



Centre for  
Trail Excellence

# Tree Planting Resource Guide





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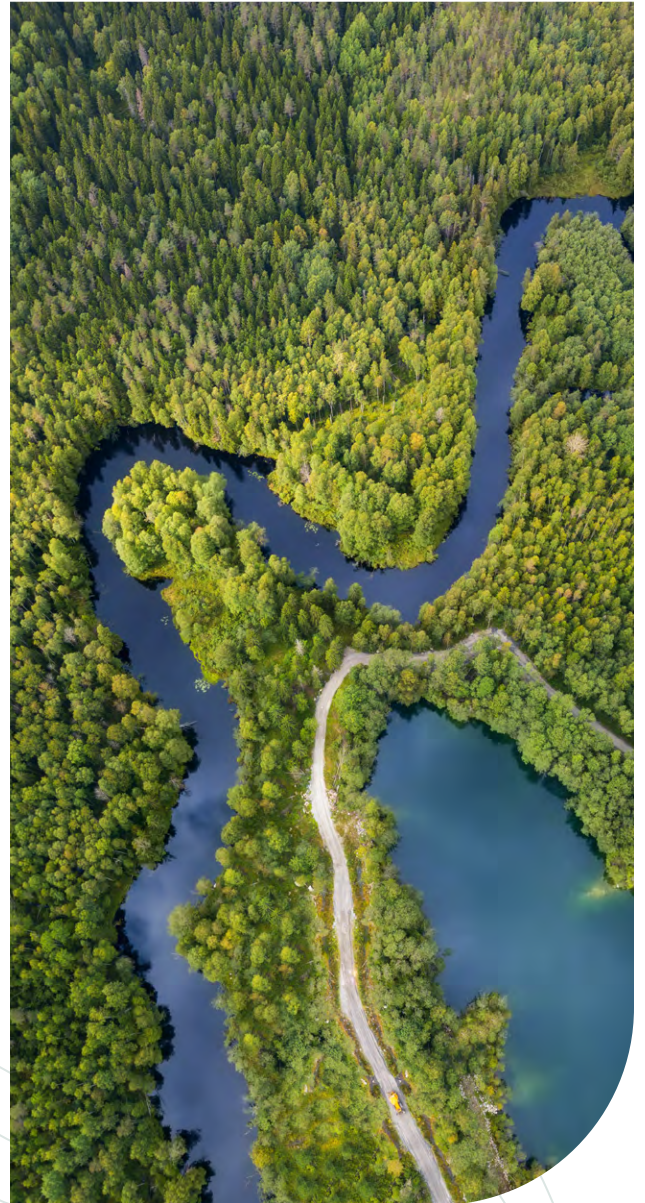
# Indigenous Land Acknowledgement

**Trans Canada Trail** acknowledges that the Trans Canada Trail is situated on the traditional territory of First Nation, Inuit and Métis peoples from coast to coast to coast. Trans Canada Trail also acknowledges that the Trail includes land and water routes that were created and used, both historically and presently, by Indigenous peoples as seasonal travel and trade routes. We support community efforts to sustain a relationship with Indigenous peoples based on respect, dignity, trust and cooperation, in the process of advancing truth and reconciliation.



# About Trans Canada Trail

The Trans Canada Trail (the Trail) is the longest recreational trail in the world, spanning over 28,000 kilometres on land and water. Linking three oceans – the Atlantic, Pacific and Arctic – the Trail connects 15,000 rural, urban and Indigenous communities across every province and territory. It is a ribbon that connects Canada's diverse landscapes, seasons, people and experiences, and fosters unity, collaboration and connectedness. Trans Canada Trail is a registered charity and stewards this national trail in collaboration with local Trail partners. With funding from the Government of Canada through Parks Canada, and investments from all levels of government and generous donors, Trans Canada Trail is the largest investor in trail infrastructure projects in Canada, supporting improvements, growth and enhancements for generations to come.



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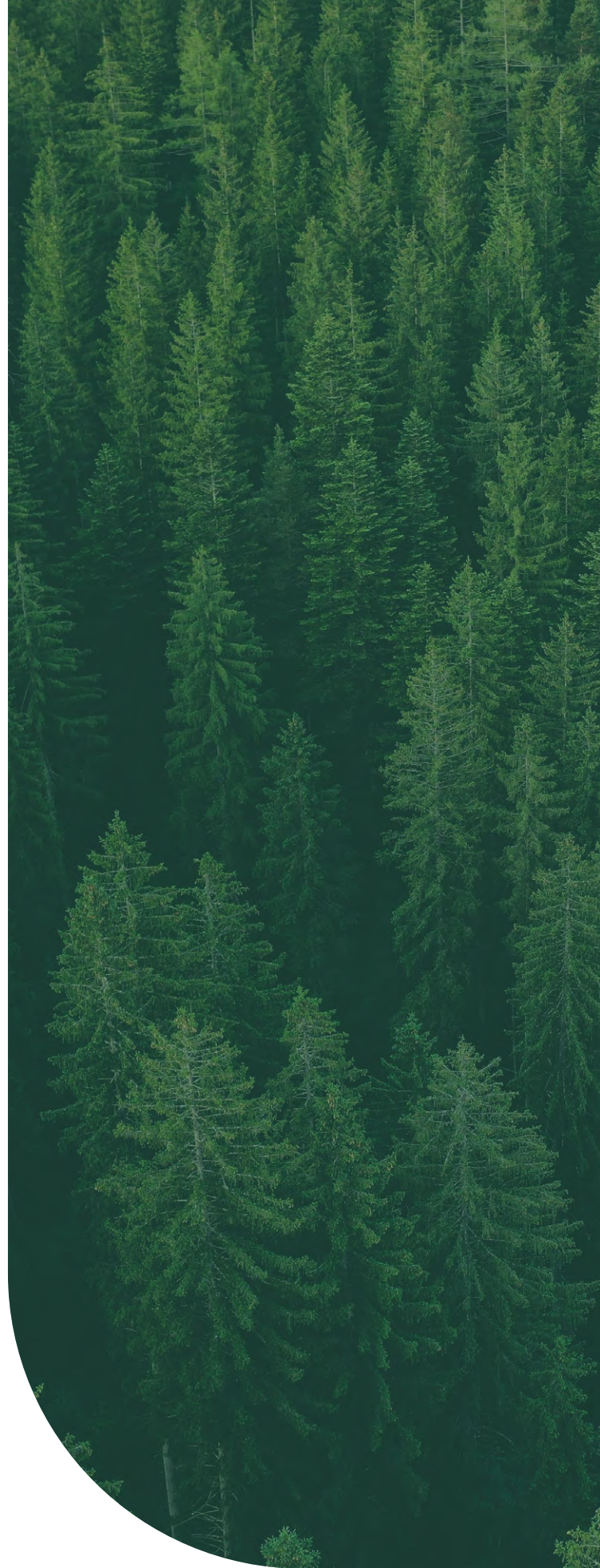
## Our Mission

As the longest trail network in the world, the Trans Canada Trail connects Canadians and visitors to nature and to one another, from coast to coast to coast, through accessible and inclusive outdoor activities. Through collaboration and partnerships, we build, maintain and steward Canada's national trail, a unique system of connected urban and rural trails.

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## Our Vision

Building on the achievement of connection, the Trans Canada Trail will continue to inspire everyone to embrace the outdoors, to discover the diversity of our land and people, to enhance their health and well-being, and to share their stories along this globally significant and iconic trail network.



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## Objective of this Guide

Trans Canada Trail is pleased to provide this guide to help with planning and preparing to plant trees in places where they will have the best chance at success, as well as offering guidance on good planting practices. The target audience for this guide is volunteer-led trail groups. Our focus lies with this audience as many municipalities and towns and cities will have tree planting guidelines in place.

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## Acknowledgements

Our thanks to Jamie MacLean, who provided the illustrations in this guide.

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## Disclaimer

This collection of resources is being made available to the trail sector, including volunteers, to support the planting of trees. It includes information, websites and other resources that may further support tree-planting initiatives. All resources are intended for informational, educational and/or capacity-building purposes. Trans Canada Trail, its contractors and other contributors assume no liability for this content or its application. If you have a question about established guidelines for the area you are planting, check with the relevant local authority.

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## Introduction

Trees are the largest and longest-living organisms in the environment. Too often, people take trees for granted and do not consider the benefits they provide. Maximizing these benefits is dependent on careful planning and selection. If a tree does not match the site, it can become more of a liability than an asset. The goal for any tree planting is to maximize the benefits and minimize the inputs necessary for it to be sustainable.

The information provided in this resource guide aims to help you better understand your planting site so you can choose a native tree species that will thrive in the location. When planting trees, we need to consider that some may not thrive and may even die. There are many factors that influence the success rate of planted trees and some factors are out of our control. Our goal is to reduce any negative impacts and give the planted trees the best chance of survival.

We recommend approaching tree-planting projects with an aim to increase biodiversity. Including a variety of native trees and plants in your project will help to increase biodiversity, foster tree growth, provide essential nutrients, attract pollinators and protect against pests and diseases. A biodiverse landscape will contribute to better soil health and ecosystem resiliency, and ensure the long-term sustainability of your project.

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## Companion documents

The following companion documents have been created for reference as you plan tree-planting activities:

- [Native Tree Species List](#)
- [Native Plants & Shrubs Species List](#)



# Site Assessment

When assessing a potential site, consider the nature of the landscape and what the trees will be exposed to daily in the environment. Trees are often planted based on the average weather conditions, when in actuality, they experience (relative) seasonal extremes of hot and cold.

This section includes information and considerations for assessing a site in order to give trees the best chance at successful development, including planning ahead, soil considerations, light tolerance, branch conflicts, determining a location, root considerations, the potential impact of invasive species, as well as pests and diseases.

## 1. Planning ahead

To achieve a favourable result in the future, start by creating a plan that will lay out your path to tree planting success. Questions to address could include the following:

- **What are the goals of the tree planting? For example: to increase biodiversity, create shelter, mitigate erosion, or provide a food source for wildlife.**
- **Site condition considerations, such as the following:**
  - Will the site be exposed to elements such as wind, road salt or pollution?
  - Is the soil moist or dry? Acidic or alkaline? Clay or sandy?
  - Will sunlight requirements be met?
  - How will you determine any currently unknown (to you) site conditions?
- **Will the site meet the needs of the tree(s) once they have reached full maturity, including the following:**
  - Considering the anticipated size and shape of the mature tree  
Spacing needs
- **Are there potential environmental impacts on the existing ecosystem? For example: planting dominant species that will choke out existing native populations, or planting trees where an existing ecosystem provides a unique habitat for plants and animals that would be negatively impacted by introducing tree species (e.g., native prairie grassland ecosystems)**

## 2. Soil considerations

The relationship between a tree and the soil where it is planted is complex and has a major influence on a tree's growth and health. Soils are described by indicators including their physical composition (minerals that make up the soil and how they're arranged) and chemical composition (acidity, salinity and nutrients).

Soil considerations include access to moisture, nutrients, temperature, drainage and porosity. Try to choose a site that will provide as many of these growth requirements as possible, while also selecting a tree that will grow well in the existing soil. Conditions vary between sites and are not always obvious during a single visit.

Indicators to assess include the following:

- **Soil structure**

- A soil structure with the presence of good pore space allows roots to grow and access air, water and nutrients.
- If poor soil is assessed, its composition can often be improved with the addition of elements such as compost, sand, structural soils, etc. Note: this can create multiple soil profiles for the root system to navigate as the tree grows. Ideally, a tree should be selected to match the site conditions.

- **Compacted soil**

- A simple test for soil compaction and water uptake is to dig a hole, pour water into it and see how quickly it drains out.
- In sites with compacted soil, often less water and air are accessible to the fine roots, and the growing tips have a harder time forcing their way through the material. This is a common problem for urban trees and includes any area that has frequent foot or vehicle traffic.
- Where serious compaction has occurred, a pitchfork can be (carefully) used to loosen the soil in the root zone.

- **Soil water**

- Soil water availability can often be a critical problem for newly established trees. Too little causes drought-like conditions and without an established root system, the seedling will fail. Too much water, and the roots will lack access to oxygen, also leading to seedling failure. This is discussed further in [Post-Planting and Establishment](#).

### 3. Light tolerance

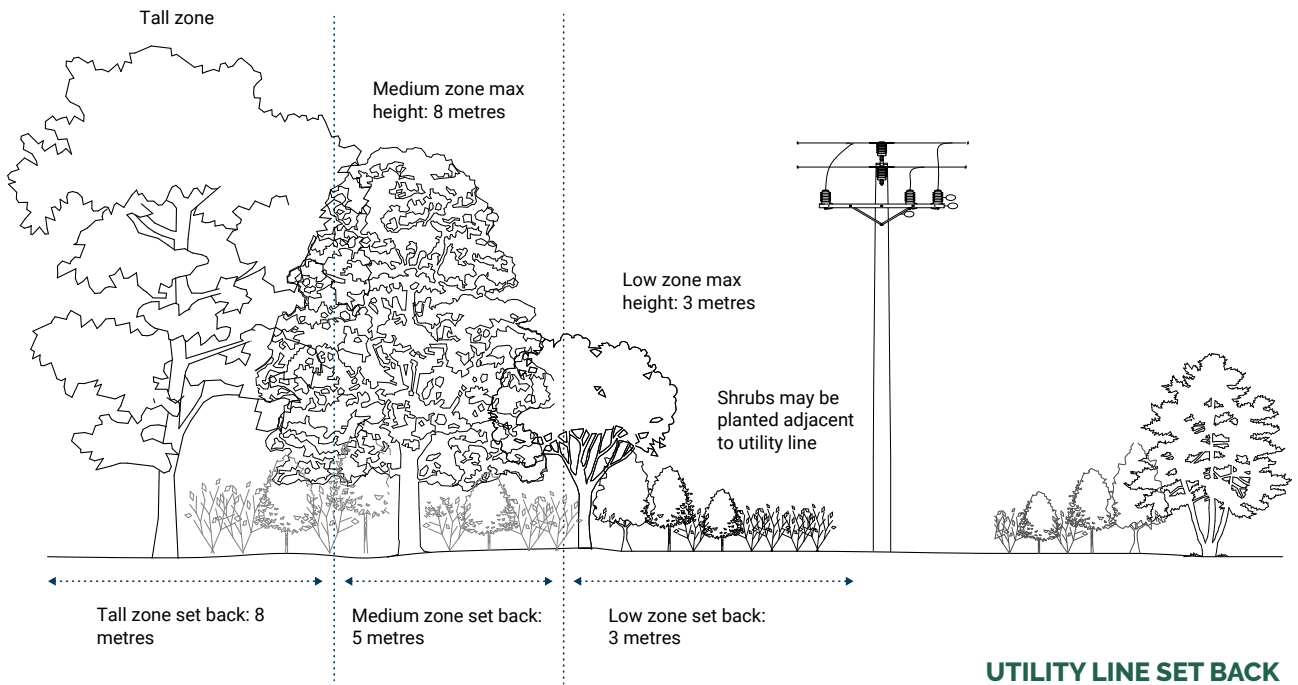
Trees vary in their response to sunlight levels. Tree species can have a narrow or wide range of light tolerance. Matching the right tree to a specific site location based on light availability will increase its chances for long-term success.

SUN TYPE	EXPOSURE TO SUNLIGHT
Full Sunlight	More than 6 hours of direct sunlight per day
Partial Shade	Fewer than 6 hours of direct or filtered sunlight per day
Full Shade	Fewer than 4 hours of filtered sunlight per day; very little to no direct sunlight per day

### 4. Branch conflicts

Prior to planting, it is essential to determine the distance from the planting site to nearby infrastructure (trails, buildings, utility wires, poles, bridges, etc.). When choosing species, aim to reduce the chances of branch conflict by considering the mature size (both height and width), growth form or habit in relation to nearby trails or structures.

If you have a question about any established guidelines in your area, check with the relevant local authority.



## 5. Determining a location

When determining the feasibility of a location for tree planting, several factors should be considered. These include advance research, buffer distance needs, the potential of salt and de-icing damage, and accessibility.

### Advance research

Before digging, make sure to be informed about underground utility locations. The local municipality is a good starting point for determining the appropriate people/companies who can provide this information. Once you have received the information, use it to avoid buried cables and wires on the property as you conduct tree-planting activities.

### Buffer distances

Riparian buffers are planted to create a buffer zone between agricultural land and bodies of water. Among many benefits, a riparian buffer can help to stabilize eroding banks and protect waterways and farmland. To begin the process:

- Inventory of previous vegetation: effective riparian buffer zones have two to three vegetation zones, with a mix of smaller shrubs and larger trees.
- Determine ideal size: the width you choose is highly dependent on the function of the buffer, e.g., bank stability (5 metres), sediment removal (10–30 metres) and wildlife corridor habitat (10–300 metres).

### Potential for salt/de-icing/snow removal damage

Spray-salt damage is most evident along heavily travelled highways where high speeds result in a high volume of salt spray being deposited on nearby plants and trees. Damage is typically most severe within 18 metres of the road, although it can sometimes extend much farther (for example: spray deposited on elevated highways over trails). Consider the following to minimize the potential for damage:

- A minimum distance of 5 metres from the roadside can reduce the stress of salt on trees. This is dependent on the grade; a downward slope towards the tree will increase exposure to salt damage. It is crucial to plant salt-tolerant species in these areas.
- Water trees well in warmer winter temperatures to lower the concentration of salt in soil.
- Avoid locations that are highly trafficked by snow-removal operations. If your trail is plowed in winter, keep in mind that deposited snow piles can crush young saplings.

## Accessibility

A tree's shape can impact a site location's accessibility, therefore:

- Consider the growth form of the tree: Will lower branches obstruct pedestrian traffic? Will a dense crown or branches obstruct sightlines and affect pedestrian safety and vehicular traffic?
- The trail corridor must be maintained for accessibility and safety; trail corridors are discussed further in [Planting Distances](#).

## 6. Root considerations

Tree roots serve multiple functions: they anchor the tree to the ground, absorb water and nutrients, and store food reserves. Root growth, development, size, form and function are controlled by genetics, environment and management. The roots of most trees develop in the top one metre of soil, with most of the small absorbing roots located in the top 15 centimetres of soil.

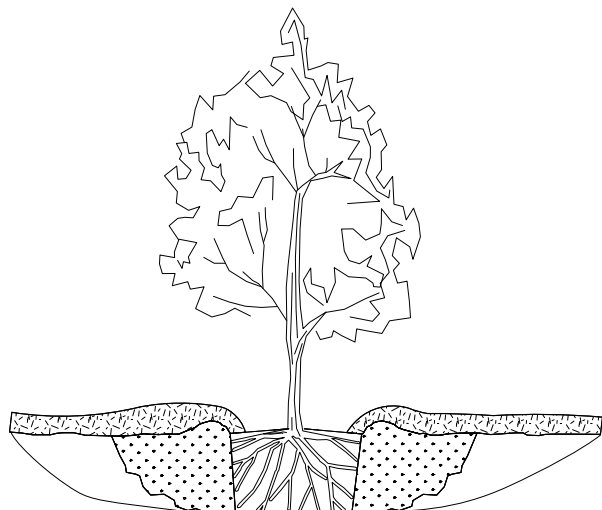
### Potential for root issues during transplanting

- Roots are easily torn and damaged during the transplanting process, especially small, fibrous roots.
- Girdling roots can circle and create congested root systems, drastically limiting the lifespan of a tree. When planting, be sure to check that roots are not circling, and have the potential to expand outwards.
- Girdling roots are often associated with planting too deeply, compacted soil and poor nursery practices.

### Root zone requirements

Biomass aboveground does not equal biomass belowground.

- Planting holes should be wide and long, not deep. Never dig a hole deeper than the root ball.
- Roots may extend laterally for large distances, often 2-3x the width of the crown.



Planting hole 3x the width  
of the root ball

## Root conflicts

- Roots are opportunistic and will grow where conditions are favourable (water, air, nutrients). Some species have more aggressive root systems than others. If possible, remove competing plants from the area.
- Mature trees may have roots that extend underneath a trail. When planting adjacent to a trail, consider a tree species with a taproot rather than one with shallow roots or one that is prone to surface roots. Keep in mind that mature trees may develop surface roots over time, especially when conditions are poor.

## 7. Potential impact of invasive species

An invasive species has a destructive impact on one or all of the following: built infrastructure, natural assets, and/or human health and safety. An invasive species often lacks natural enemies or other forms of competition to keep its range and population in check.

Integrated Pest Management is a holistic approach to prevent and manage pest damage, and keep pest populations below specific thresholds. A combination of preventative practices and carefully selected control strategies and treatments are used, with an emphasis on reducing pesticide use.

The threshold of pest populations that triggers pest management varies and is species-specific. Pests and invasive species that have severe human health impacts, such as giant hogweed, may be treated with zero tolerance while other pests that are simply a nuisance may be treated with a higher level of tolerance. Early detection and action are critical to an effective response.

A long-term strategy for most invasive species includes the following:



- Dispose of invasive plants in garbage, not compost. Discarded flowers may produce seeds.
- Remove the most prolific seed producers first (identify the fruit-bearing plants in late fall).
- Dedicate a certain time of each year to control efforts.
- Plan to replant native species once the invasive species have been eradicated.
- Follow-up monitoring is crucial to remove seedlings that may come up after initial removal efforts.

Anyone using a pesticide, herbicide, fungicide, etc., is responsible for complying with all federal and provincial legislation regarding its use.

Resources for invasive species vary by region. The [Invasive Species Centre](#) is a great

resource that highlights common invasive species and management strategies.

The Government of Canada's [Invasive Alien Species Strategy](#) provides information about the prevention of new invasions, early detection of new invaders, rapid response to new invaders and management approaches.

## 8. Pests and diseases

Plant selection, site preparation and monitoring young plants can help to manage many pests and diseases. Refer to local nurseries to help to identify and manage common pests and diseases. Trees are resilient, and the presence of a pest population may be within a manageable threshold for the tree (e.g., insect feeding and leaf-distorting pests and diseases). Pests and diseases will continue to change over time with climate change, warmer winters not leading to dieback of insects, and pest/disease migration through regions. Trees with potential pests and disease issues are noted in the companion tree list. To learn more about the pests and diseases impacting trees in Canada, refer to Natural Resource Canada's online tree list – [available here](#).



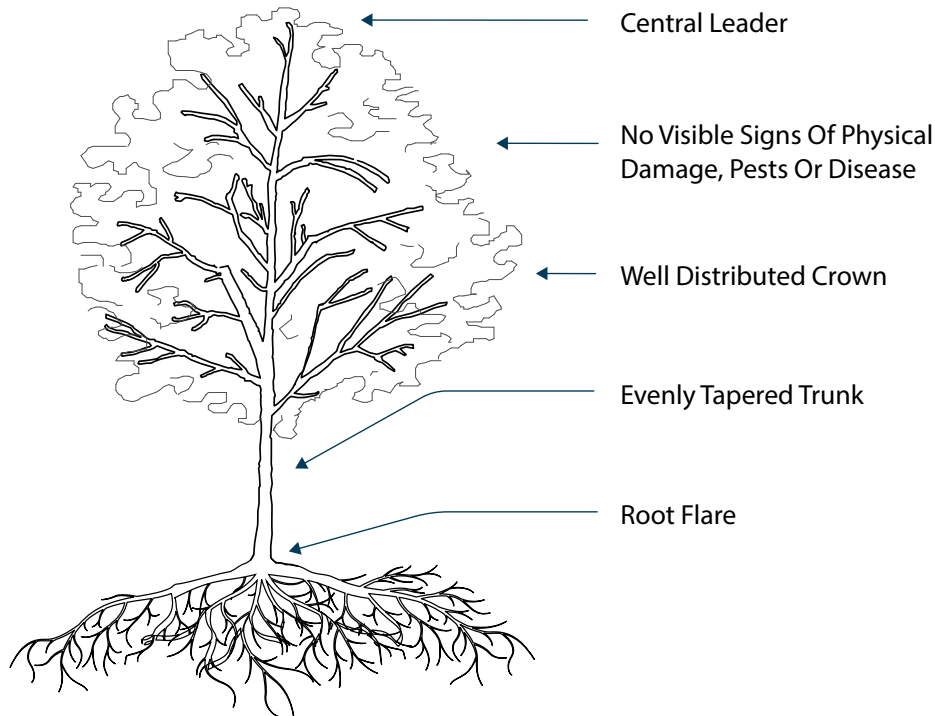


# Preparing for Planting Success

Once a site is selected, you can make choices that will increase the likelihood of planting success. This section includes information and considerations for site preparation, including how to pick a healthy specimen and its handling and care.

## 1. Pick a healthy specimen

Tree species should be considered based on aesthetic appeal, hardiness zone, size, form and most importantly, site conditions of the growing location. Choosing a tree that will succeed in a location increases its long-term survival and reduces maintenance and potential risks. Additionally, it allows the long-term benefits of the tree to be realized. When possible, increase species diversity by choosing trees from various plant families. To minimize conflicts and reduce maintenance needs, trees should be visualized at mature size.



### CHOOSING A HEALTHY SPECIMEN

## Nursery stock

- Choosing a healthy tree starts with a reputable nursery.
- Pick trees with evenly spaced branches and strong, straight trunks. For most trees, there should only be one central leader stem, which will develop into the trunk. Shrubs should have a symmetrical form with no gaping spaces.
- Buy from local sources, as those species have been proven to succeed in your climate and have been acclimatized to the area.

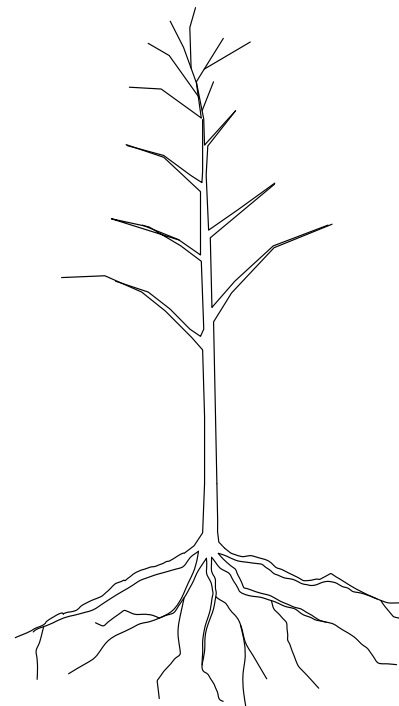
## What to look for

- Foliage: Conifer seedlings should have at least 2/3 of the stem length exhibiting live, healthy foliage that is free of disease. Foliage should not be wilting or damaged, and the leaf colour should be appropriate for the season.
- Root mass: Look for an even and strong root flare (where the roots join the trunk). There must be adequate root mass to form a cohesive plug. Roots should not be pot-bound if in containers, and soil should not easily fall away.
- Any disease infecting the main stem is unacceptable.
- Insect damage can be present, but stock with significant damage is unacceptable.
- Environmental damage: Generally, frost or drought damage that kills buds, foliage or roots is unacceptable. Minor amounts of damage may be acceptable.

Trees can be purchased in various stock types: bare-root, containerized, container grown, balled and burlapped, as well as seedlings.

## Bare-root

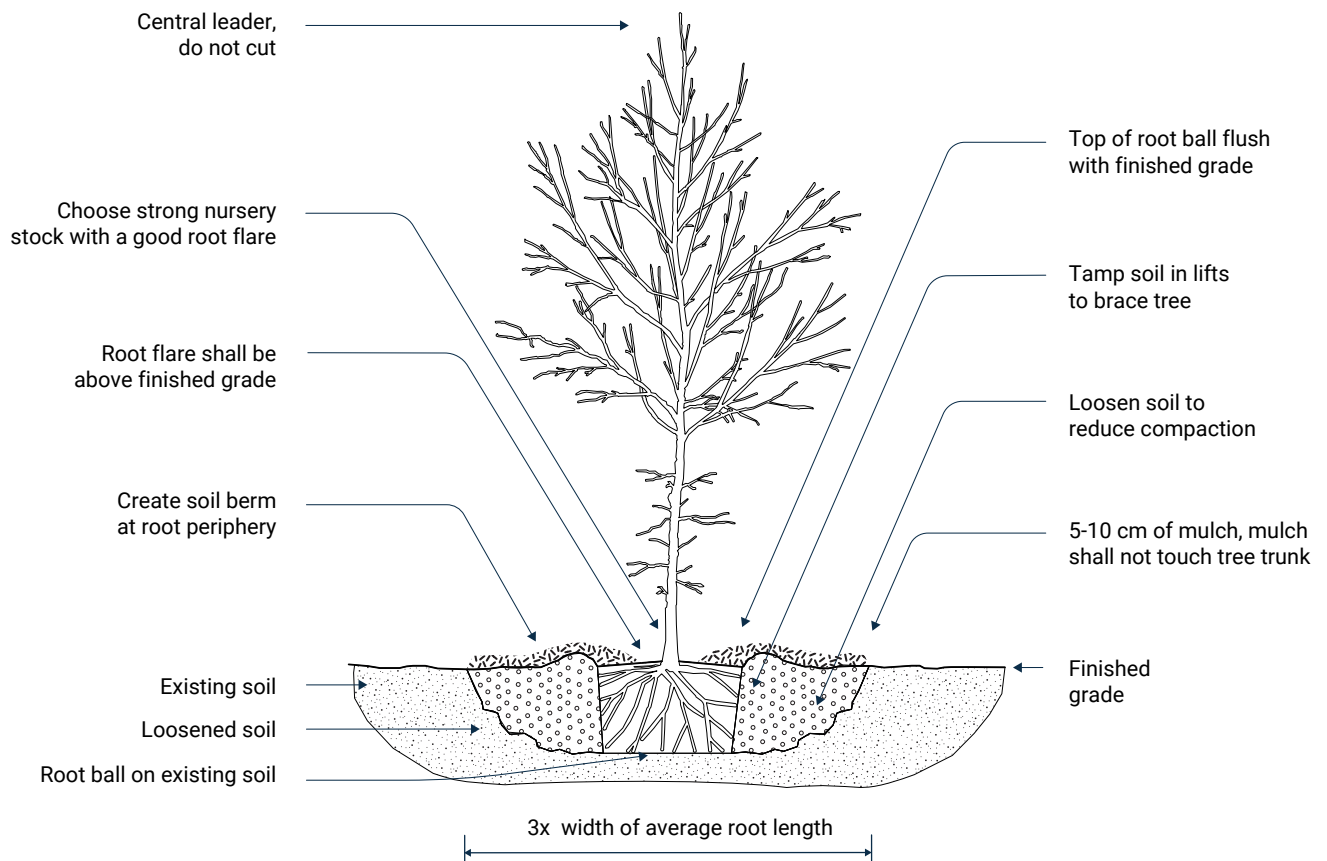
- Usually small and easy to transplant.
- Planted during the dormant season before roots and buds begin to grow.
- Vital that the roots be kept moist and stored cold, but not frozen.



**BARE-ROOT TREE STOCK**

## Containerized/Container grown/Balled and burlapped

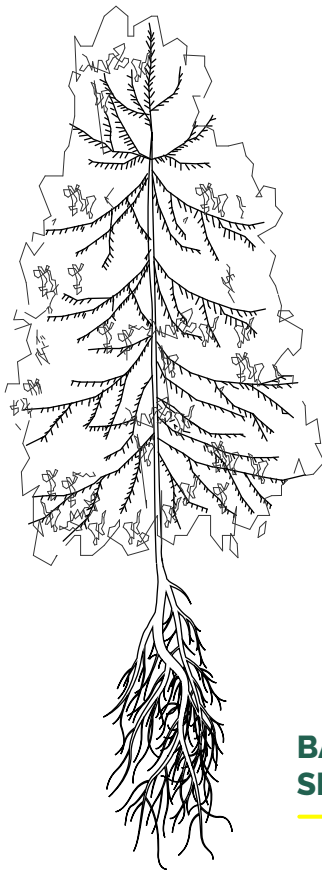
- Commonly found in nurseries.
- Can be planted any time of the year when the ground is not frozen.
- Remove containers before planting, including biodegradable containers.
- Check the roots systems, as some will have matting along the container wall; remove or pull apart.



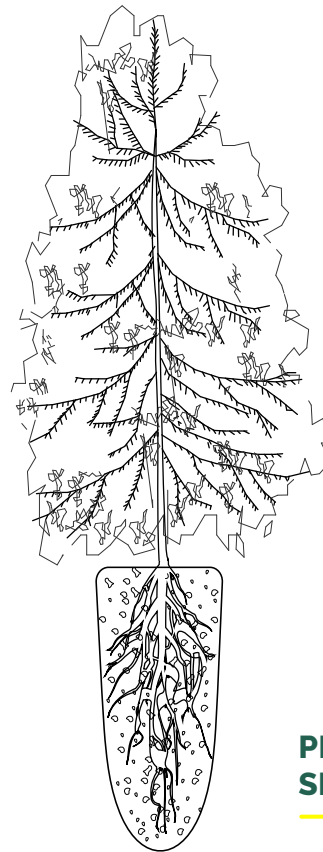
### **CONTAINERIZED TREE PLANTING GUIDELINES**

## Seedling plugs/pots

- Typically found in evergreen species; grown from seed in trays.
- The soil in the cell is “plugged” by the seedling roots.
- Easy to handle and plant.



**BARE-ROOT  
SEEDLING**



**PLUG  
SEEDLING**

Other things to consider when selecting a tree species are mature size and growth rate. Trees are classified into different height classes. Strongly consider the mature tree size when selecting a tree for a specific location, as there can be a difference of more than 30 metres in height between a very small tree and a large tree. Growth rates will be influenced by the site’s conditions, i.e., soil, water, drainage, light exposure.

## GROWTH RATE

## CONSIDERATIONS

### Fast

- Can grow up to 60 cm or more in height annually. Great to fill space quickly.
- Often tolerant of poor soil.
- Often have weak or brittle wood, prone to break easily in weather events.

### Moderate

- Grows 30–60 cm in height annually.
- Often have attributes of both fast and slow growing.

### Slow

- Grows 30 cm or less in height annually.
- Often long-lived species, with strong defense mechanisms to resist pests and disease.
- Strong, dense wood with strong branch attachments.

## 2. Handling and care of tree seedlings

### Handling

- Aim to avoid physical damage such as broken tops, injured bark, stripped foliage or torn roots.
- When transporting, always hold the seedling by the root ball, supporting the weight of the tree with the container.
- Trees should not be held by their branches.

### Transportation and delivery

- Transport trees in a covered vehicle; this helps protect the needles, branches and leaves from physical damage from wind and dehydration. If trees are being transported in an open vehicle, bring a mesh tarp to cover and protect the canopy.

## On-site handling

- Schedule delivery to minimize holding time on-site. If planting is postponed, the trees/shrubs stored on-site should be protected and watered.
- Adequate moisture must be provided to the roots to avoid desiccation of the root system.
- If trees are held on-site for any significant length of time before planting, the root ball should be checked daily and kept moist. If possible, leave the trees in a shady area.

Additional reference information can be found in the [Canadian Nursery Stock Standard](#).





# Tree Installation

The steps taken when installing a tree in the site selected are key to its long-term health. This section includes information and considerations for tree installation including when to plant, factors to consider while planting, and planting guidelines.

## 1. When to plant

In general, the best time to transplant most tree species in temperate climates is in the early spring or fall while the tree is dormant. Transplanting at this time of year gives the roots a chance to grow and establish with little heat and water stress. Summer planting can be successful with a thorough watering plan.

	CONSIDERATIONS	TREE TYPE
Fall	<ul style="list-style-type: none"><li>• Soil temperatures and moisture conditions encourage good establishment</li><li>• Less canopy stress but may predispose to winter injury and/or heaving</li><li>• Deciduous trees can be planted from leaf-fall until the soil can no longer be worked</li></ul>	Containerized, Plug seedling
Spring	<ul style="list-style-type: none"><li>• Best if trees are planted before bud break</li><li>• Deciduous trees can be planted in the spring, as soon as the frost is out of the ground</li><li>• Evergreen trees prefer to be planted early in the spring, or in the fall until the soil can no longer be worked</li></ul>	Bare-root, Containerized, Plug seedling
Summer	<ul style="list-style-type: none"><li>• Often causes excessive canopy stress</li><li>• Planters must ensure adequate moisture levels</li></ul>	Containerized

## 2. Planting considerations

### Site prep

The planting hole should never be deeper than the distance from the trunk flare to the bottom of the root ball. Planting a tree too deeply can cause stress, drowning, or suffocation of roots; it also increases the chances of pests or disease entering the trunk.

Soil amendments such as fertilizer are not always beneficial to tree establishment and growth. Instead, choose a tree that is right for the site.

### Planting distance

Consider the tree at mature size and the goals of the site.

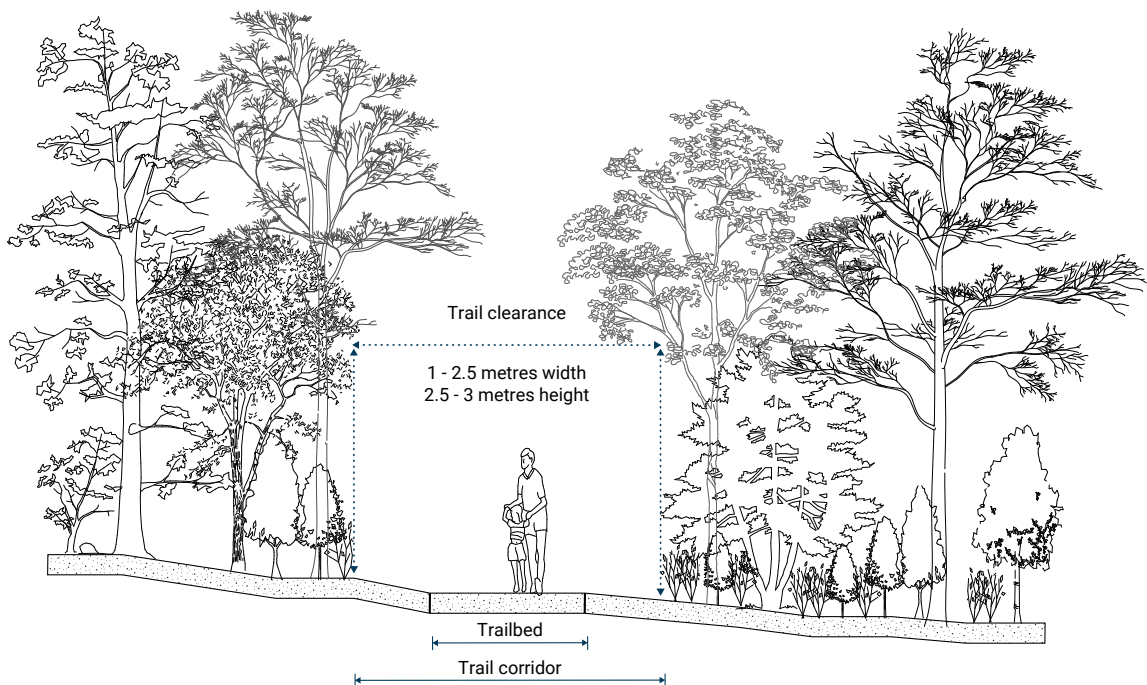
- Will the tree be planted as a singular specimen or as a grouping?
- Are there infrastructure elements that need to be considered?

The following distances are suggestions; higher density can be used if trying to imitate a forest rejuvenation or if tree failure is likely. Distances are measured from the centre of the trunk. These distances may have branch conflicts if the mature tree form is broad.



Mature Tree Size	Planting Distance (metres apart)
Shrubs/Very Small	1–5
Small Trees	3–6
Medium Trees	4–8
Large Trees	5–12

The trail corridor must be maintained for accessibility and safety. The dimensions are determined by the needs of the users and the challenge level of the trail. Average clearances are 1–2.5 metres wide and 2.5–3 metres high. Check with your local trail manager to determine appropriate trail distances in your area. Generally, within these clearance distances, branches and brush are removed to maintain the sight line.



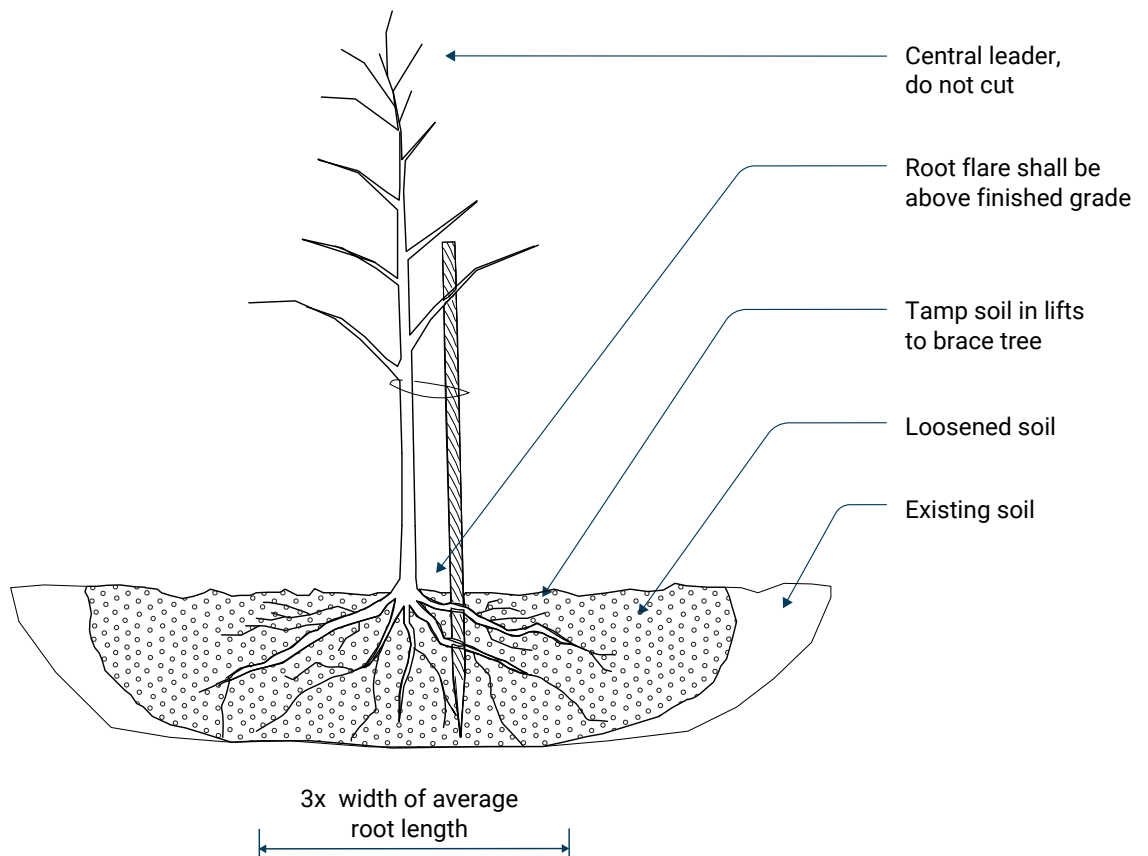
## TRAIL CLEARANCE

### 3. Tree-planting guidelines

In all planting types, the base of the trunk should be above ground and the top of the roots below ground.

#### Bare-root

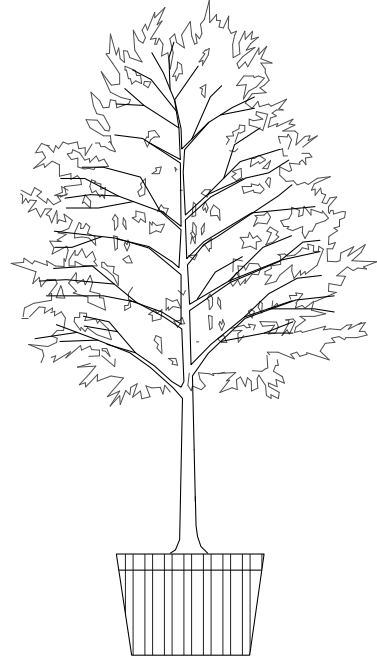
Plant bare-root trees with the main structural roots near the soil surface, and spread and distribute the roots to prevent girdling. Backfill around the roots to minimize air pockets, but do not compact the soil.



#### **BARE-ROOT TREE PLANTING GUIDELINE**

## Container

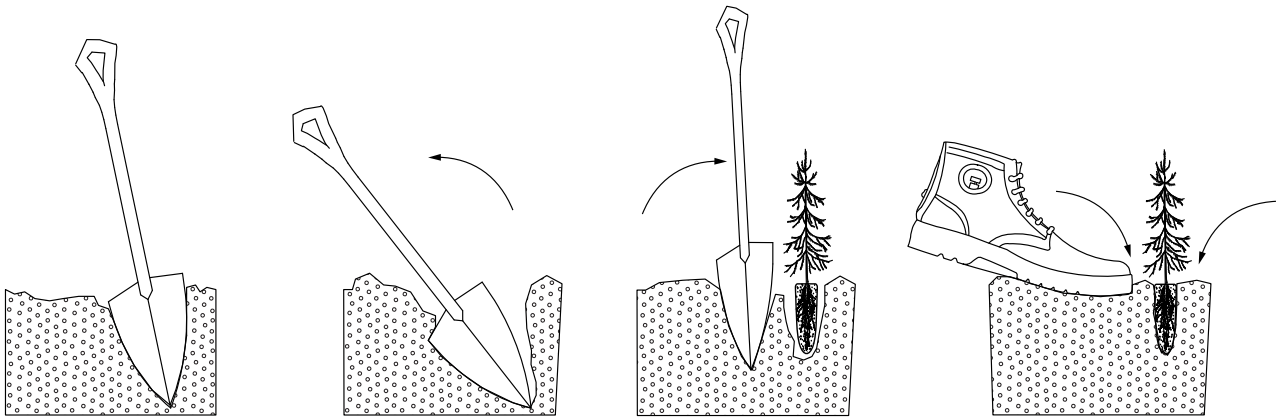
- A saucer-shaped planting hole that is two to three times the width of the root ball at the soil surface and sloping down to the base of the root ball is ideal.
- Water gently while backfilling the hole.
- Trees may require staking to remain upright once they leaf out.



### CONTAINERIZED TREE STOCK

## Seedling

- Create an opening in the ground that is wide and deep enough for the plug. Plant plug ensuring the root system is vertical. Avoid compressing or crushing the roots as the plug goes into the ground. Lightly compress the soil to remove any air pockets at the root base.



### SEEDLING PLANTING



# Post-Planting and Establishment

After trees are planted, some post-planting factors can increase the chances of successful establishment. This section includes information and considerations regarding auditing and documenting the process, watering, mulch, tree protection, maintenance and pruning.

## 1. Audit and documentation

Documentation is key to the long-term success of tree-planting programs. Recording details can help in making management decisions and providing information to others. This information may include the following:

- Quantity and species type planted
- Location
- Tree source: nursery, farm, etc.
- Date planted
- Date and type of pruning and other maintenance
- Damage to trees  
(weather, vandalism, construction, etc.)



## 2. Watering

Watering is one of the most critical aspects to the health and establishment of a newly planted tree.

- Effective watering is based on needs, not on a calendar. To assess the need, manually check the root ball, the backfill and surrounding soil.
- A newly planted tree should receive 25 millimetres of rainfall/watering per 2 centimetres of tree caliper (diameter) per week.
- Slow, gentle soaking of the root zone to approximately 30 centimetres deep is ideal, being mindful of the drainage of the site soil (root ball should not be flooded in planting hole). Slow-release watering bags are available for purchase if needed.
- Ensure there is a plan for water management.

## 3. Mulch

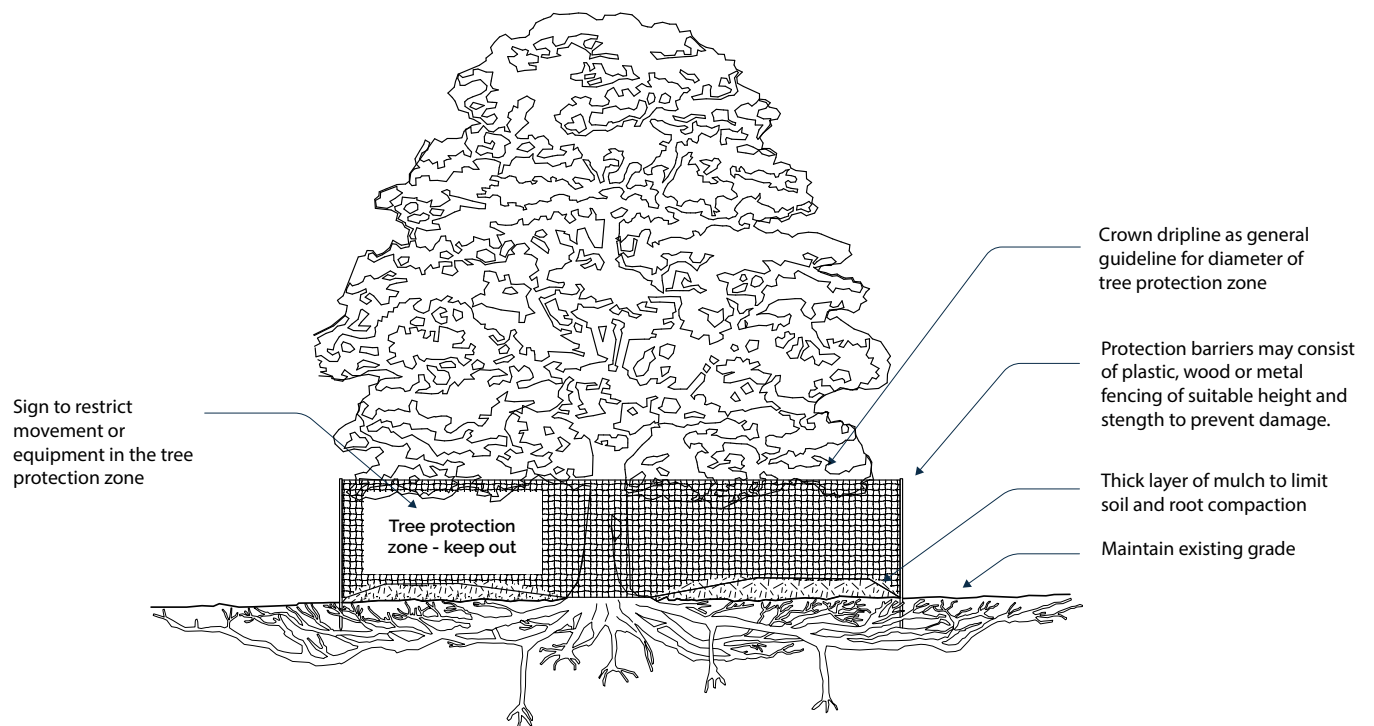
Mulches are materials placed over the soil surface and can assist with tree establishment by reducing moisture loss, moderating soil temperature, and preventing weed growth.

Mulches are classified in two categories: organic and inorganic.

- Using organic mulches (such as shredded bark, hardwood chips, or evergreen needles) is one of the most beneficial practices for the health of a tree. As the mulch decomposes, it releases essential nutrients and improves soil structure. Ideally organic mulches are topped up every one to two years.
- Inorganic mulches include stone, lava rock, pulverized rubber and other materials. These do not decompose over time and therefore do not need to be replenished as often.
- Mulch will also reduce the chances of maintenance damage (mower, line trimmers).
- Mulch should be 5–10 centimetres deep and should not be placed against the trunk as this promotes rot and attracts disease. Thicker is not better when it comes to mulch.
- The size of the mulched area depends on the tree size. For a 2.5–5 centimetre-caliper tree, the mulched tree circle should be at least 1.8 metres in diameter.

## 4. Tree protection

Longer-term root protection is a critical part of tree protection. The root zone is typically determined by the width of the crown. Keep in mind that root zones can extend well beyond this measure. Keep root protection in mind when planning changes to the elevation or digging in the root zone.



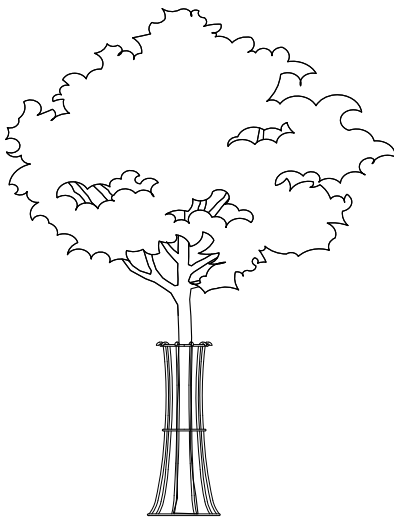
### TREE PROTECTION GUIDELINE

## Trunk protection

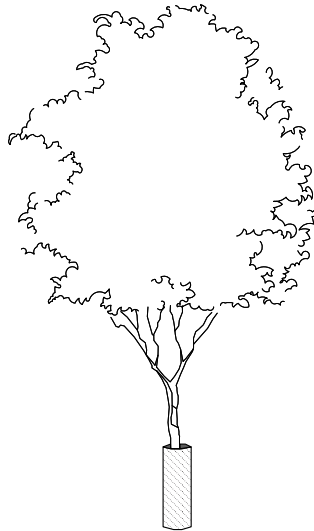
Trunk protection is installed around the trunks of trees to protect against damage that could come from situations such as animal feeding, deer rubbing, mowers and trimmers. This protection can limit the amount of physical damage to the trunk of a young tree. There are many options and alternatives available, including staked plastic or metal fencing.

Considerations to be aware of include the following:

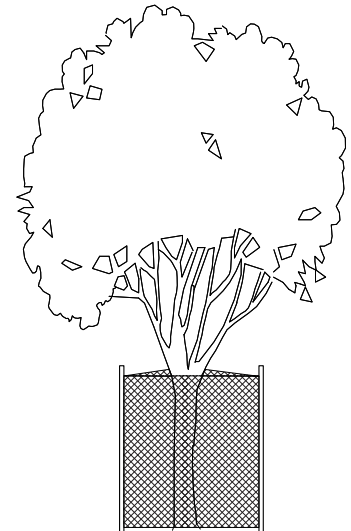
- Wraps tend to hold moisture on the bark and can lead to fungal problems.
- Most guards are loose fitting and have holes for ventilation. It is important to remove and replace guards as they are outgrown.
- Natural sprays (derived from animal blood or bone meal) can be applied to deter herbivores from causing physical damage.



Metal tree guard



Plastic tree wrap



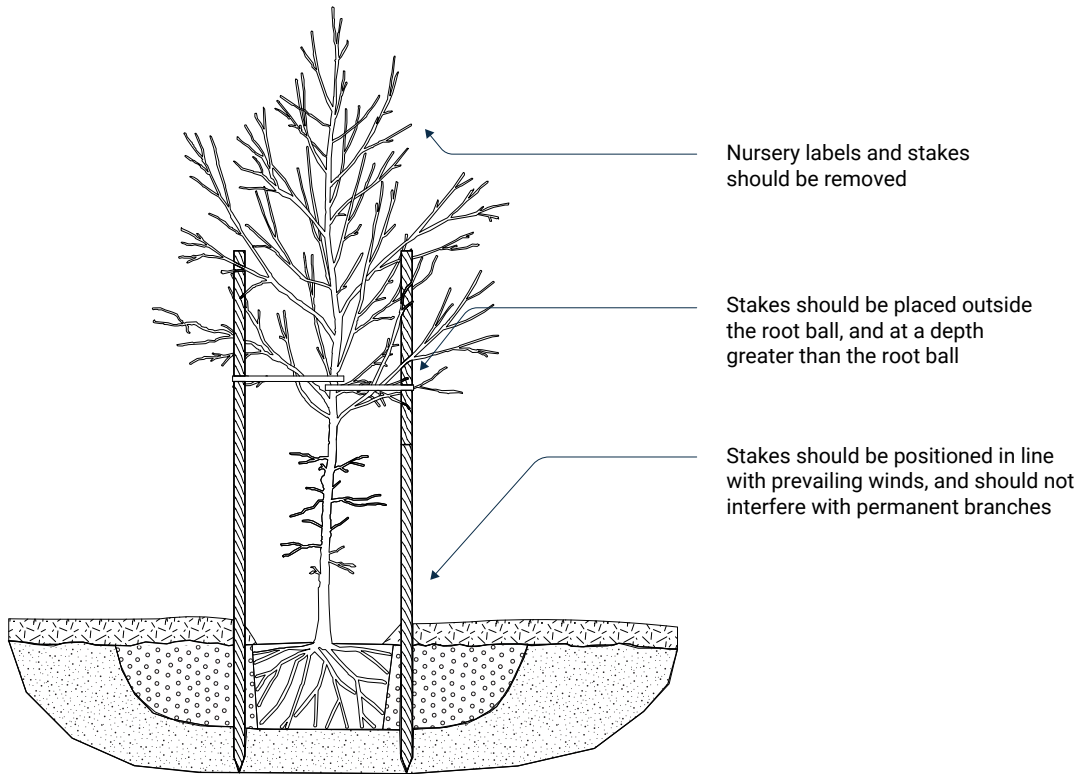
Stake with fencing

## Staking

Staking provides stabilization to newly planted trees while they become established. This may be critical to trees with large crowns or those on windy sites. Stabilization will further reduce movement of the root ball. In urban sites, stakes are sometimes used to protect against potential maintenance damage.

Considerations to be aware of include the following:

- Staking is not always necessary for newly planted trees, and it may cause detrimental effects if trees are staked for a prolonged period. If secured too rigidly, the tree will develop a less sturdy root system.
- One to three stakes are normally used to stabilize a tree. Avoid driving the stake into the root ball and stabilize the tree as low along the trunk as possible while providing necessary support.
- The material used to attach the tree to the stake should be broad, smooth and somewhat elastic (e.g., an arbor tie).



### TREE STAKE GUIDELINE

## 5. Maintenance schedule

When completing a work plan for maintenance, tree-pruning specifications are used to help convey information to everyone involved and can be used to help document work history. Effective pruning time is species dependent; however, most routine pruning can be achieved at any time of the year.

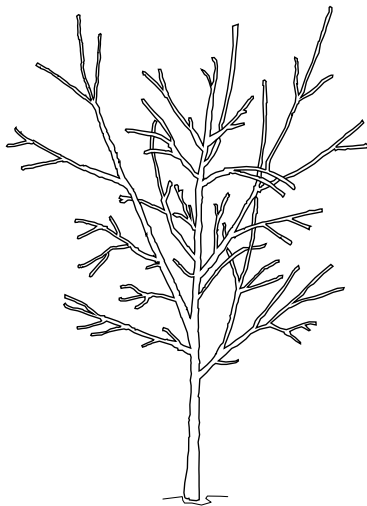
Specifications must include the pruning objective and type of pruning required. They should also include a minimum or maximum diameter of branches to be removed to establish the extent of pruning.

- E.g., crown cleaning of dead and damaged branches over the diameter of 2 centimetres.

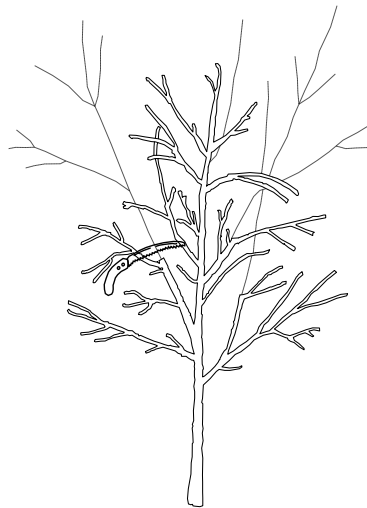
## 6. Pruning

- Pruning is the systematic removal of living or dead parts of a plant, typically branches, to reduce size, maintain shape, enhance health, control/promote flowering or to regulate growth. When pruning, think about your objectives and desired outcomes.
- Proper pruning improves tree structure and form. This practice improves tree health by increasing airflow, encouraging new growth and reducing the potential for pest or disease problems. Pruning also addresses safety by removing weak or broken limbs, as well as limbs that interfere with structures or traffic.
- Pruning cuts create a wound in the tree, and if done incorrectly, may cause serious damage or eventual death of the tree.

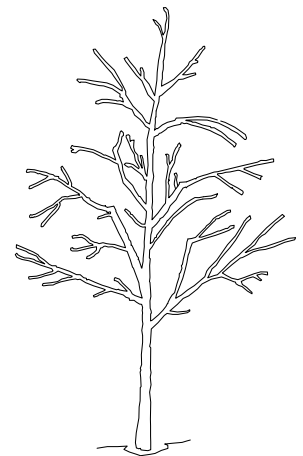
### YOUNG TREE CROWN CORRECTION



Young tree structural pruning to remove co-dominant stems



Reduction cuts are used to decrease height and spread



Tree is left with one central leader

Pruning considerations to be aware of include the following:

- **When**

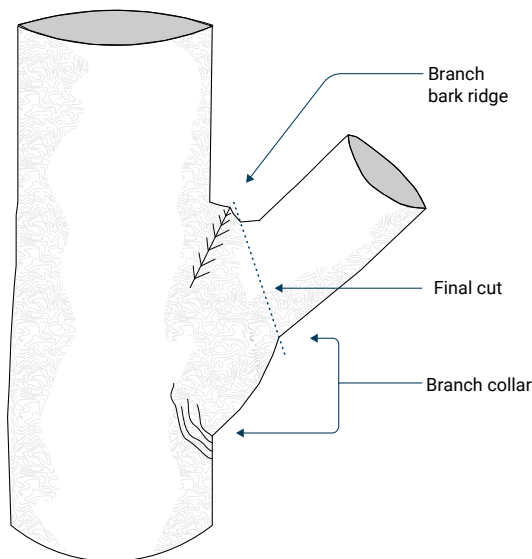
- Effective pruning time is species dependent; however, pruning is most often recommended in the dormant season.
- Avoid pruning newly established transplants and trees experiencing drought stress.
- Every year, inspect your trees and prune branches that are dead, weak, diseased or crossing each other.

- **Why**

- Increase vigour and structure.
- Reduce potentially hazardous branches.

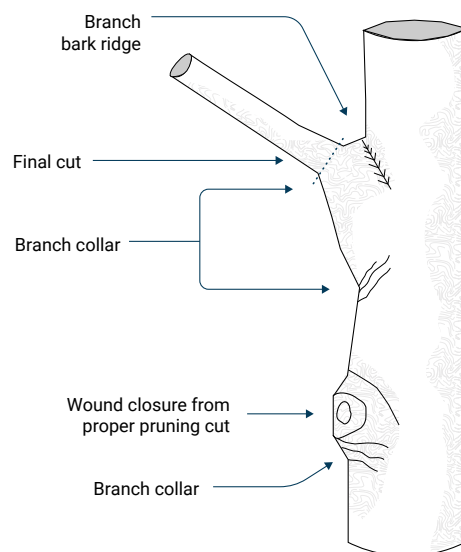
- **How much**

- Generally, prune no more than 25% of the canopy (after removing dead, damaged and diseased limbs).
- Use proper pruning techniques and maintain the branch collar.



### **BRANCH COLLAR**

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### **BRANCH COLLAR**

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## Weight distribution

On average, half the foliage should be in the lower two-thirds of the tree. Keep the main leader stem (if applicable); otherwise, the tree may lose its form and shape, and be susceptible to weak branch attachments in the future.

## Species response

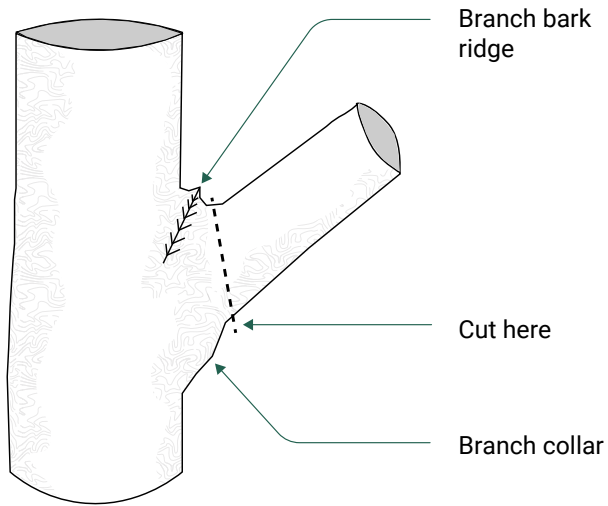
Species response refers to the tree's ability to close over a wound and recover from the damage. Some species have more vigorous responses to pruning cuts than others. The time of year and environmental factors may also influence a species response to wound closure.

Considerations to be aware of include the following:

- Natural form / habit of the tree – how does it grow? Do the branches naturally extend upwards or downwards to form its shape?
- “Bleeding” trees have annual sap flow that will weep from open wounds in the spring (e.g., maple, birch). Pruning for these tree families should be done either before or after sap flow.
- Insect and disease cycles – they may be attracted to wounds and take advantage of a tree's weakness.
- Flower and fruit production – prune directly after flowering.
- Prevention leads to enhancement – making good pruning cuts early in a tree's life can increase its health and vigour.

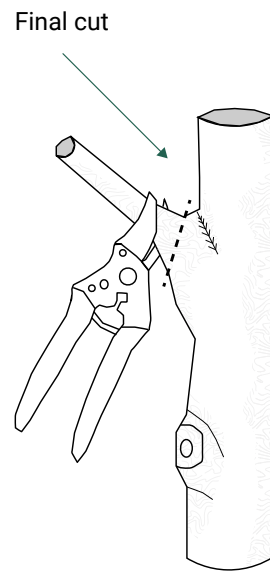
## Safety while pruning

- Only use tools that you are trained and experienced with.
- Wear protective gear (e.g., hard hat, gloves, safety glasses).
- Know your own limits as well as the limits of your tools.
- When in doubt, call a professional.



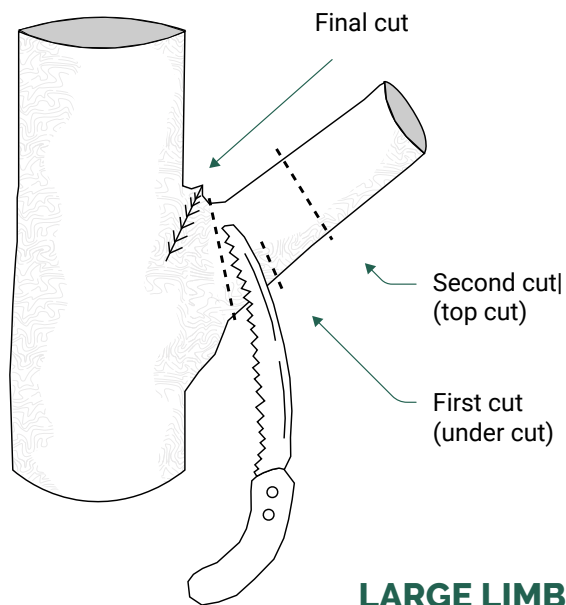
**PRUNING  
CUT TARGET**

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**SMALL LIMB  
REMOVAL**

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**LARGE LIMB  
REMOVAL**

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## Pruning young trees

Conducting preventative pruning on a young tree can decrease the need for maintenance in the future. A crown that has a strong structure and air circulation is less likely to fail during storm events.

### At planting

- Pruning should be limited to removing dead leaves or branches.
- Branches should be retained on the lower trunk to help form a strong trunk taper.

### Once established

- Cleaning should be performed.
- Rubbing and poorly attached branches should be removed.
- A central leader (the dominant vertical trunk in the centre of a tree), or leader(s) as appropriate to the species, should be developed.
- A strong, properly spaced regular branch structure should be selected and maintained.
- Interfering branches should be reduced or removed.

### 1-3 years after planting

- Select and train primary scaffold branches.
- Remove crossing branches.
- Remove codominant stems.  
Ensure adequate spacing.

## 4-6 years after planting

- Perform selective thinning.
- Remove dead, interfering, split or broken branches.
- Reduce narrow angles of attachment.
- Remove lower branches.





# Conclusion

Trees, shrubs and plant life enrich spaces in many ways. Planning for their long-term health in the project you are engaged in is key to making it a success. We hope the information provided in this resource guide helps you better understand your planting site and approaches for establishing and maintaining healthy trees so they will thrive in the chosen location.





# Glossary

<b>Biomass</b>	the amount of living organic matter in trees.
<b>Buffer distances</b>	the amount of space between an ecologically sensitive area (e.g., wetland, newly planted tree) and a different ecological zone or hazard (e.g., power line, salted roadway).
<b>Central leader</b>	the dominant vertical trunk in the centre of a tree.
<b>Deciduous</b>	a type of tree that typically sheds its leaves on an annual basis. They are also referred to as broadleaf or hardwood trees.
<b>Evergreen</b>	a type of tree that typically keeps its needles or leaves year-round. They are also referred to as conifer or softwood trees.
<b>Girdling Roots</b>	a scenario where a tree's roots circle around the trunk, or a section of the trunk.
<b>Pore spaces</b>	the amount of empty space in soil.
<b>Riparian buffer</b>	a defined space that separates or transitions an aquatic area from other land zones.
<b>Root flare</b>	the place where a tree trunk connects to the roots, flaring out at soil level.
<b>Root mass</b>	the weight of a tree's root system.
<b>Seedling</b>	a young tree that has been grown from a seed and is in the early phase of development.
<b>Seedling failure</b>	a situation where a seedling is no longer able to develop and dies. This could occur for many reasons, including breakage due to severe weather, disease or pest damage.
<b>Taproot</b>	the largest and most dominant root within a tree's root system which grows vertically and in a downwards direction.
<b>Trail corridor</b>	an area that has been designated as a continuous passageway for recreational use.



# Centre for Trail Excellence