of any landscape. Research continues to highlight that trees and their combined canopy cover provide multiple environmental, public health, social and economic benefits. No matter the location, whether in rural areas, towns or cities, trees moderate our climate through cooling in summer and mitigation against the cold in winter. They provide oxygen, filter the air of pollutants and capture and store carbon, in turn mitigating the effects of climate change. Hence the need to protect the trees we have and provide the best opportunities to add new trees to our urban forest.

As the Region of Waterloo continues to grow and expand, increased infrastructure and development impacts the available space for proper tree placement, planting and long term survival, and places increased stress on the existing inventory.

To ensure for a better future for our trees and landscapes, the Region of Waterloo has developed this guidelines document.

## 1.2 Purpose

The purpose of the Region of Waterloo Streetscape Planting Guidelines document is to provide a successful standard of practice for the design, implementation and care of trees, plantings and vegetated covers throughout Waterloo Region, focusing on streetscape and regional corridors. This covers a wide range of conditions across urban and rural environments. Multiple goals shall be achieved, including:

Environmental:

- Improve the overall Regional forest canopy.
- Produce oxygen and remove pollutants and particulate matter from the air.
- Combat climate change through capturing carbon for long-term storage (a process known as sequestration).
- Aid in the cooling of our environment during the heat of summer, offsetting urban heat island effects and protect against the cold in the winter. This translates into environmental benefits as well as energy and economic savings.
- Reduce stormwater runoff and improve water quality.

- Increase local biological diversity by providing habitat for native wildlife species.

#### Social, Mental Health and Well-Being:

- Increase the aesthetics of our natural and urban environments, with positive impacts to the population’s mental health and well-being.
- Contribute to desirable environments for people to live, work and play.
- Create vegetation buffers between moving vehicles and pedestrians, resulting in increased traffic safety through perception of road widths and speed relative to tree layout and spacing.

#### Economic

- Lower utility costs and increased energy savings.
- Enhance the landscape of the Region to attract tourism and increase real estate values.
- Reduce healthcare costs associated with poor air quality.
- Reduce costs associated with stormwater treatment and flooding control requirements.
- Extend the life of pavement surfaces by protecting against harmful UV radiation.
- Ensure that these landscaped areas can be realistically maintained by Regional Staff.

A 2021 Ecosystem Services Quantification Report completed by York Region Green Infrastructure<sup>1</sup>, found that properly planted, maintained and established tree and shrub plantings on their Regional roadways improved air quality by absorbing gaseous pollutants and/or particulates into leaf and bark surfaces. These trees and shrubs removed nearly 7.4 tonnes of pollutants from the air, produced over 675 tonnes of oxygen and sequestered over 250 tonnes of carbon, all within one year. As street trees and plantings continue to grow and mature, York Region anticipates that the benefits listed above will only continue to increase in the future. These positive outcomes are transferable to the Region of Waterloo.

<sup>1</sup>York Region. *York Region Street Tree and Horticultural Design Guidelines*. York Region, 2022, [www.york.ca/media/99451/download](http://www.york.ca/media/99451/download).

While street trees represent a small portion of the total tree canopy found across Waterloo Region, they are critical to the overall quality of our environment. By increasing the number of trees within our road corridors and ensuring that they are properly implemented for long-term success, the resulting benefits for the greater urban forest canopy, the Region’s climate resilience, and the enhanced livability of the entire area will be greatly enhanced.

### 1.3 How to Use the Guidelines

These guidelines contain the critical information necessary for Region Staff, consultants (such as landscape architects and engineers), contractors, and developers to use when implementing tree planting and other landscape works throughout the Region. These include approved tree and plant species lists, seed mixes, required soil volumes and mixtures, proper layout and setbacks, construction details, and performance specifications.

The guidelines are broken down into the following sections:

- Section 1: Streetscape Planting Guidelines Overview (Current Section)
- Section 2: Planting Information and Requirements
- Section 3: Standard Planting Details
- Section 4: Seeding Information
- Section 5: Maintenance Information and Requirements

### 1.4 The Challenges in Planting Trees

When considering the issues and challenges associated with planting trees, they are connected to the unique environments of urban centres. The key challenges when planning for and planting trees in urban environments are highlighted below:

- Limited Room to Grow:

Trees must be offered as much room to grow as possible in order to maximize their growth potential, overall longevity and health. However, in the urban environment space can be limited within boulevards and centre medians by:

- Utility conflicts (both above and below ground), such as gas, storm, sewer, water and hydro servicing lines.
- Infrastructure such as sidewalks, multi-use pathways, multi-lane roadways to accommodate pedestrian and vehicular traffic.

These factors restrict the available space for root growth and crown development, which are key for initial establishment and long-term vitality of the tree.

- **Inadequate Soil Conditions and Volumes:**

The condition and quality of soils are fundamentally linked to a tree’s ability to successfully grow and survive. Standard development practices strip sites of native topsoil and create significant levels of compaction that result in areas that are inhospitable for tree establishment and growth.

- **Inappropriate Tree Species Selection:**

A significant contributor to tree stress and failure is improper species selection, particularly in the urban environment. The streetscape planting environment exposes all trees to unique and ongoing stresses, so it is imperative that species selection is appropriate to each site’s specific conditions. Several factors must be considered when designing and selecting tree species for a streetscape, including:

- Resilience against harsh urban conditions such as drought, salt spray, snow loading and air pollution.
- Adaptation to the changing climate.

- Appropriate use of native, hybrid and non-native species, while avoiding invasive species.
- Ability to resist disease and insect impacts.
- Well-rounded diversity of both species and quantities used.

- **Poor Site Conditions:**

There are many potential challenges that trees and other plantings can experience in the streetscape environment, both physical and environmental. These include:

- Increased drought conditions
- Salt pollution
- Air pollution
- Wind tunnelling
- Reflected heat from paved surfaces (asphalt, concrete, etc.)
- Reflected light and shade from surrounding structures
- Damage caused by maintenance practices (snow plows, lawn equipment)
- Vandalism

All impact tree health, increasing susceptibility to secondary stresses such as insect infestation and disease damage.



## **2. PLANTING INFORMATION AND REQUIREMENTS**

When developing planting designs for streetscapes and selecting species, it is important to understand and be aware of the physiological growing habits of a tree. For example, tree roots are typically found in the upper metre of soil and extend well beyond the crown of the tree.

The primary threats to trees and other landscape works within the urban environment include: site characteristics, climate and environmental conditions, infrastructure conflicts and management/maintenance practices. This section provides guidance on planting requirements that must be considered and followed. These will ensure the successful implementation of trees and other landscape works on all Region of Waterloo projects.

## 2.1 Site Context and Conditions

When selecting potential tree planting locations, multiple factors must be considered, including: microclimate, soil characteristics, available planting space, existing vegetation, visibility and accessibility, aesthetics, ownership and regulations, and maintenance requirements. The Region of Waterloo, landscape architects and engineers shall work together to determine the overall design intent for any project, to best incorporate trees prior to selecting species for best overall outcome. In cases where this is not possible, landscape architects are brought in after the completion of a roadway or project and tasked with incorporating trees. Even in these situations, success can be achieved if carried out thoughtfully, carefully and properly.

Overall, having a comprehensive understanding of site context and conditions allows for successful planting designs. This reduces conflicts, maintenance needs, and long-term costs while enhancing public safety.

Below are key items that must be considered when choosing appropriate planting locations:

- Adequate soil volume and quality
- Pedestrian and driver safety related to visibility and accessibility
- Conflicts between trees and infrastructure such as underground services, overhead utilities, walkways, roadways, lighting, etc.
- Exposure to emissions, polluted runoff, wind and drought

- Impacts and exposure from salt spray, ice damage and trunk scour as well as allowing for snow removal and storage
- Potential damage from maintenance vehicles (lawn equipment and snowplows), vandalism and other conflicts
- Compaction of planting area soils by construction and foot traffic

## 2.2 Soil Requirements

### Soil Quality and Composition

Soil Quality is a measure of the soil's ability to grow plants. Three basic soil properties combine to form soil: physical composition, biological activity and plant associated chemical components.

An ideal medium for tree growth can be modelled after forest soils, which are comprised of 45% mineral materials (sand, silt and clay), 50% open pore space and 5% organic matter and microorganisms.

Typically, roots grow where the soil conditions are favourable. Absorbing roots are generally found within the upper 15-25cm of soil; the most intensive zone of biological activity influenced by available oxygen and other gases, moisture and organic matter. The remainder of the root zone typically extends no deeper than 1-1.5m.

When discussing soil options, it must be noted that "Structural" or "Engineered" soils are products that are recommended and utilized as an alternative to regular planting soils, particularly in urban conditions. The intent of these soils is to provide structural support for pavement systems (such as sidewalks and roads), while allowing tree roots to grow within soil filled void spaces. However, through years of study and observation, opinions have changed against utilizing these products. Studies reveal that structural soils contain fewer minerals and nutrients necessary for tree growth, with only 20% of the available soil is actually useable for the tree. Trees planted in these soils will often experience weak root systems and restricted growth, resulting in a poor-quality tree overall. It is for these reasons, that the Region of Waterloo advises against the use of structural/engineered soils for trees and plantings

### Soil Testing Requirements:

- Existing Soils:
  - At a minimum, on-site visual test pits are to be conducted to assess existing soil composition, depth and presence of standing water, granular or other non-soil materials.
  - Depending on the assessment of the visual test pits, the Region's Project Manager and Landscape Architectural Consultant can determine if further laboratory testing is required.
  - Through laboratory testing, results will determine what is suitable for use, what requires amendment, and/or if full excavation and replacement with proper planting soils is required.
  - The number of visual test pits and laboratory tests to examine the existing soils for each site is to be determined between the Region's Project Manager and Landscape Architectural Consultant at the beginning of the project.
  - Soil tests must be completed by a laboratory accredited by the Ontario Ministry of Agriculture and Food.
  - Testing shall evaluate at a minimum: pH, BpH, Total Salts, % Organic Matter, Phosphorus, Potassium, Magnesium, Calcium, Sodium, Chloride, SAR, CEC, and Texture (%Sand, %Silt, %Clay).
  - *Note: The quality and integrity of the subsoil is just as important as the organic layer of topsoil.*
- Imported Soils:
  - Imported soils (topsoil and growing medium) must be tested prior to being supplied and installed on site. Similar to existing soils, an accredited laboratory by the Ontario Ministry of Agriculture and Food must be used to complete these tests. Testing fees are to be covered by the Contractor.

- The Contractor shall guarantee that the soil submitted for the laboratory testing is a representative sample taken from the material that will be delivered to the site.
- The Contractor must submit an electronic copy of the soil analysis and recommendations for review. Failure to do so may be considered grounds for rejection of a proposed growing medium and removal of such material at the Contractor's expense.

### Soil Composition Requirements:

- Following the results of the soil tests, soil amendments will be recommended by the laboratory.
- The following basic requirements for soil composition must be followed:
  - 50-60% sand, 20-40% silt, 6-10% clay with adequate pore space for air and water holding capacity
  - 2-5% organic content
  - pH between 6.5-7.0
  - IF REQUIRED:
    - Bulk density (measure of compaction) not to exceed 1.3grams/cubic centimetre
    - Saturated Hydraulic Conductivity (measure of permeability). Target infiltration rates for trees and shrubs should be 13mm - 51mm per hour.
- Changing the chemical composition of soils is difficult and therefore, plant selection should match existing soil fertility and pH where and when possible.

## Soil Volumes

Trees will not grow larger than the volume of soil provided<sup>2</sup>. Soil volume is another important aspect of tree growth and health. Adequate quantities must be provided for each tree, depending on species and ultimate mature size. This has been identified through numerous studies conducted on tree root development and tree size/age projections. For example, a tree with 30m<sup>3</sup> of planting soil will grow to the size of 40cm in diameter at breast height (DBH) or 40 years in age.

### Soil Volume Requirements:

- The minimum required soil volume for trees are as follows:
  - 30m<sup>3</sup> for a single tree.
  - 20m<sup>3</sup> for two or more trees with direct access to an additional 10m<sup>3</sup> of shared soil volume.
- This is based on a minimum tree pit or soil trench depth of 900mm. Depending on available space, the depth may need to be increased to meet the proper soil volumes, but should not exceed a depth of 1200mm.
- In special project-by-project instances, reduced soil volumes may be considered for small form trees due to restrictive site factors following thorough reviews by the Region's representative.



## 2.3 Approved Tree Species for use within the Region of Waterloo

When selecting trees for regional projects, it is critical to choose the appropriate species that will best suit the location, environment and design for which they will be planted. Specific site conditions for each project must be analyzed and understood prior to species selection.

The following considerations must be incorporated when determining trees for each Waterloo Region project:

- Assess the site's microclimate and existing soil conditions.
- Examine the potential for conflicts with items such as underground utilities, overhead power lines, visibility sightlines, signage and sidewalks to reduce future maintenance costs. These items must also be considered and coordinated when assessing potential future conflicts.
- Prioritize large stature canopy trees where space and conditions allows to maximize long term benefits.
- Select a diversity of species to mitigate the potential for extensive zones of mortality (through disease, insect infestation), and to increase environmental services.
- Utilize native species that have adapted to the local environment.
- Utilize low maintenance species that are more adaptable to local climate and site conditions. This increases survivability rates and lowers the Region's maintenance requirements and budgets needed to look after the trees and landscape works.
- Implement drought resistant species that will reduce overall water consumption requirements and that respond to changing climates and periods of drought that are becoming more frequent.
- Siting trees within polluted or densely populated areas will utilize their air quality benefits.

<sup>2</sup>Urban, James. *Up by Roots, Healthy Soil and Trees in the Built Environment*. International Society of Arboriculture, 2008.

- Strategically using evergreen species of trees can offer microclimate and particulate matter reduction benefits year-round.
- Locate trees to encourage and/or re-establish ecological connectivity and habitat.

Refer to **Appendix A** for the approved tree species list for use within the Region of Waterloo. Additional information related to typical location types and scenarios have been included to aid the user of this document when selecting trees for their specific project.

## 2.4 Native vs Non-Native Tree Species: When and Where to use them Properly and Effectively

When planning for tree locations, it is crucial to consider native versus non-native species as well as understanding when and where to use them properly and effectively. Both types of trees can have significant ecological and environmental impacts on the landscapes in which they are implemented if not properly understood and designed.

Native tree species are those that have existed historically in a specific region. They have adapted over time to the specific climate, soils and biological interconnections of the place. Their ability to support local ecosystems is very important for both wildlife and humans.

As a priority, native species should be selected for all projects. It is recognized that some of our native species require specific soil and site conditions that often are not available in streetscape or boulevard contexts.

Non-native tree species on the other hand, are those that have been introduced from other regions or continents. Invasive non-native species are known to outcompete native species, displacing or at minimum disrupting ecological systems. However, there are certain non-native species that can be utilized, that do not cause harm to the overall ecosystem. They can offer unique aesthetic qualities, faster growth rates and/or resistance/tolerance to specific insects, diseases and/or pollution, making them favourable in urban areas. From an ecosystem service perspective (i.e. providing food sources and habitat for our native pollinators), many of our native plant varieties and cultivars function the same as non-natives. Studies have shown that native bird and pollinator species can't recognize those flowers.

Striking a balance between preserving native biodiversity and harnessing the positive benefits of non-native species requires careful consideration prior to their implementation. For these reasons, it is critical that they be considered in conjunction with the Approved Tree Species List identified in the previous section when planning tree placements and layouts.

## 2.5 Species Diversity

Diversity is critical to maintaining the long-term health of the urban forest and maximize its environmental benefits, which have already been outlined previously. Being proactive with the implementation of new trees as well as the management of existing tree species and age composition within the Region of Waterloo will allow for a more resilient urban forest.

### Species Diversity Requirements:

- There should be no more than 25% of any one genus per project area.
- When it comes to specific sites, particularly for street trees, no more than five (5) of any one species should be planted in a row.
- Street tree species are to be selected from the Region's Approved Tree Species list, which is found in **Appendix A**.

## Oak Wilt

Oak Wilt is an invasive fungal pathogen that impacts the tree's ability to supply water and nutrients to the canopy. This disease impacts all Oak species, but it is most susceptible to red/black oak group. White oaks and burr oaks are more capable of fighting off the infection. Oak Wilt can kill a healthy oak within two to six weeks. Oak Wilt spreads through transfer from other oaks by three (3) types of beetles. Beetles are attracted to the sap from a wound or from pruning on oak trees, which is how the fungus is introduced into the tree. Human activity further spreads the disease by moving logs, moving firewood, buying firewood from one location and burning it elsewhere, etc. Once a tree is infected, it can transfer to other trees through root grafting.

Due to the risk of Oak Wilt, it is recommended that Oaks be planted with caution and within specific guidelines.

Oak tree planting is still encouraged but limited to the right locations. It is recommended, to prevent the spread of this disease, that Oaks be planted singularly or up to 1.5-2.0 km apart. Do not plant them in groups or monocultures where the roots/branches can potentially touch once mature. Limit your tree species list to 5% Oaks and avoid Red Oaks being your primary oak of choice.

## 2.6 Planting Selection and Stock Requirements

Best selection and quality of planting stock are two critical aspects to implement long-term success for landscape works throughout the Region of Waterloo. Tree species to be used for Region related projects must be selected from the Approved Tree Species list in **Appendix A**. It is recommended and encouraged that large stature shade trees be prioritized when and where possible, as they provide more environmental benefits than small stature trees. However, it is understood that this may not always be possible depending on the situation, such as within smaller spaces or underneath/ adjacent overhead power lines.

### Requirements:

When evaluating nursery stock, the following requirements must be considered and enforced to ensure that the best quality plant material is utilized for Region of Waterloo projects. These requirements are based on the current version of the Canadian Nursery Landscape Association's Canadian Standards for Nursery Stock document.

- Only high-quality nursery grown trees are acceptable.
- Plants shall be nursery grown for a least two years under climatic conditions similar to those of the planting location. Contractors must provide a list of the proposed sources of nursery stock prior to acquisition and installation. Geographic origin of seed or cuttings used to produce the trees and plantings shall be made available upon request.
- Plant material shall not be dug or collected from native stands or established woodlots.
- Trees and plantings shall be sound, healthy, vigorous, well branched, and densely foliated when in leaf and free of disease and insects of any stage. They shall have healthy, well-developed root systems and shall

be free from physical damage or other conditions that would prevent thriving growth.

- Trees with multiple leaders, unless specified, shall be rejected. Trees with damaged, cut or crooked leaders, including bark, abrasion of bark, sunscald, or pruned limbs over 2cm in diameter that are not completely callused shall be rejected.
- Stock Type:
  - Balled and burlapped trees
  - Container grown trees
  - Bare root trees are not typically used in Region of Waterloo projects and should be avoided. They can be considered on a case-by-case basis with the approval of the Region's Project Manager and Landscape Architectural Consultant, dependent on the proposed project site.
- Selection and Inspection:
  - All plant material shall be inspected at the nursery where they are coming from, their place of growth and/or holding yard prior to delivery and installation to confirm conformance with specification requirements.
  - The Region reserves the right to reject any plants upon delivery that do not meet the standards or that have been damaged during transport. Approval does not impair the right of inspection and rejection during the progress of work.



- It is recommended that the Contractor have a representative be present at all inspections.

#### Type and Size:

- All trees shall match the calipers/heights proposed on the 'Issued for Construction' landscape drawings, or shall conform to the following minimum sizes:
  - 50mm caliper for deciduous trees, measured at 15cm above the root collar.
  - 1.5m height for coniferous trees.
- If these cannot be achieved, the Contractor is to notify the Region's Project Manager to determine alternative sizes and/or tree species.

- Transportation, Delivery and Storage:
  - Only material that is freshly dug during the season of planting is allowed.
  - Branches shall be tied with rope or twine only and in a manner that will cause no damage to the bark or branches.
  - During transportation of the plant material, the Contractor shall exercise care to prevent injury and drying out of trees. Damaged or dried out trees may be rejected at delivery based on inspections completed on site.
  - All planting stock to be reviewed by Region's representative prior to installation.
  - Plantings must be protected at all times from the elements, such as the sun and drying winds until planted. Those that cannot be planted immediately upon delivery are to be kept in the shade and well watered. Plants shall not remain unplanted longer than three (3) days following delivery.
  - Plantings shall be handled by the soil root ball with care and appropriate support to avoid any damage. They are not to be handled by the trunk or foliage parts in a manner that will cause damage to the tree or loosen the roots in the ball.

- Roots and root ball must be watered and kept moist during transportation and after delivery to the project site(s).

As noted above, it is strongly recommended that the Region's representative and the Contractor conduct thorough inspections of the nursery planting stock prior to being delivered and installed as any major deficiencies found may be rejected upon review.

#### 2.7 Timing Requirements for Planting Installation

When implementing the landscape works for Region of Waterloo projects, time of year is another key factor that must be considered and incorporated into the overall process. The recommended and preferred planting window for the Region, is between May 1st and June 30th, weather depending. Fall planting may only be considered on a project-by-project basis and would be dependent on various factors, such as project size and weather conditions. These situations would require review by the Region's Project Manager to determine approval to proceed or alternative scheduling of works.



## 2.8 Typical Planting Products and Amendments

There are numerous products and amendments to consider and ensure are incorporated and completed when any planting works are being completed by the Contractor. The following are typical items that are to be used on all Region of Waterloo landscape and planting works / contracts (many of which are included within the planting details found in Section 3):

- Tree Supports
  - Wooden Stakes (x2 minimum) - 50mm x 50mm x 2400mm. Stakes to be set approximately 1200mm above finish grade and shall not interfere with branches or penetrate the rootball.
  - Arborties (or an approved equal product) to be used to securely hold the newly planted tree in place and aid in its establishment.
  - Stakes and ties are to align with prevailing winds.
  - Stakes and ties are to be removed after the first year of growth and during the warranty period.
- Tree Maintenance
  - Mulch - shredded cedar, pine or hemlock bark, natural colour (with no dyes) to be used.
  - Anti-Desiccant - wax-like emulsion to provide film over plant surfaces to reduce evaporation, but permeable enough to permit transpiration.
  - Trunk Protection (ArborGuard, or an approved equal product) to be installed around the base of the tree trunk to provide protection from wildlife and landscape maintenance tools.
- Growing Medium
  - Shall be thoroughly combined prior to placement in planting bed areas and tree pits to the following proportions: 4 parts approved topsoil and 1 part organic amendment.
- Soil Amendments
  - All soil amendments to be applied as per soil test recommendations and the approval of the Region's representative.
- Organic Components - mushroom compost, animal manure and/or bonemeal are accepted organic components.
- The organic amendment (ex: compost) shall have the following characteristics: pH range of 5.5 – 8.0; a minimum of 60% Organic Matter; salt conductivity, salt less than 2.0 ms/cm (millisiemens/cm) Total Salts; and a maximum moisture content of 35%.
- Compost shall meet the standards found in the Interim Guidelines for the Production and Use of Aerobic Compost in Ontario published by the Ontario Ministry of Environment and Energy (MOEE), and shall be virtually free from all viable weed seeds, or other plant reproductive parts, pathogens, chemicals or toxic contaminants.
- Fertilizers - any and all used shall be a standard commercial brand, having a guaranteed N-P-K analysis meeting the requirements of the Canada Fertilizer Act and the CFQAP.
- Mycorrhizal Inoculants - fungi-based soil inoculants. Endomycorrhizal and ectomycorrhizal inoculant that contains several species of fungi which are compatible with deciduous trees, as well as some coniferous trees, shrubs and herbaceous plants. Store to avoid freezing and intensive heat; store in a dry place out of direct sunlight.

## 2.9 Typical Street Tree Layout and Setbacks

### Layout

When preparing street tree planting designs there are numerous factors that will influence the spacing and layout of trees, with emphasis on mature canopy size, tree form and site conditions. The way in which trees are spaced affects their form and development. Trees closely spaced together will develop a denser canopy and upright form, while spacing them further apart will allow them to grow an open canopy with lower branching. Groupings of trees also offer numerous benefits including; increased shading, reduced evapotranspiration, reduced soil compaction, larger, shared soil volumes and reduced reflective heat on single trees.

## Layout Requirements:

Below are the recommended spacing standards for street trees within the Region of Waterloo:

- **Urban Conditions**
  - Large stature tree species shall be spaced 8.0m minimum on centre and maximum 10.0m on centre.
  - Small stature tree species shall be spaced at 6.0m minimum on centre and maximum 8.0m on centre.
  - Coniferous trees shall be considered based on the site conditions, adjacent trees and intended purposes (such as wind breaks or utility screening). Note, that they are not to be used within the boulevard or centre median areas where sightlines will be affected.
  - Columnar tree forms shall be considered based on site conditions (i.e. where space is limited). Note, that they are not to be used within the boulevard or centre median areas where sightlines will be affected.
- **Rural Conditions**
  - Large stature tree species shall be spaced 10.0m minimum on centre and maximum 12.0m on centre.
  - Small stature tree species shall be spaced at 8.0m minimum on centre and maximum 10.0m on centre.
  - Coniferous trees shall be considered based on the site conditions, adjacent trees and intended purposes (such as wind breaks or utility screening). Note, that they are not to be used within the boulevard or centre median areas where sightlines will be affected.
  - Columnar tree forms shall be considered based on the site conditions (i.e. where space is limited). Note, that they are not to be used within the boulevard or centre median areas where sightlines will be affected.

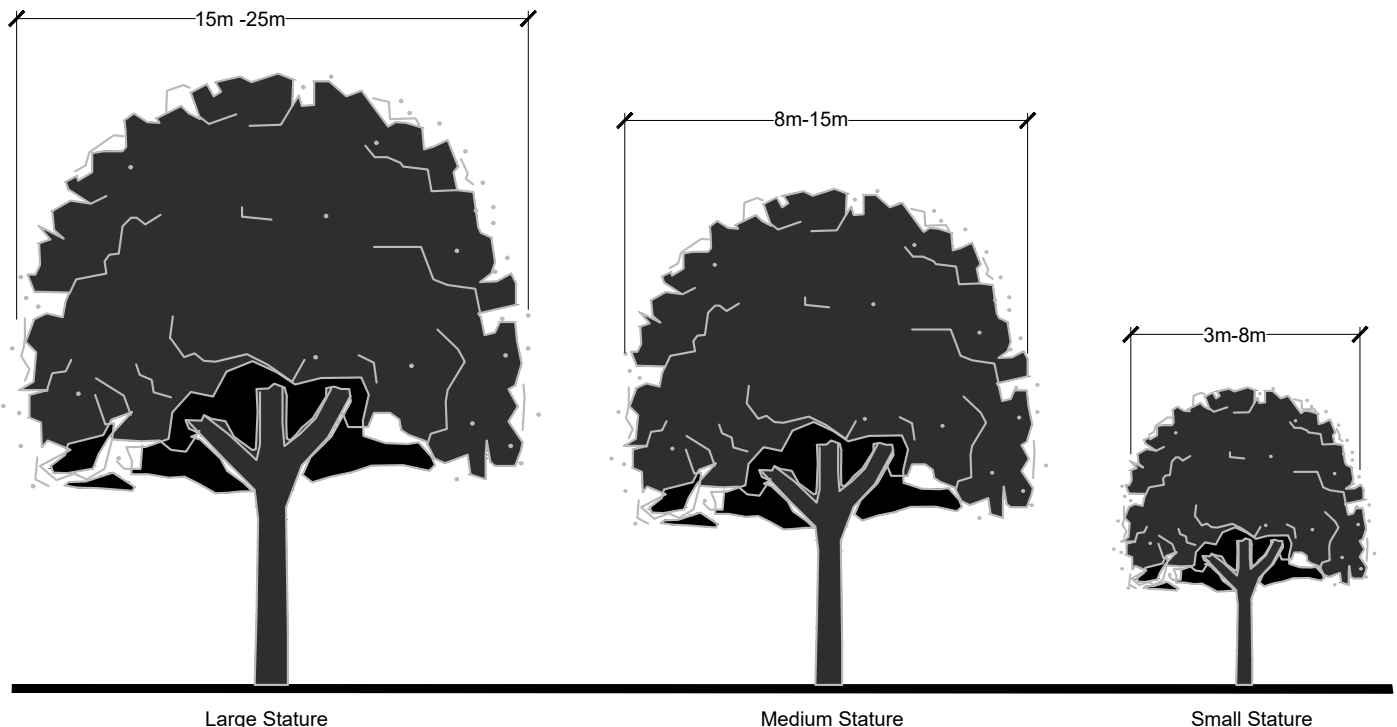


Figure 1: Tree Stature (Mature Widths)

## Setbacks

In both urban and rural conditions, it is preferable that trees be placed further away from road edges as possible to minimize damage from salt spray, salt build-up due to snow loading, and future road works/ construction. Typically, trees are to be placed within the boulevard between the back of curb and sidewalk. However, if additional space allows, trees are to be installed between the sidewalk and property line. Locating them in these areas in many situations offers trees more adjacent soil volumes and allows for greater separation from road salt use.

Refer to Section 2.5 Species Diversity for further tree layout information.

Refer to **Appendix C** for Tree Setback Requirements – R.O.W. Infrastructure Guidelines Table information.

### 2.10 Soil Trenching

When designing street tree layouts, consideration must be given to incorporating soil trenches when and where possible as they will significantly increase planting soil volumes, when compared with traditional tree pit excavations. These trenches are to be implemented in areas where existing soils are compromised by compaction, low nutrient values, poor texture, and high salt content. This is determined by on site soil testing and/or review by Region’s representative. An additional benefit would apply to proposed groupings of trees that are planted 10.0m apart or less. Existing soils between tree pits are excavated and removed to a minimum depth of 300mm and replaced with the specified planting medium.

Refer to Section 3: Standard Planting Details, for Details 3.2.1 and 3.2.2 on the implementation of soil trenches for single trees and tree groupings.

### 2.11 Soil Cells

In certain cases, especially in dense urban conditions, it can be difficult to meet the minimum soil volume requirements for street trees due to limitations in space, underground services and other surrounding infrastructure. Inadequate soil volumes have proven to cause stunted growth, poor health and short life spans for trees.

To avoid these issues and allow for the proper installation of trees with adequate soil volumes, soil cells can be utilized. Soil cells are modular systems that connect together around tree pits to allow infrastructure to be built on top and within the cells, such as sidewalks, roadways, and utility lines. Their structural framework incorporates void spaces for continuous planting soil around the trees and utilities, allowing room for tree roots to grow. The system prevents the compaction of soils and allows for better circulation of oxygen and water throughout the root zone.

For Region of Waterloo projects, the use of soil cells will be considered on a case-by-case basis through the Region’s Project Manager. Coordination with lower-tier municipalities within the Region of Waterloo must also be conducted and agreed upon in order to proceed with the implementation of soil cells. This includes both the sharing of responsibilities for budgets, installation and ongoing maintenance following construction of the soil cells.

### 2.12 Ornamental Planting Beds – When and Where to Use Them Properly and Effectively

The implementation of ornamental planting beds in Region of Waterloo projects are typically reserved for roundabouts and at transit stops, with some special inclusions, such as centre medians and in adjacent open spaces. The addition of any planting beds need to be discussed with Region Operations Staff before implementation to ensure that maintenance of the beds will be possible upon completion. When designing these beds, initial thought may be to intricately plant them with a variety of species with the intent of creating enhanced landscaped areas. However, the following items must be considered when planning these spaces:

**Quality over Quantity:** Do not inundate these planting beds with numerous species as this can result in maintenance issues. Large plant massing design should be utilized, with two (2) to three (3) species (between shrubs, ornamental grasses and perennials). Refer to Appendix B for the Approved Ornamental Planting Species List.

**Maintenance:** Utilize low maintenance species. The goal is to minimize maintenance works for the Region’s Operations Staff, while executing visually appealing and effective ornamental planting beds.

**Height:** When designing ornamental planting beds higher species are to be placed at the back of the bed or towards the centre of the roundabout; lower species towards the sidewalk or outer edges of the roundabout. Similarly, for designing within a daylight triangle, higher species are to be in the back and lower species are to be planted in front, with heights not exceeding 600mm. Mature heights of species used within centre medians and boulevards must be considered and account for all required sight lines for the safety of all road users (such as intersections, midblock entrances or exits, etc.).

**Colour and Texture:** Utilize a variety of colours, textures and shapes when selecting plant material when and where possible to provide interest throughout the year.

**Growth:** Utilize plantings that are quick to establish and will fill the planting beds rapidly to prevent establishment and competition of weeds.

**Spacing and Size:**

- Spacing of shrubs and perennials shall conform to the planted species size at maturity.
- Shrub, ornamental grass and perennial planting stock shall conform to the following sizes:
  - Deciduous and coniferous shrubs shall be minimum 2 to 3 gallon potted stock.
  - Ornamental grasses and perennials shall be minimum 1 gallon potted stock.
- Shrubs and perennials, depending on species or variety, shall conform to the following offsets from the inside of the planter wall or edge of planting bed:
  - Deciduous and coniferous shrubs shall be 500mm minimum from the inside of walls or plant bed edges.

- Perennials shall be 250mm minimum from the inside of the planter wall or plant bed edge.

**Roundabouts:** When proposing planting designs for a roundabout, two to three rings of plantings, maximum, should be utilized in addition to tree plantings within the centre. Refer to Section 3: Standard Planting Details, on typical Roundabout Planting Designs. At the base of the roundabout planting area, a 2.4m minimum turf zone is to be incorporated, creating a buffer between the planting bed and concrete apron. This zone is to be topsoiled and seeded with a standard lawn seed mix that can be found below within Section 4: Seeding Information.

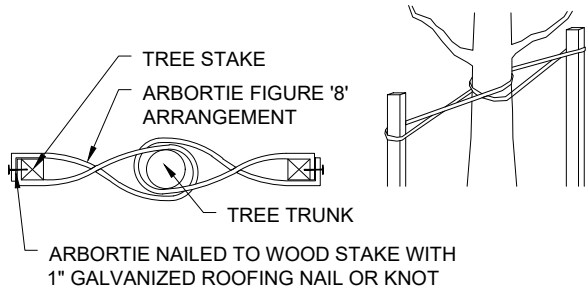
As an alternative to a lawn seed mix, pollinator and native meadow seed mixes can be utilized to lower maintenance and increase ecological services. For Region of Waterloo projects, the use of native seed mixes will be considered on a case-by-case basis after discussion with Region Operations Staff.

**Transit Stops:** When proposing planting designs for a transit stop, two to three rows of plantings, maximum, should be utilized. Trees are to be incorporated adjacent the transit shelters when and where possible to offer shading/cooling opportunities for transit users, reduce Urban Heat Island Effects and for additional enhancement of the overall transit stop experience.

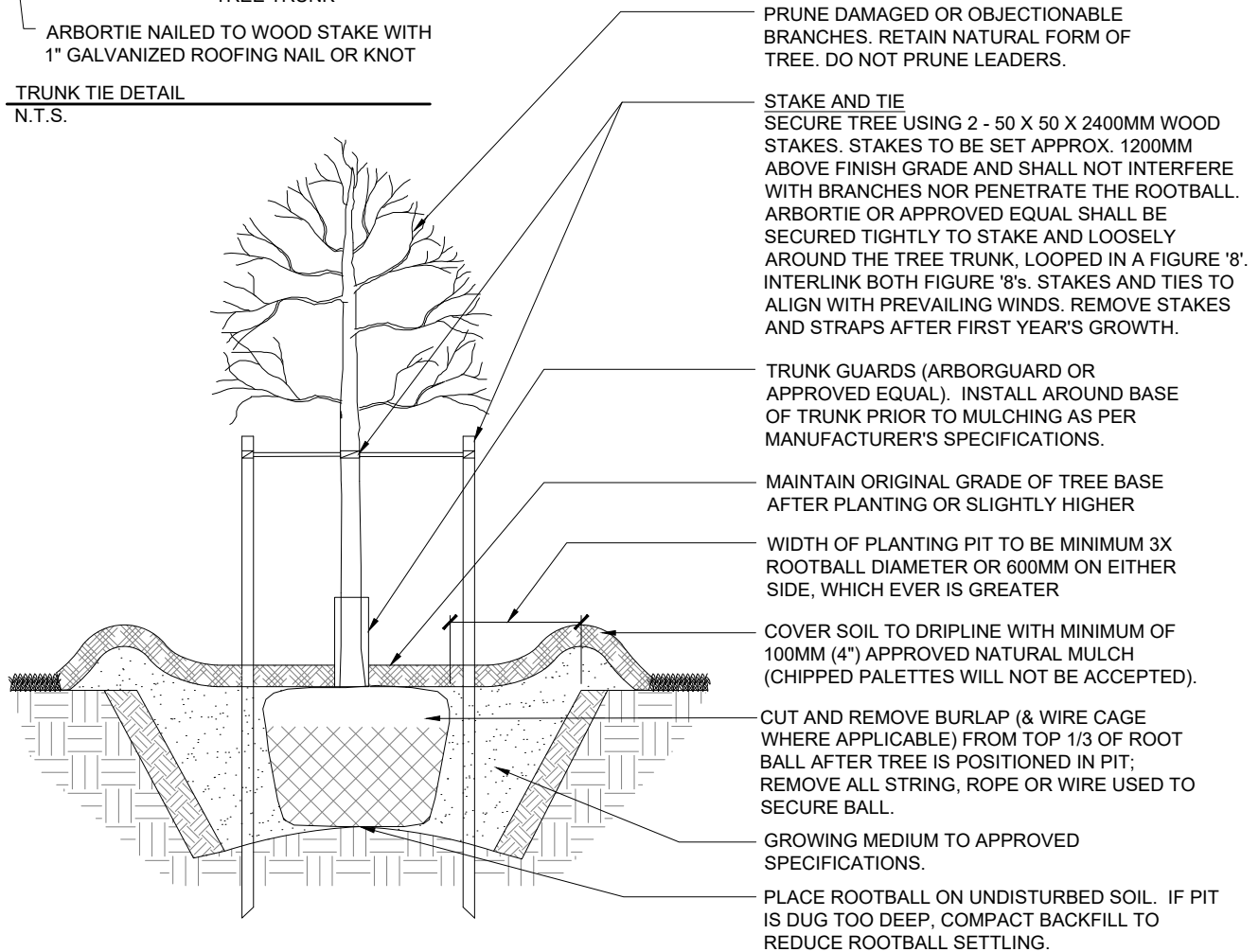
Ultimately, planting designs should be minimal while being effective, incorporating low maintenance plantings that are quick to establish and will fill the areas rapidly to prevent establishment of weeds from over-taking the space. Of course, no landscape element is truly “maintenance free”; maintenance will be required periodically throughout the year. The goal is to minimize excessive effort for Operations Staff, while executing visually appealing and effective ornamental planting beds throughout the Region.



### **3. STANDARD PLANTING DETAILS**



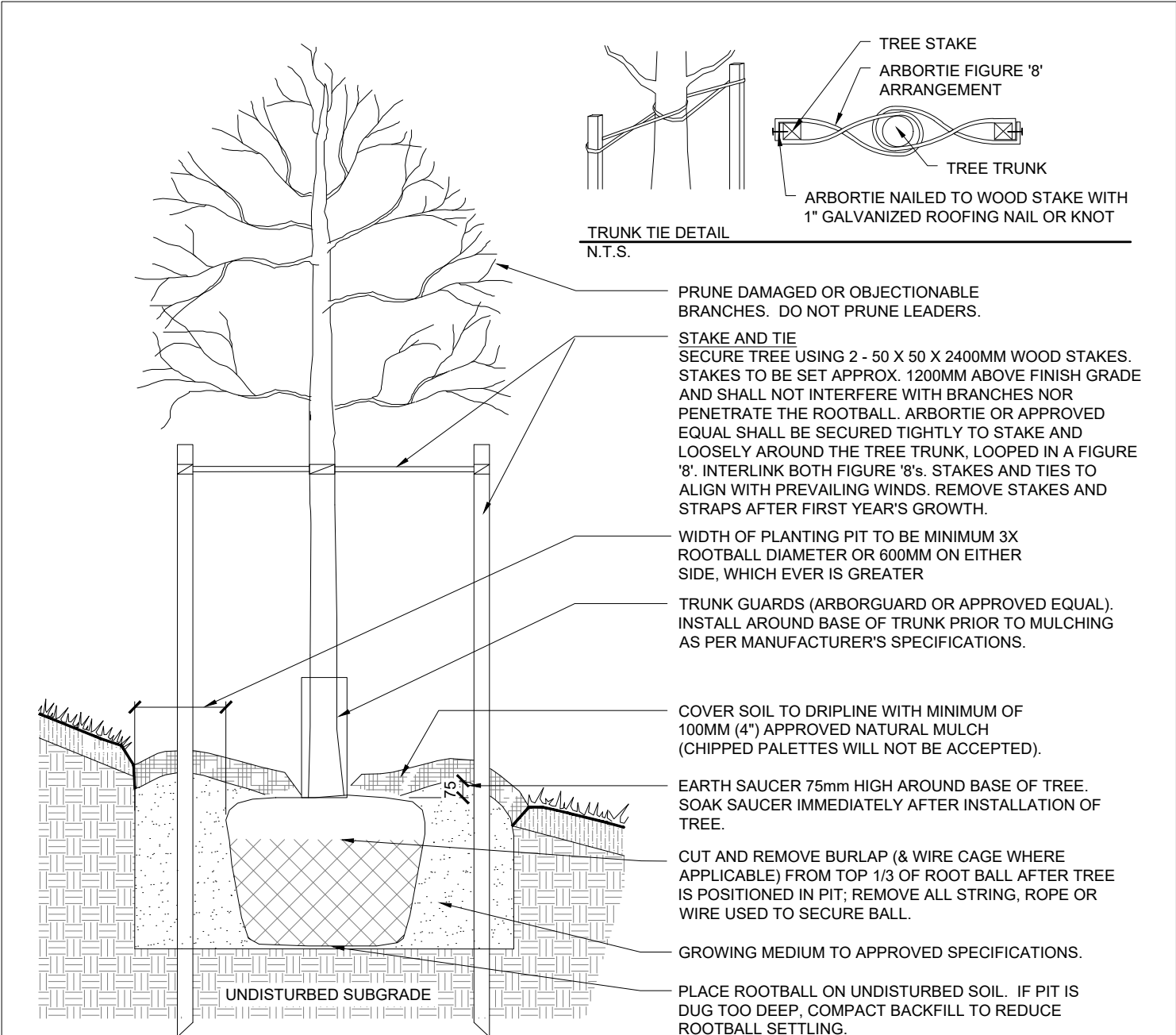
**TRUNK TIE DETAIL**  
N.T.S.



**NOTES:**


1. PLANT MATERIAL SHALL BE THOROUGHLY WATERED AT TIME OF PLANTING.
2. PLANT MATERIAL SHALL BE SET PLUMB IN THE MIDDLE OF THE PIT.
3. TREE SHALL BEAR SAME RELATION OR SLIGHTLY HIGHER TO FINISHED GRADE AS ORIGINALLY GROWN.
4. PLANT STOCK MOVED WHILE IN LEAF SHALL BE COVERED WHILE IN TRANSIT. ROOTS SHOULD BE KEPT MOIST UNTIL PLANTED. TREES IN LEAF TO BE TREATED WITH ANTI-DESICANT. ALL WRAPPING TO BE REMOVED AFTER PLANTING.
5. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
6. STAKING IS TO OCCUR ONLY AT THE DIRECTION OF THE REGION OF WATERLOO PROJECT MANAGER AND/OR LANDSCAPE ARCHITECT.
7. 100MM HIGH SAUCER EXCEPT WHEN PLANTING IN BED.
8. MYCORRHIZAL (FUNGI-BASED) SOIL INOCULANTS: ENDOMYCORRHIZAL AND ECTOMYCORRHIZAL INOCULANT THAT CONTAINS SEVERAL SPECIES OF FUNGI WHICH ARE TO BE INSTALLED WITH ALL PLANTINGS. REFER TO SPECIFICATIONS AND/OR SPECIAL PROVISIONS FOR INFORMATION.

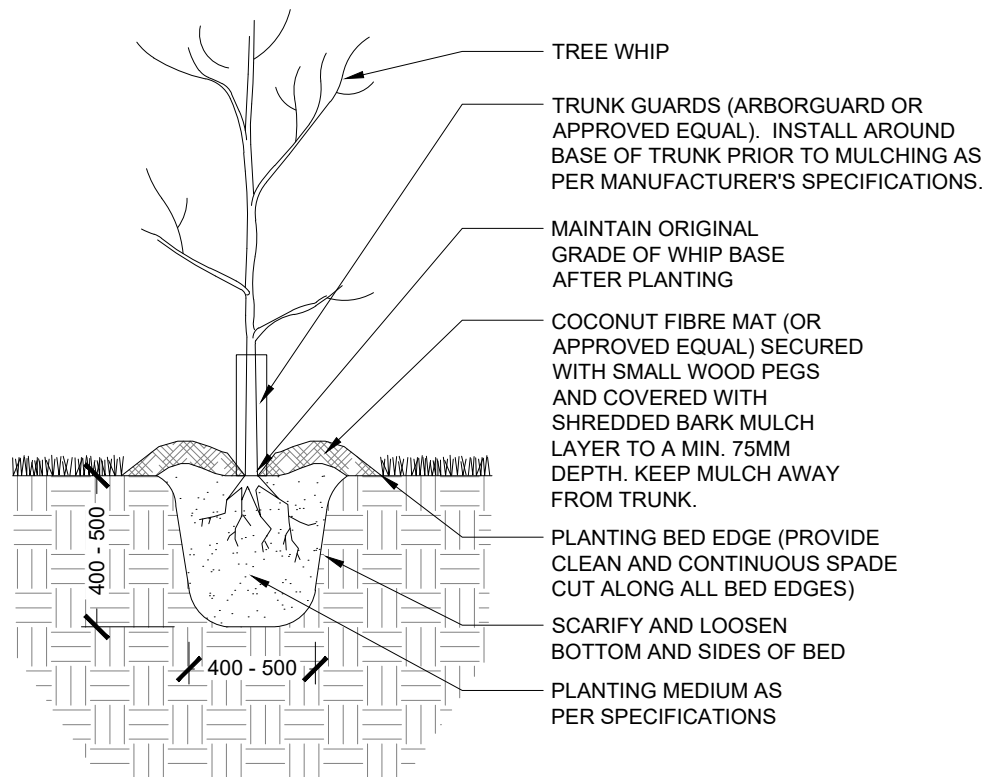
 Region of Waterloo	Region of Waterloo Standard Planting Detail	DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.	<b>3.1.1</b>
	<b>DECIDUOUS TREE PLANTING</b> (UP TO 80mm CALIPER (B.B/W.B))		Scale: N.T.S.
			Rev No.: 01
			Date: June 2024



**NOTES:**


1. PLANT MATERIAL SHALL BE THOROUGHLY WATERED AT TIME OF PLANTING.
2. PLANT MATERIAL SHALL BE SET PLUMB IN THE MIDDLE OF THE PIT.
3. PLANT TREE 75 ABOVE EXISTING ADJACENT GRADE TO ACCOMMODATE FOR SETTLEMENT.
4. PLANT STOCK MOVED WHILE IN LEAF SHALL BE COVERED WHILE IN TRANSIT. ROOTS SHOULD BE KEPT MOIST UNTIL PLANTED. TREES IN LEAF TO BE TREATED WITH ANTI-DESICANT. ALL WRAPPING TO REMOVED AFTER PLANTING.
5. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
6. STAKING IS TO OCCUR ONLY AT THE DIRECTION OF THE REGION OF WATERLOO PROJECT MANAGER AND/OR LANDSCAPE ARCHITECT.
7. 100MM HIGH SAUCER EXCEPT WHEN PLANTING IN BED.
8. PROVIDE DRAINAGE FOR PLANTING PIT IN IMPERMEABLE SOIL.
9. MYCORRHIZAL (FUNGI-BASED) SOIL INOCULANTS: ENDOMYCORRHIZAL AND ECTOMYCORRHIZAL INOCULANT THAT CONTAINS SEVERAL SPECIES OF FUNGI WHICH ARE TO BE INSTALLED WITH ALL PLANTINGS. REFER TO SPECIFICATIONS AND/OR SPECIAL PROVISIONS FOR INFORMATION.

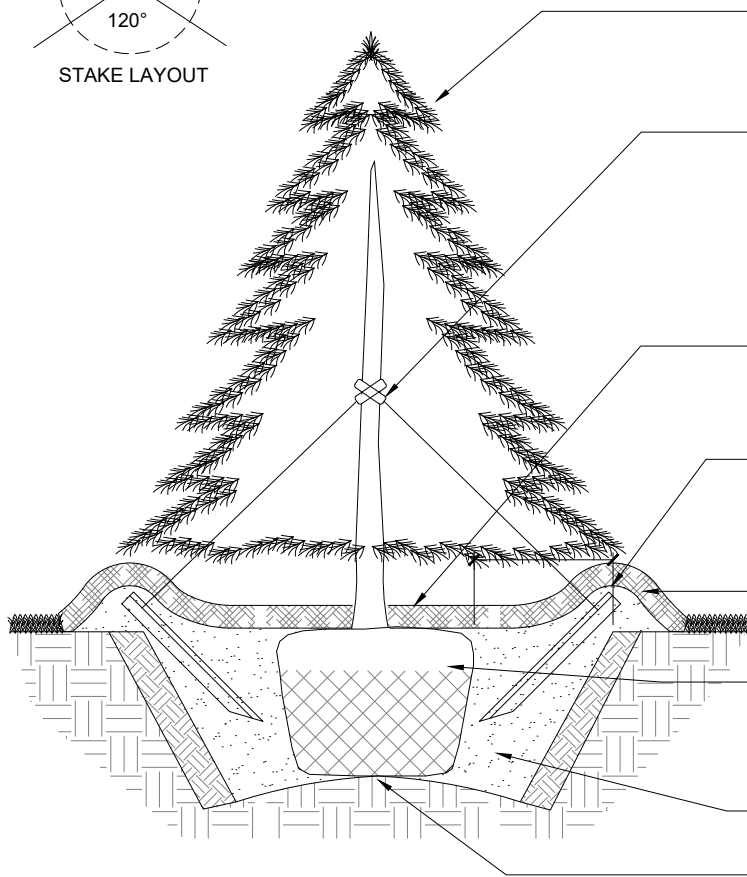
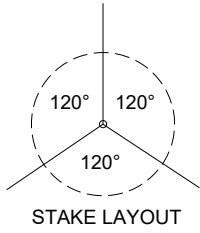
 Region of Waterloo	Region of Waterloo Standard Planting Detail	DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.	<b>3.1.2</b>
	<b>DECIDUOUS TREE PLANTING ON SLOPE</b> (UP TO 80mm CALIPER (B.B/W.B))		Scale: N.T.S.
			Rev No.: 01
			Date: June 2024



**NOTES:**

1. PLANT MATERIAL SHALL BE THOROUGHLY WATERED AT TIME OF PLANTING.
2. PLANT MATERIAL SHALL BE SET PLUMB IN THE MIDDLE OF THE PIT.
3. TREE SHALL BEAR SAME RELATION OR SLIGHTLY HIGHER TO FINISHED GRADE AS ORIGINALLY GROWN.
4. PLANT STOCK MOVED WHILE IN LEAF SHALL BE COVERED WHILE IN TRANSIT. ROOTS SHOULD BE KEPT MOIST UNTIL PLANTED. TREES IN LEAF TO BE TREATED WITH ANTI-DESICANT. ALL WRAPPING TO BE REMOVED AFTER PLANTING.
5. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
6. STAKING IS TO OCCUR ONLY AT THE DIRECTION OF THE REGION OF WATERLOO PROJECT MANAGER AND/OR LANDSCAPE ARCHITECT.
7. 75MM HIGH SAUCER EXCEPT WHEN PLANTING IN BED.
8. MYCORRHIZAL (FUNGI-BASED) SOIL INOCULANTS: ENDOMYCORRHIZAL AND ECTOMYCORRHIZAL INOCULANT THAT CONTAINS SEVERAL SPECIES OF FUNGI WHICH ARE TO BE INSTALLED WITH ALL PLANTINGS. REFER TO SPECIFICATIONS AND/OR SPECIAL PROVISIONS FOR INFORMATION.

 Region of Waterloo	Region of Waterloo Standard Planting Detail	DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.	<b>3.1.3</b>
	<b>TREE WHIP PLANTING</b>		Scale: N.T.S.
			Rev No.: 01
			Date: June 2024



PRUNE AT PLANTING TO CAREFULLY REMOVE DEAD, BROKEN, DAMAGED, AND RUBBING BRANCHES. DO NOT REMOVE A LEADER.

**STAKE AND TIE**  
 SECURE TREE USING 3 - 50 X 50 X 450MM LONG WOOD STAKES, DRIVEN IN AT 45° TO FINISHED GRADE, TO 50MM BELOW SOIL LEVEL. ARBORTIE OR APPROVED EQUAL TO BE SECURED TIGHTLY AROUND STAKE AND LOOSELY AROUND TREE TRUNK. REMOVE STAKES AND STRAPS AFTER FIRST YEAR'S GROWTH.

CONIFEROUS TREE SHALL BE SET IN CENTER OF PIT AND SAME RELATION TO FINISHED GRADE AS ORIGINALLY GROWN.

WIDTH OF PLANTING PIT TO BE MINIMUM 3X ROOTBALL DIAMETER OR 600MM ON EITHER SIDE, WHICH EVER IS GREATER

COVER SOIL TO DRIPLINE WITH MINIMUM OF 100MM (4") APPROVED NATURAL MULCH (CHIPPED PALETTES WILL NOT BE ACCEPTED).

CUT AND REMOVE BURLAP (& WIRE CAGE WHERE APPLICABLE) FROM TOP 1/3 OF ROOT BALL AFTER TREE IS POSITIONED IN PIT; REMOVE ALL STRING, ROPE OR WIRE USED TO SECURE BALL.

GROWING MEDIUM TO APPROVED SPECIFICATIONS.

PLACE ROOTBALL ON UNDISTURBED SOIL. IF PIT IS DUG TOO DEEP, COMPACT BACKFILL TO REDUCE ROOTBALL SETTLING.

**NOTES:**

1. PLANT MATERIAL SHALL BE THOROUGHLY WATERED AT TIME OF PLANTING.
2. PLANT MATERIAL SHALL BE SET PLUMB IN THE MIDDLE OF THE PIT.
3. TREE SHALL BEAR SAME RELATION OR SLIGHTLY HIGHER TO FINISHED GRADE AS ORIGINALLY GROWN.
4. PLANT STOCK SHALL BE COVERED WHILE IN TRANSIT. ROOTS SHOULD BE KEPT MOIST UNTIL PLANTED. TREES TO BE TREATED WITH ANTI-DESICANT. ALL WRAPPING TO BE REMOVED AFTER PLANTING.
5. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
6. STAKING IS TO OCCUR ONLY AT THE DIRECTION OF THE REGION OF WATERLOO PROJECT MANAGER AND/OR LANDSCAPE ARCHITECT.
7. 100MM HIGH SAUCER EXCEPT WHEN PLANTING IN BED.
8. MYCORRHIZAL (FUNGI-BASED) SOIL INOCULANTS: ENDOMYCORRHIZAL AND ECTOMYCORRHIZAL INOCULANT THAT CONTAINS SEVERAL SPECIES OF FUNGI WHICH ARE TO BE INSTALLED WITH ALL PLANTINGS. REFER TO SPECIFICATIONS AND/OR SPECIAL PROVISIONS FOR INFORMATION.



Region of Waterloo  
 Standard Planting Detail

DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.

**3.1.4**

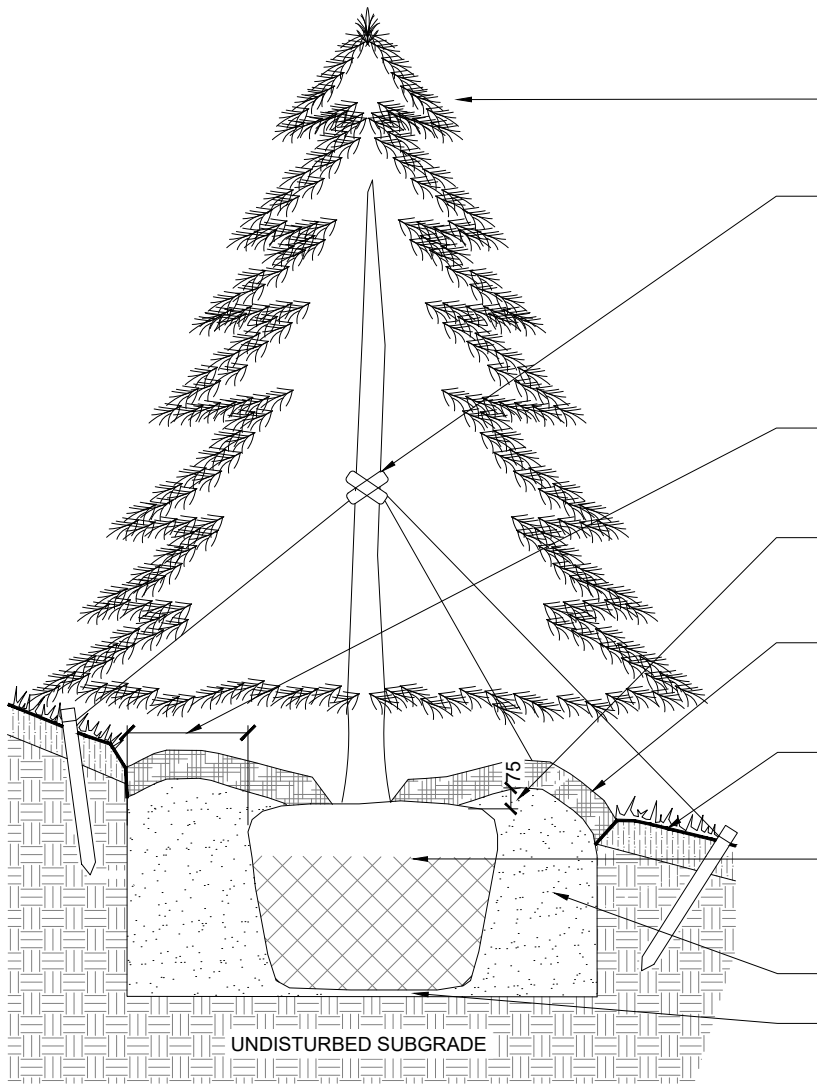
**CONIFEROUS TREE PLANTING**  
 (UP TO 2500mm HEIGHT (B.B/W.B))

Scale: N.T.S.

Rev No.: 01

Date: June 2024

Page Size: 8.5" x 11"



PRUNE DAMAGED OR OBJECTIONABLE BRANCHES. DO NOT PRUNE/CUT LEADER.

**STAKE AND TIE**  
 SECURE TREE USING 3 - 50 X 50 X 450MM LONG WOOD STAKES, DRIVEN IN AT 45° TO FINISHED GRADE, TO 50MM BELOW SOIL LEVEL. ARBORTIE OR APPROVED EQUAL TO BE SECURED TIGHTLY AROUND STAKE AND LOOSELY AROUND TREE TRUNK. REMOVE STAKES AND STRAPS AFTER FIRST YEAR'S GROWTH.

WIDTH OF PLANTING PIT TO BE MINIMUM 3X ROOTBALL DIAMETER OR 600MM ON EITHER SIDE, WHICH EVER IS GREATER

EARTH SAUCER 75mm HIGH AROUND BASE OF TREE. SOAK SAUCER IMMEDIATELY AFTER INSTALLATION OF TREE.

COVER SOIL TO DRIPLINE WITH MINIMUM OF 100MM (4") APPROVED NATURAL MULCH (CHIPPED PALETTES WILL NOT BE ACCEPTED).

FINISH GRADE

CUT AND REMOVE BURLAP (& WIRE CAGE WHERE APPLICABLE) FROM TOP 1/3 OF ROOT BALL AFTER TREE IS POSITIONED IN PIT; REMOVE ALL STRING, ROPE OR WIRE USED TO SECURE BALL.

GROWING MEDIUM TO APPROVED SPECIFICATIONS.

PLACE ROOTBALL ON UNDISTURBED SOIL. IF PIT IS DUG TOO DEEP, COMPACT BACKFILL TO REDUCE ROOTBALL SETTLING.

UNDISTURBED SUBGRADE

**NOTES:**

1. PLANT MATERIAL SHALL BE THOROUGHLY WATERED AT TIME OF PLANTING.
2. PLANT MATERIAL SHALL BE SET PLUMB IN THE MIDDLE OF THE PIT.
3. PLANT TREE 75 ABOVE EXISTING ADJACENT GRADE TO ACCOMMODATE FOR SETTLEMENT.
4. PLANT STOCK MOVED WHILE IN LEAF SHALL BE COVERED WHILE IN TRANSIT. ROOTS SHOULD BE KEPT MOIST UNTIL PLANTED. TREES IN LEAF TO BE TREATED WITH ANTI-DESICANT. ALL WRAPPING TO REMOVED AFTER PLANTING.
5. DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
6. STAKING IS TO OCCUR ONLY AT THE DIRECTION OF THE REGION OF WATERLOO PROJECT MANAGER AND/OR LANDSCAPE ARCHITECT.
7. 100MM HIGH SAUCER EXCEPT WHEN PLANTING IN BED.
8. PROVIDE DRAINAGE FOR PLANTING PIT IN IMPERMEABLE SOIL.
9. MYCORRHIZAL (FUNGI-BASED) SOIL INOCULANTS: ENDOMYCORRHIZAL AND ECTOMYCORRHIZAL INOCULANT THAT CONTAINS SEVERAL SPECIES OF FUNGI WHICH ARE TO BE INSTALLED WITH ALL PLANTINGS. REFER TO SPECIFICATIONS AND/OR SPECIAL PROVISIONS FOR INFORMATION.



Region of Waterloo  
 Standard Planting Detail

DIMENSIONS ARE SHOWN  
 IN MILLIMETERS UNLESS  
 OTHERWISE NOTED.

**3.1.5**

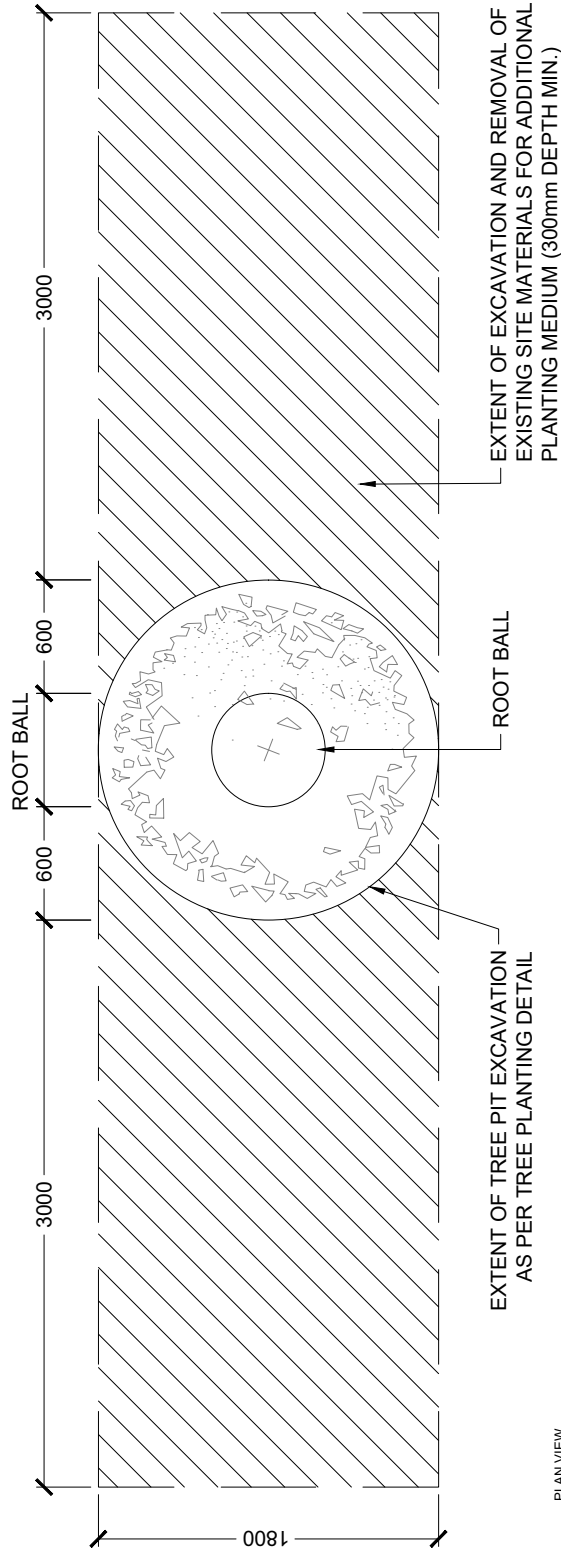
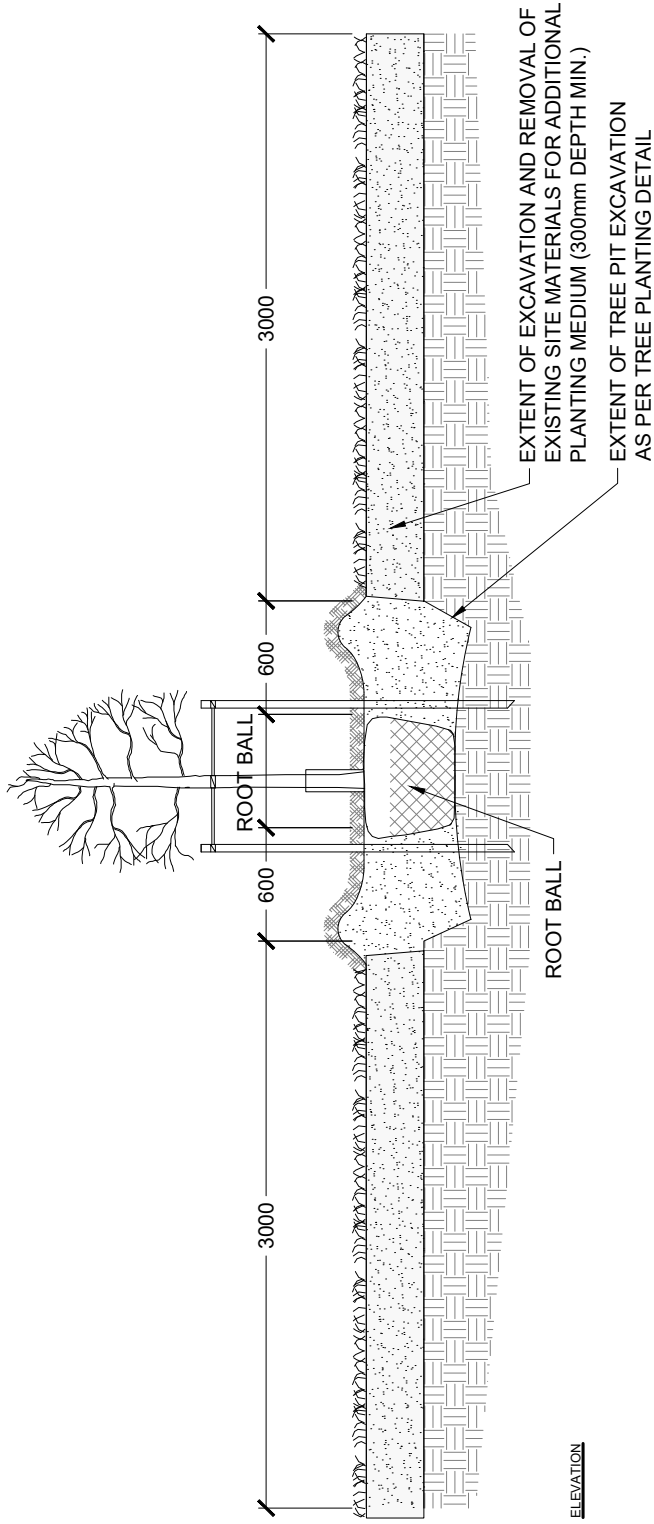
**CONIFEROUS TREE PLANTING ON SLOPE**  
 (UP TO 2500mm HEIGHT (B.B/W.B))

Scale: N.T.S.

Rev No.: 01

Date: June 2024

Page Size: 8.5" x 11"



Region of Waterloo  
Standard Planting Detail

**TREE SOIL TRENCH PLANTING DETAIL**  
**SINGLE TREE OR SPACED GREATER THAN 10M APART**

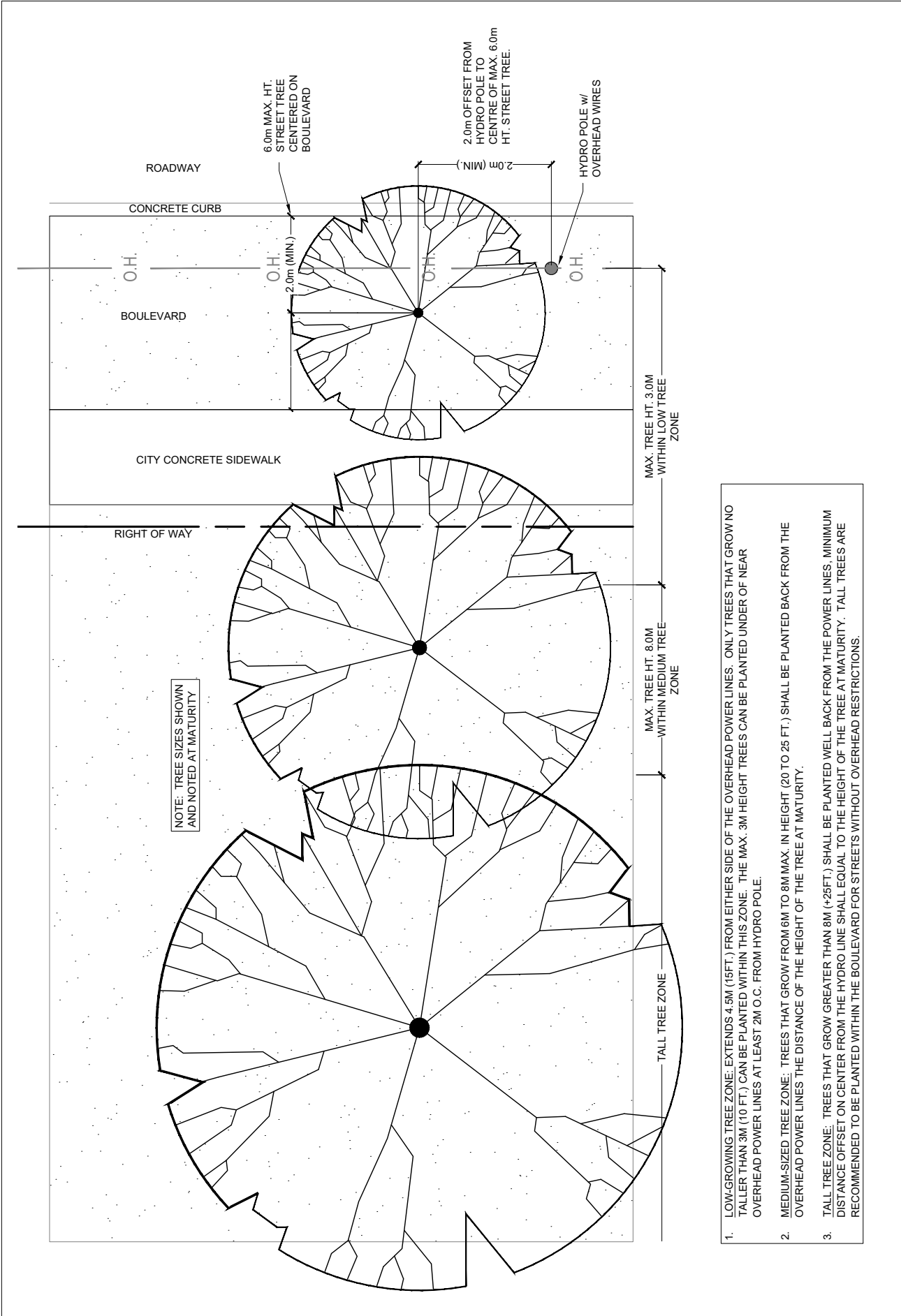
DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.

Date: June 2024


**3.2.1**

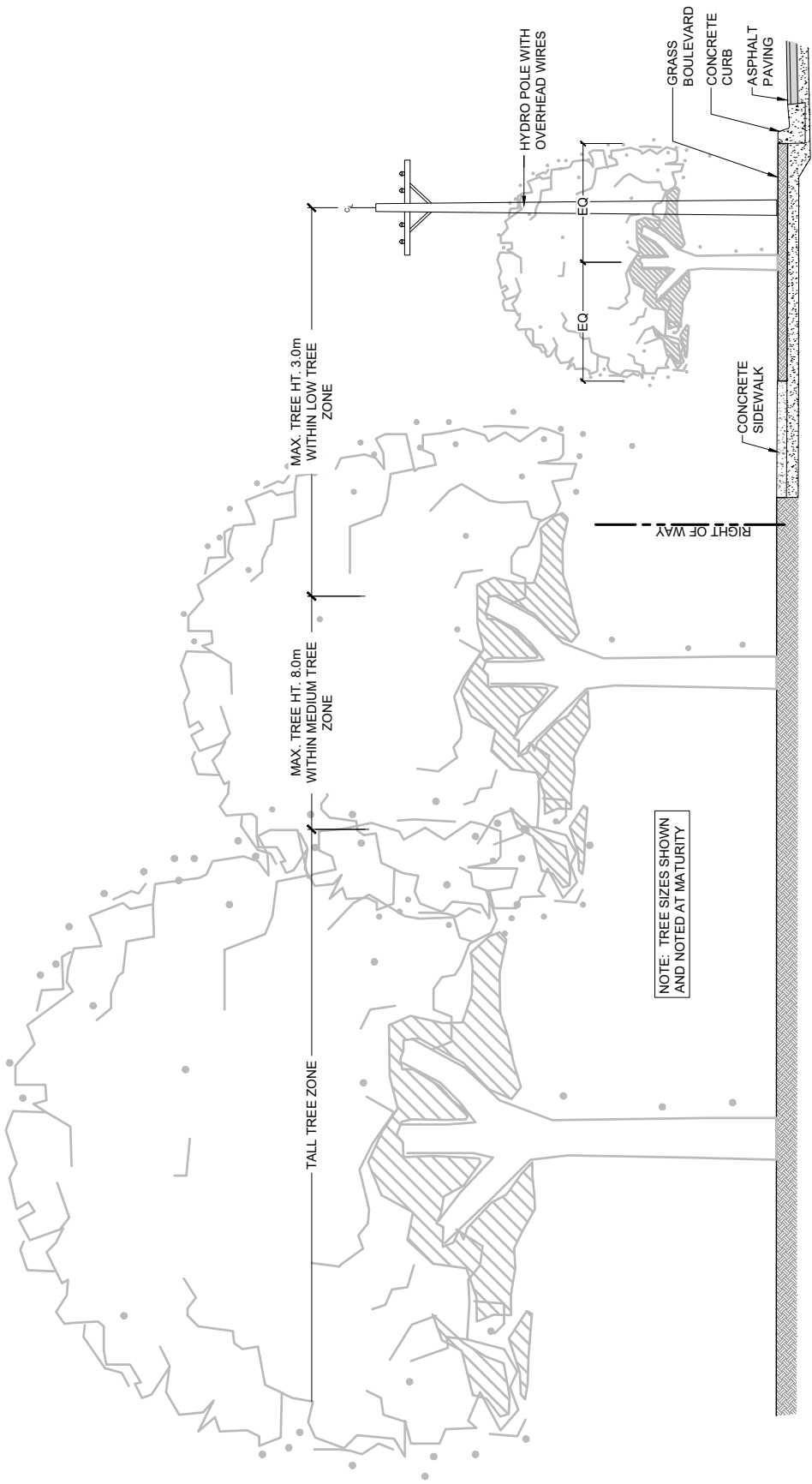
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Rev No.: 01  
Page Size: 8.5" x 11"





1. **LOW-GROWING TREE ZONE:** EXTENDS 4.5M (15FT.) FROM EITHER SIDE OF THE OVERHEAD POWER LINES. ONLY TREES THAT GROW NO TALLER THAN 3M (10 FT.) CAN BE PLANTED WITHIN THIS ZONE. THE MAX. 3M HEIGHT TREES CAN BE PLANTED UNDER OF NEAR OVERHEAD POWER LINES AT LEAST 2M O.C. FROM HYDRO POLE.
2. **MEDIUM-SIZED TREE ZONE:** TREES THAT GROW FROM 6M TO 8M MAX. IN HEIGHT (20 TO 25 FT.) SHALL BE PLANTED BACK FROM THE OVERHEAD POWER LINES THE DISTANCE OF THE HEIGHT OF THE TREE AT MATURITY.
3. **TALL TREE ZONE:** TREES THAT GROW GREATER THAN 8M (>25FT.) SHALL BE PLANTED WELL BACK FROM THE POWER LINES. MINIMUM DISTANCE OFFSET ON CENTER FROM THE HYDRO LINE SHALL EQUAL TO THE HEIGHT OF THE TREE AT MATURITY. TALL TREES ARE RECOMMENDED TO BE PLANTED WITHIN THE BOULEVARD FOR STREETS WITHOUT OVERHEAD RESTRICTIONS.

	<b>Region of Waterloo</b> Standard Planting Detail		<b>3.3.1</b>
	<b>TREE PLANTING UNDER HYDRO LINES (PLAN VIEW)</b>		DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.
	Date: June 2024	Scale: N.T.S.	Rev No.: 01
Page Size: 8.5" x 11"			Page Size: 8.5" x 11"



NOTE: TREE SIZES SHOWN AND NOTED AT MATURITY

1. LOW-GROWING TREE ZONE: EXTENDS 4.5M (15FT.) FROM EITHER SIDE OF THE OVERHEAD POWER LINES. ONLY TREES THAT GROW NO TALLER THAN 3M (10 FT.) CAN BE PLANTED WITHIN THIS ZONE. THE MAX. 3M HEIGHT TREES CAN BE PLANTED UNDER OF NEAR OVERHEAD POWER LINES AT LEAST 2M O.C. FROM HYDRO POLE.
2. MEDIUM-SIZED TREE ZONE: TREES THAT GROW FROM 6M TO 8M MAX. IN HEIGHT (20 TO 25 FT.) SHALL BE PLANTED BACK FROM THE OVERHEAD POWER LINES THE DISTANCE OF THE HEIGHT OF THE TREE AT MATURITY.
3. TALL TREE ZONE: TREES THAT GROW GREATER THAN 8M (+25FT.) SHALL BE PLANTED WELL BACK FROM THE POWER LINES. MINIMUM DISTANCE OFFSET ON CENTER FROM THE HYDRO LINE SHALL EQUAL TO THE HEIGHT OF THE TREE AT MATURITY. TALL TREES ARE RECOMMENDED TO BE PLANTED WITHIN THE BOULEVARD FOR STREETS WITHOUT OVERHEAD RESTRICTIONS.



Region of Waterloo  
Standard Planting Detail

## TREE PLANTING UNDER HYDRO LINES (ELEVATION)

3.3.2

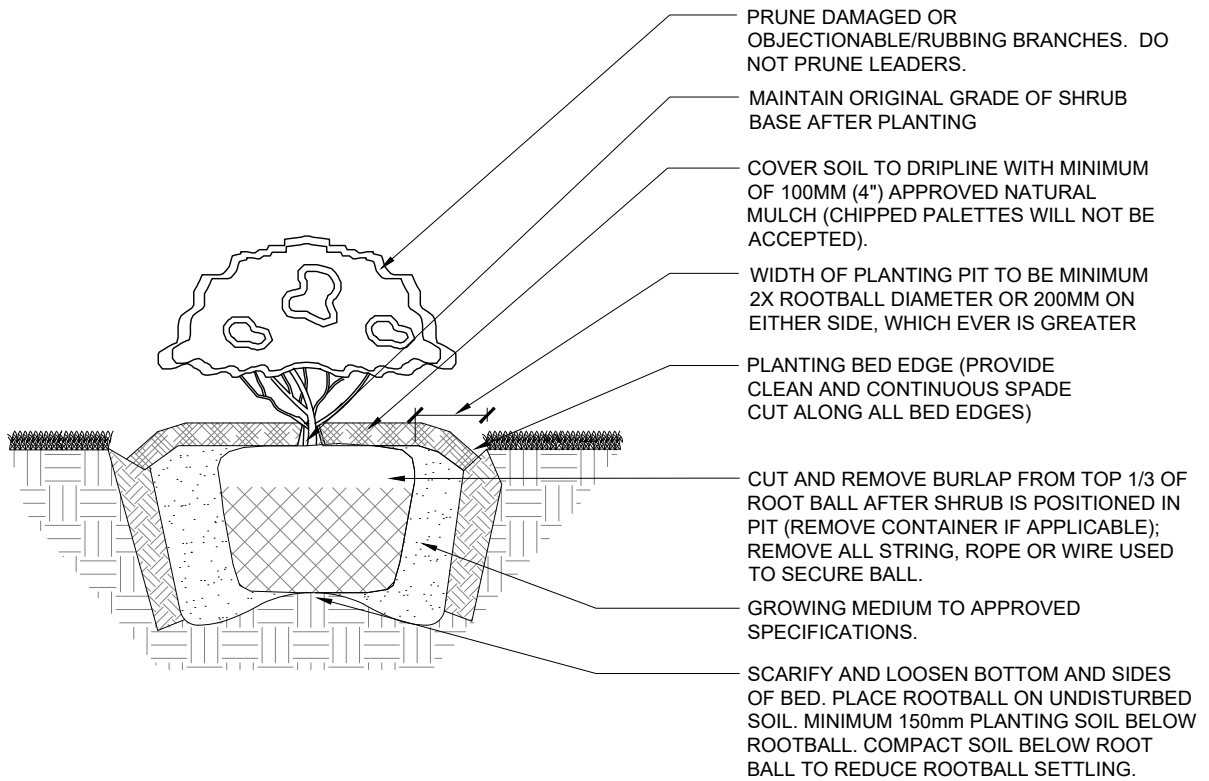
DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.

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Rev No.: 01

Date: June 2024

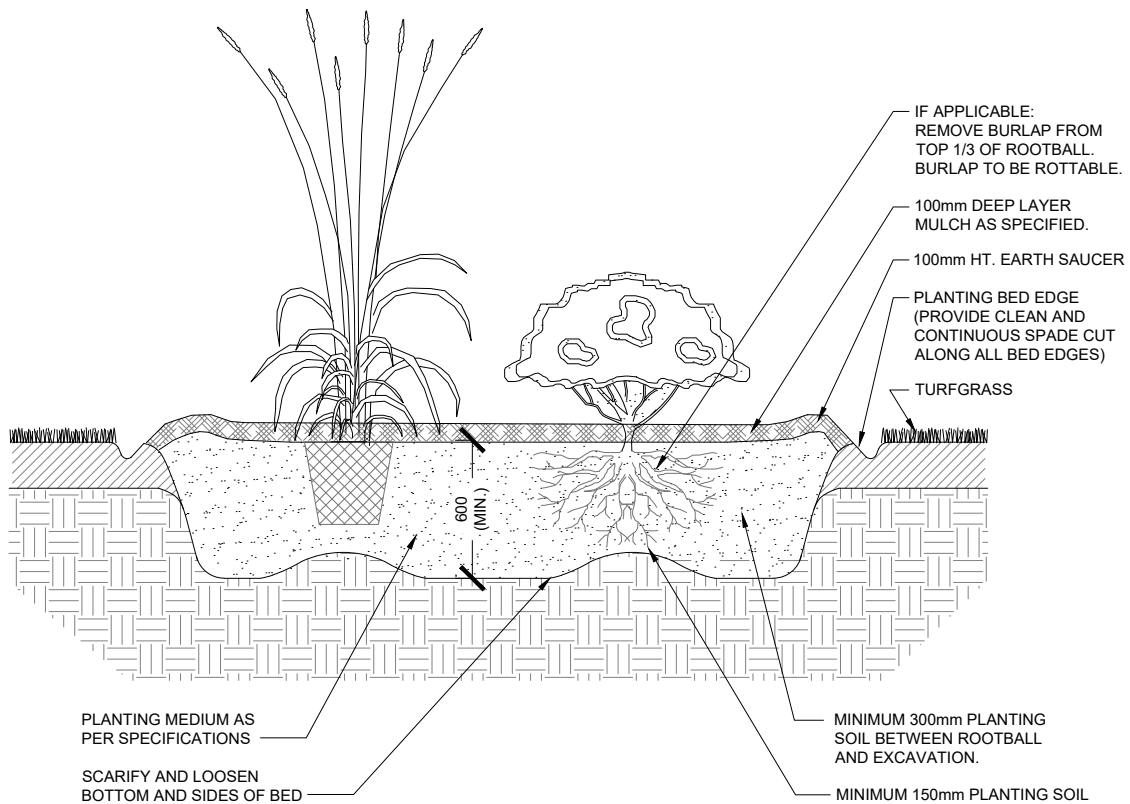
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**NOTES:**

1. SHRUBS ARE TO BE SPACED AS DIRECTED.
2. MYCORRHIZAL (FUNGI-BASED) SOIL INOCULANTS: ENDOMYCORRHIZAL AND ECTOMYCORRHIZAL INOCULANT THAT CONTAINS SEVERAL SPECIES OF FUNGI WHICH ARE TO BE INSTALLED WITH ALL PLANTINGS. REFER TO SPECIFICATIONS AND/OR SPECIAL PROVISIONS FOR INFORMATION.

 Region of Waterloo	Region of Waterloo Standard Planting Detail	<small>DIMENSIONS ARE SHOWN          IN MILLIMETERS UNLESS          OTHERWISE NOTED.</small>	<b>3.4.1</b>
	<b>SHRUB PLANTING</b> (B&B / CONTAINER STOCK)		Scale: N.T.S.
			Rev No.: 01
			Date: June 2024



**NOTES:**

1. PLANTINGS ARE TO BE SPACED AS DIRECTED.
2. MYCORRHIZAL (FUNGI-BASED) SOIL INOCULANTS: ENDOMYCORRHIZAL AND ECTOMYCORRHIZAL INOCULANT THAT CONTAINS SEVERAL SPECIES OF FUNGI WHICH ARE TO BE INSTALLED WITH ALL PLANTINGS. REFER TO SPECIFICATIONS AND/OR SPECIAL PROVISIONS FOR INFORMATION.

 Region of Waterloo	Region of Waterloo Standard Planting Detail	DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.	<b>3.4.2</b>
	<b>MIXED PLANTING BED DETAIL</b> (SHRUBS, PERENNIALS AND/OR ORNAMENTAL GRASSES - B&B/CONTAINER STOCK)		Scale: N.T.S.
			Rev No.: 01
			Date: June 2024

**ROUNDABOUT DESIGN NOTES:**

1. TWO TO THREE RINGS OF PLANTINGS, MAX.
2. TREE PLANTINGS WITHIN THE CENTRE, TYPICALLY CONIFEROUS.
3. 2.4M MINIMUM SOD OR SEEDED STRIP BETWEEN THE PLANTING BED AND CONCRETE APRON. (REFER TO SECTION 4: SEEDING INFORMATION.)

3 - 4 TREES WITHIN THE CENTRE OF THE ROUNDABOUT (DEPENDING ON SIZE OF ROUNDABOUT) ARE RECOMMENDED.

2 - 3 ROWS OF MASS PLANTING (MAX.) DECIDUOUS AND CONIFEROUS SHRUBS AS PER APPROVED PLANT LIST ARE RECOMMENDED.

2.4m - 3.0m WIDE BUFFER TURF STRIP OF SEED OR SOD  
CONCRETE APRON

Region of Waterloo  
Standard Planting Detail

**TYPICAL ROUNDABOUT PLANTING BED LAYOUT**

DIMENSIONS ARE SHOWN IN MILLIMETERS UNLESS OTHERWISE NOTED.

**3.5**

Scale: N.T.S.

Rev No.: 01

Date: June 2024

Page Size: 8.5" x 11"



## **4. SEEDING INFORMATION**

## 4.1. Approved Application Methods

### Hydroseed

Hydroseeding is the typical, preferred method of seeding for Region projects. Hydroseeding consists of the mixing of seeds, fertilizer, mulch and water into a slurry, that is then sprayed onto an area or areas that require a vegetated cover.

Prior to conducting the hydroseeding works, the area(s) to be seeded must be prepared by ensuring that the final grades are set, with a fine uniform surface that is free of erosion, surface stones greater than 50mm in diameter, weeds and other unwanted vegetation. The soil must be scarified to a depth of 25mm, minimum, for easy root penetration of the species within the specified seed mix. The seeded area must also receive an organic, pre-emergent herbicide application of Turf Maize, 98% Corn Gluten Meal, pre-emergent weed control per manufacturer's recommendations, at least 2 weeks prior to the final cultivation before seeding. Once prepared for the seeding works, the Contractor is to notify the Region's representative to inspect and approve the site conditions.

During the installation process, the Contractor must apply the slurry uniformly to all areas that are to be seeded as identified within the Landscape Contract Drawings and/or as directed by the Region's representative. For the minimum specifications for all hydroseeding works, the Ontario Provincial Standard Specification (OPSS) 803 is to be referenced and followed.

Upon completion of the hydroseeding works, the areas must be watered and maintained by the Contractor to promote establishment and a healthy growing condition during the growing season, until acceptance. These areas will be accepted by the Region's representative provided that the seeded areas are uniformly established and free of rutted, eroded, bare, or dead spots. Areas seeded in the fall will be accepted in the following spring, one month after start of the growing season, provided acceptance conditions are fulfilled.

### Terraseed

Terraseeding consists of perennial seeding with a pneumatically blown mixture of composted organics. This surface must be constructed with a pneumatic blower unit complete with a supplemental granular injection system capable of installing at least 15 cubic meters per hour.

Composted organics shall:

- Be pre-mixed and shall consist of 100% composted materials. Once mixed, composted organic material shall consist of particles where 100% of the material is able to pass through a 25 mm sieve.
- Be derived from 100% well-composted green organic waste matter.
- Meet the Ontario Ministry of the Environment and Climate Change's Interim Guidelines for the Production and Use of Aerobic Compost in Ontario definition for Type A compost and shall be supplied from composting sites certified to meet the Ontario Ministry of the Environment and Climate Change's Compost Regulation 101.

Prior to conducting the terraseeding works, the area(s) to be seeded must be prepared by ensuring that the final grades are set, with a fine uniform surface and are free of erosion, surface stones greater than 50mm in diameter, weeds and other unwanted vegetation. In addition, the soil must be loose, friable and appropriate for easy root penetration of the species within the specified seed mix. This preparation work must be done within seven (7) calendar days before the seeding works are to be completed. Once prepared for the seeding works, the Contractor is to notify the Region's Landscape Architect and/or Contractor Administrator to inspect and approve the site conditions.

Depending on slope gradation, depth of composted organics shall be as follows:

- 3:1 slopes and less – 50mm minimum application
- 3:1 and greater – 75mm minimum application

During the installation process, the Contractor must apply the composted organics and seeding uniformly at the specified depths to all areas that have been identified

for cover within the Landscape Contract Drawings and/or as directed by the Region’s representative. For the minimum specifications for all terraseeding works, the Ontario Provincial Standard Specification (OPSS) 803 is to be referenced and followed.

Upon completion of the terraseeding works, the seeded areas must be watered and maintained by the Contractor to promote establishment and a healthy growing condition for 60 consecutive days during the growing season. These areas will be accepted by the Region’s representative provided that the seeded areas are uniformly established and free of rutted, eroded, bare, or dead spots. Areas seeded in the fall will be accepted in the following spring, one month after start of the growing season, provided acceptance conditions are fulfilled.

### Scheduling of Seeding Works

The timing of completing seeding works, whether it be terraseeding or hydroseeding, must be followed to ensure proper establishment. Below are the scheduling timelines to be followed or avoided with seeding works:

- **March 1 through June 29:** Seeding during this period is appropriate, but germination of a portion of the seed may not occur until the following season following cold stratification to break seed dormancy. Cover crop generally germinates within 2 to 3 weeks of seeding operation.
- **June 20 through August 30:** Installation of seed should be suspended unless supplemental watering can be provided, or unseasonably cool conditions persist.
- **October 1 through November 30:** Seeding on bare, graded surfaces must be protected with specified erosion control blankets on slopes. Less cover crop will be observed during the following spring due to frost damage.

### 4.2. Soil Requirements (Existing & Proposed Soil Quality, Composition and Amendments)

Whether for tree planting or seeding, the importance of soil type and quality applies for proper establishment and growth. The functional connection between the seed mix species and the properties of the soil in which they are to grow, ultimately determines the health and success of the vegetation. It is for this reason, that it is highly recommended that laboratory soil testing of existing

soils occurs at the beginning of each Region of Waterloo project that involves seeding works. Through these tests, the extent of soil remediation that is necessary for the proposed seeding can be determined to improve control over the quality and quantity of the growing medium. It must also be noted that the quality and integrity of the subsoil is just as important as the organic layer of topsoil.

Please refer to section 2.2 for more information regarding soil testing.

### 4.3. Approved Seed Mixes

Typically, the following Lawn Grass seed mix is recommended to be most Region of Waterloo project types and locations (such as within urban areas, along most road thoroughfares and roundabouts).

#### Lawn Grass Seed Mixture

Botanical Name	Common Name	Seed Mix %
Lolium perenne	Perennial Ryegrass	30%
Festuca rubra	Creeping Red Fescue	15%
Festuca rubra subsp. commutata	Chewings Fescue	15%
Festuca trachyphylla cultivar	Hard Fescue	15%
Lolium arundinaceum	Turf-type Tall Fescue	15%
Poa pratensis	Kentucky Bluegrass	10%

Lawn Grass Seed Mixture Seeding Rate:

- Seed at 5lbs/1000 sq ft with hydraulic mulch cover

Alternatively, the Native Meadow seed mix, found on the following page, is to be used for specific project types and locations as determined by the Region of Waterloo Staff and the Landscape Architectural Consultant. This seed mix is recommended to be used for areas adjacent existing naturalized areas, restoring disturbed roadsides and/or select roundabouts.

### Native Meadow Seed Mixture

Botanical Name	Common Name	Seed Mix %
<i>Andropogon gerardii</i>	Big Bluestem	4%
<i>Anemone canadensis</i>	Canada Anemone	1%
<i>Asclepias syriaca</i>	Common Milkweed	2%
<i>Carex granularis</i>	Meadow sedge	15%
<i>Elymus canadensis</i>	Canada Wild Rye	20%
<i>Elymus virginicus</i>	Virginia Wild Rye	20%
<i>Euthamia graminifolia</i>	Grass leaved Goldenrod	1%
<i>Oenothera biennis</i>	Evening Primrose	10%
<i>Monarda fistulosa</i>	Wild bergamot	2%
<i>Rudbeckia hirta</i>	Black-Eyed Susan	10%
<i>Schizachyrium scoparium</i>	Little Bluestem	4%
<i>Solidago canadensis</i>	Canada Goldenrod	1%
<i>Solidago nemoralis</i>	Grey Goldenrod	2%
<i>Solidago rugosa</i>	Rough Goldenrod	2%
<i>Symphyotrichum ericoides</i>	Heath Aster	1%
<i>Symphyotrichum novae-angliae</i>	New England Aster	1%
<i>Symphyotrichum laevis</i>	Smooth Aster	2%
<i>Symphyotrichum umbellatum</i>	Flat Topped Aster	2%

### Native Meadow Seed Mixture Cover Crop

Botanical Name	Common Name	Seed Mix %
<i>Avena sativa</i>	Common Oats	60%
<i>Festuca ovina</i> cultivar	Sheeps Fescue	10%
<i>Festuca trachyphylla</i> cultivar	Hard Fescue	20%
<i>Lolium perenne</i>	Perennial Ryegrass	10%

All seed and seed mixes shall be in the original sealed package with the original legible label securely attached. All packing slips must be provided to client prior to seed placement. Labelling shall conform to the requirements of the Canada Seeds Act and Regulations. All seed and inoculants shall be stored in a cool, dry location until use.



## **5. MAINTENANCE INFORMATION AND REQUIREMENTS**



## 5.1. Typical Maintenance

The Region of Waterloo’s standard maintenance period for all plant material is for a period of two (2) years and one (1) year for all Hydroseeding and Terraseeding areas following acceptance. All plant material shall be maintained for two (2) years by the Contractor and be under warranty for two (2) years of full growing seasons (May – October) after the date of substantial completion and acceptance by the Region’s representative. The Contractor shall maintain all plant materials and planting areas immediately after planting and continue such maintenance until final acceptance. Payment for annual maintenance of all plantings will be based upon monthly inspections by the Region’s representative and given on a yearly basis to the end of the two (2) years.

For Hydroseeding and Terraseeding works, only seed which has rooted in place and exhibits vigorous healthy growth at the time of inspection will be deemed to have met the terms of the maintenance period. Seeded areas which show deterioration, bare spots, or failure to take root and thrive, shall be re-seeded and maintained for an additional sixty (60) days according to all the requirements as described in the Specifications or Special Provisions.

It is recommended that for each project that the Contractor:

- Submit a maintenance schedule for all Region of Waterloo project sites for each year’s maintenance activities. Maintenance shall include watering, pruning, fertilizing, maintaining mulch areas, weeding, debris pick up and replacement of dead plant material. At the time of each inspection, all plant material shall be completely free of diseases and insect infestations, and all planting beds and tree saucers shall be cultivated and free of all weeds and debris. The Contractor shall cultivate and keep planting beds and tree saucers free of weeds and debris.
- Provide plant replacements as required. All plant replacements are required to be replanted shortly after being identified via site inspection.
- Prune in order to mitigate hazards, remove dead or broken branches or to improve structure or health of the plant material. Pruning shall be carried out in accordance with current International Society of Arboriculture Best Management Practices (ANSI A300).

- For seeded areas, all rills and gullies greater than 100mm in width shall be repaired immediately throughout the maintenance period.

Adding fertilizer to newly planted trees that are subjected to transplanting and drought stress may be ineffective for root production and can promote soft growth. If transplanted trees are fertilized, only slow-release fertilizer with  $\geq 50\%$  water-insoluble nitrogen should be used. Fertilizer shall only be applied in order to correct nutrient deficiencies as required and included under this Item. Fertilizer application shall be subject to approval by the Authority or Contract Administrator and shall be applied as per manufacturer's specifications.

## 5.2. Watering Requirements for Establishment

Watering of plant material for any Region of Waterloo project is highly important and critical to the successful growth of the plant material. All trees must be watered at the time of planting to ensure good soil root contact and prevent air gaps.

It is recommended that during the maintenance period all trees shall be watered at a minimum every five (5) to seven (7) days, dependent on rainfall amounts and occurrences. The Contractor is to provide a weekly watering schedule to the Region's Project Manager at the beginning of each week for coordination purposes. Scheduled applications of water shall be skipped only when rainfall has penetrated the soil fully as required and is to be communicated to the Region's Project Manager by the Contractor for confirmation. Moisture will be monitored to avoid overwatering or under-watering. It is the responsibility of the Contractor to ensure that the plant material does not become stressed in dry periods. Should the tree die due to these dry conditions, the Contractor will be responsible for replacement, as per the warranty obligations.

**APPENDIX A**  
**APPROVED TREE SPECIES LIST**

Deciduous Trees										
Botanical Name	Common Name	Native or Non-Native	Salt Tolerance	Drought Tolerance	Tolerates Poor Soil	Tolerates Air Pollution	Resistance to insect/diseases	Tight Locations	Wind Tolerance	Ability to be Placed Under Hydro Lines
<i>Acer campestre</i>	Hedge Maple	Non-Native	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
<i>Acer saccharinum</i>	Silver Maple	Native	Somewhat	Somewhat	Yes	Yes	Disease	No	Yes	No
<i>Acer saccharum</i>	Sugar Mountain	Native	Somewhat	Somewhat	Somewhat	Somewhat	Yes	No	Yes	No
<i>Acer saccharum</i> 'Green Mountain'	Green Mountain Maple	Native Cultivar	Somewhat	Yes	Somewhat	Somewhat	Yes	No	Yes	No
<i>Acer saccharum</i> 'Legacy'	Legacy Maple	Native Cultivar	Somewhat	Somewhat	Yes	Somewhat	Yes	No	Somewhat	No
<i>Acer x freemanii</i> 'Jeffersred'	Autumn Blaze Maple	Native Cultivar	Somewhat	Yes	Yes	Yes	Yes	No	Yes	No
<i>Acer x freemanii</i> 'Celebration'	Celebration Maple	Native Cultivar	Somewhat	Yes	Yes	Yes	Yes	Somewhat	Yes	No
<i>Aesculus glabra</i>	Ohio Buckeye	Non-Native	Somewhat	Somewhat	Yes	Somewhat	No	No	Yes	No
<i>Aesculus hippocastanum</i>	Horse Chestnut	Non-Native	Somewhat	Somewhat	Yes	Somewhat	No	No	Somewhat	No
<i>Amelanchier canadensis</i>	Canadian Serviceberry	Native	Yes	Somewhat	Somewhat	Somewhat	Yes	Yes	Somewhat	Yes
<i>Amelanchier laevis</i>	Serviceberry	Native	Yes	Somewhat	Somewhat	Somewhat	Yes	Yes	Somewhat	Yes
<i>Amelanchier x grandiflora</i> 'Robin Hill'	Robin Hill Serviceberry	Native Cultivar	Somewhat	Somewhat	Somewhat	Somewhat	Yes	Yes	Somewhat	Yes
<i>Catalpa speciosa</i>	Northern Catalpa	Non-Native	Somewhat	Yes	Yes	Yes	Disease	No	Yes	No
<i>Celtis occidentalis</i>	Hackberry	Native	Yes	Yes	Yes	Yes	Disease	No	Yes	No
<i>Crataegus crus-galli</i> 'Crusader'	Thornless Crusader Hawthorn	Native Cultivar	Yes	Somewhat	Somewhat	Yes	No	Yes	Yes	Yes
<i>Ginkgo biloba</i>	Maidenhair Tree	Non-Native	Yes	Yes	Yes	Yes	Yes	No	Yes	No
<i>Ginkgo biloba</i> 'Princeton Sentry'	Princeton Sentry Maidenhair Tree	Non-Native	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
<i>Gleditsia triacanthos</i> var. <i>inermis</i> 'Imperial'	Imperial Honeylocust	Non-Native	Yes	Yes	Somewhat	Yes	Somewhat	No	Somewhat	No
<i>Gleditsia triacanthos</i> var. <i>inermis</i> 'Shademaster'	Shademaster Honeylocust	Non-Native	Yes	Yes	Somewhat	Yes	Somewhat	No	Yes	No
<i>Gleditsia triacanthos</i> var. <i>inermis</i> 'Skyline'	Skyline Honeylocust	Non-Native	Yes	Yes	Somewhat	Yes	Somewhat	No	Yes	No

Deciduous Trees										
Botanical Name	Common Name	Native or Non-Native	Salt Tolerance	Drought Tolerance	Tolerates Poor Soil	Tolerates Air Pollution	Resistance to Insect/diseases	Tight Locations	Wind Tolerance	Ability to be Placed Under Hydro Lines
<i>Gleditsia triacanthos</i> var. <i>inermis</i> 'Sunburst'	Sunburst Honeylocust	Non-Native	Yes	Yes	Somewhat	Yes	Somewhat	No	Yes	No
<i>Gleditsia triacanthos</i> var. <i>inermis</i> 'Street Keeper'	Street Keeper Honey Locust	Non-Native	Yes	Yes	Somewhat	Yes	Somewhat	No	Yes	No
<i>Gymnocladus dioica</i> 'Expresso' Tree	Expresso Kentucky Coffee Tree	Native cultivar	Yes	Somewhat	Somewhat	Yes	Yes	No	Yes	No
<i>Platanus occidentalis</i>	American Sycamore	Native	Somewhat	Yes	Yes	Yes	No	No	Yes	No
<i>Platanus x acerifolia</i>	London Planetree	Non-Native	Somewhat	Yes	Yes	Yes	No	No	Yes	No
<i>Platanus x acerifolia</i> 'Bloodgood'	Bloodgood London Planetree	Non-Native Hybrid	Somewhat	Yes	Yes	Yes	No	No	Yes	No
<i>Pyrus calleryana</i> 'Chanticleer'	Chanticleer Ornamental Pear	Non-Native	Yes	Yes	Yes	Yes	Yes	Yes	Somewhat	No
<i>Pyrus calleryana</i> 'Redspire'	Redspire Ornamental Pear	Non-Native	Yes	Yes	Yes	Yes	Somewhat	Yes	Somewhat	No
<i>Quercus alba</i>	White Oak	Native	Yes	Somewhat	Somewhat	Yes	Oak Wilt	No	Yes	No
<i>Quercus macrocarpa</i>	Burr Oak	Native	Yes	Yes	Yes	Yes	Oak Wilt	No	Yes	No
<i>Quercus robur</i>	English Oak	Non-Native	Yes	Somewhat	Somewhat	Yes	Oak Wilt	No	Somewhat	No
<i>Quercus robur</i> 'Fastigiata'	Pyramidal English Oak	Non-Native	Yes	Somewhat	Somewhat	Yes	Oak Wilt	Yes	Somewhat	No
<i>Quercus rubra</i>	Red Oak	Native	Somewhat	Somewhat	Somewhat	Somewhat	Oak Wilt	No	Somewhat	No
<i>Syringa reticulata</i> 'Ivory Silk'	Ivory Silk Tree Lilac	Non-Native	Yes	Yes	Yes	Yes	Yes	Yes	Somewhat	Yes
<i>Tilia americana</i>	Basswood	Native	Somewhat	Somewhat	Somewhat	No	Somewhat	No	No	No
<i>Tilia americana</i> 'Boulevard'	Boulevard Basswood	Native Cultivar	Somewhat	Somewhat	Somewhat	No	Somewhat	No	No	No
<i>Tilia americana</i> 'Redmond'	Redmond Basswood	Native Cultivar	Somewhat	Somewhat	Somewhat	No	Somewhat	No	No	No
<i>Tilia cordata</i>	Littleleaf Linden	Non-Native	Somewhat	Yes	Somewhat	Yes	Yes	No	Yes	No
<i>Tilia cordata</i> 'Greenspire'	Greenspire Linden	Non-Native	Somewhat	Yes	Somewhat	Yes	Yes	No	Yes	No
<i>Ulmus americana</i> 'Princeton'	Princeton Elm	Native Cultivar	Somewhat	Yes	Yes	Yes	Yes	No	Yes	No
<i>Ulmus americana</i> 'Valley Forge'	Valley Forge Elm	Native Cultivar	Somewhat	Yes	Yes	Yes	Yes	No	Yes	No
<i>Ulmus x 'Homestead'</i>	Homestead Elm	Non-Native Cultivar	Somewhat	Yes	Yes	Yes	Somewhat	No	Yes	No
<i>Zelkova serrata</i> 'Green Vase'	Green Vase Zelkova	Non-Native	Yes	Yes	Somewhat	Yes	Yes	No	Yes	No

<b>Coniferous Trees</b>										
<b>Botanical Name</b>	<b>Common Name</b>	<b>Native or Non-Native</b>	<b>Salt Tolerance</b>	<b>Drought Tolerance</b>	<b>Tolerates Poor Soil</b>	<b>Tolerates Air Pollution</b>	<b>Resistance to insect/diseases</b>	<b>Tight Locations</b>	<b>Wind Tolerance</b>	<b>Ability to be Placed Under Hydro Lines</b>
Juniperus virginiana	Eastern Red Cedar	Native	Somewhat	Yes	Yes	Somewhat	Yes	Yes	Yes	Yes
Larix laricina	Tamarack	Native	Somewhat	No	No	No	Yes	No	Yes	No
Picea abies	Norway Spruce	Non-Native	Somewhat	Somewhat	Somewhat	Yes	Yes	No	Yes	No
Picea glauca	White Spruce	Native	Somewhat	Yes	Somewhat	Somewhat	Yes	No	Yes	No
Picea pungens	Colorado Spruce	Non-Native	Somewhat	Yes	Somewhat	Yes	Yes	No	Yes	No
Thuja occidentalis	White Cedar	Native	Somewhat	Yes	No	Yes	Yes	No	Yes	No

**APPENDIX B**  
**APPROVED ORNAMENTAL PLANTING SPECIES LIST**

### Deciduous Shrubs

Botanical Name	Common Name	Native or Non-Native	Salt Tolerance	Drought Tolerance	Tolerates Poor Soil	Tolerates Air Pollution
<i>Cornus sericea</i>	Red Osier Dogwood	Native	Somewhat	Somewhat	Yes	Yes
<i>Cornus sericea</i> 'Arctic Fire'	Arctic Fire Dogwood	Native Cultivar	Somewhat	Somewhat	Yes	Yes
<i>Cornus sericea</i> 'Kelseyi'	Kelseyi Red Osier Dogwood	Native Cultivar	Somewhat	Somewhat	Yes	Yes
<i>Diervilla lonicera</i>	Bush Honeysuckle	Native	Somewhat	Yes	Yes	Yes
<i>Hypericum prolificum</i>	St. John's Wort	Native	Somewhat	Somewhat	Somewhat	Yes
<i>Rhus aromatica</i>	Fragrant Sumac	Native	Yes	Yes	Yes	Yes
<i>Rhus aromatica</i> 'Gro-Low'	Gro-Low Sumac	Native Cultivar	Yes	Yes	Yes	Yes
<i>Rhus typhina</i>	Staghorn Sumac	Native	Yes	Yes	Yes	Yes
<i>Rosa rugosa</i>	Rugosa Rose	Non-Native	Yes	Yes	Yes	Yes
<i>Spiraea japonica</i> 'Little Princess'	Little Princess Spirea	Non-Native	Somewhat	Somewhat	Somewhat	Yes
<i>Spiraea japonica</i> 'Neon Flash'	Neon Flash Spirea	Non-Native	Somewhat	Somewhat	Somewhat	Yes
<i>Spiraea x 'Gold Mound'</i>	Gold Mound Spirea	Non-Native	Somewhat	Somewhat	Somewhat	Yes
<i>Syringa vulgaris</i>	Common Lilac	Non-Native	Yes	Yes	Yes	Yes

### Coniferous Shrubs

Botanical Name	Common Name	Native or Non-Native	Salt Tolerance	Drought Tolerance	Tolerates Poor Soil	Tolerates Air Pollution
<i>Juniperus chinensis sargentii</i> 'Viridis'	Green Sargent Juniper	Non-Native	Somewhat	Yes	Somewhat	Yes
<i>Juniperus sabina</i>	Savin Juniper	Non-Native	Somewhat	Yes	Somewhat	Yes
<i>Juniperus virginiana</i> 'Grey Owl'	Grey Owl Juniper	Non-Native	Somewhat	Yes	Somewhat	Yes
<i>Juniperus x pfitzeriana</i> 'Pfitzeriana Glauca'	Blue Pfitzer Juniper	Non-Native	Somewhat	Yes	Somewhat	Yes
<i>Taxus x media</i> 'Densiflora'	Dense Yew	Non-Native	Somewhat	Yes	Somewhat	Yes
<i>Taxus x media</i> 'Wardii'	Ward's Yew	Non-Native	Somewhat	Yes	Somewhat	Yes

<b>Perennials</b>						
<b>Botanical Name</b>	<b>Common Name</b>	<b>Native or Non-Native</b>	<b>Salt Tolerance</b>	<b>Drought Tolerance</b>	<b>Tolerates Poor Soil</b>	<b>Tolerates Air Pollution</b>
<i>Asclepias tuberosa</i>	Butterfly Weed	Native	Yes	Yes	Yes	Yes
<i>Gaillardia aristata</i>	Blanket Flower	Non-Native	Yes	Yes	Yes	Yes
<i>Perovskia atriplicifolia</i>	Russian Sage	Non-Native	Yes	Yes	Yes	Yes
<i>Nepeta faassenii</i> 'Walker's Low'	Walker's Low Catmint	Non-Native	Yes	Yes	Somewhat	Yes
<i>Rudbeckia fulgida</i> 'Goldstrum'	Black-Eyed Susan	Non-Native	Somewhat	Somewhat	Somewhat	Yes
<i>Sedum spectabile</i> 'Autumn Joy'	Autumn Joy Sedum	Non-Native	Yes	Yes	Yes	Yes

<b>Grasses</b>						
<b>Botanical Name</b>	<b>Common Name</b>	<b>Native or Non-Native</b>	<b>Salt Tolerance</b>	<b>Drought Tolerance</b>	<b>Tolerates Poor Soil</b>	<b>Tolerates Air Pollution</b>
<i>Andropogon gerardii</i>	Big Bluestem	Native	Yes	Yes	Yes	Yes
<i>Bouteloua gracilis</i>	Blue Grama Grass	Native	Yes	Yes	Yes	Yes
<i>Calamagrostis acutiflora</i> 'Karl Foerster'	Karl Foerster Feather Reed Grass	Non-Native	Yes	Yes	Yes	Yes
<i>Helictotrichon sempervirens</i>	Blue Oat Grass	Non-Native	Yes	Yes	Yes	Yes
<i>Panicum virgatum</i>	Switch Grass	Native	Yes	Yes	Yes	Yes
<i>Panicum virgatum</i> 'Heavy Metal'	Heavy Metal Switch Grass	Native Cultivar	Yes	Yes	Yes	Yes
<i>Schizachyrium scoparium</i>	Little Bluestem Grass	Native	Yes	Yes	Yes	Yes
<i>Sorghastrum nutans</i>	Indian Grass	Native	Somewhat	Yes	Yes	Yes

**APPENDIX C**  
**TREE SETBACK REQUIREMENTS - RIGHT-OF-WAY**  
**(R.O.W.) INFRASTRUCTURE GUIDELINES TABLE**

The guidelines below provide standard setbacks, but individual site context and other local variables should be considered by Landscape Architects and designers before siting trees along the roadway.

R.O.W. Infrastructure	Depth	Height	Setback / Offset Requirements	Restrictions / Notes
House Services (water, storm, sanitary)	1.75 - 2.75m		Ideal: 2.0m from centre of trunk Min: 1.5m from centre of trunk	3.0m service trench location dependant on lot width
Watermain	1.75m		Ideal: 2.0m from centre of trunk Min: 1.5m from centre of trunk	
Light Standards		5.0 - 8.0m	No trees to be planted within 5.0m radius from light standards.	Allow for maintenance access. Canopy cannot block illumination.
Hydro Pole		9.0 - 10.0m	2.0m from canopy edge	Allow for maintenance access
Hydro / Joint Use Trench	1.4m		1.0m from centre of trunk	Allow for maintenance access
Transformer		1.2m	Centre of trunk 1.2m from sides and 3.0m from door	Allow for maintenance access
Telecom. Trench	1.4m		1.0m from centre of trunk	Allow for maintenance access
Telecom. Box		1.2m	1.0m from centre of trunk	Allow for maintenance access
Fire Hydrant		1.0m	2.0m from centre of trunk	Allow for maintenance access
Gas Main	1.2m		2.0m from centre of trunk	
Property Lines			1.0m from centre of trunk	Alleviate maintenance disputes
Pavement and Sidewalks			Ideal: 2.0m from centre of trunk to back of sidewalk Min: 1.5m from centre of trunk to back of sidewalk	Heaving and root flare conflict
Back of Curb			Ideal: 2.0m from centre of trunk to back of curb Min: 1.5m from centre of trunk to back of curb	1.0m offset to allow for snow plow trucks and overhanging branches for car doors and parking lanes. Minimize tree disturbance related to future roadworks.
Driveway			2.0m from centre of trunk for residential and 3.0m for commercial / industrial	Visibility and minimize tree disturbance related to future roadworks.
Structures (Buildings)			4.0 – 6.0m from centre of trunk	Pruning may be required depending on mature tree size
Signs			5.0m from centre of trunk	Visibility. Pruning may be required depending on mature tree size
Ditch			5.0m between centre line of ditch and tree	Allow for maintenance access
Stop Signs & Intersections			10.0m minimum from centre of trunk	Visibility

