12 TREE PLANTING AND PROTECTION GUIDELINES

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12.1.1 INTRODUCTION

Tree protection is a fundamental requirement of any urban forest. To encourage the health and enhancement of the urban forest, it is necessary to take the provisions outlined in this document while working in close proximity to trees. Trees provide many benefits that include temperature regulation, CO2 absorption, rainfall interception, and reducing pollution. These benefits become more prominent when a tree reaches maturity. Therefore in order to maximize these benefits, tree retention needs to be accompanied by proper tree protection where there is a risk of damage to trees and their rooting systems.

Prior to any construction, it is important to evaluate the existing trees to ensure we retain as many trees as possible and we recommend a certified arborist or Registered Professional Forester or other qualified person with appropriate training and experience be employed to carry out such evaluations on both private and public lands.

All trees located on City boulevards are subject to protection under the Boulevard Tree Protection By-law P.-69. Other sites may also be subject to the Tree Conservation By-law or Parks By-law.

Types of Tree Damage
Physical tree damage can occur when construction equipment is allowed to come in close proximity to tree. This can lead to broken branches, wounds on the trunk, scorching of branches or other physical wounds which may be fatal, give cause to remove the tree, or require remedial action.

Root damage may occur if there is any excavation within the rooting area of the tree. Depending on the extent of excavation, the health of a tree can be seriously affected, causing a tree to decline to the point where the tree may need to be removed. Most of the fibrous roots of the tree, which are responsible for the uptake of nutrients and water, are contained in the top 30 cm of soil and are easily severed during excavation, structural roots are located deeper. Hand digging, low pressure hydro-vac, or air spade exploratory digging will aid in determining the extent of the root system and what steps will need to be taken to minimize impacts.

Soil compaction happens when vehicles cross over the rooting area, especially when the soil is wet. This compaction reduces the pores with in the soil which contain the water and air needed for the proper biological function of the tree. This reduces soil function with the potential to cause a decline in the health of the tree, killing off many of the feeder roots which sustain the tree. This could also lead to a premature removal of a once healthy tree.

The following standards and guidelines have been produced so that adequate care can be taken to ensure the health of trees when there is potential risk of damage during construction or demolition. They are a combination of standards, guidelines and best management practices from London, other major municipalities and jurisdictions. The requirements and measures may include an arboricultural impact assessment, a tree protection and watering plan, identification of tree protection zones,

Note: Refer to Section 18 regarding additional design information for new subdivisions.

installation of tree protection barriers, pruning of branches and roots and remediation measures to mitigate the impact of damage.

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12.1.1.1 SCOPE

12.1.1.1.1 This document outlines the tree protection procedures that shall be followed when a City tree of any size is present on, or adjacent to, a construction or demolition site. Trees that are adjacent to a proposed site and have a Root Protection Area (RPA) that falls within the boundary must be included and considered for protection.

12.1.1.1.2 All new subdivisions require a Tree Protection Plan.

12.1.1.1.3 For site plans, the City ~~will~~ shall recommend at the site plan pre-consultation meeting whether a tree protection plan is warranted for a site or adjacent trees.

12.1.1.1.4 A Tree Protection Plan is required for every Capital Works project. Current City practices have included the preparation of a Tree Protection Plan for any projects which will affect City trees in some way, where there is excavation within the roadway of a City street or on other City property or equipment is moving past City trees to enter a worksite.

12.1.1.2 TERMS DEFINED FOR THE USE OF THIS DOCUMENT

12.1.1.2.1 “Tree Protection Zone (TPZ)” shall refer to the calculated area around the base of a tree that is designated for tree protection both above and below ground

12.1.1.2.2 “Arborist” is an educated professional with a recognized ISA (International Society of Arboriculture) certification which is current and valid.

12.1.1.2.3 “RPF” is a Registered Professional Forester who is a member in good standing with the Ontario Professional Foresters Association (OPFA) and eligible to work in Ontario.

12.1.1.2.4 “Landscape Architect” shall mean a person who is in good standing with the OALA and has demonstrated competence in arboriculture, urban forestry, tree identification and tree risk assessment

12.1.1.2.5 “Qualified Person” means an Arborist, RPF or Landscape Architect as per the definition

12.1.1.2.6 “Damage” shall means any activity that may injure or kill a tree, above or below the ground

12.1.1.2.7 “injure a tree” includes but is not limited to cutting of trees or branches, topping, removing tree bark, leaves or fruit, removing whole tree or cutting or breaking of tree roots.

12.1.1.2.8 The” barrier” is the fence placed a specific distance away from and around either a single tree or grouping of trees to create a Tree Protection Zone (TPZ)

12.1.1.2.9 “Developer or Contractor” means the landowner, or a landowner’s agent who represents and acts on behalf of and with the consent of the landowner, applying for any kind of Permit which would include any sort of work around City trees.

Note: Refer to Section 18 regarding additional design information for new subdivisions.

12.1.1.2.10 “City” means The Corporation of the City of London

12.1.1.2.11 “Good Forestry Practices” shall be as defined by the Forestry Act R.S.O. 1990, c. F-26 and any amendments thereto

12.1.1.2.12 “habitat” by reference to wildlife or Species At Risk shall have the same definition as that defined in the Endangered Species Act R.S.O. 2007 and any amendments thereto

12.1.1.2.13 the “dripline” is the location on the ground directly beneath the theoretical vertical line from the tips of the outermost branches of the tree

12.1.1.2.14 “Diameter at breast height (DBH)” is the diameter of the tree measured at 1.4 meters above the ground.

12.1.2 PRIOR TO CONSTRUCTION

12.1.2.1 Requirements for Approved Tree Protection Plan (TPP)

12.1.2.1 There shall be a requirement for a Tree Protection Plan, approved by the City, for all City trees which are on a boulevard in front of a construction or demolition site or on property adjacent to a developing property. Trees on lands adjacent to the developing property will be included if they are within 3m of the property line.

12.1.2.2 A Tree Protection Plan shall be completed by a qualified person and be submitted to the City for approval by the Urban Forestry section and/or the Forestry Operations department prior to the start of construction or other works.

12.1.2.3 No onsite construction or other works that could cause damage to trees either above or below ground is permitted without an approved Tree Protection Plan.

12.1.2.4 The tree protection plan shall include, but is not limited to:

A) A complete inventory of all trees on site, on the boulevard in front of the site, or on adjacent properties within 3m of the property line. This includes tree species, DBH, and recommendations for future tree management described in detail. If there is a recommendation for removal, a detailed explanation including photographs highlighting their condition, must be included with the tree quality assessment of that tree; any proposed removal of City trees will be conditional and subject to the approval of a consensual removal as per the Boulevard Tree protection By-law Schedule B and any fees there in.

B) Any existing structures or grade changes;

C) A map showing:
   i. The location of all existing trees and the extent of their crowns;
   ii. The location of all trees to be retained, removed, replaced or relocated; as well as the locations they will be replanted
   iii. The Tree Protection Zones and the precise location of their barriers;
   iv. Any additional ground protection that is required;

v. Designated travel corridors and storage compounds, portable rooms/buildings, and any other facilities for on-site work for both workers and equipment;
vi. Topography, slope of the land and all significant land features;

D) The plan will include a recent aerial photograph of the site.

E) Foreseeable remedial actions to ensure the health of the remaining trees such as but not limited to branch pruning (including specifications), deep root fertilization, ~~tree watering,~~ soil replacement or planting;

F) A watering plan for any trees expected to be impacted by construction

12.1.2.5 When addressing young trees (DBH <15cm) especially ones that occur as individual specimens, it may be acceptable to consider relocation. If the tree is of no particular significance, replacement is also a viable option. Any tree replacement will be addressed in a post construction remediation plan. The value of trees to be replaced (and thus the number of trees that must be planted to make up for any removed) should be calculated according to the system laid out in the City Tree Protection Bylaw.

12.1.2.6 If there is maintenance required on any tree that is designated for retention, that maintenance should be completed prior to construction or demolition. This can include but is not limited to crown pruning, deep root fertilization, tree watering, and/or soil replacement.

12.1.3 Tree Protection Zones

12.1.3.1 Tree protection zones (TPZ) shall be established based on the criteria in Table 1;

12.1.3.2 Barriers will not be placed within the TPZ rather on the outside of the predetermined area.

Table 1 Tree Protection Zones:

Trunk Diameter (DBH)	Minimum Protection Distances Required City-owned Trees	Minimum Protection Distances Required For ~~areas~~ Areas ~~d~~Designated Open Space or
	Whichever of the two is greater:	Whichever of the two is greater:
< 10cm	The drip line or 1.2 m	The drip line or 1.2 m
10-29 cm	The drip line or 1.8 m	The drip line or 3.6 m
30-40 cm	The drip line or 2.4 m	The drip line or 4.8 m
41-50 cm	The drip line or 3.0 m	The drip line or 6.0 m
51-60 cm	The drip line or 3.6 m	The drip line or 7.2 m
61-70 cm	The drip line or 4.2 m	The drip line or 8.4 m
71-80 cm	The drip line or 4.8 m	The drip line or 9.6 m
81-90 cm	5.4 m	The drip line or 10.8 m
91-100 cm	6.0 m	The drip line or 12.0 m

>100 cm	6 cm protection for each 1 cm diameter	12 cm protection for each 1cm diameter or the drip line

12.1.3.3 An exception to the minimum distance of the TPZ may be when the tree is flanked by a curb, sidewalk, and or asphalt road. In such cases the barrier may be limited to the furthest extent of the grassed boulevard area however root pruning using approved methods must be incorporated to reduce impacts on tree roots due to ripping or tearing of roots. Hand digging, low pressure hydo-vac or air spades may be used to uncover roots for pruning or avoidance by an arborist and roots may be pruned to a depth which will meet the construction requirements. This operation is only to be done with the approval of the City. Roots that are exposed ~~should~~ must be covered with wet burlap or soil as soon as possible and watered regularly to prevent them from drying out. Watering is required until such time as the topsoil and sod has been replaced satisfactorily or as otherwise directed by the City.

12.1.3.4 Within a TPZ there must be:

A) No construction;
B) No altering of grade by adding fill, excavating, trenching, scraping, dumping or disturbance of any kind.
C) No storage of construction materials, equipment, soil, construction waste or debris wash facilities, portable rooms/buildings.
D) No disposal of any liquids e.g. concrete sleuth, gas, oil, paint.
E) No movement of vehicles, equipment or pedestrians.
F) No parking or storage of vehicles or machinery.
G) Directional micro-tunneling and boring may be permitted within the limits of the TPZ subject to approval from the City.

12.1.4 Tree Protection Barriers

12.1.4.1 All barriers shall be erected, secure, and complete with signage posted prior to any demolition, construction or other works.

12.1.4.2 Materials must comply with all barrier specifications, as well as all supports and bracing used to secure the barrier should be located outside the TPZ. All supports and bracing shall be located as to minimize damage to roots.

12.1.4.3 Barrier Specifications Figure 1

i) Height can be 1.2 m (4'), visibility on boulevards must be maintained;
ii) T-Bar Posts are to be used for support
iii) 2''x4''s are to be used for top rails;
iv) Spacing between vertical posts to be no further apart than 2.4 m (8');
v) Structure must be sturdy with posts driven firmly in to the ground;
vi) Continuous plastic mesh screening (e.g. orange snow fencing) is to be used;
vii) Signage must be posted, sign must be a minimum of 40cm x 60cm and water proof, Figure 2;
viii) Where some excavate or fill has to be temporarily located near tree protection barrier, plywood must be used to ensure no material enters the Tree Protection Zone;
ix) In addition to tree protection fencing, sediment fencing might be required, this will be determined in the Tree Protection Plan by a Qualified person

FIGURE 1

Example for Boulevard Trees

Commented [H1]: AMC notes – there appears to be some cut-off text at the bottom of this diagram?

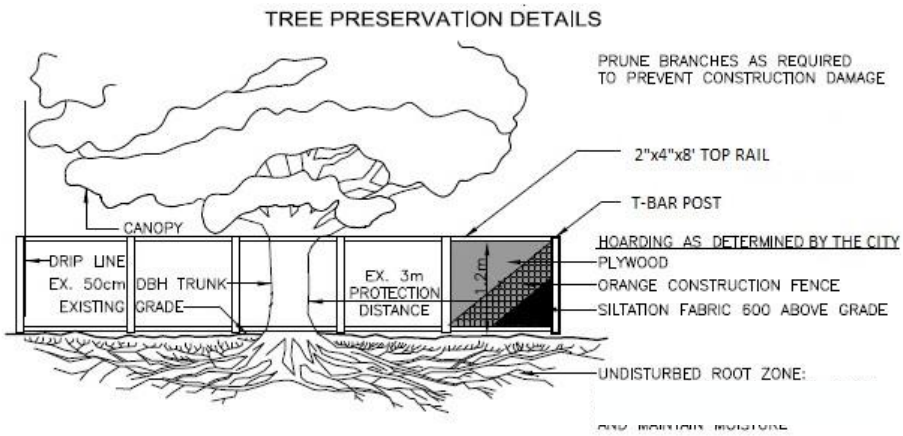
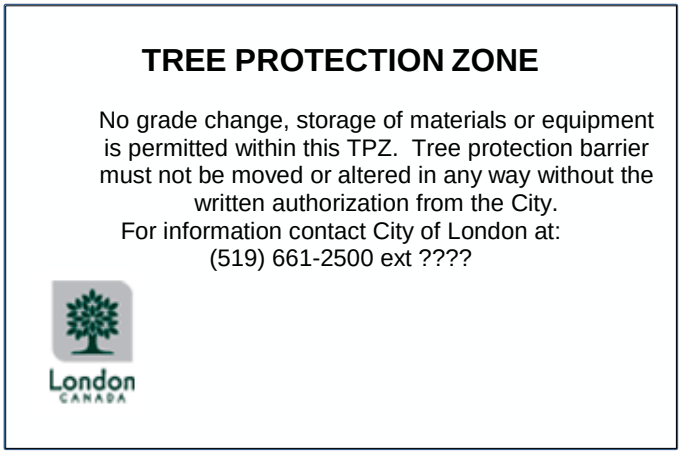


Figure 2.

Tree protection signage



12.1.5 DURING CONSTRUCTION

12.1.5.1 Site monitoring

12.1.5.1.1 Site monitoring will be the responsibility of the developer, contractor or project manager. Random checks may be done by City staff at any time and without notice.

12.1.5.1.2 A weekly photograph will be taken by the developer, contractor or project manager and submitted to the City depicting a well maintained and intact barrier with weather proof signage posted.

12.1.5.1.3 If there are any proposed changes to the TPZ, the City will require notification immediately and no changes may be made without prior written approval from the City.

12.1.5.1.4 Any damage to a tree during construction must be reported to the City immediately and a Qualified person shall make recommendations on how remediation will take place. Any remediation will take place as soon as possible to protect the health of the tree. Failure to do so may result in penalties under the Boulevard Tree Protection By-law or as listed in the Standard Contract Documents for Municipal Construction Section 5 part B

Commented [H2]: AMC notes: it would be far more valuable to have this time spent on confirming watering – a barrier is unlikely to change from week to week, and it is easy to confirm (via site visit) that it is still in place, whereas for watering, a person could always just say "Oh, it was watered yesterday".

Commented [H3]: To be updated to "City Tree Protection Bylaw" once that is passed

12.1.5.2 Avoiding damage to trees above ground

Any tree damage during construction must be reported to the City Forester or designate immediately. This includes the following:

a) The topping or removal of branches from a tree other than in accordance with the approved Tree Protection Plan and accepted arboricultural practices;

b) The cutting or tearing of the roots of a tree within the drip line other than in accordance with the approved Tree Protection Plan and accepted arboricultural practice;

d) The scraping, gouging or compaction of the soil within the Tree Protection Zone by the placement of soil, fill, heavy equipment, vehicles, building or other materials thereon or by the movement of vehicles or equipment there over;

e) Depositing within the tree's drip line any fill, or toxic/harmful substance;

f) The removal of soil from within a tree's drip line.

12.1.5.3 Avoiding damage to trees below ground

12.1.5.3.1 Any roots outside the TPZ that require pruning or exposure, shall be located by hand digging or low pressure hydro vac/ Air spade excavation and pruned to the face of the excavation by a Certified Arborist.

12.1.5.3.2 If at any point, roots that have grown out past the drip line, become exposed or severed it is required that a qualified person is notified and proper root pruning procedures are employed.

12.1.5.3.3 If roots are exposed but not severed and do not require pruning it is mandatory that they are properly covered with soil or burlap and watered at least twice a day or as needed. This shall continue until the soil and sod have been replaced or until otherwise directed by the Qualified person, or the City.

12.1.5.3.4 To avoid damage to tree roots, existing ground levels shall be retained within the TPZ

12.1.5.3.5 Subject to justification, in a circumstance where digging within the TPZ is permitted, only hand held tools or a displacement tool such as compressed air or hydro-vac systems are permitted.

12.1.5.3.6 Where equipment must travel across City property to access the work area, designated travel corridors shall be established to the satisfaction of the City in order to minimize soil compaction or damage to trees and other values.

12.1.5.3.7 If there is a barrier within 1 metre of a path that is to be used by any vehicle or machinery during work at any time, additional protection is required (3.3.8).

12.1.5.3.8 A 4 inch mulch path will be laid that spans the width of the widest piece of equipment that will be used on site for the duration of the work. Plywood boards will then be placed on top of the mulch. An image of this will be included in the photograph that is to be submitted weekly to the Urban Forester or designate.

12.1.5.3.9 Any amendments required by the City to maintain the tree protection measures on site shall be implemented to the satisfaction of the City.

12.1.5.3.10 Failure to maintain an approved Tree Protection Plan will result in a warning by the City with 1 day to comply and bring the tree protection measures in line with the approved Tree Protection Plan. A second infraction may be dealt with by the issuance of a Stop Work order and possible fines as per the Boulevard Tree Protection By-law or the Tree Conservation By-law or as listed in the Standard Contract Documents for Municipal Construction Section 5 part B.

12.1.6 POST CONSTRUCTION

12.1.6.1 Inspection

An ISA certified arborist or RPF or approved Landscape Architect shall inspect all retained trees and their rooting area to assess if any additional remediation work is required to ensure their future health and survival.

Commented [H4]: AMC: When is this expected to occur? Please specify. Also, ho will they know if damage was done if the sod is already back in place?

How long does it take construction damage to kill a typical street tree, and how is this factored into the inspection process?

12.1.6.2 Remediation Plan

If the inspection indicates damage to retained trees, the Qualified person shall prepare a post construction remediation plan for approval to the City Urban Forester or delegate. The remediation plan may include but is not limited to: Pruning, deep root fertilization; irrigation; aeration; tree planting (with replacement rates being guided by the system laid out in the City Tree Conservation Bylaw); either as a single activity or as a combination.

12.1.6.3 Remediation Plan Inspection

A Qualified person shall inspect the project site and certify that any and all measures specified in the tree protection plan or post construction remediation plan have been completed as per the plan. This certification is required before final acceptance and approval of the work by the city.

12.1.6.4 Project Approval

An assessment will be done by a Qualified person to confirm that all protocols were met during construction or demolition.

12.2.1 TREE PLANTING

INTRODUCTION

Tree planting on the public right-of-way is a long term initiative that supports the goals of the City's Urban Forest Strategy. ~~What is done today~~ Actions taken today can ~~have a serious~~ significantly impact ~~on~~ the extent and quality of our urban forest as well as street tree maintenance activities for years to come. It is therefore imperative that tree planting ~~be done~~ proceed with care and ~~planning~~ forethought. Planning is critical to ensure that the final product maximizes the environmental and health benefits of tree planting, and—is sustainable and aesthetically pleasing. Trees of similar shape but different species, if carefully selected from the "medium" and "large" species lists, will provide the desired effect of tree arch over the street. The mix of species is essential to reduce the ~~chances~~likelihood of insect epidemics (and extent of associated impacts);~~,~~ to guard against the spread of disease as trees are trimmed in efficient block treatments;~~,~~ ~~to prevent widespread neighbourhood complaints~~ and to eliminate extensive tree removal programs ~~when~~ resulting from single species ~~plantings die~~ mass mortality (eg. due to Dutch Elm Disease on American Elm, or~~Verticillium wilt on Norway Maples~~ Emerald Ash Borer on ashes, etc.).

Designs should ~~reflect patterns which show a use of~~ incorporate a mix of~~random plantings~~ of divers~~e~~ified species, and give higher priority to the use of native over non-native species, especially over those not indigenous to continental North America~~.~~ The City of London is committed to not only planting new trees, but ensuring the health and protection of our existing trees and forests. As such, non-continental invasive species, which can cause significant damage to natural areas and are an ongoing challenge for the City (with our two most common trees now being invasives), are not to be planted. Adjacent lands with existing street trees should receive due consideration to prevent continuous plantings of a single species. ~~Consideration should be given to adjacent lands where existing street trees may exist to ensure that continuous plantings are not created, in~~ particularly in infill projects of limited frontage.

~~(AMBER TO PUT A CLIMATE CHANGE PARAGRAPH HERE)~~As climate change progresses, London's trees, both new and old, will be placed under considerable stress as the number of extreme heat days and droughts increase. As such, the planting of drought-tolerant species native to continental North America (especially those already in London or expected to move into London as a result of climate change) are strongly encouraged. The planting of species ill-adapted to our warming climate (and which are expected to have a natural range that begins well north of London by the end of the century) are discouraged.

The City of London recognizes the ~~difficulties in~~ complexities of coordinating tree planting within the development process for new subdivisions. Trees ~~are a living entity and, as such, cannot~~, as living entities, may not always be planted or inspected at convenient times. ~~As well,~~ In addition, difficulties with tree species availability, the seasonal nature of planting operations, and administration make it more difficult to coordinate tree planting operations within the prepared framework ~~in place~~ for assumption and end of warranty processes currently in place for new developments. The City of London, therefore, has instituted a 'cash-in-lieu' system whereby the developer will participate in ~~providing~~ the creation of a planting plan at the time of assumption, ~~and~~ but the City will implement the tree planting.

Note: Refer to Section 18 regarding additional design information for new subdivisions.

12.2.2 POLICY

12.2.2.1 Security (at Development Agreement Stage)

Security is required to ensure that funds are available in the event of default by the developer. ~~Currently, this is~~ Security is already a standard subdivision development requirement and will continue to be required in the amount of $25.00 per linear metre of street frontage (both sides) within the plan of subdivision.

12.2.2.2 Planting Plan (at time of assumption request by developer)

The developer ~~will~~ shall submit a planting plan ~~showing~~ specifying actual planting locations (with all site amenities known and shown on the plan) ~~and~~ as well as proposed species of trees (with common and ~~Latin~~ scientific names provided~~shown~~). **The services of an Ontario Registered Professional Forester (R.P.F), or a member of the Ontario Association of Landscape Architects (L.A.) in good standing must be retained.** This stipulation will ensure that an appropriate planting plan is in place, one which considers species diversity (and includes native species); ~~,~~ canopy cover goals; tree form; location; and design. The planting plan must be stamped by the R.P.F. or L.A. and ~~be shown~~ must appear on the standard plan of subdivision drawing or grading plan which ~~shows~~ specifies lot dimensions (particularly frontages) as prepared by the consulting engineer. The plan ~~will~~ shall be reviewed and approved by City staff. The plan ~~is to~~ must be submitted to the Coordinator, Forestry Programs, Planning Division, City Hall for review.

Commented [LA5]: AMC: Is soil or drainage info required to be provided? (Seems hard to judge appropriateness, otherwise).

12.2.2.3 Guidelines for Planting Plan Preparation

All trees are to be planted on City property.

Tree planting locations ~~will~~ shall be determined on a site specific basis. As a goal, no less than one tree should be planted for each lot. Larger lots and corner lots may have more than one tree.

Since large trees contribute more to the environment and the neighbourhood than smaller ones, the largest tree ~~that is~~ suitable for the location ~~is to~~ shall be planted, considering eventual size at maturity. Substitutions for smaller species will not be accepted. Plantable space may include the boulevard in front of or rear of the sidewalk (where present). Tree locations may be staggered and/or grouped where appropriate to ~~make the~~ best utilize ~~use of~~ available planting and growing space. The preferred location for trees will be in the boulevard between sidewalk and curb, where present. ~~All trees are to be planted on City property.~~

Adjacent~~ly planted~~ trees ~~will be shown~~ shall be planted approximately every 3.0m – 12.0m on centre (o.c.)~~e.c.~~ where practical and where growing space is available, according to species. Ornamental trees ~~will~~ shall be spaced more closely than medium trees, and medium trees more closely than large trees.

The following guidelines ~~will assist~~ should help clarify: Figure 1. Tree size section.

		Lot width		
		<9.0m	9.0m – 15.0m	>15.0m
Blvd width	>2.0m	Ornamental or medium	Medium or Large	Large
	1.5m – 2.0 m	Ornamental or Medium	Medium	Medium or Large
	<1.5m	Select Ornamental, Medium or Large tree (or no tree) on site specific basis e.g. consider adjacent use of structural soil to reach breakout zone	~~Select Ornamental, Medium or Large tree (or no tree) on site specific basis e.g. consider adjacent use of structural soil to reach breakout zone~~	~~Select Ornamental, Medium or Large tree (or no tree) on site specific basis e.g. consider adjacent use of structural soil to reach breakout zone~~
No sidewalk		Ornamental or Medium or Large (largest	~~Ornamental or Medium Large (site specific)~~	~~Ornamental or Medium or Large (site specific)~~

Commented [LA6]: AMC: Proposed for deletion due to repetition.

Commented [LA7]: Hayley: Word did not allow me to modify comments within table; troubleshooting failed. Comment regarding "select Ornamental, Medium or Large tree" cells.

AMC: suggest merging these three cells, and then at the end reiterating the importance of selecting the largest tree possible.

Do the same for "No Sidewalk" cells below.

ii) Curb to Property Line Considerations

- Where no sidewalks exist or where sidewalk construction is not planned, trees are to be shown no closer than 0.6m to the private property boundary on City property. However this location should not be so far from the curb as to not contribute to a street canopy.

iii) Site Considerations

- ~~Plant o~~Only ornamental tree varieties shall be planted under or within 3m of high voltage overhead utility wires or poles. Large and medium shade trees maturing to an upright or vase shape are permitted no closer than 3m from high voltage overhead utility wires or their poles. Large and medium shade trees are not permitted immediately under but may be planted near other overhead cables including single phase and service wires and their poles.

- Trees may be planted at 0m (measured horizontally) from buried street light cable, not closer than 0.9m (measured horizontally) from other buried electric cables and not closer than 0.3m (measured horizontally) from buried telephone and/or TV service cables

- No new tree ~~is to~~ shall be ~~shown~~ closer than 2.0m to a driveway or 0.5m from a lead sidewalk ~~going~~ leading into a property

- No new tree ~~is to~~ shall be planted closer than 1.5m to the doors or within 1.2m from the sides of an above ground hydro vault (transformer).

- No new tree ~~is to be shown~~ shall be closer than 6m in line of sight to a stop sign on a residential street only (i.e. not a collector or arterial road).

- No new tree ~~is to be shown~~ shall be closer than 15.0m in line of sight to a stop sign or traffic signal light on any collector or arterial road.

- No new tree ~~is to be shown~~ shall be closer than 3m to the front and sides of a fire hydrant.

- No new tree ~~is to be shown~~ shall be closer than 0.3m (measured horizontally) to a water main, or
  0.7m from a shutoff.

- No new tree ~~is to be shown~~ shall be closer than 0.2m (measured horizontally) to a gas line.

- No new tree may be ~~shown~~ closer than 2.0m (measured horizontally) to a sanitary sewer.

- No new tree may be ~~shown~~ closer than 3.0m to another tree.

- No new tree is to be ~~shown~~ closer than 1.5m to a street light pole.

- Trees ~~only~~ are required for cul-de-sac island or roundabout areas and ~~will~~ must be ~~shown~~ indicated on the planting plan. The cost for any shrub or perennial plantings

Note: Refer to Section 18 regarding additional design information for new subdivisions.

Commented [LA8]: AMC: Are all overhead power lines "high voltage"?

Commented [LA9]: AMC – Personally, I object to this. A huge number of streets in London have hydro on one side, and the implications for our urban forest are enormous. (Imagine if half of our big street trees were replaced with lilac bushes… something that is occurring quite often now!)

Trees have been pruned to allow for wires for ages.

Need a recommendation to study the scale of this move on London's canopy cover: what proportion of boulevards have overhead utility wires, and how is this ongoing conversion of medium & large trees -> ornamentals going to affect cover?

Commented [LA10]: AMC: Can we create a required density for these? Great opportunity for more intense planting.

will be at the expense of the developer, and will likewise be ~~shown~~ indicated on the planting plan for review and approval in accordance with city guidelines and specifications. Planting of shrubs and/or perennials should coincide with City guidelines and specifications. Should this be required by City Staff in advance of scheduled planting operations ~~by City staff~~ (ie: for model homes, etc), the developer should discuss the scheduling of this planting with City Staff prior to ~~work being carried out~~the commencement of any such work.

iv) Design and Species Considerations

- Mature street trees are the most visible and desirable component of our streetscapes. However, it is vital that tree species are intermixed to avoid a continuous mono-culture situation, which, though aesthetically pleasing, increases trees' vulnerability to insect and disease outbreaks (both of which are expected to increase with climate change). ~~to increase resistance to insect and disease problems, tree species must be mixed in order to avoid a continuous mono-culture situation.~~ Where several phases make up the M-Plan, the plan should reflect the character of planting in adjacent phases.

- Use of native species over non-native species is ~~desirable~~strongly preferred. The term nNative ~~means~~ signifies naturally occurring (indigenous) ~~in~~ to Southwestern Ontario. Where non-native species are used, preference should be given to those species native to continental North America and which may expand into Ontario as climate change proceeds (see Appendix 5). Tree Planting plans must specify the nativity status of each species included on the plan (native to Southwestern Ontario, continental non-native or non-continental non-native).
  - At least 50% of the trees in a given planting plan must be native to Southwestern Ontario, unless otherwise approved by the City Forester or their designate
  - Non-invasive non-continental species may constitute no more than 25% of the trees in a given planting plan, unless otherwise approved by the City forester or their designate.

- Invasive species (see Appendix ~~5~~ 6) ~~will~~ **shall** ~~be avoided except in special circumstances~~ **not to be used** without special written approval by the City Forester or their designate. Invasive species, as a rule, will not be permitted as a "first resort" on any site.

- 'Ornamental' tree means a tree that typically achieves a mature height of not more than 6m.
- 'Medium' tree means a tree that typically achieves a mature height greater than 6m and less than 16m.

- 'Large' tree means a tree that typically achieves a mature height greater than16m.

- No more than five of any one species may be permitted in a row ~~or variety is to be shown~~ on one side of the street ~~in a row~~. Trees should, where possible, be matched from one side of the street to the other (maximum of 10 matched trees between the two sides of the street) to provide a 'closed canopy' effect at maturity. Possible exceptions include situations where obstructions (e.g. powerlines) necessitate a different species on either side.

- Where several phases make up the M-Plan, the plan should reflect the landscape character of plantings in adjacent phases. It is not ~~necessary~~ essential, nor

necessarily ~~and may not~~ be desirable to match species on adjacent phases, but consideration should be given to a neighbourhood identity with similar tree shape and size at maturity. **However, this factor is less important than ensuring that tree cover is maximized in the new development.**

- In order to integrate species diversity into each plan, the species mix shall ~~provide~~ include no more than 15% of any one species (percentage of the entire number of trees within the plan). Individual phases may diverge from this percentage if deemed reasonable (e.g. cul-de-sac of 12 lots) so long as the overall object of 15% species mix is maintained within the plan of subdivision.

- Trees with similar shape (i.e.: vase, oval, upright) ~~are to~~ shall be selected to provide a neighborhood landscape character.

- No species other than those listed in Appendix 5 ~~are to~~ shall be shown on the planting plan without prior consultation with City of London staff. Other species may be considered for approval if it can be ~~shown~~ demonstrated that the proposed species are non-invasive in Ontario; are appropriate to the proposed planting locations; or in cases of ~~and to permit~~ trial plantings of new (to the City) species or cultivars.

- Trees with large or messy fruit may be planted only in limited situations, or by request of residents;

- ~~Trees with large thorns are not permitted and species such as poplar and willow are banned by by-law for street tree planting~~.

Commented [SI11]: AMC: General Q/thought: how can the City update the Tree Guidelines to help implement the Urban Forest Strategy? That's something we should be considering too.

Commented [SI12]: AMC: Should be exemption for large lots without sidewalks: a flat out ban does not make sense, and "species such as" is very vague. (What other species, and why?)

Commented [H13]: Redundant if they are not in Appendix 5, and otherwise vague – what is "such as"? (What is the basis for poplar and willow to be banned, how are people to make inferences from this?)

- Coniferous needle-bearing trees ~~will~~ shall not be shown in the boulevard where they will cause sight line obstructions but may be planted rear of the sidewalk. (For roads without sidewalks, a minimum 3m setback for conifers shall be used).

- Ash (*Fraxinus*) species may not be shown or planted on any City boulevard until further notice – no exceptions.

12.2.3 PLANTING

12.2.3.1 Planting (Post Assumption)

Once the planting plan is approved at the time of assumption, the City of London ~~will~~ shall implement street tree planting before end of warranty of the subdivision through City of London tender processes and administration.

12.2.3.2 Species Substitutions

The City ~~will~~ shall implement the approved tree planting plan, as accurately as possible, with the tree species specified. Once the planting plan is prepared, substitutions ~~will be done~~ shall occur only as necessary and should not be a common occurrence, -. Should substitution be required due to unforeseen circumstances, the City reserves the right to substitute with a suitable species without further consultation or approvals through the developer.

Note: Substitute species will endeavour to match the size and shape of the originally planned species. The overall 15% maximum by species limit shall still apply. Substitutions to a smaller size class of tree will not be permitted.

Commented [SI14]: AMC: We should ask the City how these instructions can be best communicated to contractors and possibly make some general recommendations around that.

12.2.3.3 Timely Planting

The City of London ~~will~~ shall commit to planting trees within one year of assumption. Any subdivisions assumed prior to October 1 of the current year would be incorporated into the Tender process for planting the following year. If assumptions are processed after that date, they ~~could~~ may be planted the following year, depending upon availability of plant material specific to the planting plan, and depending upon the distribution date of ~~when~~ the Tender documents ~~are distributed~~.

If assumption of the subdivision is unduly delayed, with at least 50% of homes already occupied, the City of London may work with the developer to arrange for planting of trees prior to assumption by the City, recognising the high benefit to the neighbourhood and the environment of planting trees as early as possible.

12.2.3.4 Fee

There are several components which comprise the cash-in-lieu amount charged for street tree planting. The fee must cover all costs associated with implementing the program, including the cost to supply and install the tree, a two year replacement warranty policy and associated administration costs (planning, organizing and implementing of tree planting as well as surveying and compliance checks).

Once the trees are planted, the City ~~will~~ shall forward an invoice to the developer reflecting the actual cost of planting trees in that subdivision with an additional 10% administration fee (plus all applicable taxes).

Note: Refer to Section 18 regarding additional design information for new subdivisions.

12.2.4 AT END OF SUBDIVISION WARRANTY

12.2.4.1 Fee

Payment for tree planting as invoiced by the City of London is ~~a requirement~~ required at the time of end of ~~warranty of the subdivision~~ subdivision warranty. If payment is not received, end of subdivision warranty will not be granted.

12.2.4.2 Security

Once payment for street tree planting has been received (as invoiced), the developer will be released from all obligations in this regard and the City's Engineering Review Department will be authorized to release all securities held for such.

12.2.4.3 Public Relations

Should homeowners inquired about tree planting operations, the developer will explain that trees will be planted post-assumption. Further inquiries may be directed to the Urban Forestry Division at the City of London.

12.2.4.4 PROCEDURE SUMMARY

- The developer ~~will~~ shall submit the security amount at time of the development agreement;
- The developer ~~will~~ shall provide a planting plan for review and approval at time of assumption;
- City ~~Staff~~ staff or designated contractors shall~~will~~ plant trees between assumption and end of warranty of the subdivision;
- The City ~~will~~ shall invoice the developer for tree planting operations;
- The developer ~~will~~ shall forward payment as invoiced to the Finance Division, City Hall, Room 406;
- City staff ~~will~~ shall acknowledge receipt of payment and communicate to the Engineering Review Department that all requirements with regards to tree planting have been met for the area being assumed;
- City staff will authorize release of securities held;
- Payment for street tree planting is a requirement at end of warranty. If payment has not been received, end of warranty will not be awarded and securities will continue to be held until such time as payment is received.by the consulting engineer. The plan will be reviewed and approved by City staff. The plan is to be submitted to the Coordinator, Forestry Programs, Planning Division, City Hall for review.

Commented [SI15]: AMC: Specify which plan (Tree Planting Plan?)

12.2.5 END OF TREE WARRANTY – INSPECTION PROCEDURE

Trees shall be planted under a 2-year warranty from time of planting, as prescribed in the tender documents. A tree warranty inspection shall be conducted by City staff prior to the expiry of the 2-year warranty period. This inspection shall be conducted as per the guidance in Appendix ~~7~~ 8 and included in the tree planting tender (contract). Trees that fail inspection shall be replaced at the contractor's expense within a suitable timeframe (no more than one year from the date of replacement request).

Commented [SI16]: Question to staff: Could we require this be followed up with another 2 year warranty to ensure successful establishment?

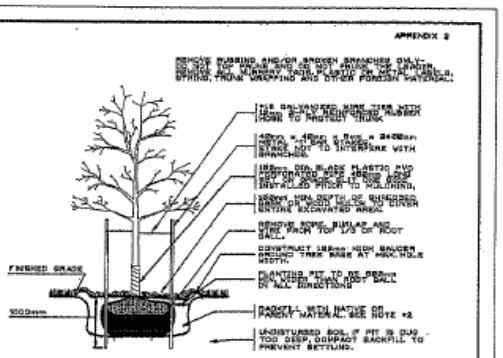
TRANSPORTATION

LIST OF FIGURES

Note: Refer to Section 18 regarding additional design information for new subdivisions.

APPENDIX 1

KEY	BOTANICAL NAME	COMMON NAME	TOTAL	SIZE (CALIPER) mm
A	GLEDITSIA TRIACANTHOS "SKYLINE"	SKYLINE HONEY LOCUST	16	50mm
B	ACER RUBRUM	RED MAPLE	17	50mm
C	FRAXINUS PENNSYLVANICA "PATMORE"	PATMORE ASH	23	50mm
D	QUERCUS MACROCARPA	BUR OAK	7	50mm
E	TILIA CORDATA "GREENSPIRE"	GREENSPIRE LINDEN	20	50mm



NOTES:
1. TRUNK TO HAVE SAME ELEVATION RELATIVE TO FINISHED GRADE AS PREVIOUSLY OCCUPIED PRIOR TO TRANSPLANTING.
2. BACKFILL TREE-PIT WITH NATIVE SOIL AND/ OR A COMBINATION OF NATIVE SOIL AND APPROVED AMENDED TOPSOIL. REMOVE FOREIGN DEBRIS AND STONES.
3. GAUGES TO BE SOAKED WITH WATER AND COMPLETELY MULCHED IMMEDIATELY FOLLOWING PLANTING.
4. ON STRONG SOILS, ONLY BIODEGRADABLE ROPE IS ACCEPTABLE.
5. ALL DIMENSIONS ARE IN MILLIMETERS.

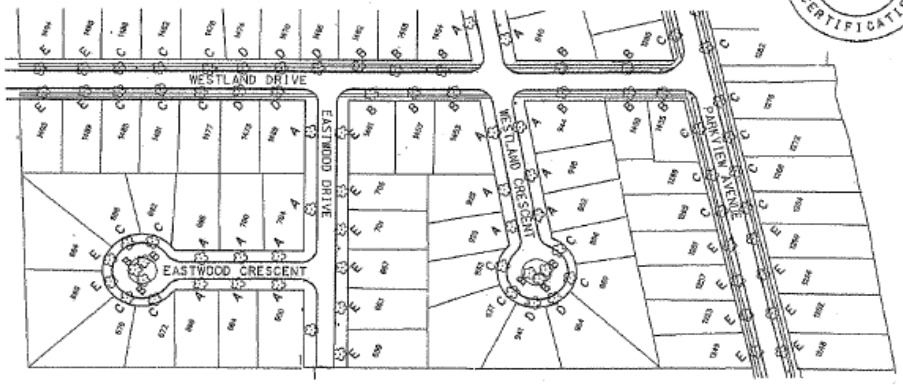
BALLED AND BURLAPPED DECIDUOUS TREES

CITY OF LONDON STANDARD DRAWING

TREE PLANTING DETAIL

DWG	DATE	APPROVED BY
D-36A	2002 11 14	CITY ENGINEER

PROFESSIONAL CERTIFICATION



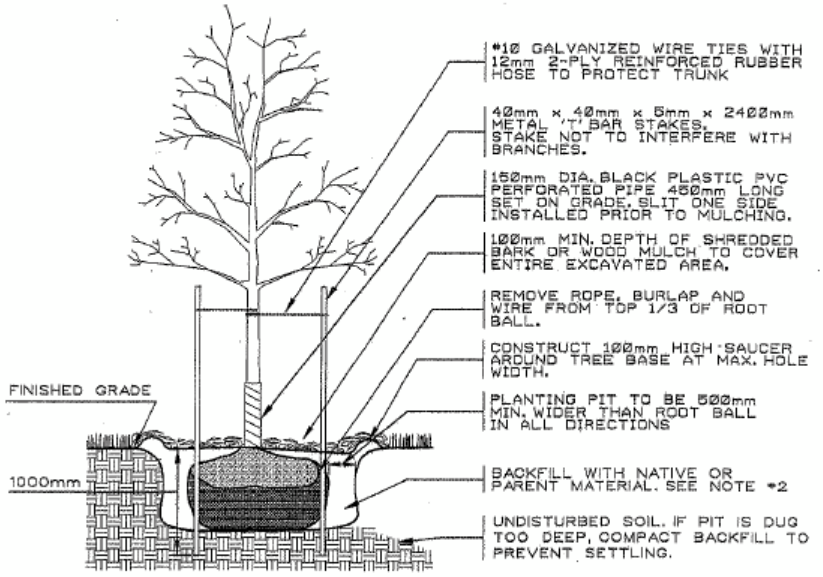
CITY OF LONDON STANDARD DRAWING

TREE CONCEPT PLAN

DWG	DATE	APPROVED BY
D-37	2002 11 14	CITY ENGINEER

APPENDIX 2

REMOVE RUBBING AND/OR BROKEN BRANCHES ONLY-
DO NOT TOP PRUNE AND DO NOT PRUNE THE LEADER.
REMOVE ALL NURSERY TAGS, PLASTIC OR METAL LABELS,
STRING, TRUNK WRAPPING AND OTHER FOREIGN MATERIAL.



NOTE:

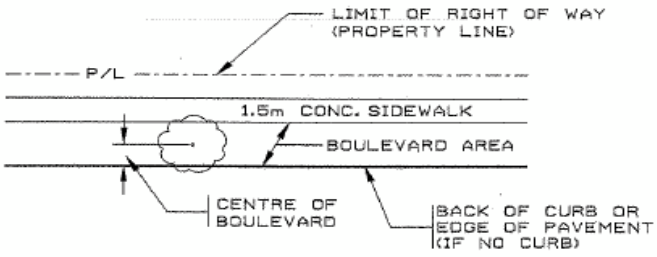
1. TRUNK TO HAVE SAME ELEVATION RELATIVE TO FINISHED GRADE AS PREVIOUSLY OCCUPIED PRIOR TO TRANSPLANTING.
2. BACKFILL TREE-PIT WITH NATIVE SOIL AND/ OR A COMBINATION OF NATIVE SOIL AND APPROVED IMPORTED TOPSOIL. REMOVE FOREIGN DEBRIS AND STONES.
3. SAUCER TO BE SOAKED WITH WATER AND COMPLETELY MULCHED IMMEDIATELY FOLLOWING PLANTING.
4. ON STRING BALLS, ONLY BIODEGRADABLE ROPE IS ACCEPTABLE.
5. ALL DIMENSIONS ARE IN MILLIMETERS.

BALLED AND BURLAPPED DECIDUOUS TREES

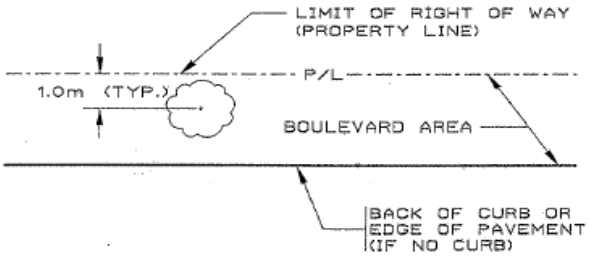
CITY OF LONDON STANDARD DRAWING

TREE PLANTING DETAIL

DWG	DATE	APPROVED BY	
D-31A	2002 11 14	CITY ENGINEER	Pg. 12-11



TYPICAL TREE LOCATION DETAIL
ON BOULEVARD WITH SIDEWALK



TYPICAL TREE LOCATION DETAIL
WITHOUT BOULEVARD SIDEWALK

CITY OF LONDON STANDARD DRAWING

BOULEVARD TREE PLANTING DETAIL

DWG	DATE	APPROVED BY
D-36	2002 11 14	CITY ENGINEER

Note: Refer to Section 18 regarding additional design information for new subdivisions.

APPENDIX 4

GENERAL NOTES

1. All plant materials shall be #1 nursery stock meeting Canadian standards.
2. Stake all deciduous trees.
3. Dig all tree pits 500.0 mm larger all around than the root ball and place tree centred in pit on undisturbed soil. Backfill with parent material and replace debris (eg. Brick, dry wall, etc) with screened topsoil.
4. For grading and drainage, see engineering plans.
5. Specific tree locations for each lot are to be determined by Tree Planting Guidelines set by the City of London Environmental Services Department and as shown on Lot Grading Certification Plans.
6. All dimensions are in millimetres unless otherwise noted.
7. All plant materials to be guaranteed for two growing seasons from the date of provisional acceptance.
8. Prior to the commencement of construction, all existing underground utilities within the limits of the construction site shall be located and marked. Any utilities damages or disturbed during construction shall be repaired or replaced to the satisfaction of the City of London at the Contractor's expense.
9. Plant materials to be installed as shown; substitutions allowed only after consultation with the Landscape Consultant and express written permission from the City of London. Substitutions to a smaller size class of tree or to a more alien species (see Fig. ?? below) shall not be permitted except under extenuating circumstances.

(CREATE FIGURE, showing, in descending order: native to London, native to Ontario, native to North America, not native continentally, and give examples of each)

10. Predominant soil type in the area.

Commented [SI17]: Please specify which organization's standards.

(The only one I could find only had a #1 class for potted stock, not B&B.)

Commented [SI18]: Q to staff: is 50 cm adequate? Should we be considering larger pits to loosen up the soil a bit when the tree goes in?

Commented [SI19]: Q to staff: Has compost ever been considered?

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Commented [SI20]: AMC: Not clear what this item means or what purpose it serves. Remove?

APPROVED STREET TREES

APPENDIX 5

The selection of trees for individual locations is a ~~difficult~~ complex process. ~~It must give c~~Careful consideration must be given to the neighbourhood and ~~the~~ existing conditions including soil type, moisture, available growing space above ground, proximity to hard physical plant (hydro wires, gas, lighting, hydrants, vaults, sidewalks) and future rooting and growing space demands.

In recommending the species in the table below, we recognize that ~~they are~~ not all species are suitable for all locations. Carefully select the species which possess the characteristics ~~that~~ which most closely ~~meet~~ suit the environmental conditions of each site, and which will provide the maximum (allowable) canopy cover at maturity. ~~As well~~Furthermore, not all cultivars of each species are listed. The design professional may suggest **non-invasive** species which are not listed for consideration; ~~and they~~ these species will be reviewed by City staff through the approval process. Where new species are proposed, those native to continental North America (and preferably Southwestern Ontario) are **strongly** preferred over non-continental species.

Other concerns include:

- ◆ STRESS — considers the tolerance to conditions such as compacted soil, diseases, drought, insects, road salt spray
- ◆ TIME — considers which species can be transplanted/moved at specific times in the year eg. spring only
- ~~◆ NATIVE~~ — ~~considers the suitability of trees indigenous to this region for use in highly disturbed soils, traditionally found in streetscapes and new subdivisions ->~~

ORIGIN (Native, Non-Native and Invasive): Considers the potential for species to contribute to the resilience and health of London's urban forest and existing woodlands. As climate change occurs, many species native to the United States (and the ecological communities of which they are a part) will expand north into Ontario. While trees native to Ontario are preferred over those that are not, non-native species expected to expand into Ontario from other parts of continental North America are strongly preferred over non-native species from other continents, which provide no support for their associated species.

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ALLERGENS: considers the allergenic potential of the species and whether it is possible to avoid planting pollen producing (male) trees, especially in areas where people are more likely to have respiratory illness (e,g., around hospitals, retirement homes)

- ◆ FRUIT — considers the size ~~and~~ season and abundance of fruit produced by some species, which makes~~ing~~ them more or less desirable in specific locations

Note: Refer to Section 18 regarding additional design information for new subdivisions.

◆ DISEASE — considers the potential for widespread mortality and costly removal and replacement programs, which generateing public and political complaints with regarding trees, for instance such as Norway maple (Verticillium wilt), American Elm (Dutch Elm Disease) and Austrian Pine (Diplodic Tip Blight). Avoid mass planting of single species.

Variety

In an effort to promote long long-term sustainability, cost effective block trimming operations and increase enhance our ability to manage street tree risk management, we encourage a variety of tree species on each and every street. We also support aesthetically pleasing street tree designs and therefore encourage the planting of tree species mixtures which have similar form. Native trees are preferred over non-native trees. Where non-native trees are used, continental non-native species are strongly preferred over non-continental ones as a form of climate change adaption.

Commented [SI21]: AMC: Does not make sense – possibly meant "can" instead of "and"? Or "increased" instead of "increase"?

Commonly the landscape architect or registered professional forester is responsible for proper design and species selection taking the above points into consideration.

In an attempt to assist the design and species selection process, a list of recommended street trees is included. The list has been prepared using a number of references and you are encouraged to search these out and provide input with respect to other species for consideration.

In light of the harm they cause to London's forests and other components of our natural heritage system, invasive species (see Appendix 6) are no longer permitted within tree planting plans, except with express written permission of the Urban Forester. The City considers the elimination of invasive species from publicly owned natural areas as an important goal, and it is hoped that by taking leadership in this area, the City may encourage residents and other communities to follow suit.

APPENDIX 5

References include:

Dirr, M.A. 1990 Manual of Woody Landscape Plants

Farrar, J.L. 1995 Trees in Canada

Gerhold, H.D. et.al., 1989 Street Tree Factsheets

Himelick, E.B., 1981 Tree & Shrub Transplanting Manual

Poor, J.M. (Editor) 1984 Plants That Merit Attention Vol. 1

Rehder, A. 1940 Manual of Cultivated Trees & Shrubs

Sternberg, G, & J. Wilson 1995 Landscaping with Native Trees

Watson, G.W. 1992 Selecting and Planting Trees

TREE FORMS:

VASE

PYRAMIDAL

OVAL

COLUMNAR

ROUNDED

SPREADI

Note: Refer to Section 18 regarding additional design information for new subdivisions.

APPROVED STREET TREES

APPENDIX 5

Commented [SI22]: AMC: May need a definition section

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious / Dioecious	OPALS Rating
~~***Acer campestre*** ~~*Hedge Maple*~~	~~Invasive*~~	~~**Non-Continental:** Europe and southwestern Asia~~[8]	~~Boulevard~~	~~Compact form/trunk suckers require extra maintenance.~~	~~Medium~~	~~Rounded~~	~~Monoecious~~[8]	~~7~~
Acer x freemanii Hybrid Soft Maple	Non-native	**Continental:** **USA** (KY, ME, NC, NY, OH, WI) **CAN** (ON, QC)[2]	Boulevard	Caution: Many cultivars of *Acer rubrum* and *A. saccharinum* exist under the name Freemanii, each with different characteristics	Medium	Oval-Rounded	Dioecious Gender can change[11]	Autumn Fantasy, Indian Summer and Morgan all 1. Autumn Blaze 7
~~***Acer ginnala*** ~~Amur Maple~~	~~Invasive*~~	~~**Non-Continental:** E. Asia (China, Japan, Manchuria)~~[8]	~~Boulevard~~	~~Multi-stem by prior approval only. Compact form/red &yellow face colour/lots of seeds/tends to sucker/specify single stem form~~	~~Ornamental~~	~~Rounded~~	~~Monoecious~~[8]	~~4~~
Acer nigrum Black Maple	Native	**Continental:** **USA** (AL, AR, CT, DC, DE, GA, IA, IL, IN, KS, KY, MA, MD, MI, MN, MO, NC, NH, NJ, NY, OH, PA, SD, TN, VA, VT, WI, WV) **CAN** (ON, QC)[2]	Boulevard, Parks	Lots of seed for winter interest/rare/needs moist soil	Large	Oval	Monoecious[3]	~7 (assumed to be same as sugar maple)

Commented [H24]: New columns/data

Commented [H23]: New column/data

Acer pennsylvanicum Striped Maple	Native	**Continental: USA** (CT, GA, KY, MA, MD, ME, MI, MN, NC, NH, NJ, NY, OH, PA, RI, SC, TN, VA, VT, WI, WV),	Boulevard Park	Specify single stem.	Medium	Rounded	Dioecious Gender can change[1]	6
~~***Acer platanoides***~~ ~~Norway Maple~~ ~~-many cultivars~~ ~~-plant only in specific locations~~	~~Invasive*~~	~~**Non-Continental:** Europe, from Scandanavia to the Urals and the Mediterranean, east to W.Asia[8]~~	~~Boulevard~~	~~Surface roots conflict with and turf/girdling roots/aphid and wilt problems.~~	~~Medium~~	~~Various Forms~~	~~Dioecious[1]~~	~~8~~

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Dioecious	OPALS Rating
~~***Acer pseudoplatanus***~~ ~~Sycamore Maple~~	~~Invasive*~~	~~**Non-Continental:** Europe[8]~~	~~Boulevard~~	~~Very pollution and salt tolerant Cankers cause high maintenance~~	~~Large~~	~~Oval-Rounded~~	~~Monoecious[8]~~	~~8~~
Acer rubrum Red Maple ▪ 'October Glory' ▪ 'Red Sunset'	Native	**Continental:** **USA** (AL, AR, CT, DE, DE, FL, GA, IA, IL, IN, KY, LA, MA, MD, ME, MI, MN, MO, MS, NC, NH, NJ, NY, OH, OK, PA, RI, SC, TN, TX, VA, VT, WI, WV) **CA** (NB, NF, NS, ON, PE, QC)[2]	Boulevard Park	Green summer foliage & yellow to red fall colour/tolerates wet soil	Medium	Oval-Rounded	Polygamo-dioecious[3]	*1 *1
Acer saccharinum Silver Maple	Native	**Continental:** From Great Lakes down to NW Florida, East as New Brunswick, West to Central Maine[3]	Boulevard Park	Fast growing softwood maple; Maintenance issues as tree nears maturity due to weak wood.	Large	Oval-Rounded	Can be monoecious or dioecious[3]	Males: 9 Females: *1
Acer saccharum *Sugar Maple*	Native	**Continental:** Manitoba through to Quebec, New Brunswick and Nova Scotia. Middle Atlantic States through to Appalachians[3]	Boulevard Park	Upright form/fall colour varies/prefers good drainage/shallow roots/salt sensitive	Large	Oval-Rounded	Monoecious[3]	7

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Acer spicatum Mountain Maple	Native	**Continental:** **USA** (AL, NC, NH, NJ, NY, OH, PA, RI, TN, VA, VT, WI, WV), **CAN** (LB, MB, NB, NF, NS, ON, PE, QC, SK)[2]	Boulevard Park	Specify single stem. Shade tolerant, seldom thriving in the open. Prefers cool shade. May spread by root shoots.	Ornamental	Oval-rounded	Monoecious[5]	Not available
~~***Acer tataricum***~~ ~~Tatarian Maple~~	~~Invasive*~~	~~**Non-Continental:**~~ ~~S.E. Europe, W. Asia[8]~~	~~Boulevard~~	~~Specify single stem. Good red & yellow fall~~	~~Medium~~	~~Rounded~~	~~Monoecious[8]~~	~~5~~

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APPROVED STREET TREES

APPENDIX 5

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious / Dioecious	OPALS Rating
Aesculus glabra Ohio Buckeye	Non-native	**Continental:** South-eastern and Central N. America – Pennsylvania to Nebraska, south to Tennessee and Oklahoma[8]	Boulevard	Untested in London area and may suffer winter problems. Likes moist soil. ***For use in limited circumstances***	Medium	Oval	Polygamo-dioecious[3]	7
~~***Aesculus hippocastanum***~~ ~~Horsechestnut~~ ~~▪ 'Baumannii'~~	~~Invasive*~~	~~**Non-Continental:** Europe – N. Greece and Albania[8]~~	~~Boulevard~~	~~Good spring flower with no fruit/limit use due to disease susceptibility~~	~~Large~~	~~Rounded~~	Polygamo-monoecious[6]	~~7~~
~~***Alnus glutinosa***~~ ~~European Alder (Single Stem Only)~~	~~Invasive*~~	~~**Non-Continental:** Most of Europe, including Britain, to Siberia, W. Asia and N. Africa[8]~~	~~Boulevard~~	~~Tolerant of wet & dry soil. Invasive tendencies checked by dry sites.~~	~~Medium~~	~~Pyramidal~~	~~Monoecious[3]~~	~~9~~
Amelanchier arborea Downy Serviceberry	Native	**Continental:** Eastern N. America – New Brunswick to Florida, west to Minnesota and Texas[8]	Boulevard Park	Showy flower & fruit/ tolerant of wet & dry soil	Ornamental	Rounded	Monoecious[8]	Not available

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Dioecious	OPALS Rating
Amelanchier canadensis Shadblow Serviceberry	Native	**Continental:** Eastern N. America – Nova Scotia to Ontario, south to Florida[8]	Boulevard Park	Difficult to maintain single stem Four-season interest Tolerates moist soil	Ornamental	Rounded	Monoecious[8]	Not available
Amelanchier laevis Alleghany Serviceberry	Native	**Continental:** Eastern N. America[8]	Boulevard, Park	Multi-stem specimens by prior approval only	Ornamental	Rounded	Monoecious[8]	3
Betula alleghaniensis Yellow Birch	Native	**Continental:** SE Manitoba to Maritime Canada, South to Minnesota, NE to Illinois[3]	Parks,	Interesting bark features and good fall colour	Large	Rounded-Spreading	Monoecious[3]	7 but only has a shor blooming period)
Betula papyrifera White Birch	Native	**Continental:** Northern limit of tree growth from Newfoundland and Labrador west across the continent into northwest Alaska[8]	Parks,	Interesting bark features and good fall colour	Large	Rounded-Oval	Monoecious[3]	7

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious / Dioecious	OPALS Rating
~~***Carpinus betulus*** European Hornbeam 'Fastigiata'~~	~~Invasive*~~	~~**Non-Continental:** Europe, including Britain, from Sweden to the Pyreness east to Iran in W. Asia[8]~~	~~Boulevard~~	~~Difficult to transplant Keep away from road salt & spray~~	~~Medium~~	~~Pyramidal Oval~~	~~Monoecious[8]~~	~~8~~
Carpinus caroliniana Blue beech or Musclewood	Native	**Continental:** Eastern United States and extends into Canada in southwest Quebec and southeast Ontario[3]	Boulevard Parks	Difficult to transplant/keep away from road salt & spray/likes wet soil/thin bark and sculptured trunk	Medium	Rounded	Monoecious[3]	8 (Rating for genus only)
Carya cordiformis Bitternut Hickory	Native	**Continental:** Eastern United States from southwestern New Hampshire, southern Quebec, west to southern Ontario, down to NE Florida[3]	Parks	Difficult to transplant due to large tap root, messy fruit	Large	Oval-Vase	Monoecious[3]	8-10* (Rating for genus only)
Carya glabra Pignut Hickory	Native	**Continental:** Eastern United States, extreme southern Ontario[3]	Parks	Difficult to transplant due to large tap root, messy fruit	Large	Oval-Vase	Monoecious[3]	8-10*

APPROVED STREET TREES

APPENDIX 5

*Do not use within 200m of a natural area or watercourse. Use only in highly urbanized and disturbed environments where other species may fail

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Dioecious	OPALS Rating
Carya laciniosa Big Shellbark Hickory	Native	**Continental:** Western New York through southern Michigan to southeast Iowa, south through eastern Kansas into northern Oklahoma, and eastward through Tennessee into Pennsylvania[3]	Parks	Difficult to transplant due to large tap root, messy fruit	Large	Oval-Vase	Monoecious[8]	8-10*
Carya ~~ovate~~ovata Shagbark Hickory	Native	**Continental:** Eastern United States, Southern Ontario, NE Mexico[3]	Parks	Difficult to transplant due to large tap root, messy fruit	Large	Oval-Vase	Monoecious[3]	10
Celtis laevigata Sugar ~~Hackberry~~berry	Non-Native	**Continental:** Southeastern Virginia to southern Florida, west to central Texas and northeastern Mexico[3]	Boulevard Park	Compact form/good in moist soils	Large	Vase	Polygamo-monoecious[3]	8
Celtis occidentalis Common Hackberry	Native	**Continental:** Eastern United States from the southern New England States through central New York west in southern Ontario to North and South Dakota[3]	Boulevard Park	Requires pruning for witches broom and general form. Very tolerant.	Large	Vase	Polygamo-monoecious[3]	8

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Dioecious	OPALS Rating
Cercidiphyllum japonicum Katsura Tree	Non-native	**Non-Continental:** E. Asia – China and Japan[8]	Boulevard	Multi-stem by prior approval only. Difficult to transplant. Thin bark. Needs supplemental Water. ***For use in limited circumstances***	Large	Rounded	Dioecious[5]	Males: 8 Females: *1
Cercis canadensis Redbud	Native	**Continental:** Eastern and Central N. America – New York to Florida, west to Texas and Wisconsin[8]	Boulevard Park	Seeds readily. Suitable for lawns but not formal boulevard due to low branching.	Medium	Vase-Rounded	Monoecious[3]	5
Cladrastis kentukea (lutea) Yellowwood (Single Stem Only)	Non-native	**Continental:** South-eastern N. America – Appalachian mountains, mainly in North Carolina and Tennessee[8]	Boulevard	Few problems/use local seed sources or stock only/prune early	Medium	Rounded	Monoecious[8]	5
Cornus alternifolia Alternate-leaf Dogwood	Native	Eastern N. America – NFLD to Florida, west to Manitoba and Arkansas[8]	Boulevard Park	Use local winter hardy material only Specify single stem	Medium	Rounded	Monoecious[8]	5

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Dioecious	OPALS Rating
Cornus florida Flowering dogwood	Native	**Continental:** Extreme southwestern Maine west to New York, extreme southern Ontario, central Michigan, central Illinois, and central Missouri[3]	Park	Specify single stem only. Use local winter hardy material only/ good flower/ specify single stem Can be very sensitive. Prefers acid soil, Limited use only.	Ornamental	Rounded	Monoecious[3]	5
Corylus colurna Turkish Hazal	Non-native	**Non-Continental:** S.E. Europe to W. Asia[8]	Boulevard	Good form/ difficult to transplant/ winter interest/ needs supplemental water	Large	Pyramidal	Monoecious	8
Crataegus (varieties) Hawthorns	Non-Native	*(Dependent on species)*	Boulevard Park	thornless & disease resistant varieties only. * For use in limited circumstances *Crataegus monogyna* is invasive*	Ornamental	Rounded		4
Fagus grandifolia American Beech	Native	**Continental:** Maritime Canada to Southern Quebec to Eastern Wisconsin[3]	Boulevard Park		Large	Oval	Monoecious[3]	7

APPROVED STREET TREES

APPENDIX 5

*Do not use within 200m of a natural area or watercourse. Use only in highly urbanized and disturbed environments where other species may fail to thrive

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Dioecious	OPALS Rating
Fagus sylvatica European Beech	Non-native	**Non-Continental:** Europe, including Britain, from Norway south and east to Spain, Greece, W. Russia and the Crimea[8]	Park	Needs moist soil/different leaf colours with varieties/sensitive to activity within root zone/leaves persist through winter/thin bark	Large	Oval-Rounded	Monoecious[8]	7
Fagus orientalis Oriental beech	Non-native	**Non-Continental:** E. Europe to W. Asia[8]	Park		Large	Oval-Rounded	Monoecious[8]	7
Ginkgo biloba Maidenhair tree (Male cultivar only)	Non-native	**Non-Continental: E. Asia – N. China[8]**	Boulevard	Good yellow fall colour/thin bark/tolerant of city conditions & pollution/slow growing but very large at maturity/virtually pest and disease free	Large	Pyramidal Spreading	Dioecious[8]	Males: 7 Females: *2
Gleditsia triacanthos* var. *inermis Thornless Honeylocust ▪ 'Shademaster' ▪ 'Skyline'	Non-native	**Continental:** Maritime Canada to Southern Quebec to Eastern Wisconsin	Boulevard	Provides a filtered shade/susceptible to defoliation by leafhopper/susceptible to canker and other pests and diseases	Medium	Spreading	Monoecious[8]	Males: 7 Females: *1 Bisexual: 4

Commented [EL25]: Fagus Genus Only

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Dioecious	OPALS Rating
Gymnocladus dioicus Kentucky coffeetree	Native	**Non-Continental:** Europe, including Britain, from Norway south and east to Spain, Greece, W. Russia and the Crimea	Boulevard Park	Male variety only in boulevard	Large	Oval	Dioeicous[5]	Males: *9 Females: *1
Halesia tetraptera Carolina Silverbell	Native	**Non-Continental:** E. Europe to W. Asia	Park	Low branched tree with narrow head/broad, rounded crown/reserve for lawn areas	Medium	Rounded	Monoecious[8]	3
Juglans nigra Black Walnut	Native	**Non-Continental: E. Asia – N. China**	Park	messy fruit/needs large area * For use in limited circumstances	Large	Oval	Monoecious[8]	8-*9
Koelreuteria paniculata Goldenrain tree	Non-native	**Continental:** Maritime Canada to Southern Quebec to Eastern Wisconsin[3]	BoulevardPark	Good yellow flower & fruit/susceptible to winter damage/weak	Medium	Rounded	Perfect (hermaphrodite)[8]	4
***Laburnum* (varieties)**	Non-native	**Non-Continental:** Europe, including Britain, from Norway south	Park	Poisonous pea-like seeds. yellow chain like flower/winter hardy local varieties	Ornamental	Rounded	Perfect (hermaphrodite)[8]	7

Golden chain tree		and east to Spain, Greece, W. Russia and the Crimea		only/borderline hardiness **** For use in limited circumstances***				

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Diecious	OPALS Rating
Liriodendron tulipifera Tulip tree	Native	**Continental:** Eastern N. America – Nova Scotia to Florida	Boulevard Park	Good flowers and yellow fall colour/local sources/moist well drained soil/very large tree most appropriate for lawn areas/somewhat weak wooded	Large	Rounded	Perfect (hermaphrodite)[1]	4
~~***Maackia amurensis*** Amur Maackia~~	~~Invasive*~~	~~**Non-Continental:** E. Asia – China, northern and central Japan, Korea[8]~~	~~Boulevard~~	~~Small, round headed tree/slow growing/summer flowering/bronze coloured bark~~	~~Ornamental~~	~~Rounded~~	~~Perfect (hermaphrodite)[8]~~	~~3~~
Magnolia acuminata Cucumber tree	Native	**Continental:** Western New York and southern Ontario southwest to Ohio[3]	Boulevard Park		Medium	Oval-Rounded	Perfect (hermaphrodite)[1]	Deciduous:6 Evergreen: 5
Malus **(most)** Flowering & Domestic Crab Apple:	Invasive*	*(Dependent on species)*	Boulevard	Maintenance problems/disease & insect problems/tolerates most soils Choose persistent fruit- holding, or poorly-fruiting types.	Ornamental	Rounded-Spreading		4

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APPROVED STREET TREES **APPENDIX 5**

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Dioecious	OPALS Rating
Malus coronia ***Wild Crabapple***	Native	**Continental:** Eastern N. America – New York to South Carolina, west to Kansas[8]	Park		Ornamental	Rounded	Monoecious[8]	4 (Genus only)
Nyssa sylvatica Black Gum	Native	**Continental:** Eastern N. America – Maine to Florida, west to Ontario and Texas[8]	Park	Difficult to transplant due to tap root, interesting summer and fall foliage, not for heavily polluted areas	Medium	Rounded - Oval	Polygamo-dioecious[3]	Males: 9 Females: 1
Ostrya virginiana Hop Hornbeam or Ironwood	Native	**Continental:** Eastern N. America – Nova Scotia to Manitoba, Nebraska, Florida and Texas[8]	Boulevard Park	Mainly an understory species	Medium	Oval	Monoecious[3]	7
Phellodendron amurense Amur corktree	Non-native	**Non-Continental:** E. Asia – N. China and Manchuria[8]	Boulevard	Good winter texture in bark/lots of black berries/use in protected areas	Medium	Spreading	Dioecious[5]	Males: 8 Females: 1
Pinus strobus White Pine	Native	**Continental:** Eastern N. America – Newfoundland to Manitoba, south to Georgia[8]	Park Boulevard	Locate with care in boulevards, due to possible sight line and access issues when immature (bushy). Avoid *Ribes* (alternate host for white pine blister rust)	Large	Pyramidal	Monoecious[8]	4

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Diecious	OPALS Rating
Platanus x acerifolia London Planetree	Non-native	**Continental:** Hybrid of *Platanus occidentalis* (N. America) and *Platanus orientalis (Europe)*, so has no native range[11]	Boulevard	Frost cracks on trunk/attractive peeling bark/fruit can cause problems/very large at maturity – reserve for large lots and lawn areas	Large	Spreading	Monoecious[8]	9
Platanus occidentalis *Sycamore*	Native	**Continental:** Southwestern Maine west to New York, extreme southern Ontario, central Michigan, and southern Wisconsin. Also N Mexico[3]	Boulevard Park	Frost cracks on trunk/attractive peeling bark/fruit can cause problems/very large at maturity – reserve for large lots and lawn areas	Large	Spreading	Monoecious[3]	9
Populus ssp. Balsam Poplar, eastern cottonwood, Large-tooth Aspen, Trembling Aspen	Native	**Continental for the following four species:** **Balsam Poplar**: Northern Canada and Alaska, south to western New England, NY, WV, MI, WI, northwest NE and CO[10] **Eastern Cottonwood**: Southwest Quebec, central MI and ND, south to northwest FL and central TX[10] **Large-tooth Aspen**: Nova Scotia to southwest Ontario and southeast Manitoba, south to western NC, TN **Trembling Aspen:** (TBD)	Park. Not permitted in Boulevard	Wood is light, soft and weak, breaks easily in storms, drops flowers, fruit, twigs and branches	Large	Pyramidal – Vase and Spreading	Dioecious[3]	Males: 9 Females: 1

APPROVED STREET TREES

APPENDIX 5

~~Do not use within 200m of a natural area or watercourse. Use only in highly urbanized and disturbed environments where other species may fail to thrive~~

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious / Diocecious	OPALS Rating
Prunus Americana American plum	Native	**Continental:** Southern NH to Manitoba and MT, south to FL Panhandle, AR, KS and NM[10]	Park	Somewhat thorny. Untested in boulevard.	Ornamental	Rounded	Monoecious[8]	2
Prunus nigra Canada plum	Native	**Continental:** Newfoundland to western Ontario and MN, south to VA, KY, and IA[10]	Park	Thorny. Untested in boulevard.	Medium	Rounded	Monoecious[8]	3
Prunus pensylvanica Pin Cherry	Native	**Continental:** Newfoundland and Labrador west to southern Mackenzie District and British Columbia in Canada. Scattered stands are found south in the Rocky Mountains to Montana and Colorado[3]	Parks	excellent flowers with no fruit/single stem to be specified/weeping cankers * For use in limited circumstances	Ornamental	Oval	Monoecious[3]	5
Prunus serotina Black Cherry	Native	**Continental:** Nova Scotia to MN and Eastern NE, south to FL Panhandle and Eastern TX. Disjunct populations in central TX and the southwestern US from west TX to AZ, south into mountains of Mexico and Guatemala[10]	Boulevard Park	Interesting bark, messy fruit; Better in lawns than in formal boulevard.	Large	Oval	Monoecious[3]	5 (Genus only)

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious / Diocecious	OPALS Rating
***Prunus* (flowering varieties)** Ornamental Cherry	Non-native	*(Dependent on species; most popular flowering cherries are non-continental)*	Boulevard	Weeping cankers; prone to fungal infections *** For use in limited circumstances***	Ornamental	Vase		(NEEDS REVISITING)
Prunus virginiana Choke Cherry	Native	**Continental:** N. America – British Columbia to California, east to Newfoundland and North Carolina[8]	Boulevard Park	green spring foliage & red in summer/bark tends to split	Ornamental	Rounded	Monoecious[8]	6
~~***Pyrus calleryana*** Callery Pear ▪ 'Chanticleer'~~	~~Invasive*~~	~~**Non-Continental:** E. Asia – China, central and southern Japan[8]~~	~~Boulevard~~	~~Fireblight problems Graft incompatibility problems with some rootstocks~~	~~Ornamental~~	~~Pyramidal~~	~~Monoecious)[8]~~	~~Ornamentals:4 Fruiting: 3~~
Quercus alba White Oak	Native	**Continental:** Eastern N. America – Maine to Florida, west to Texas and Minnesota[8]	Boulevard Park	Needs moist soil/fruit maintenance/needs large space at maturity	Large	Rounded	Monoecious[3]	Deciduous: 8 Evergreen 9
Quercus bicolour Swamp White Oak	Native	**Continental:** Southwestern Maine west to New York, southern Quebec, and southern Ontario, to central Michigan, northern Wisconsin, and southeastern Minnesota[3]	Boulevard Park	Grows in wetter conditions with acidic soils	Large	Rounded	Monoecious[3]	Same for all Oak
Quercus ellipsoidalis Northern Pin Oak	Native	**USA** (IA, IL, IN, MI, MN, MO, ND, OH, WI) **CAN** (ON)[2]	Boulevard Park				Monoecious[3]	""

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Diocecious	OPALS Rating
Quercus macrocarpa Bur Oak	Native	**Continental:** Southern New Brunswick, central Maine, Vermont, and southern Quebec, west through Ontario to southern Manitoba, and extreme southeastern Saskatchewan, south to North Dakota[3]	Boulevard Park	Large size at maturity – reserve for large lots and lawn areas/fruit drop/difficult to transplant/requires good soils	Large	Rounded	Monoecious[3]	""
Quercus muhlenbergii Chinquapin Oak	Native	**Continental:** Western Vermont and New York, west to southern Ontario, southern Michigan, southern Wisconsin, extreme southeastern Minnesota, and Iowa[3]	Boulevard Park	Attractive tree, especially in old age	Mediu m	Rounded	Monoecious[3]	""
Quercus robur 'Fastigata' Fastigate English Oak	Non-native	**Non-Continental:** Cultivar of *Quercus robur*	Boulevard	Needs well drained soil/holds leaves through the winter/ difficult to transplant/very upright in form – reserve for sites with specific need for this form	Large	Columnar	Monoecious[3]	""
Quercus robur English Oak	Non-native	**Non-Continental:** Europe, including Britain, from Scandanavia south and east to Spain, the Urals and Crimea[8]	Boulevard Park	Needs well drained soil/difficult to transplant/large size at maturity	Large	Rounded	Monoecious[8]	""

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Diocecious	OPALS Rating
Quercus rubra Red Oak	Native	**Continental: Eastern N. America – Nova Scotia to Georgia, west to Oklahoma and Minnesota**[8]	Boulevard Park	Needs sandy loam soil/difficult to transplant/more salt tolerant and faster growing than other oaks	Large	Rounded	Monoecious[3]	""
Quercus velutina Black Oak	Native	**Continental:** Eastern N. America – Maine to Ontario, Minnesota, Florida and Texas[8]	Boulevard Park	Needs well drained soil/difficult to transplant/large size at maturity	Large	Rounded	Monoecious[3]	""
Rhus ssp. Staghorn Sumac, Smooth Sumac	Native	**Continental Smooth Sumac**: N. America – found in all 48 mainland states of USA and in southern Canada[8] **Staghorn Sumac**: Eastern N. America – New Brunswick to the southern Appalacian mountains and west to Iowa[8]	Boulevard Park	Spreads quick, freely suckers from roots creating wide spreading colonies. Tolerates dry sterile soils	Ornamental	Rounded - Spreading	Dioecious[5]	Males: 10 Females: 7

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Diocecious	OPALS Rating
Sassafrass albidum Sassafrass	Native	**Continental:** Southwestern Maine west to New York, extreme southern Ontario, and central Michigan[3]	Boulevard Park	Prefers sandy soils			Dioecious[3]	Males: 7 Females: 1
Sophora japonica Japanese Pagoda Tree	Non-native	**Non-Continental:** E. Asia – N. China, Japan, Korea[8]	Boulevard	Excellent white flower/green stem when young/limit use due to messy characteristics	Large	Spreading	Monoecious [8]	5
Sorbus aria *Whitebeam Mountain Ash*	Non-native	**Non-Continental:** Central and S. Europe, from Britain and France to Spain, east to Macedonia and Transylvania[8]	Boulevard	Leathery, gray-green leaves/white flowers in May/fall colour varies from pale green to golden brown to reddish	Medium	Pyramidal-Oval	Monoecious[8]	4 (Genus only)
~~***Sorbus aucuparia*** *European Mountain Ash*~~	~~Invasive*~~	~~**Non-Continental:** Europe, including Britain, south and east from Iceland to Spain, Macedonia and the Caucasus[8]~~	~~Boulevard~~	~~Scab disease & insect problems; Limit use due to fruit and other problems.~~	~~Medium~~	~~Oval~~	Monoecious[8]	4
Sorbus x thuringiaca Oakleaf Mountain Ash	Non-native	**Non-Continental:** Hybrid between European Mountain-Ash and Whitebeam	Boulevard	Forms a tight, rounded crown/White flowers/red fruit/Leathery dark green leaves	Ornamental	Rounded		4 (Genus only)
Syringa reticulata Japanese Tree Lilac ▪ 'Ivory Silk'	Non-native	**Non-Continental:** Eastern Asia	Boulevard	Good white summer flower/excellent small specimen	Ornamental	Rounded		6

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Diocecious	OPALS Rating
Tilia americana Basswood	Native	**Continental:** Southwestern New Brunswick and New England west in Quebec and Ontario to the southeast corner of Manitoba[3]	Boulevard Park	Prefers deep moist fertile soil/will grow on drier heavier soil/needs large space	Large		Monoecious [3]	7
Tilia cordata Littleleaf Linden ▪ 'Glenleven' ▪ 'Greenspire' ▪ 'Greenglobe'	Possibly invasive*	**Non-Continental:** Europe, including Britain, from Norway south and east to Spain, Siberia, Crimea and Caucasus[8]	Boulevard	Aphid & borer problems; suckers from base; messy species	Medium	Pyramidal	Monoecious[8]	7
Tilia x euchlora Crimean Linden	Non-native	**Non-Continental:** Hybrid between T. cordata and T. dasystyla	Boulevard	Fruit messy/suckers from base **** For use in limited circumstances***	Medium	Rounded		7
Tilia tomentosa Silver Linden	Non-native	**Non-Continental:** S.E Europe[8]	Boulevard	Heat and drought tolerant.	Medium	Pyramidal-Oval	Monoecious [8]	7

Ulmus carpinifolia Smoothleaf Elm ▪ 'Homestead' ▪ 'Pioneer' ▪ 'Sapporo Autumn Gold' *Ulmus* x 'Accolade'	Non-native	**Non-Continental:** Southern Europe	Boulevard	Choose with care. Cultivars vary in resistance to Dutch elm disease and elm leaf beetle.	Large	Vase		8
Zelkova serrata Japanese Zelkova ▪ 'Green Vase' ▪ 'Village Green'	Non-native	**Non-Continental:** E. Asia – E. China, Japan[8]	Boulevard	Rapid growth/narrow branch angles promote fork split/frost susceptibility when young	Large	Vase	Monoecious[8]	*10

APPENDIX 6

INVASIVE SPECIES NOT PERMITTED FOR USE

Commented [A29]: These 11 species pulled from Appendix 5 list.

Tree Species	Native or Not	Native Range	Uses	Comments and Notes	Size	Form	Monoecious/ Dioecious	OPALS Rating[7]
Acer campestre *Hedge Maple*	Invasive*	**Non-Continental:** Europe and southwestern Asia[9]	Boulevard	Compact form/trunk suckers require extra maintenance.	Medium	Rounded	Monoecious[8]	7
Acer ginnala Amur Maple	Invasive*	**Non-Continental:** E. Asia (China, Japan, Manchuria)[8]	Boulevard	Multi-stem by prior approval only. Compact form/red &yellow face colour/lots of seeds/tends to sucker/specify single stem form	Ornamental	Rounded	Monoecious[8]	4
Acer platanoides Norway Maple -many cultivars -plant only in specific locations	Invasive*	**Non-Continental:** Europe, from Scandanavia to the Urals and the Mediterranean, east to W.Asia[8]	Boulevard	Surface roots conflict with and turf/girdling roots/aphid and wilt problems.	Medium	Various Forms	Dioecious[1]	8
Acer pseudoplatanus Sycamore Maple	Invasive*	**Non-Continental:** Europe[8]	Boulevard	Very pollution and salt tolerant Cankers cause high maintenance	Large	Oval-Rounded	Monoecious[8]	8
Acer tataricum Tatarian Maple	Invasive*	**Non-Continental:** S.E. Europe, W. Asia[8]	Boulevard	Specify single stem. Good red & yellow fall colour/tends to sucker/lots of seeds	Medium	Rounded	Monoecious[8]	5
Aesculus hippocastanum Horsechestnut ▪ 'Baumannii'	Invasive*	**Non-Continental:** Europe – N. Greece and Albania[8]	Boulevard	Good spring flower with no fruit/limit use due to disease susceptibility	Large	Rounded	Polygamo-monoecious[6]	7
Alnus glutinosa European Alder (Single Stem Only)	Invasive*	**Non-Continental:** Most of Europe, including Britain, to Siberia, W. Asia and N. Africa[8]	Boulevard	Tolerant of wet & dry soil. Invasive tendencies checked by dry sites.	Medium	Pyramidal	Monoecious[3]	9

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Carpinus betulus European Hornbeam 'Fastigiata'	Invasive*	**Non-Continental:** Europe, including Britain, from Sweden to the Pyreness east to Iran in W. Asia[8]	Boulevard	Difficult to transplant Keep away from road salt & spray	Medium	Pyramidal-Oval	Monoecious[8]	8
Maackia amurensis Amur Maackia	Invasive*	**Non-Continental:** E. Asia – China, northern and central Japan, Korea[8]	Boulevard	Small, round headed tree/slow growing/summer flowering/bronze coloured bark	Ornamental	Rounded	Perfect (hermaphrodite)[8]	3
Pyrus calleryana Callery Pear ▪ 'Chanticleer'	Invasive*	**Non-Continental:** E. Asia – China, central and southern Japan[8]	Boulevard	Fireblight problems Graft incompatibility problems with some rootstocks. Objectionable smell.	Ornamental	Pyramidal	Perfect (hermaphrodite)[8]	Fruiting: 3
Sorbus aucuparia *European Mountain Ash*	Invasive*	**Non-Continental:** Europe, including Britain, south and east from Iceland to Spain, Macedonia and the Caucasus[8]	Boulevard	Scab disease & insect problems; Limit use due to fruit and other problems.	Medium	Oval	Perfect (hermaphrodite)[8]	4

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TREE PLANTING LISTING FOR PROVINCIAL ACCEPTANCE

SUBDIVISION NAME: _____ **Date:** _____

M-PLAN NUMBER: _____

ADDRESS	TREE SPECIES	DATE PLANTED	CONTRACTOR

TREE PLANTING PROCESS

ITEM		RESPONSIBILITY
1.	Select landscape architect/consulting forestry firm	Developer
2.	Using plan of subdivision drawing and the list of trees in the guidelines for tree planting , select the most appropriate tree species for the lot size, conditions and soil types, and plot on the plan	Consultant
3.	Submit the tree planting concept plan to the Forestry Division, Environmental Services Department for review and approval.	Consultant
4.	Once plan receives final approval stamp and is signed and dated, the plan is submitted to Engineering Review for inclusion in their files.	Consultant
5.	When subdivision final grades are established and sodding is complete, select landscape firm to plant trees according to planting plan and guidelines.	Developer
6.	Plant Trees	Landscaper
7.	Inspect trees for compliance with plan and guidelines (location, species, etc.) and prepare listing of trees planted by address.	Consultant
8.	Notify Forestry Division of completion and provide listing by address of species planted.	Consultant
9.	Acknowledge provisional acceptance.	Forestry Division
10.	At the end of 2 year guarantee, inspect all trees for condition/survival and recommend and arrange replacements and/or assumption to Forestry Division.	Consultant
11.	Inspect and prepare assumption letter for developer with copy to Engineering Review and authorize release of security.	Forestry Division

APPENDIX 9~~8~~

TREE ASSESSMENT CRITERIA

It is critical that the inspections of trees are done in a consistent manner so that all developers and landscapers are treated ~~fairly~~ equitably. We must also ensure that the City assumes a quality product that will not result in high maintenance costs.

To help facilitate this process, the following tree assessment criteria ~~are to~~ shall be followed by the L.A. or R.P.F. ~~in~~ when recommending tree assumption to the City. If these criteria are followed, City staff should be able to quickly approve trees for assumption.

Tree assessments are to be conducted from May 1 to September 1 only.

TREE CROWN

- leaf area must be 75% or more
- branch ratio must be 50% of total tree height and there must be 9 to 11 branches, well spaced and assending the main trunk in a spiral fashion. The crown must be well balanced.
- leaf size must be normal for the species
- leaf colour must be normal for the species

TREE STEM

- the main leader must be intact – not cut
- the trunk must be single and straight
- the tree must be planted straight
- there must be 175 – 200 cm of clean stem below the branches
- there must be no major scrapes or cuts on the bark
- the tree must meet the diameter class as specified on the concept plan
- trees must be planted as on the concept plan or an explanation provided
- trees must be planted at the same height as in the nursery. We will accept maximum 4 inches high where necessary for survival. We will not accept trees planted deep, ie: below the level they were in the nursery.

PLANTING METHODS

- plastic pipe may be left in place
- stakes, ties, labels and wrap must be removed prior to acceptance
- saucer and mulch are to be left in place

- NO mounding of soil or avolcano@ acceptable.

A professionally stamped report by address is to be submitted with your recommendation to the Parks and Forestry Division. The following form is to be completed and submitted with your recommendation for assumption.

Commented [SI30]: AMC: Needs revised by City staff. (Likely going for “volcano mulching”?)

TREE HEALTH & WORKMANSHIP ACCEPTABLE - ASSUMED

TREE HEALTH ACCEPTABLE BUT DEFICIENCIES TO CORRECT

TREE HEALTH UNACCEPTABLE AND DEFICIENCIES TO CORRECT
(Replace tree)

M-PLAN **DATE OF SURVEY:** **SURVEYOR:**

STREET NAME:

		TREE CROWN:					TREE STEM:				PLANTING METHODS:										
House No.	Species Planted	% Leaf	Branch Ratio	Leaf Size	Leaf Colour	Balance	Leader	Stem Size	Lean/ Trunk Straight-ness	Scars & Scrapes	Plastic Pipe	Planting Height	Mulch	Saucer	Stakes	Ties	Tree Wrap	Labels, Tags, Other			

Note: Refer to Section 18 regarding additional design information for new subdivisions.

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