

# Technical Guidelines Street Tree Master Plan



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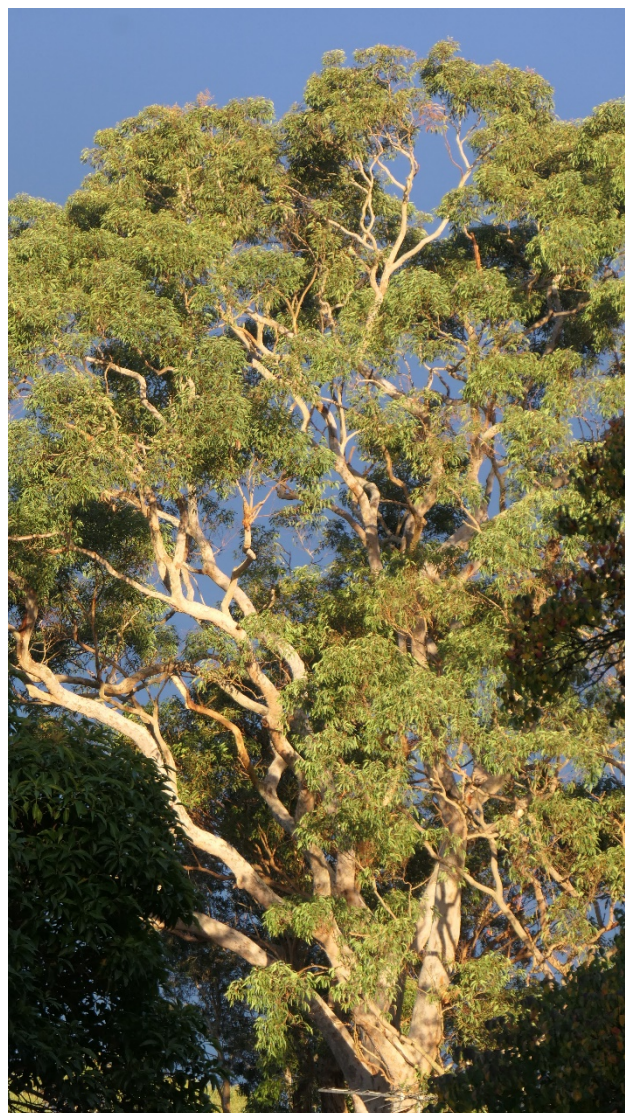
# 1. Technical guidelines overview

The planting of trees in streets is a complex process that can involve locating of services, saw cutting of concrete, demolition of pavements, excavations by machine or by hand, disposal of spoil, installation of new soil, planting, mulching, and installation of tree guards and grates. If the tree planting is carried out on major vehicle or pedestrian thoroughfares, consideration must be given to traffic control measures, including the scheduling of work out of peak hours or on weekends.

This amount of time and expense is largely wasted if the tree dies shortly after planting and must be replaced.

It is therefore essential that the tree is in optimal condition when planted, and the method of planting, protection and maintenance is of a high standard.

This specification outlines the requirements to provide new trees with the best possible chance for success. These guidelines will act as a specification for the purchase, installation and establishment maintenance of street trees for use by the City of Sydney and any developers carrying out work in the public domain on our behalf.



Sydney Red Gum (*Angophora costata*). Arterra 2022

## 2. Guidelines for trees in footpaths

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### 2.1 Layout and placement of street trees

There are many limitations to the positioning of street trees in footpaths immediately behind the road kerb. Distances from infrastructure elements such as intersections, light and electricity poles, stormwater inlets, underground service pits and bus stops, are important in determining final planting locations. Typically, this will require individual site assessment and will be determined on a case by case basis.

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### 2.2 Spacing of street trees

Taking into account clearance requirements, street trees are to be planted as follows:

- small trees: spaced at 5 to 7 metre intervals
- medium trees: spaced at 7 to 10 metre intervals
- large trees: spaced at 10 to 15 metre intervals

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### 2.3 Width of footpath

An essential factor in species selection is the width of the footpath proposed for street tree planting. Too small a tree in a wide footpath free of obstructions is a lost opportunity for a large shade tree that would greatly add to the appearance of the streetscape. Conversely a tree with too large an ultimate size for the width of the footpath can become both an expensive maintenance item, and a danger to pedestrians.

The City of Sydney footpaths consist of either stone or decorative unit paving, asphalt / concrete pathways with grass or planted verge, or concrete / asphalt paving from building line to kerb line. The footpaths outside the CBD vary greatly in width but are generally between 1500mm and 3600mm wide.

For the purposes of tree planting Council footpaths can be divided into four categories:

- narrow - less than 1800mm;
- medium - 1800 to 3000mm;
- wide - greater than 3000mm; and
- grassed or planted - combination of grassed or planted verge and paved footpath.

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### 2.4 Narrow footpaths (less than 1800mm)

For the safe passage of pedestrians in single file, a clear width of at least 900mm is needed between the back of any tree pit and the building/ boundary line. As the minimum practical width of a tree pit is 400mm, the minimum width of footpath that can be safely planted is 1300mm (400mm plus 900mm), subject to the following conditions:

- that there are no obstructions overhanging the building line from the front boundary of the adjacent property (e.g. shrubs, vines, awnings) and;
- that the lower branches of the tree can be pruned to a height of at least 2000mm.

Further problems can occur on narrow carriageways where parking may be restricted to one side only. Larger vehicles tend to ride up



over the kerb onto the footpath to avoid parked cars. In this case trees may only be planted on one side of the street even if the footpath is otherwise sufficiently wide.

Trees planted in footpaths less than 1300mm wide (from building line to back of kerb) force pedestrians, particularly those with strollers, to walk on the road. As it is necessary to encourage pedestrians to stay on the footpath, trees will not be planted in footpaths less than 1300mm in width.

It should be noted however that existing trees that have been planted in footpaths less than 1300mm wide will not be removed (unless considered necessary for arboricultural reasons), but more trees will not be added to the footpath. In streets with footpaths less than 1300mm, in-road or shared zone options will typically be explored for any new trees.

The minimum size of a tree pit opening that is appropriate in such footpaths is 400mm wide and 700mm long. Larger size tree pits should be considered wherever space and practicality allows.

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## 2.5 Medium footpaths (1800mm - 3000mm)

Medium width footpaths are generally free from the problems of narrow footpaths and are of a suitable scale to allow the planting of both small and medium sized trees.

The minimum size of a tree pit that is appropriate in such footpaths is 600mm wide and 900mm long. Larger size tree pits should be considered wherever space and practicality allows.

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## 2.6 Wide footpaths (>3000mm)

Wide footpaths naturally have the greatest scope for tree planting and allow the growth of the largest of the suitable street tree species. In these footpaths the larger trees are the most appropriate so as to take advantage of the larger space available. The tree pit size typical in wide footpaths is 1350mm square.

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## 2.7 Grassed and planted footpaths

Council footpaths with a grassed verge are generally constructed of a 1500-1800mm wide concrete pathway and 1500-1800mm of grass between the path and the kerb. Trees have traditionally been planted half way between the kerb and the edge of the concrete footpath. This method of planting allows an area of water penetration to the roots of the tree and avoids some of the problems of pavement lifting by the roots of the tree.

In this type of footpath species selection is still based upon the overall width of the footpath from the building line to the back of the kerb, i.e. small trees in narrow footpaths, medium trees in medium footpaths and larger trees in wide footpaths.



Morris Grove, Zetland. Adam Hollingworth, 2015



George Street, Sydney. Arterra 2022

# 3. Street tree supply specification

## 3.1 General conditions and quality

All trees planted in the City of Sydney are to conform with the following specification, detailing the requirements for the supply and transportation of trees and palms, AS2303:2018 "Tree Stock for Landscape Use" and "Guide for assessing the quality of and purchasing of landscape trees" by Ross Clark 2003 . If any differences in the requirements exist, this specification will prevail.

The following specification details the requirements for the supply and transportation of trees and palms.

## 3.2 Definitions

Definitions for the terms used within this specification shall be in accordance with the AS2303:2018 "Tree stock for landscape use".

Term	Definition
Batch	Quantity of tree stock of the same species, container size, type, age from the same origin.
Calliper	Trunk diameter measured at 300mm above the root crown, or 50% of the overall height, whichever is the lower height, expressed in millimetres.
Central Leader	Clearly defined single, relatively straight, trunk.

Term	Definition
Clean Stem Height	Distance between the uppermost surface of the root ball and the first order branches of the trunk that is free from branches.
Self-Supporting	Tree stock supporting its above ground parts in an upright position without movement of $\leq 30^\circ$ from vertical, stem breakage, injury or loosening of roots in the growing media.
Size Index	Numerical expression of the size of the tree above ground. It is the product of the height of the tree (in metres) and the calliper (in mm). (ie. height x calliper)
Destructive Root ball Inspection	The washing away or removal of all soil from a root ball to allow for detailed inspection and assessment of root development.
Partial Investigative Root ball Inspection	A method of exposing a section of a root system to enable inspection of root development by washing away a wedge-shaped section from the stem to the extremity of the root ball. This soil can be gently replaced so the tree is not significantly damaged.

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### 3.3 Typical size requirements

Nursery stock shall meet the following criteria for their typical minimum dimensions, container size, plant shape and pruning requirements outlined in this document and the table outlined in Figure 1.

Note:

Category A species are species that are particularly tall and slender (e.g. *Corymbia citriodora*)

Category B species are generally typical tree species (most cases)

Category C species are generally stocky, thick-stemmed tree species (e.g. *Ficus macrophylla*)

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### 3.4 Labelling of stock

Clearly label individual trees and batches with the species name and cultivar / variety / provenance if appropriate. The label is to withstand transit without erasure or misplacement.

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### 3.5 True to type

The trees supplied and planted shall be the species, and variety or cultivar that the City has specified.

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### 3.6 Health and vigour

The trees supplied shall be healthy and vigorous at the time of delivery and planting. Supply trees with foliage size, texture and colour at the time of delivery consistent with the size, texture and colour shown in healthy specimens of the nominated species. Supply trees with extension growth consistent with that exhibited by vigorous specimens of the nominated species.

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### 3.7 Crown symmetry

The symmetry of the crown is an important aspect of the presentation and appearance of the tree in the landscape. Difference in crown distribution on opposite sides of the stem axis must not exceed 20%.

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### 3.8 Injury

Supply only trees free from injury and wounds, except properly made pruning cuts made in accordance with AS4373: Pruning of Amenity Trees.

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### 3.9 Stem taper and structure

Supply trees where the calliper at any given point on the stem is greater than the calliper at any point higher on the stem, excluding species with atypical stem tapers. (e.g. *Brachychiton rupestris*)

Species with an apical dominant (excurrent) form: Supply trees with a defined central leader and the apical bud intact. Trees that have had their leaders cut or damaged will not be accepted. Supply trees with a single stem roughly in the centre of the tree with any deviation from vertical  $\leq 15^\circ$ .

Species with branch dominant (decurrent) form: Terminal buds shall be intact. Supply trees where the central stem is not divided at any point lower than the nominated clean stem height, and that the stem junction at the point of division is sound.

All species: Ensure that branch diameters are less than or equal to one-half of the calliper immediately above the branch junction.

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### 3.10 Self supporting

Supply only trees that are self-supporting.



Figure 1. Typical size requirements table

Container Volume	Height above container (metres)	Calliper (at 300mm)	Size Index Range	Min. rootball diameter (mm)	Clear Trunk Height (metres)
45 Litre	A = 2.4m B = 2.0m C = 1.6m	A = 30 mm B = 35 mm C = 42 mm	51-75	450mm	0.6 - 0.9
75 Litre	A = 2.9m B = 2.4m C = 2.0m	A = 35 mm B = 40 mm C = 48 mm	79-117	500mm	0.8 - 1.1
100 Litre	A = 3.3m B = 2.7m C = 2.2m	A = 40 mm B = 45 mm C = 55 mm	102-150	500mm	0.8 – 1.3
200 Litre	A = 4.4m B = 3.8m C = 3.0m	A = 55 mm B = 65 mm C = 75 mm	185-272	700mm	1.2-1.7m
300 Litre	A = 4.8m B = 4.2m C = 3.5m	A = 65 mm B = 75 mm C = 90 mm	262-386	800mm	1.4-1.9m
400 Litre	A = 5.2m B = 4.5m C = 3.8m	A = 75 mm B = 85 mm C = 100 mm	330-494	900mm	1.5-2.0m
500 Litre	A = 5.6m B = 4.8m C = 4.2m	A = 85 mm B = 100 mm C = 115 mm	407-599	1000mm	1.6-2.2m
600 Litre	A = 6.0m B = 5.2m C = 4.6m	A = 95 mm B = 115 mm C = 130 mm	476-700	1100mm	1.8-2.4m
800 Litre	A = 6.5m B = 5.7m C = 5.2m	A = 110 mm B = 130 mm C = 145 mm	715-754	1200mm	2.0-2.6m
1000 Litre	A = 7.0m B = 6.2m C = 5.6m	A = 130 mm B = 145 mm C = 160 mm	739-1087	1500mm	2.2-2.8m
Palm trees	n/a	n/a	n/a	900mm	>3.0m

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### 3.11 Formative pruning

All formative pruning shall be a clean-cut at the branch collar that complies with AS4373: Pruning of Amenity Trees. The diameter of any wound shall not exceed 50% of the calliper immediately above the point of pruning. No lopping or topping of trees is to be carried out.

Trees shall be typically supplied with a clean stem height of 35-40% of the total tree height. For example, a 5m tree is to be pruned to a 2m maximum (clean stem height must not exceed 40% of total tree height).

Trees are not to be pruned into shape just prior to dispatch. Restrict any fresh cuts (i.e. recent, non-calloused wounds) to  $\leq 20\%$  of the total tree height.

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### 3.12 Included bark

Supply trees where the branch/stem bark ridges at junctions between stems and branches and between co-dominant stems are convex, except for species prone to included bark that are known to remain strong (approved by the City).

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### 3.13 Trunk position

Trunks shall typically be located in the centre of the container. The distance from the centre of the trunk to any extremity of the root ball shall not vary by  $>10\%$ . This may be varied if the tree is grown in an irregular shaped container, as approved, or specifically directed by the City.

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### 3.14 Compatibility of graft unions

When purchasing named cultivars propagated by grafting, it is critical that the graft union is sound and that the scion and root stock are compatible. The union between the scion and the root stock must be sound for the entire perimeter of the graft.

The diameter of the scion immediately above the graft must be within  $\pm 20\%$  of the diameter of the rootstock immediately below the graft, excluding bark and cleft grafts.

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### 3.15 Indication of north

Trees supplied in containers  $\geq 100$  litres shall indicate the northerly aspect during growth in the nursery and ensure it is marked to withstand transit without erasure or misplacement.

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### 3.16 Pest and disease

Trees shall not be diseased or show evidence of pest attack that could affect the long-term health of the tree or adjoining plantings. Supply trees with foliage and soil free from attack by pests and diseases. For Australian native trees with a history of attack by native pests (e.g. *Ficus macrophylla* & Eucalypts), evidence of previous attack must be restricted to less than 15% of the foliage and there must be no actively feeding insects or evidence of fungal infections.

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### 3.17 Root ball diameter

Trees grown in containers  $\geq 45L$  and ex-ground trees shall have a diameter greater than or equal to their depth. The nominal root ball diameters expected for different tree sizes are shown in the table in clause 3.3 - Typical size requirements.

Bare-rooted tree stock with a size index  $\leq 57$  shall have an intact root mass diameter  $\geq 10$  x their calliper.

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### 3.18 Root ball depth

Root ball depth for containerised trees shall not exceed 660mm, regardless of the tree size, except for palms.

Palm root ball depths shall not exceed 850mm, unless agreed by the City.

Ex-ground trees with a size index  $\leq 1144$  shall have root ball depths  $\leq 850$ mm. Ex-ground trees with size index larger than 1144 shall have root ball depths that do not exceed 1200mm.

### 3.19 Height of root crown

Ensure that the tree root crown is at the uppermost surface of the root ball.

### 3.20 Non-suckering rootstock

At the time of dispatch there shall be no evidence of suckers or water shoots. Grafted cultivars and varieties shall be grafted onto non-suckering species of rootstock.

### 3.21 Weeds

At the time of dispatch there shall be no weeds evident that may compromise the health of the tree stock or pose an unacceptable burden for on-going landscape maintenance in the trees planted position.

### 3.22 Root ball occupancy

On removal and shaking or handling of the unsupported root ball at least 90% of the soil volume shall remain intact in or around the root ball.

### 3.23 Root direction

Circling roots shall not be present. Girdled roots, kinked roots or j-roots shall not be present. Woody circling roots shall not be present at the extremity of the root ball. Root systems should be inspected for non-conforming roots at each stage of production. Only roots less than 10mm diameter shall be pruned. Trees with non-conforming roots greater than this diameter shall be rejected.

For all container grown trees, ensure that all roots, from the point of initiation, generally grow in outwards (radial) and downwards direction, and that any deviation from the established direction is less than 45°.

### 3.24 Root division

Trees in containers ≤45 litre primary division of roots is to have occurred at least once within the root ball.

Trees in containers >45 litre shall have undergone primary division of roots and is to have occurred at multiple intervals within the outer 50% of the root ball and at <100mm intervals.

### 3.25 Tree stock quality assessment and compliance

The installer must submit suitable documentation to demonstrate compliance with the requirements of this specification and AS2303:2018 Tree stock for landscape use. Documentation for each differing batch and different species shall be issued to the City at 3 monthly intervals and at least 7 days prior to their dispatch.

As a minimum, the tree stock inspection forms are to be in accordance with the 'Example 1' form contained in Appendix C of AS2303:2018. The required compliance testing that is referenced in that form shall be performed in accordance with the scope and protocols outlined in Appendix A and B of the standard, with the exception of the sampling size, which shall be amended as per the table below. The sample size shall be equal for both above and below ground assessments.

No. of Trees in Batch	Minimum No. to be sampled
1-4	all trees in batch
5-20	4
21-50	6
51-100	10
>100	10 + 2% of number to be supplied in excess of 100

All documentation shall be retained by the supplier for a minimum of 3 years from the date of supply.





Zetland Ave, Zetland. Abril Felman 2022

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### 3.26 Delivery, transport and unloading

Carefully load, transport and unload, at the nominated site, the specified trees. All trees are to be delivered in such a way to prevent in transit wind damage. All trees shall be watered prior to loading for delivery. Plants shall not be contained within delivery vehicles for a period longer than 24hrs.

Trees shall be carefully unloaded using methods appropriate to the size and weight of the trees. Damage to trees sustained during transport or unloading will result in those plants being rejected. Plants shall conform to the requirements at the time of delivery to the planting site. Transpiration shall be minimised during transport to prevent subsequent wilting or unseasonal defoliation. Plants that have been allowed to wilt or dry out during transport shall be rejected, irrespective of any previous acceptance.

The soil mass of the root ball shall be securely contained and supported during transport. Root balls that have been unreasonably fractured, deformed or slumped during transit or unloading shall not be accepted.

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### 3.27 Rejection of non-conforming specimens

Any tree not conforming to the requirements and standards contained within this specification shall be rejected and suitable replacements provided. If non-conforming trees are provided, the City requires new complying stock to be supplied and planted, or alternatively the City may supply replacement specimens.

# 4. Street tree soil specification

## 4.1 Soils - general

The following soil specifications are generally extracted from the book 'Soils for Landscape Development' by Simon Leake and Elke Haeger (CSIRO Publishing; 2014). They have been adapted for common and typical tree planting sites in the City.

Major tree planting work, unique or difficult sites, or special projects may be subject to specific specifications that may be issued separately and may override the certain requirements contained here.

If any doubt exists please refer to the City of Sydney Tree Management Team for further information and instructions.

## 4.2 Tree rooting volumes

Some sites may have existing site soils that are incompatible with tree root growth, have paved surfaces requiring heavy compaction of the site soils, or sites where all soil media available to trees needs to be imported. The following table specifies the minimum soil volume for trees where the soil volumes require improvement.

### Important Notes:

- Harsh planting sites are those that have moderate to high temperatures, winds, hard paved surfaces surrounding, shallow soil profiles (A and B horizons) and no organic mulch.
- Favourable planting sites are those that are partially shaded and protected from winds, with limited hard / paved surfaces, low reflection, moderate soil depth (600mm+) that is free draining and organic mulch applied regularly.
- When the tree is irrigated regularly, soil volume can be reduced by 10%.
- Where the trees have shared root systems, soil volume can be reduced by 10%.
- When using structural soils, the volume of rock or plastic cells (or other) must be subtracted to determine soil rooting volume. However, the soil depth can often be increased due to increased air at depth, provided there is adequate drainage.
- May not apply for single infill replacement trees when existing pavements are not being disturbed.

Tree planting	Soil volume per tree – harsh planting sites	Soil volume per tree –favourable planting sites
Small trees (<7m height / 5m spread)	15m <sup>3</sup>	10m <sup>3</sup>
Medium Trees (7 – 15m height/ 6-10m spread)	50m <sup>3</sup>	30m <sup>3</sup>
Large Trees (15m+ height / 12-15m spread)	80m <sup>3</sup>	50m <sup>3</sup>

### 4.3 Tree planting sites – existing soil investigations

For all sites to be planted a site soil investigation shall be conducted as part of the planting operations. This assessment shall be carried out for all sites, whether natural or disturbed. A site soil survey shall be carried out to identify and assess any adverse physical or chemical soil properties that may impact on the future successful establishment of a tree to the site. Record findings as part of the tree planting work, report any significant issues to the City, and make recommendations for any soil or site remediation work required to make the site suitable for planting.

### 4.4 Soil Stockpiling

For normal tree planting work there shall be no stockpiling of soils on site. Typically, all materials are to be moved directly from the carrier to the hole or only stockpiled for a very short period of time. Adjoining pavement and road surfaces are to be maintained in a clean and tidy state at all times.

### 4.5 Soil horizon profiles

The required soil profiles are dependent on the location and type of materials placed around the tree base. The following plantings shall have the following profile horizon structure.

Planting type	Profile horizon structure
Trees planted in paved locations, with decomposed granite or porous paving around the tree base.	B/C horizons only
Trees planted in grass or garden beds with organic mulch surface treatment.	A/B/C horizons
Trees planted in load bearing pavement situations (subject to design review).	B/C horizons, with A horizon only around the tree

### 4.6 Schedule of soil horizon depth

The following planting types shall have the following soil depths as a minimum.

Important Note: These soil depths are above all drainage layers or soils known to be freely draining. Further, these soil depths are minimums, and topsoil must not be increased beyond 400mm.

Planting type	Total drained soil depth	Topsoil depth (A horizon)	Subsoil depth (B horizon)
Trees planted in paved locations, with decomposed granite or porous paving around the tree base. (100L – 200L nominal tree size)	700mm	nil	700mm
Trees planted in grass or garden beds with organic mulch surface treatment. (100L – 200L nominal size)	600mm	200mm	400mm



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## 4.7 Drainage layers

Where a drainage layer is coarser particle size than around 5mm diameter, a transition layer may be needed between it and the soil media to prevent soil migrating into the drainage gravel layer. Generally, this will be an intermediate very coarse sand or fine gravel. Do not use geotextile fabrics over the drainage layer to prevent soil migration.

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## 4.8 Tree planting subgrade preparation

Before installing specified tree pit backfill soil, the following subgrade treatment must be applied to all finished subgrade areas:

- Fair and trim to relative level to accommodate the required overall soil depths
- Remove rocks > 70 mm diameter
- Remove rubbish such as construction generated waste, plastics, metals and glass
- If required by soil testing, apply any necessary soil ameliorants
- Use appropriate hand tools when working on smaller sites / individual tree pits or around underground services. If size permits use an excavator with a tyne attachment to loosen the subgrade and mix the ameliorants to 200 mm depth to incorporate. Break up clods but do not smooth (leave the surface 'keyed' to accept the subsoil/topsoil).

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## 4.9 Soil mixes

### **Soil Type A - Normal Tree Planting Topsoil**

A sandy loam to clay loam topsoil mix designed for general purpose, on-grade landscape garden bed planting of grasses, woody and herbaceous annuals and perennials that have a high nutrient requirement for sustained optimum growth, and are not subject to compaction by pedestrian or other traffic.

A suitable commercially available product such as ANL Organic Garden Mix, or Benedicts SMARTMIX 6 native Garden Mix, or an approved equivalent manufactured garden soil with a maximum 20% organic matter by volume, may be used.

The heavier textured soils in this specification may require the use of engineered solutions (drainage techniques) where excessive wetness is anticipated. Note that the organic soil variant should not be chosen for low P plantings and should not be used below 300mm.

The use of site reclaimed topsoil may be permitted, subject to investigation and testing.

### **Soil Type B(1) -Imported Subsoils or Ameliorated Subgrades**

This specification is to be used to manage the importation of subsoil, or its manufacture from on-site materials, where existing subgrades do not provide sufficient quality to qualify as a rooting medium to provide rooting depth and volume sufficient for larger plantings.

A suitable commercially available product such as ANL 80:20 Washed Sand and Screened Soil Blend, or Benedicts SMARTMIX 7 Native garden subsoil mix, or an approved equivalent manufactured soil with a maximum 5% organic matter by volume, may be used.

This soil shall be generally a low organic matter material that is well balanced chemically, is not saline or sodic or excessively acidic or calcium deficient and not dispersive. It is designed to provide improved rooting depth for larger plantings and reduce the likelihood of waterlogging. It may be made using existing site subsoil or imported fill materials or a blend of both. It is not generally considered to require the application of fertiliser but must be low in P if used for P-sensitive plantings.

### **Soil Type B(2) - Advanced Tree Planting & Vault Subsoils**

A sandy, well-drained medium with low organic matter for backfilling below 300mm from the surface in larger containerised specimens > 45L or >400mm depth of root ball. It may contain a small proportion of recovered site topsoil or subsoil, provided the organic matter upper limit is not exceeded.

A suitable commercially available product such as ANL 80:20 Washed Sand and Screened Soil Blend, or Benedicts SMARTMIX 7 Native garden subsoil mix, or an approved equivalent manufactured soil with a maximum 5% organic matter by volume, may be used.

Wherever soil surface is required to support landscape planting or turf (i.e. for A horizon, top 300mm) include Normal Tree Planting Soil (Type A) above the B Horizon. Wherever soil is beneath paving, porous paving or a decomposed granite surface use Soil Type B2 for the entire depth.

## 4.10 Physical and chemical properties

Generally, all soils must be free of 'unwanted material' and must meet all the requirements of the Tables that follow. Where variations from these requirements occur refer to Soil Quality Control specifications and hold points.

### Note 1 to Properties Table

For alkaline soils the pH in water (1:5) range shall be 6.8-8.0

For alkaline soils the pH in CaCl<sub>2</sub> (1:5) range shall be 6.5-5.5

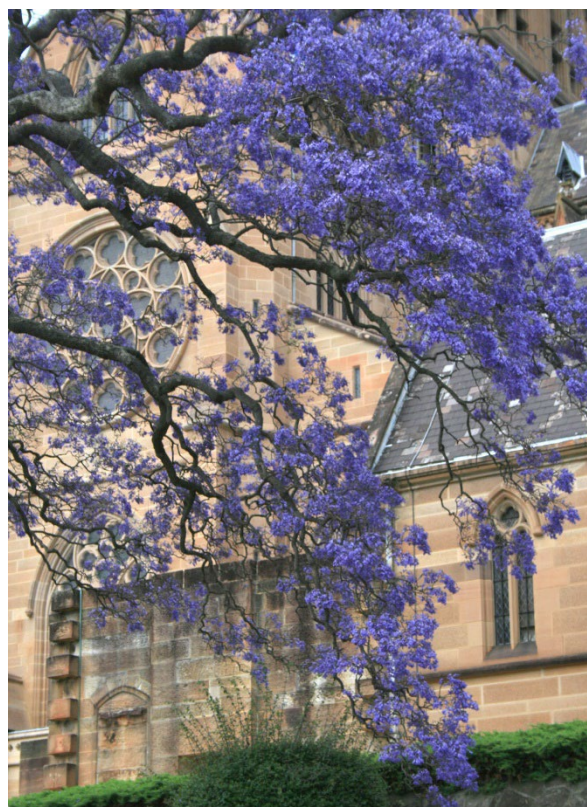
### Note 2 to Properties Table

For base level requirements for fertilisers (to be verified by laboratory testing and per agronomist's report). The soil supplier must allow for the inclusion of the below soil amendments, but the specific amendments may require verification by laboratory testing and agronomist's recommendations.

Additive	Rate
Lime and/or dolomite	300 g/m <sup>3</sup> at mixing
Balanced compound NPK turf starter fertilizer	1 kg/100 m <sup>2</sup> after placement
Minor and trace elements	2 kg/m <sup>3</sup> at mixing



Lower Fort Street, The Rocks. Arterra 2012



Jacaranda in Sydney, Arterra 2012

Figure 2. Physical soils property table

Physical Property	Units	Normal Tree Planting Soil Target range	Tree Planting Subsoil Target range	Advanced Tree & Vaults Subsoil Target range	Raingarden Soil Target range	Structural Soils – (Filler Soil)
Texture, preferred range	n/a	Sandy loam to clay loam	Sandy loam to clay loam	Loam to sandy loam	Loamy sand	Loam to Clay loam
Organic matter	% dwb	3–6	n/a	<5	2-5	3-8
Organic matter (organic soil variant)	% dwb	15–25	n/a	n/a	n/a	n/a
Permeability (@ 16 drops by McIntyre Jakobsen)	mm/h	> 30		> 50	100-300	n/a
Wettability	mm/h	> 5		> 5	> 5	> 5
Dispersibility in water		1 or 2 (AS 4419) category	>4 (Emerson Agg Class)	1 or 2 (AS 4419) category	1 or 2 (AS 4419) category	1 or 2 (AS 4419) category
Large particles (naturally occurring)						
>50 mm	% w/w	nil	<2	nil	nil	nil
> 20 mm	% w/w	< 10	<10	< 10	nil	nil
2–20 mm	% w/w	< 20	<30 (with <10 for 10-20mm)	< 20	nil	Gravel >4mm to be less than 2
Particle size distribution						
2.0-3.35 mm (fine gravel)	% w/w	n/a	n/a	n/a	<3	n/a
1.0-2.0 mm (coarse sand)	% w/w	n/a	n/a	n/a	4-10	n/a
0.25-1.0 mm (medium coarse sand)	% w/w	n/a	n/a	n/a	40-60	n/a
0.15-0.25 mm (fine sand)	% w/w	n/a	n/a	n/a	10-30	n/a
0.05-0.15 mm (very fine sand)	% w/w	n/a	n/a	n/a	5-30	n/a
<0.05 mm (silt plus clay)	% w/w	n/a	n/a	n/a	<3	n/a
Visible contaminants > 2 mm (glass, plastic and metal)	% w/w	< 0.5	<0.5	< 0.5	< 0.5	< 0.5

**Figure 3. Chemical Property Table**

Chemical Property	Units	Normal Tree Planting Soil Target range	Tree Planting Subsoil Target range	Advanced Tree & Vaults Subsoil Target range	Raingarden Soil Target range	Structural Soils – (Filler Soil)
pH in water (1:5) Standard range	pH units	5.4–6.8	5.4–6.8	5.4–6.8	5.5–7.5	5.4–6.8
pH in CaCl <sub>2</sub> (1:5) Standard range	pH units	5.2–6.5	5.2–6.5	5.2–6.5	n/a	5.2–6.5
Electrical conductivity (1:5)	dS/m	< 0.65	< 0.65	< 0.5	<1.2	< 0.5
Phosphorus – P-tolerant/standard plants. Acid soils method 18F1	mg/kg	50–150	50–150	30–80	<80 (Olsen)	30–100
Phosphorus – P-tolerant/standard plants. Alkaline soils method 9B1 or 9C1	mg/kg	30–60	30–60	10–30	n/a	n/a
Phosphorus for P-sensitive plants, acid soils method 18F1	mg/kg	< 30	< 30	< 30	n/a	n/a
Phosphorus for P-sensitive plants, alkaline soils method 9B1 or 9C1	mg/kg	< 20	< 20	< 20	n/a	n/a
Exchangeable sodium (Na)	% of ECEC	< 7%	< 7%	< 7%	< 7%	< 7%
Exchangeable potassium (K)	% of ECEC	5–10%	5–10%	3–10%	5–10%	3–10%
Exchangeable calcium (Ca) method 18F1 or 15A1 in alkaline soils	% of ECEC	60–80	60–80	60–80	60–80	60–80
Exchangeable magnesium (Mg)	% of CEC	15–25	15–25	15–25	15–25	15–25
Exchangeable aluminium (Al)	% of CEC	< 2	< 2	< 5	< 2	< 5
Exchangeable Ca:Mg ratio	Ratio	3–9	3–9	3–9	3–9	3–9
Available iron (Fe)	mg/kg	100–400	100–400	100–400	100–400	100–400
Available manganese (Mn)	mg/kg	25–100	25–100	25–100	25–100	25–100
Available zinc (Zn)	mg/kg	5–30	5–30	5–30	5–30	5–30
Available copper (Cu)	mg/kg	1–15	1–15	1–15	1–15	1–15
Available boron (B)	mg/kg	0.5–5	0.5–5	0.5–5	0.5–5	0.5–5
Available N (N as nitrate)	mg/kg	> 30	> 30	> 20	30-1000	> 20



---

## 4.11 Soil testing and quality control

The installer must verify compliance with the product specification. This is done in two parts: initial compliance certification and then quality control, as described below.

Before any soil installation, the installer or soil manufacturer will submit samples of trial blends likely to meet the performance specifications to a testing laboratory. The trial blend must be based on available test information on components and, if necessary, employ an agronomist for advice. They must allow sufficient time for testing and re-formulation in the case of failure to satisfy the performance criteria. Once compliant, a test certificate clearly stating compliance with the applicable criteria must be presented to the City of Sydney.

Manufacturer's product representation: For imported soils from soil manufacturers, a 'product representation' document produced by the supplier may be accepted as compliance certificate if:

- it is an off-the-shelf product line, not a custom mix
- a representative test certificate is available and is acceptably recent (within 6 months)
- the testing covers all those criteria in the performance specification, and
- the manufacturer's quality assurance system is externally certified.

---

## 4.12 Record keeping

Growing media initial compliance certification records must be kept in an easily retrievable manner that provides for traceability of purchase and location on site. Each compliance certification for all the product specifications used on site must be identified by date, quantity to be supplied and a copy of the formulation used to reach compliance.

All quality control and compliance testing as required by the product specifications must be

arranged by the installer and carried out by an approved soil testing laboratory. All compliance records will be made available to the City of Sydney on request.

Compliance certificates will be in the form of a report clearly stating the material is compliant, with an attachment showing the test result relied upon. In the case of minor non-compliance or substantial compliance, a clear statement must be obtained from a qualified independent agronomist waiving the compliance and certifying the sample is compliant with or without conditions.

---

## 4.13 Non-compliance

In the case of substantive non-compliance, a clear statement must be obtained from a qualified independent agronomist waiving the compliance and certifying the sample is fit for purpose.

Typically, there shall be no further placement of the soils that are non-compliant until suitable compliance is demonstrated.

Non-compliance with the target range criteria does not necessarily render a soil not fit for purpose but making this judgment requires an expert person to take responsibility for such deviation. Also, a conditional compliance certificate may be issued requiring that a certain fertiliser or further organic matter or some other amendment be added, with the aim of achieving compliance.

---

## 4.14 Sample declaration of compliance

The following page contains the expected minimum content and requirements for a declaration of compliance

**DECLARATION OF COMPLIANCE [SAMPLE]**

Certificate no:	Product name:
To: <insert addressee's name>	Supplier:
Of: <insert company name>	Supplier's batch:
Phone:	Compliance standard:
Email:	Date sampled:
Project name:	Laboratory ID:
Project location:	Batch no. and sample no.:

I, <insert name>, of <insert company name>, having been appointed by <insert principal's name>, hereby certify that:-

1. I am a qualified soil scientist, agronomist or analyst.

or

2. I am a person experienced and competent in the interpretation of soil test results for the establishment and cultivation of plants in amenity horticulture and have been appointed by the Principal or their agents.
3. This sample has been submitted by <insert name of person submitting sample> and has been analysed in accordance with specification <insert reference to specification>.
4. The extent of sampling and the results of all tests carried out on the subject soil mix conducted for the subject project are described in my report <insert report number> dated <insert date> and are attached to this declaration for reference.
5. In my professional opinion, the soil mix described in the attached report complies with the nominated soil specification having given due consideration to the intended use and purpose, under the following circumstance:
  - The soil complies with all target criteria with no further amendment.
  - The soil shows minor or insignificant deviation from some of the target criteria that do not affect its fitness for purpose and do not require corrective action.
  - The soil shows significant deviation from one or more of the target criteria but may be considered compliant if the corrective action as stated below is taken.

**Corrective actions required**

This certificate is issued on the understanding that the following corrective actions will be undertaken by a competent person. These corrective actions are intended to adjust <insert purpose of the corrective action>.

The corrective actions required are:

<insert list of correct actions>

This professional opinion is furnished to <insert addressee's name> as a representative of <insert company name> for their purposes alone on the express condition this it will not be relied upon by any other person and does not remove the necessity for the normal inspection of site conditions, workmanship and product liability at the time of construction.

Signed:

Date of report

# 5. Street tree installation specification

---

## 5.1 General

This specification describes the appropriate techniques to be used to install new street trees within the City of Sydney local government area.

There may be allowance for some variation in the techniques to be used, however any change to the techniques from those described here must be submitted in a Work Method Statement for approval by the City of Sydney prior to any work being carried out.

Tree planting works shall be undertaken by an Arborist or Horticulturist with minimum certification in accordance with Australian Qualifications Framework Level 3.

---

## 5.2 Typical scope of work

The scope of work for tree installation work typically comprises:-

- Demolition of existing tree pit or cutting of the existing footpath.
- Excavation of subgrade for tree pits.
- Supply and installation of imported and existing soil mixes.
- Installation of trees.
- Supply and installation of wooden stakes, ties and guys where required to maintain stability.
- Installation of supplied tree guards where specified.
- Supply and installation of various style tree bases, to the City of Sydney specification,

after an initial six (6) month soil settlement and tree establishment period.

- Reinstatement of pavement in aborted tree pits.
- Maintenance of planted trees for a specified period following completion of planting.

---

## 5.3 Standards

All works shall be in accordance with the relevant standards. The following standards are referred to in this section:-

- AS 4419-2018 Soils for landscaping and garden use;
- AS 4454-2012 Compost, soil conditioners and mulches;
- AS 4373-2007 Pruning of amenity trees.

---

## 5.4 Statutory requirements

The installer is responsible for compliance with all relevant statutory requirements.

The installer shall apply for a Road Opening Permit and be able to demonstrate clear working programs and sequences. Site specific pedestrian and vehicular traffic control plans are to be submitted as part of this application and shall conform to NSW Roads and Traffic Authority guidelines and any other statutory requirements. These plans shall include any requirements for parking of worksite vehicles and the delivery of materials.

Approval from the NSW Police Service and the NSW Roads and Maritime Services may be required when the work has an impact on traffic flow.

---

## 5.5 Environmental controls

The installer shall ensure that all materials and the execution of the work are ecologically sound, environmentally benign and consistent with the principles of sustainable development.

The installer shall take all practical precautions to ensure that dust and noise caused by the works are kept to a minimum. The installer shall take all practical precautions to prevent the spread of dirt and mud along roads and paths. The installer shall be responsible for all localised sediment and erosion control of work and stockpiles under their control and use.

The installer must comply, and make sure that sub-contractors comply, with the general provisions of this clause and any other environmental protection provisions within the requirements of any statute, by-law, standard and the like related to environmental protection.

---

## 5.6 Inspections

Provide not less than 48 hours' notice for a City of Sydney Representative to make the following inspections (or as otherwise specified):

- Tree stock prior to planting.
- Plant materials set out and placed in tree pits before backfilling.
- Tree planting completed.
- Footpath reinstated.
- Periodic inspections during maintenance period.
- Completion of plant establishment period.

---

## 5.7 Site investigations, existing services and structures

The installer shall confirm with the City of Sydney the exact location of all tree pits associated with tree planting works.

In accordance with NSW electricity and gas supply regulations, all excavations for tree planting require the review of underground service plans sourced from Dial Before You Dig

service. Specialist service location tools or expertise may be required when underground service plans are insufficiently detailed or where plans indicate that services are close to the intended planting location. The installer shall be responsible for the rectification of all pavement surfaces where inspections have been undertaken including the making good of any excavation or site markings.

The installer shall notify the City of Sydney immediately upon discovery of services or obstructions that prevent any planned tree planting. All services shall be considered live until determined otherwise. No liability is accepted, by the City of Sydney or the Service Authorities, for accidents resulting from contact or disturbance to services.

In the event of any damage to any service, the installer shall immediately notify the relevant authority and the City of Sydney and satisfy all requirements of the authority concerned.

The installer shall be liable for all damage caused by the tree installation works to all existing buildings and structures. The installer shall make good all damage at their expense.

---

## 5.8 Spoil

Surplus excavated material must be immediately removed from the site. This includes debris resulting from site clearance and excavated material not reusable as topsoil, filling, mulch or the like, unless otherwise specified or directed. Existing topsoil with any stump grinding debris incorporated within it will be removed from site and not re-used in the new planting site.

The installer shall be solely responsible for the safe and harmless disposal of material away from the site. Surplus excavated material shall not be permitted to remain in place overnight.

---

## 5.9 Extent of excavations

Excavate to an equivalent depth of the new tree root ball measured from the underside of any concrete base slabs, or as shown on the details. Do not disturb services, and excavate



by hand around any existing services as required.

The installer shall determine the root ball depth of each tree to determine the appropriate tree pit depth. Allow additional depth to achieve specified falls for subsoil drainage lines and to satisfy finished levels.

Safety precautions must be in place to prevent public entry to worksite area.

---

## 5.10 Existing pavement

The existing pavement shall be cut by a road-saw or other suitable tool to the dimensions shown in the details. Cutting shall only be at right angles and parallel to the kerb. The cut shall have a neat straight edge and smooth face. Kerbs must not be cut under any circumstances. In the case of cutting unit paving, ensure that the cuts are made along the joints without damage to the surrounding pavers. Unit paving may be dismantled rather than cut if this option minimises damage.

---

## 5.11 Subgrade preparation

Refer also Section 4. Cultivate or rip the subgrade at the base and sides of tree pits to a depth of 100mm. During cultivation, thoroughly mix in any materials required to be incorporated into the subsoil. Remove stones exceeding 70mm and any rubbish or other deleterious material brought to the surface during cultivation. Grade the base of tree holes to the required design levels and shapes after cultivation.

---

## 5.12 Root control barriers

Root barriers will typically not be required and shall only be installed when specifically instructed by the City of Sydney.

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## 5.13 Soils and bad ground

Bad ground shall be ground considered unsuitable for the purpose of the works, including filling liable to subsidence, ground containing cavities, faults or fissures, ground contaminated by harmful substances or ground which is, or becomes soft, wet and unstable and the like. If bad ground is encountered in, or adjacent, to any tree pit during the work, notify the City of Sydney immediately and obtain instructions before carrying out any further work in the affected area.

---

## 5.14 Drainage

Subsoil drainage is to be installed as per City of Sydney requirements and will be determined on a site by site basis.

---

## 5.15 Planting conditions

Do not plant in unsuitable weather conditions such as extreme heat, cold wind or rain. Avoid planting where unseasonable and adverse weather is forecast within 24 hours of the operations. No trees are to be planted on days exceeding temperatures of 30° Celsius. Generally tree planting is preferred during the cooler months from March to October.

---

## 5.16 Watering

Thoroughly water the tree root balls before planting and then immediately after planting. Prevent the root balls from drying out during the planting phase.

Apply water so as not to disturb the soil. Raise the moisture within the root zone to field capacity. Ensure potted root ball is thoroughly wet through the entire soil profile. Continue watering at a rate and frequency as required to avoid water stress in the plant.

---

## 5.17 Lifting of trees

It is preferred that all trees are carried or slung via the root ball. In the event that the trees have to be repositioned or lifted by the trunk, the installer shall provide adequate soft padding to the trunk in the form of underfelt, carpet or rubber wrapping and use only soft slings during the lifting.

---

## 5.18 Placement

When the tree pit is excavated and the hole is the correct size, place the rootball in its final position. Ensure the trees are centred and plumb and the top of the rootball level with the finished surface of the surrounding soil mix.

Do not use the trunk of the tree as a lever in positioning or moving the tree in the planting hole.

---

## 5.19 Alignment and orientation

Position the tree at the set out distances as indicated in the details. Ensure trunks are set vertically and aligned with other new or existing trees.

Orientate the trees trunk north where indicated by supplied markings where applicable. (+or- 20°). Adjust within the above tolerances so that the primary lowest branches are generally aligned parallel with the kerb and road way (NOT extending into roadway).

---

## 5.20 Root trimming

All trees shall have the outer 10-25mm of the external root ball faces pruned or sliced away using secateurs or a sharp and clean spade. Avoid excessive disturbance to the remaining root ball during this trimming and discontinue if excessive root ball soil begins to fall away. Do not leave the root balls exposed for extended periods. Cover the root ball with moist hessian if backfilling cannot occur immediately.

---

## 5.21 Backfilling

Backfill with soil mix as specified in soil mixes and in accordance with the details and specification. Lightly compact the soil to ensure all voids around root balls are filled and that no air pockets are retained.

Ensure that the backfill soil is not paced over the top of the potted root ball. The top of the root ball and plant stem must be kept level with the top of the backfill.

---

## 5.22 Mulch

Any soil conditioners and mulch shall comply with AS4454-2012 Composts, Soil Conditioners and Mulches. Unless otherwise noted the mulch shall be a minimum of 50mm depth and a maximum of 75mm depth. Mulch types shall be: -

- 15mm graded aged horticultural pine bark fines or
- 50mm minus recycled urban wood waste
- Decomposed granite gold colour, lightly compacted and installed as shown in details.

Mulch shall be free of deleterious and extraneous matter, including soil, weeds, rocks, twigs and the like. Place the mulch so that it is not in direct contact with the trunk. Feather mulch layers away from trunk at the root crown.





Tree roots being pruned prior to planting and ensuring correct placement in the tree pit. City of Sydney 2016.



# 6. Tree planting details

Technical details have been developed to ensure an appropriate and consistent treatment for street tree planting throughout the variety of street environments typically encountered.

The following pages illustrate the typical details to be applied.

In-road planting details and median strip details will be dependent on the individual street widths, traffic and services and will therefore require site specific designs to be employed, however the following 'ideal practice' details have been included here to provide general expectations for tree planting in these instances.

The use of continuous planting trenches, structural soil, structural cells, suspended pavements and other tree planting technology will be considered based on specific site conditions. Actual designs shall be submitted to the City of Sydney for consideration prior to any installation.

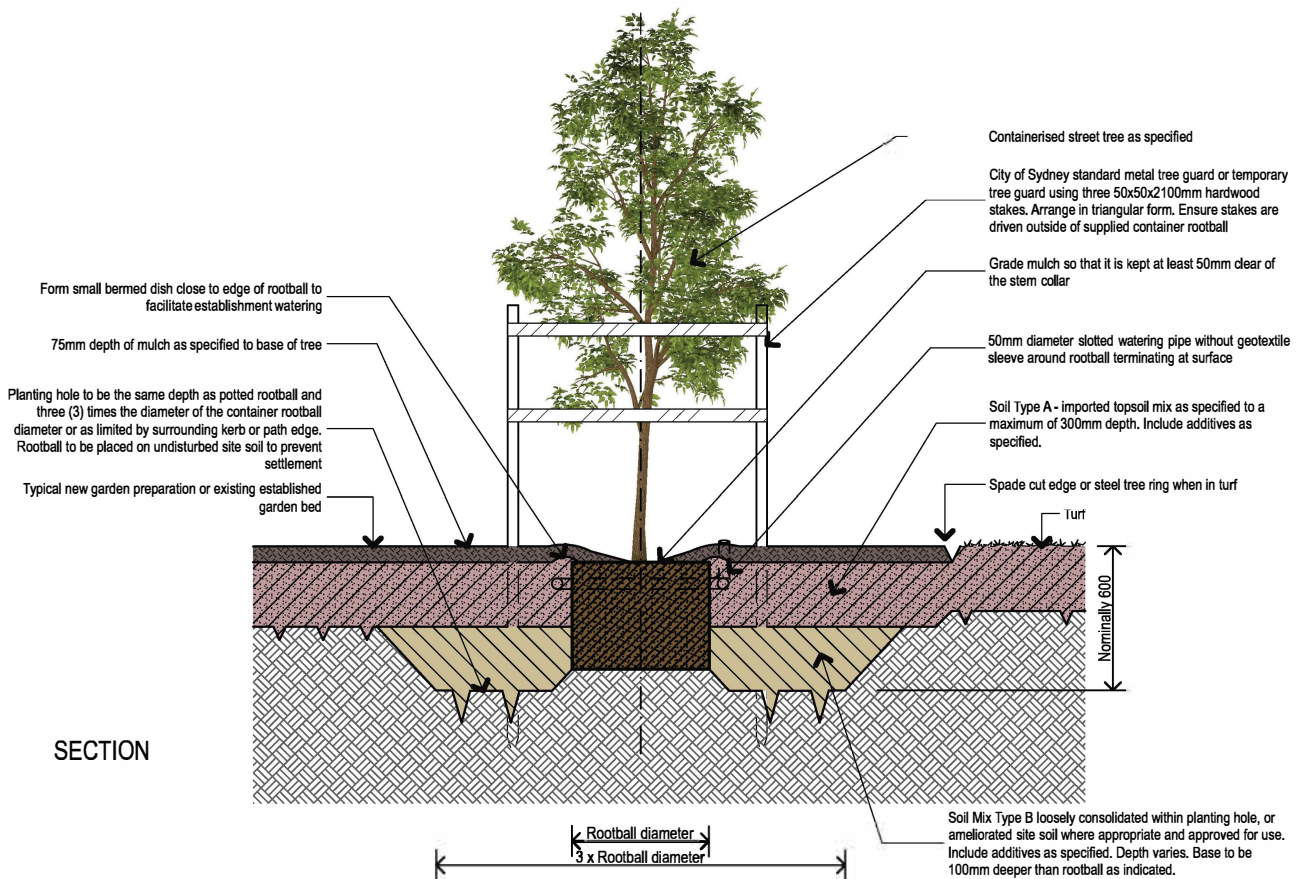
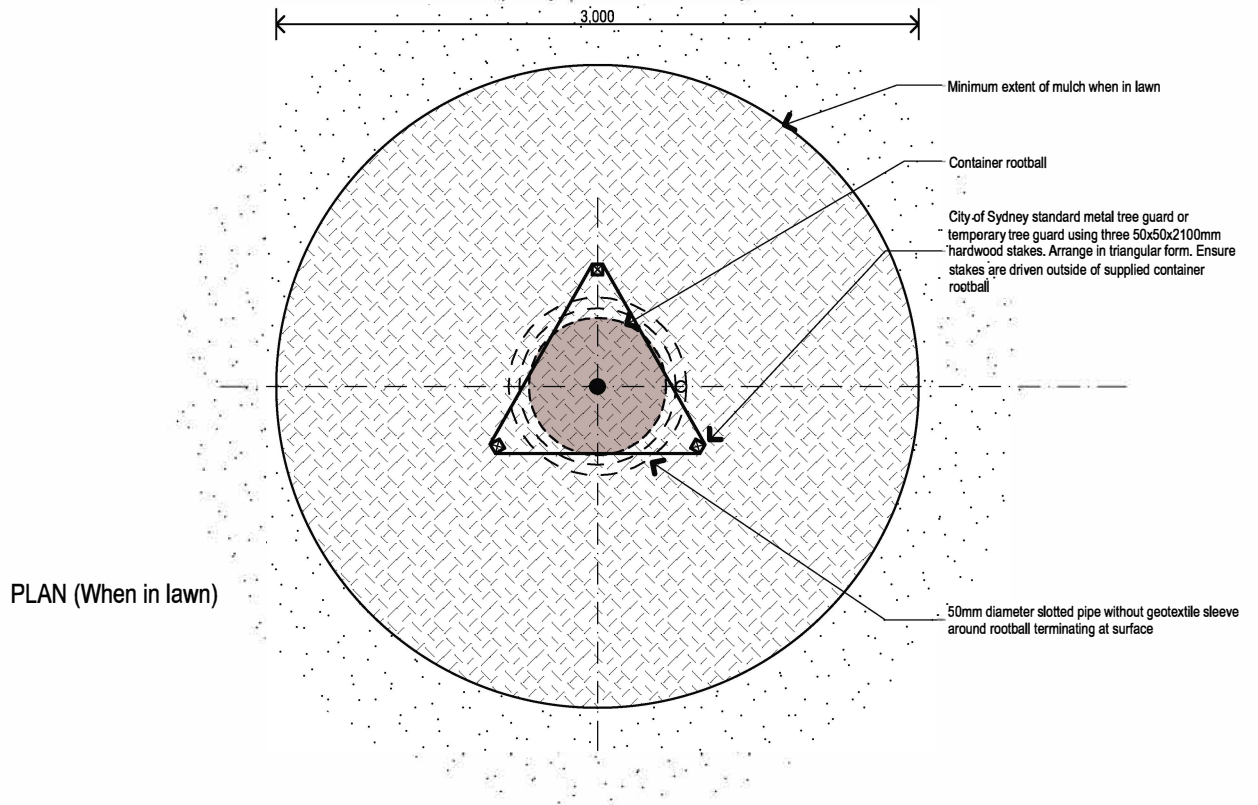


Median strip planting in Westmoreland Street, Glebe. Arterra Design, 2022



NOTE 1:  
All details are to be read in conjunction with any site specific DA conditions or Council issued Contract Documentation.

NOTE 2:  
This planting detail also applies to planting in parks.

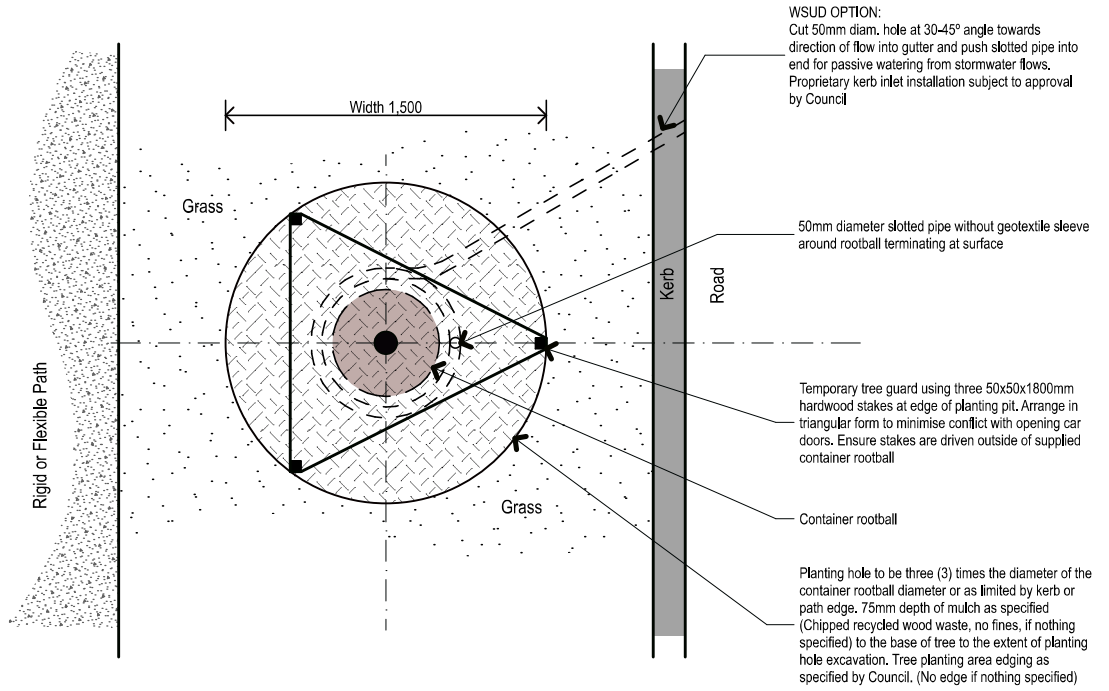


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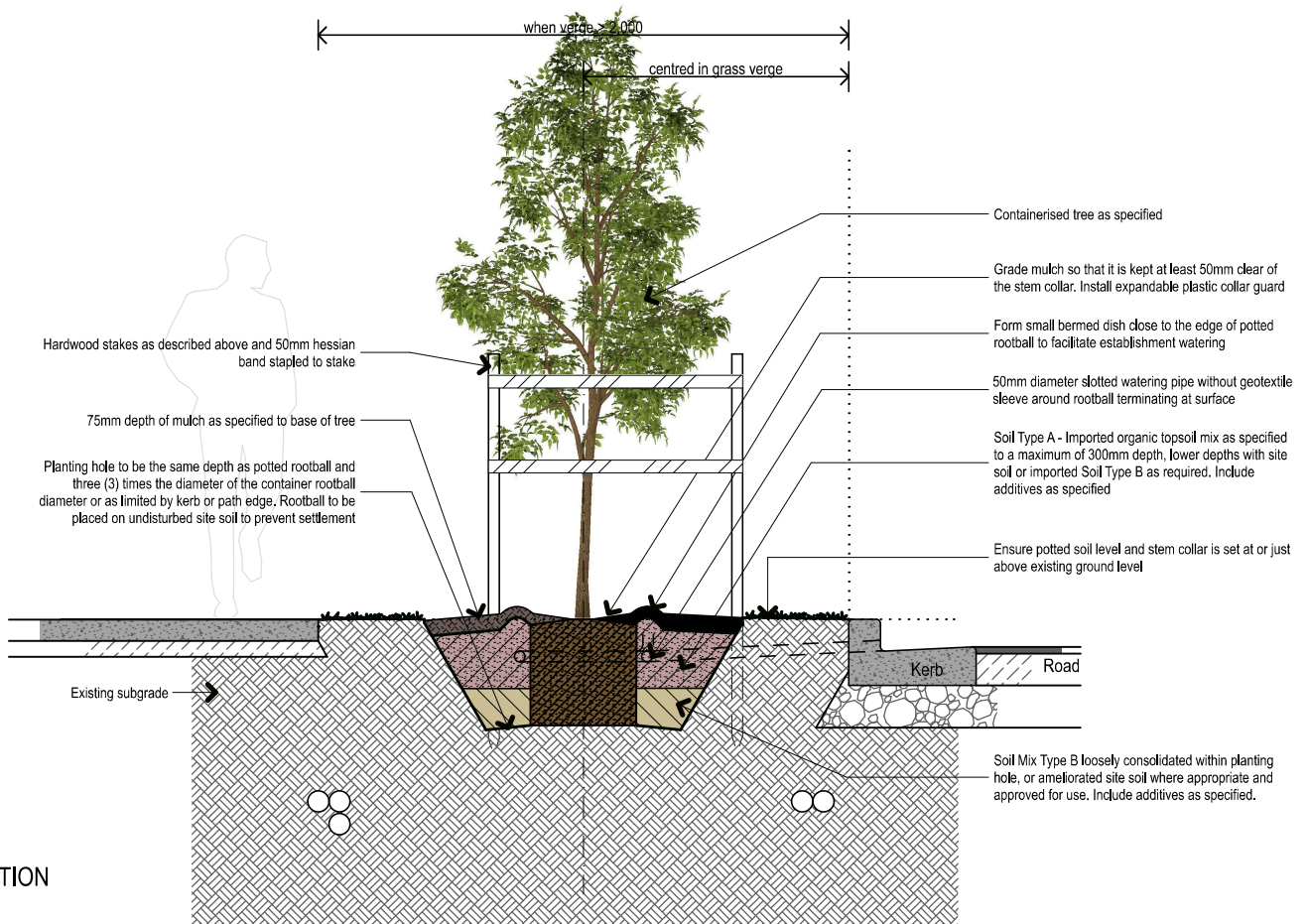
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NOTE 1:  
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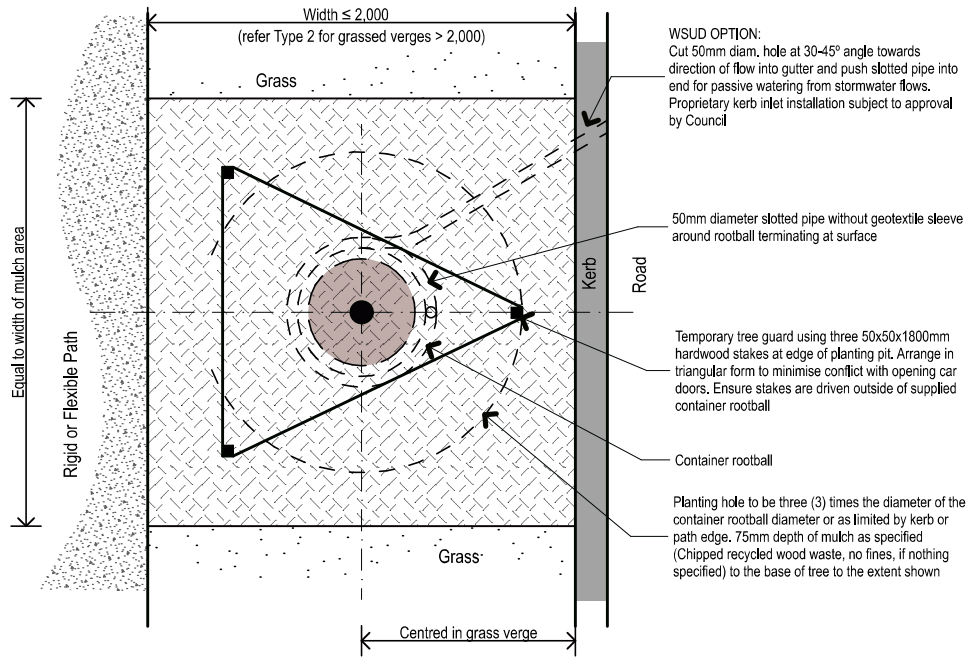


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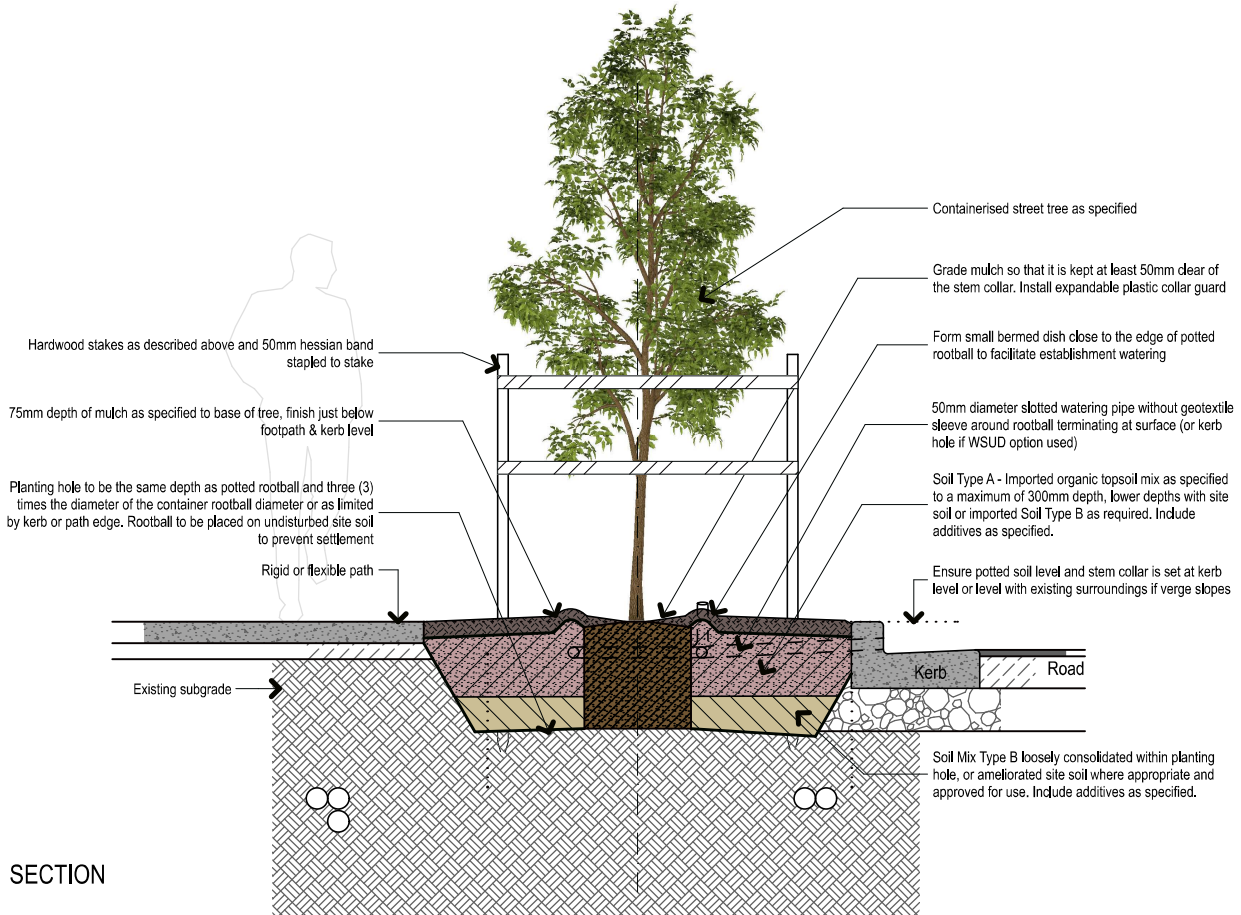
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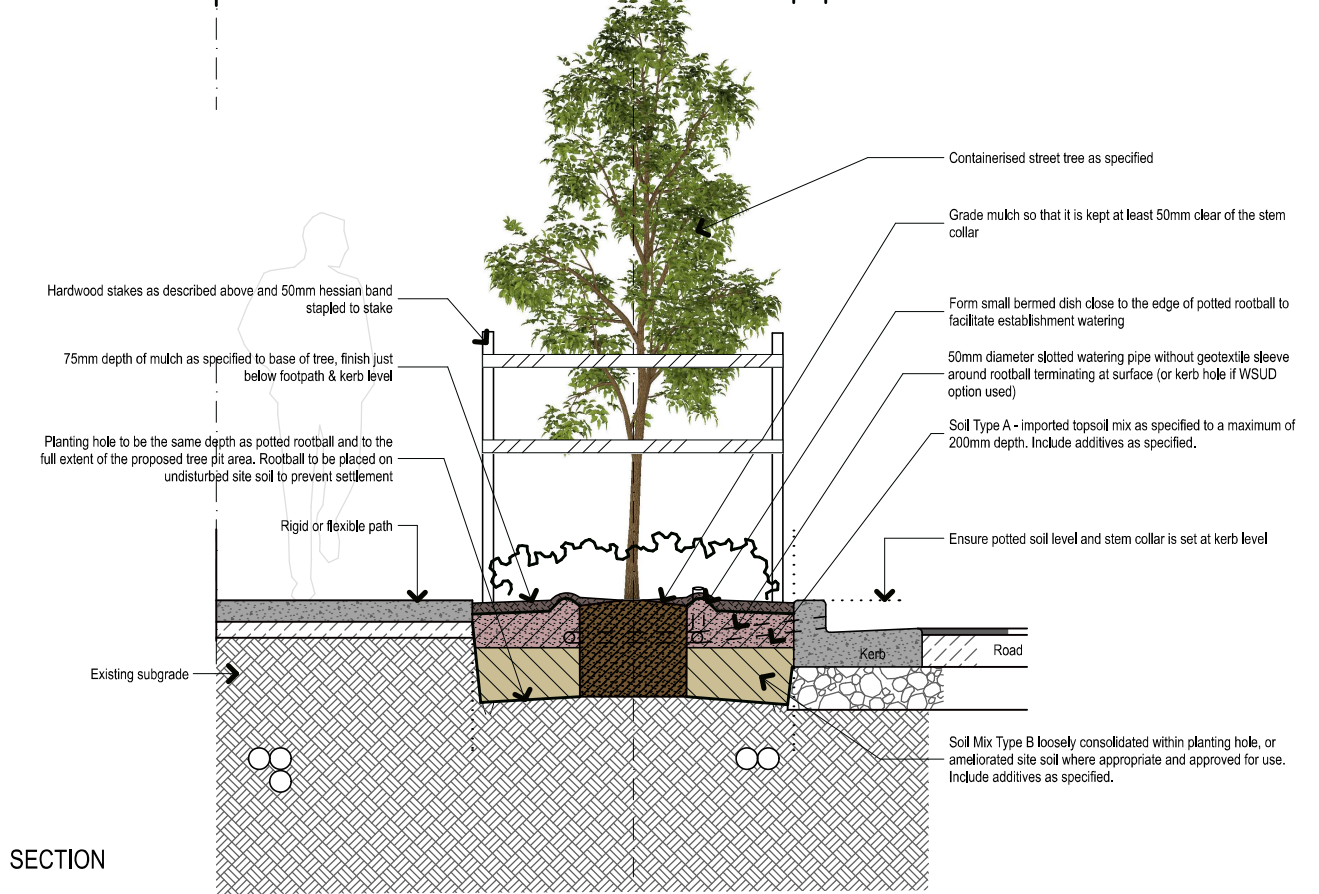
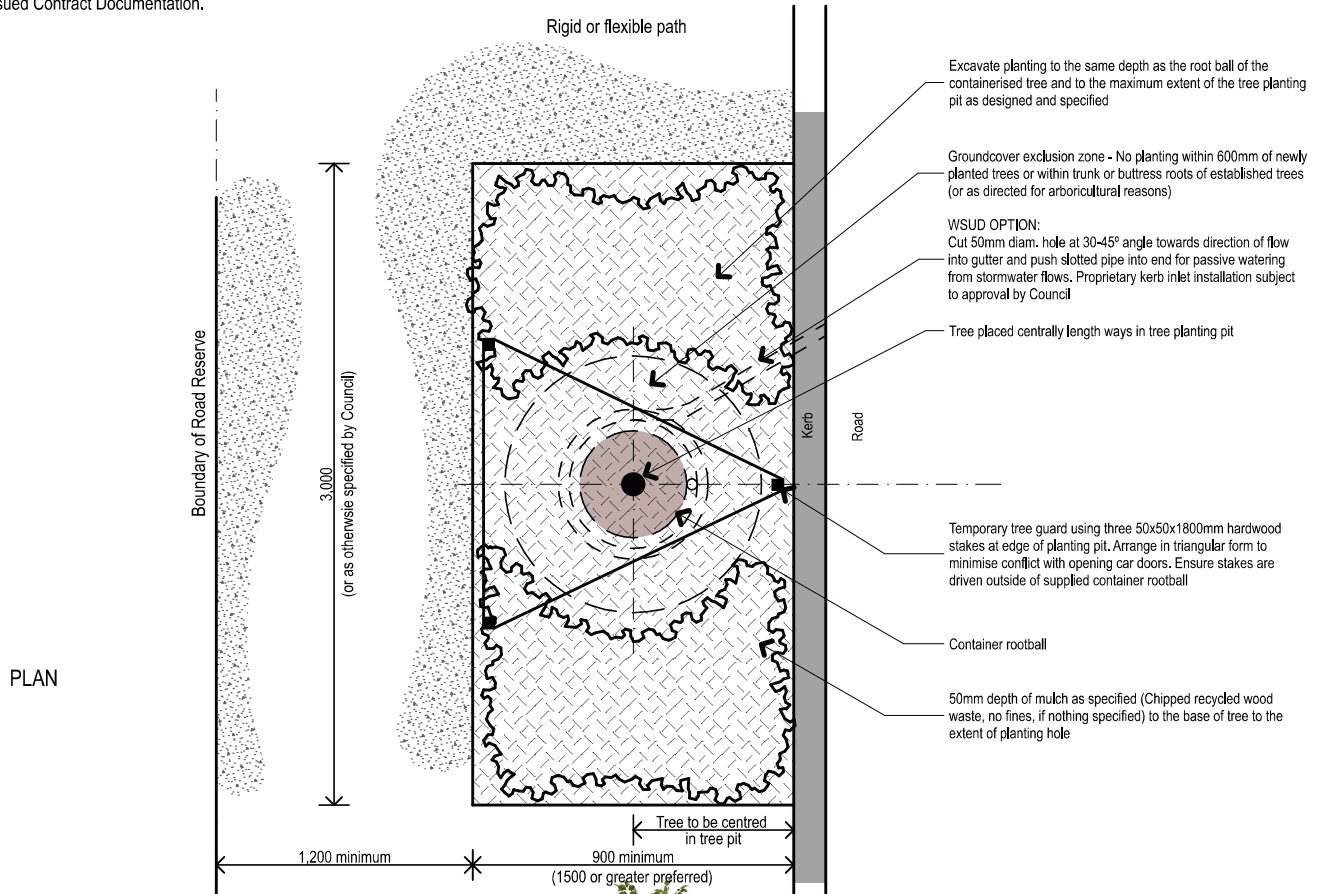


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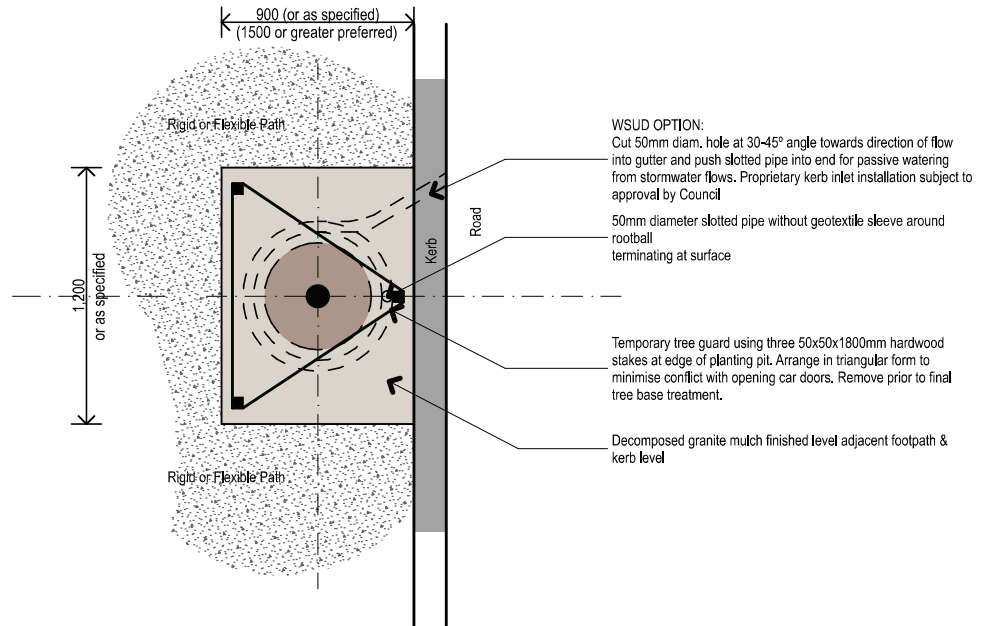


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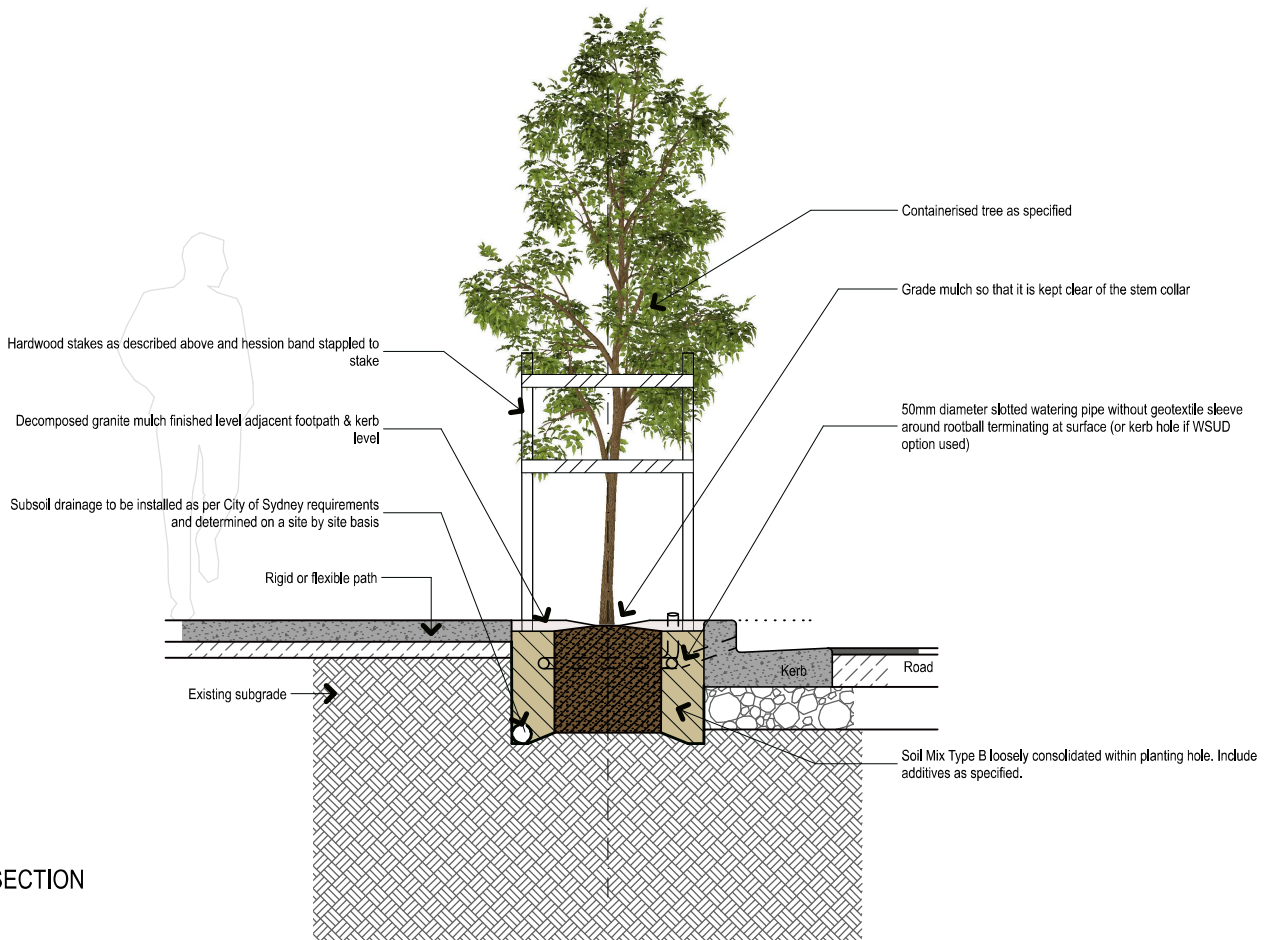
All details are to be read in conjunction with any site specific DA conditions or Council issued Contract Documentation.

**NOTE 2: Existing Trees**

- a. Size of tree pit may vary depending on depth of surface roots or trunk flare of mature trees.
- b. Paving construction may be altered to accommodate tree roots at the direction of Council.
- c. Tree pit surface to be installed level with surrounding paving, leaving surface roots exposed where necessary.



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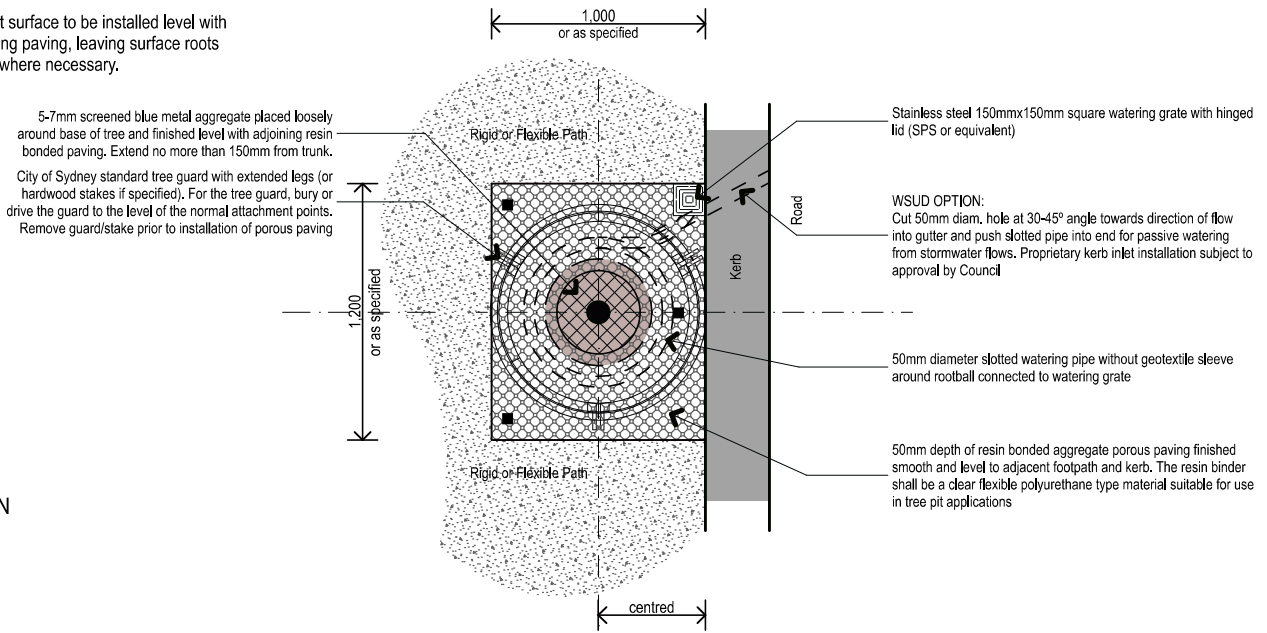
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All details are to be read in conjunction with any site specific DA conditions or Council issued Contract Documentation.

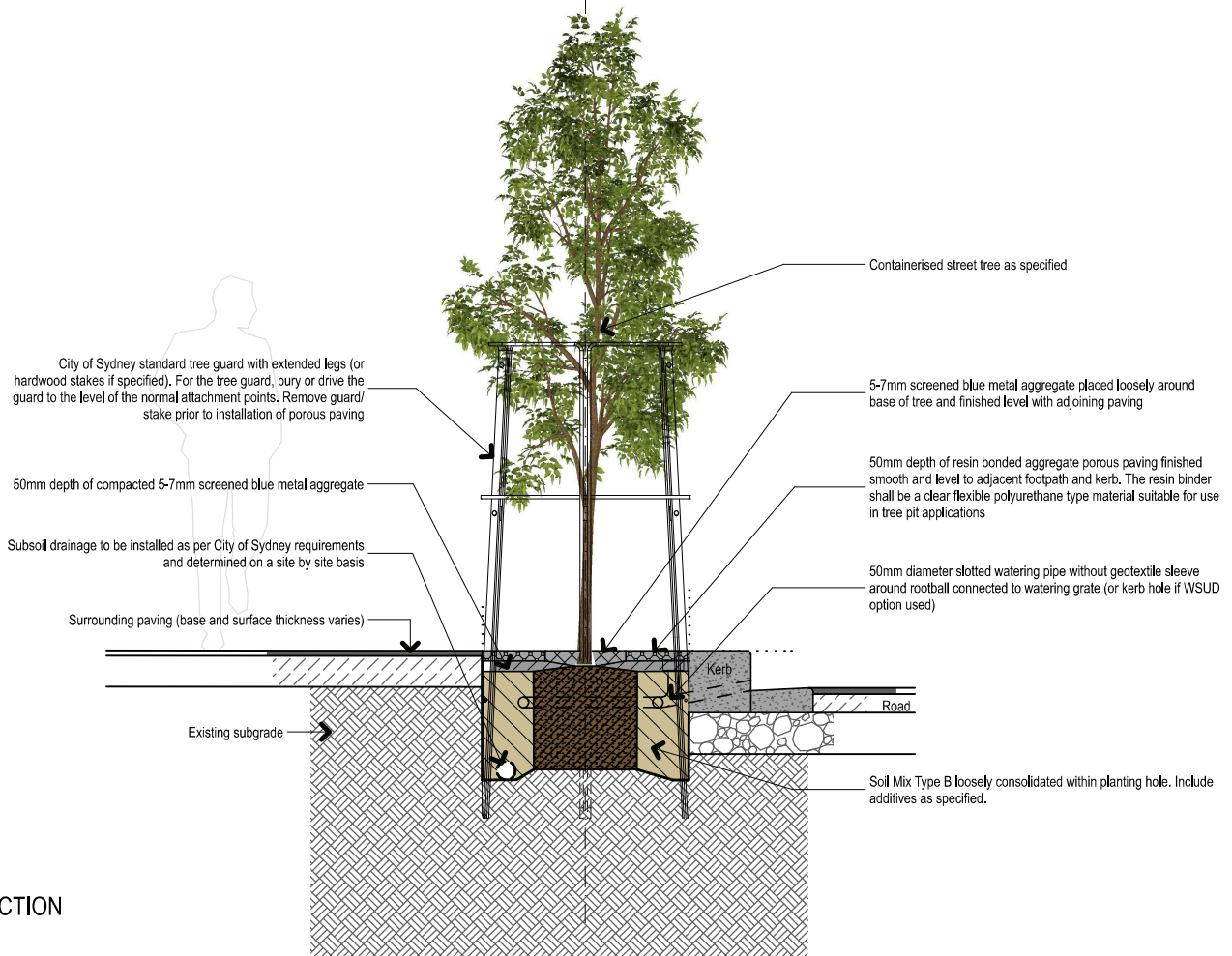
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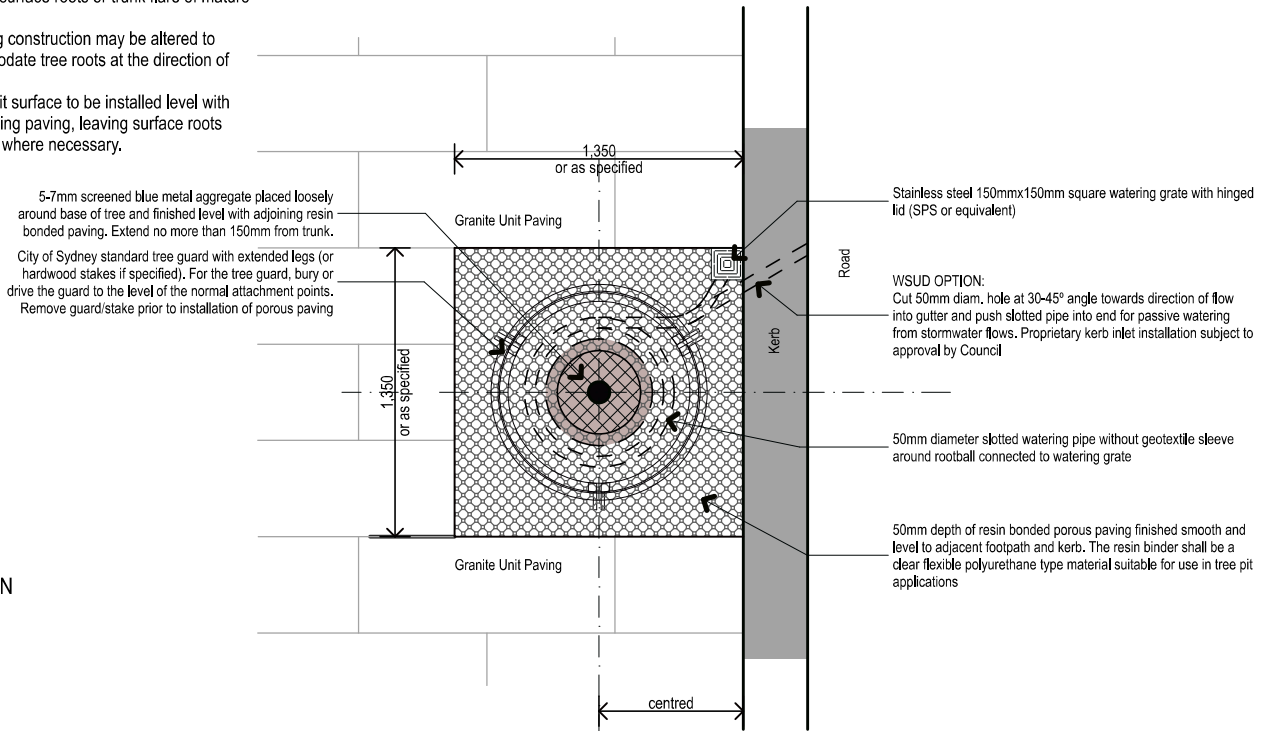
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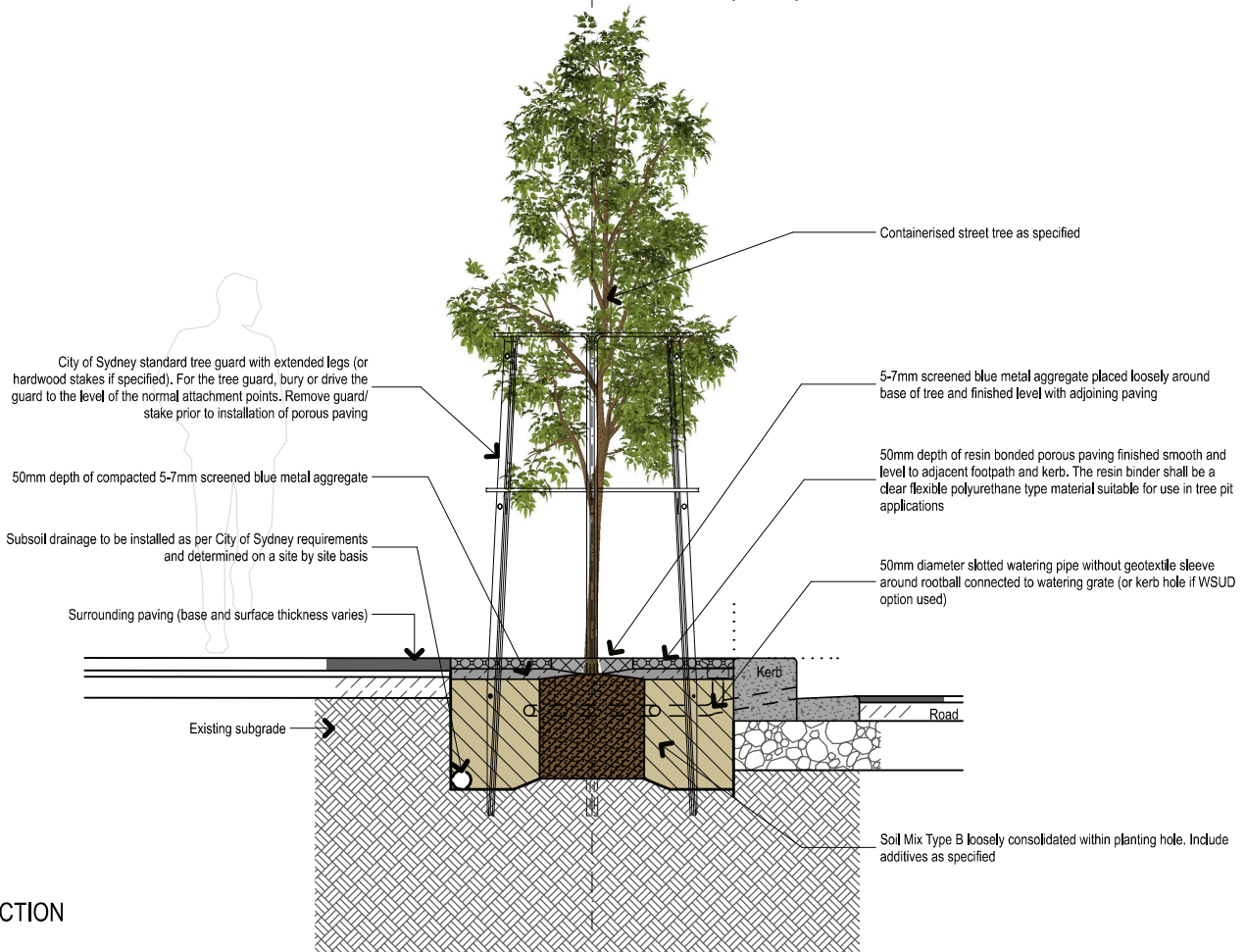
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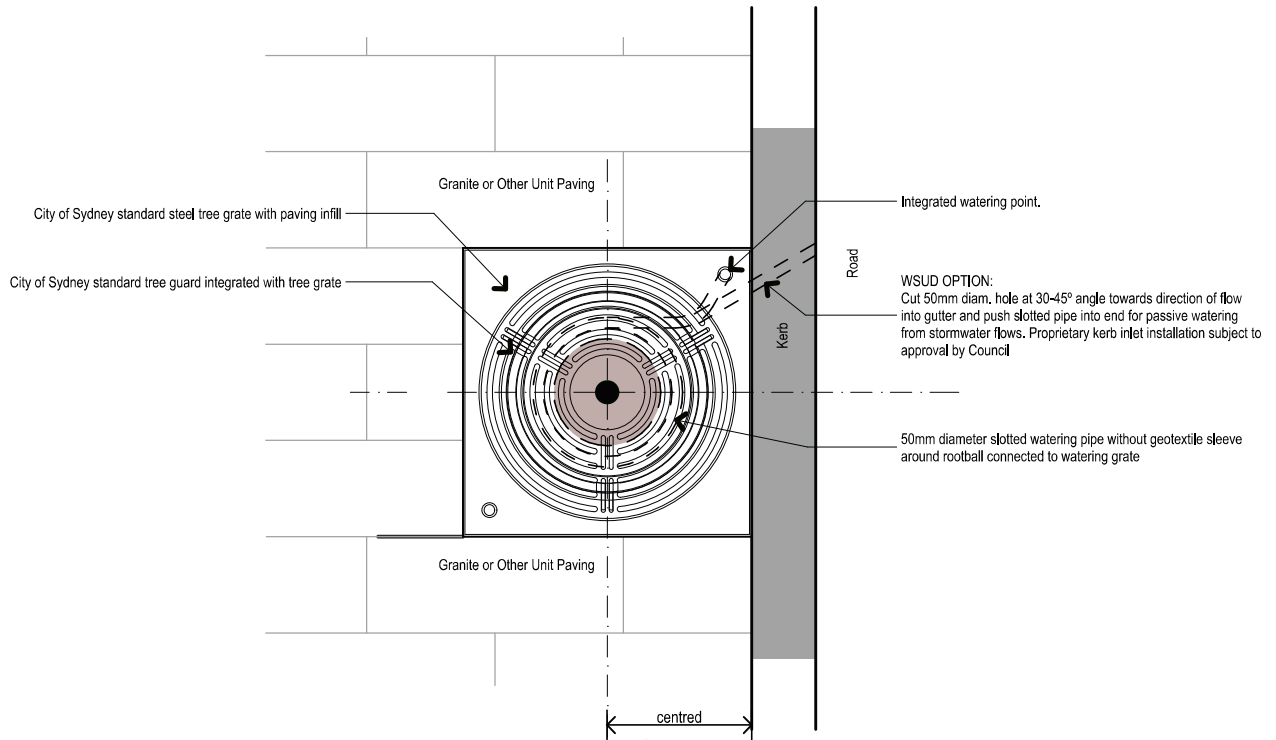


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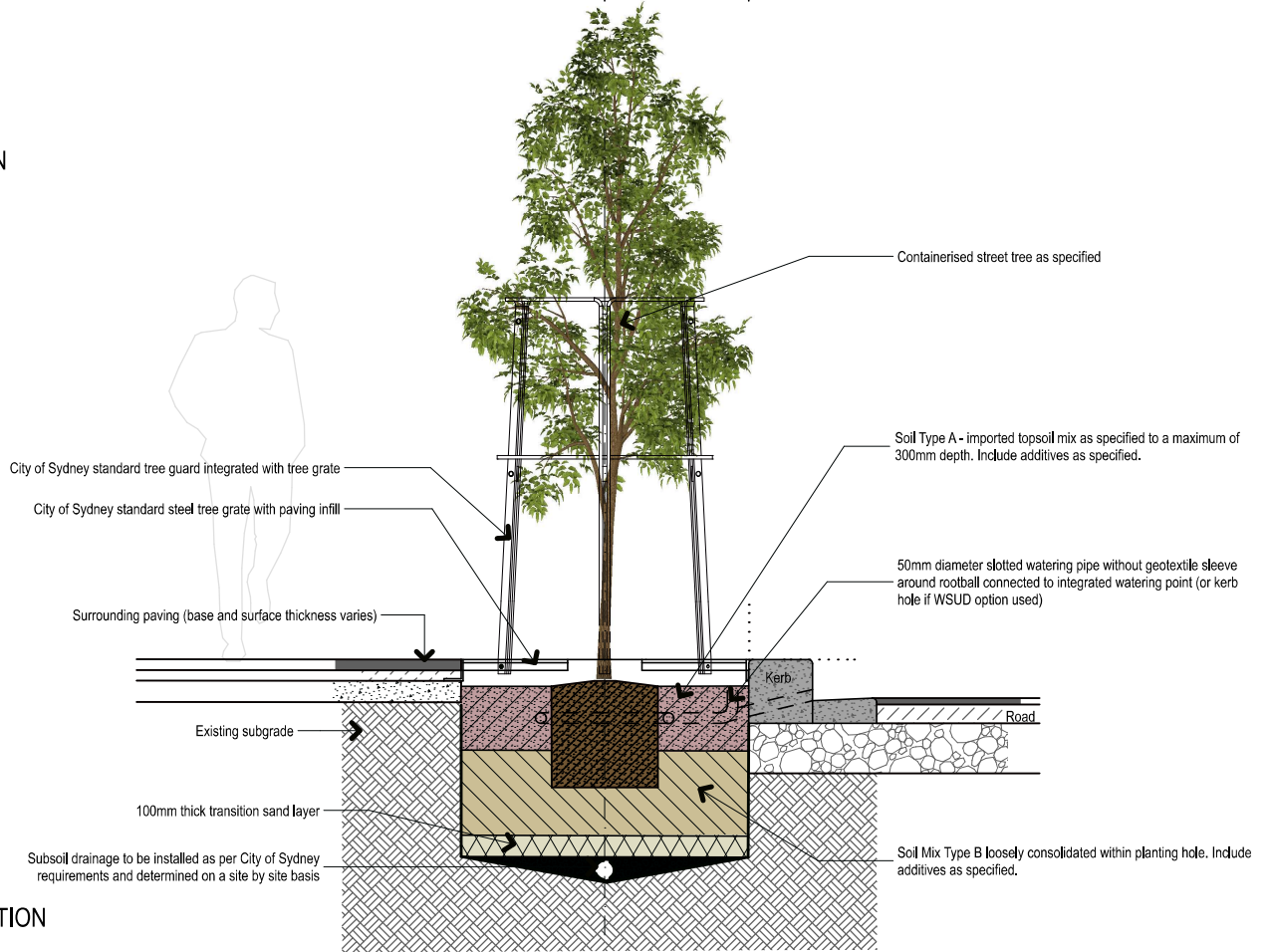
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**NOTE 1:**  
 All details are to be read in conjunction with any site specific DA conditions or Council issued Contract Documentation.



**WSUD OPTION:**  
 Cut 50mm diam. hole at 30-45° angle towards direction of flow into gutter and push slotted pipe into end for passive watering from stormwater flows. Proprietary kerb inlet installation subject to approval by Council

**PLAN**

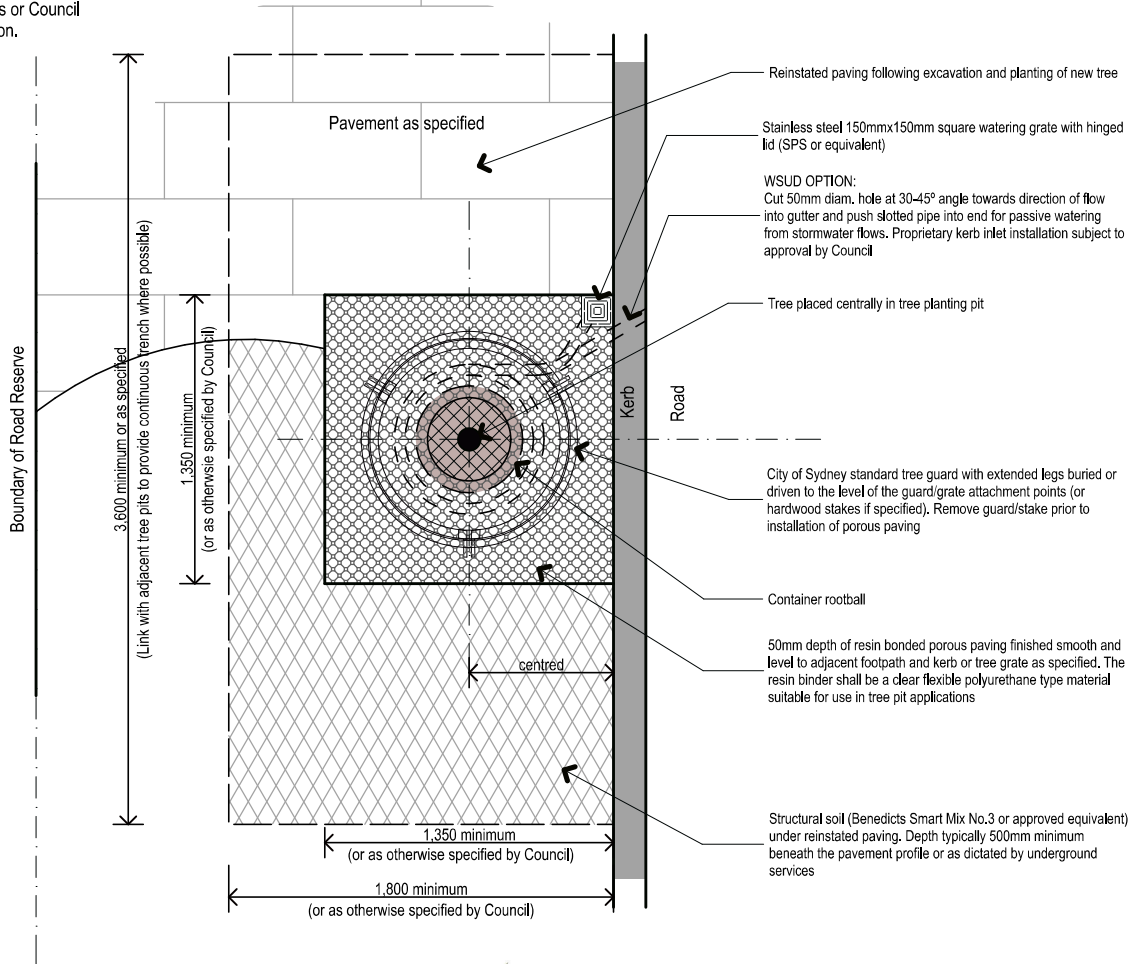


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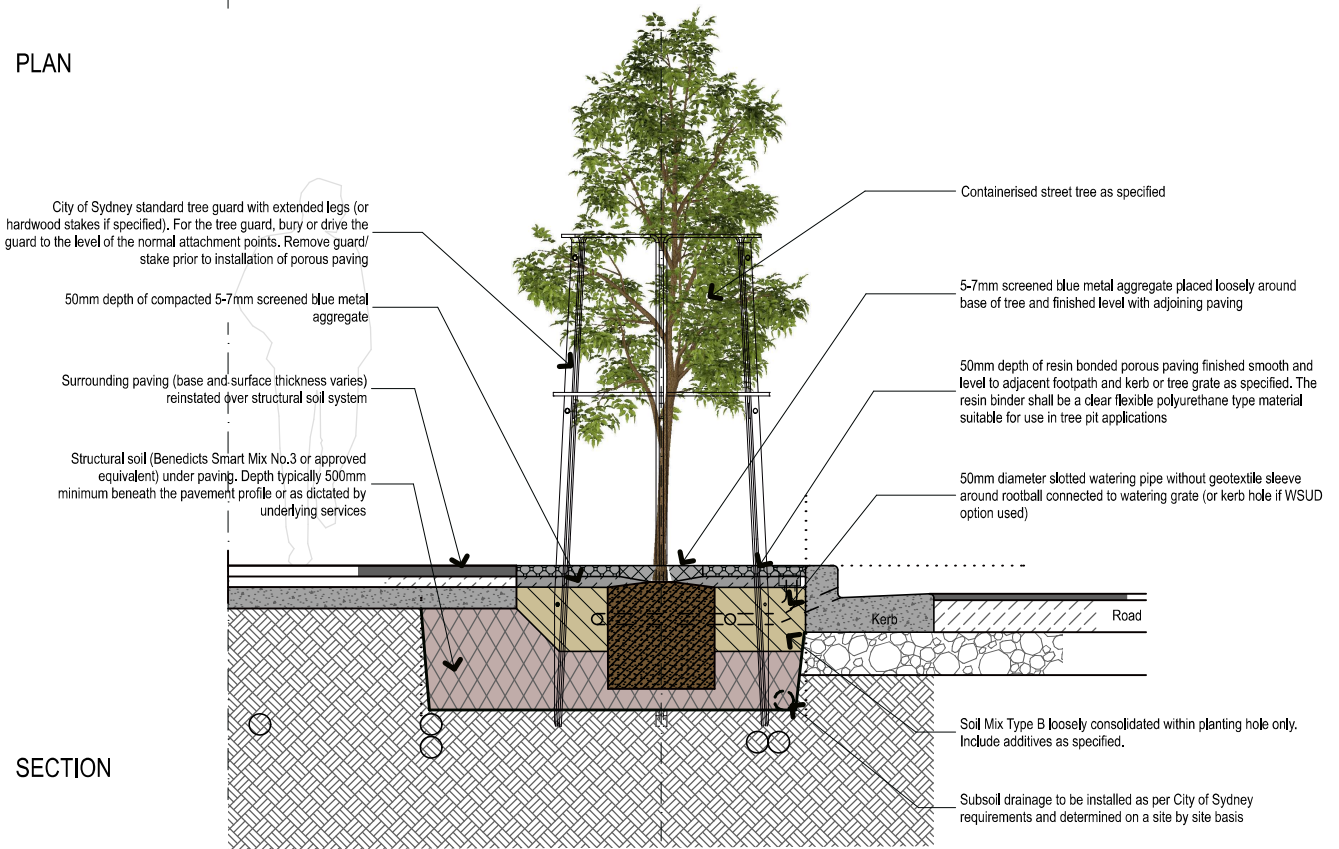
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NOTE 1:  
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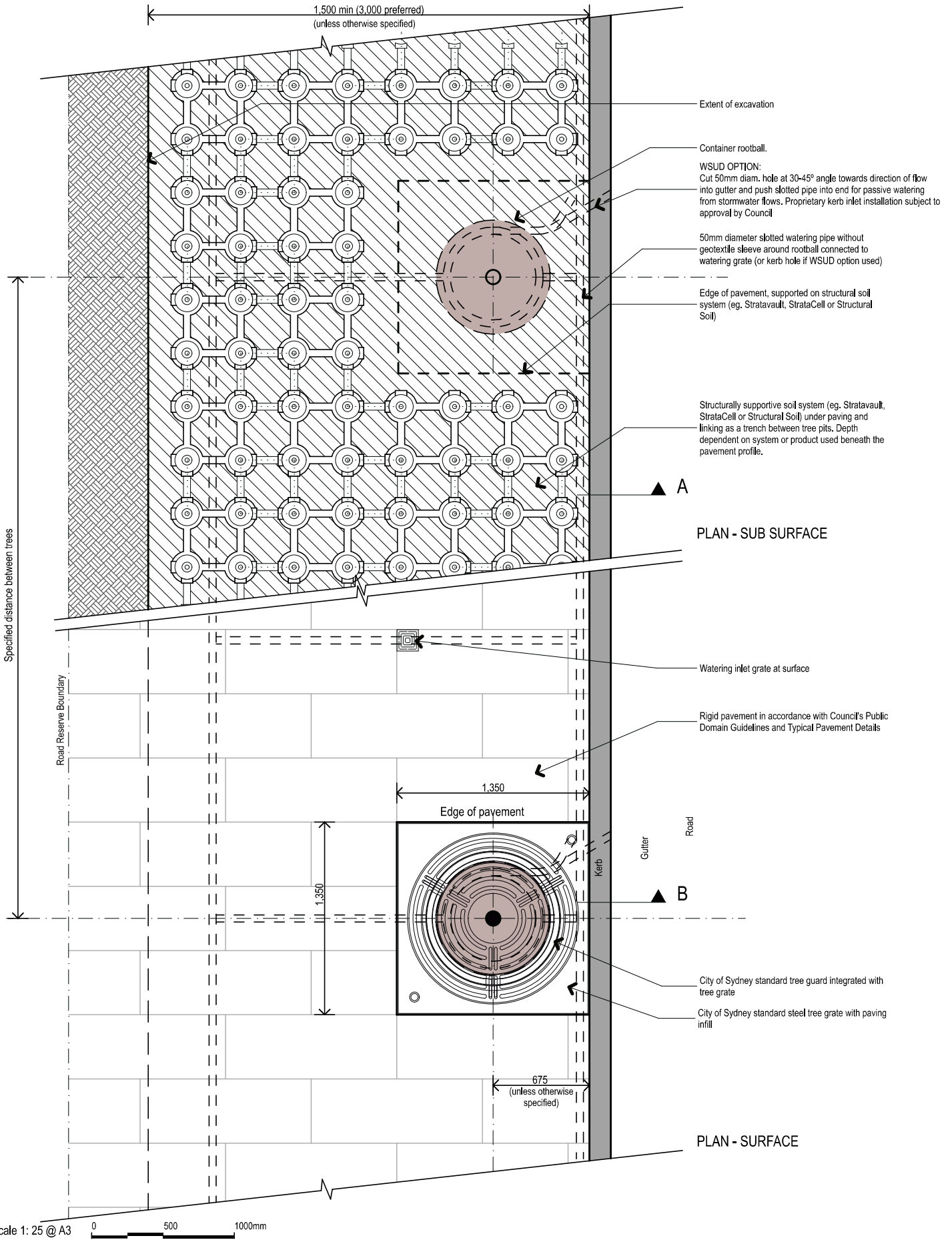


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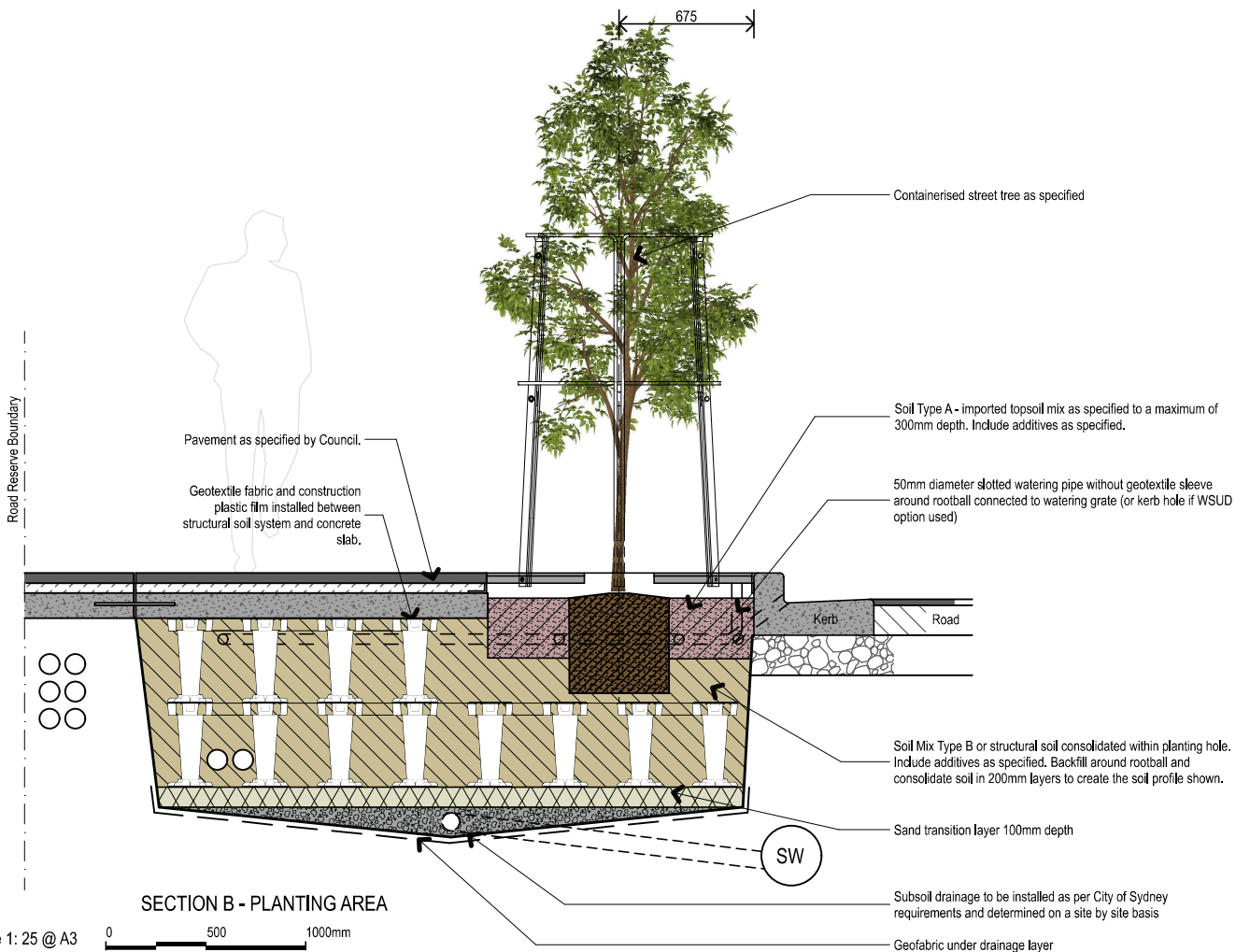
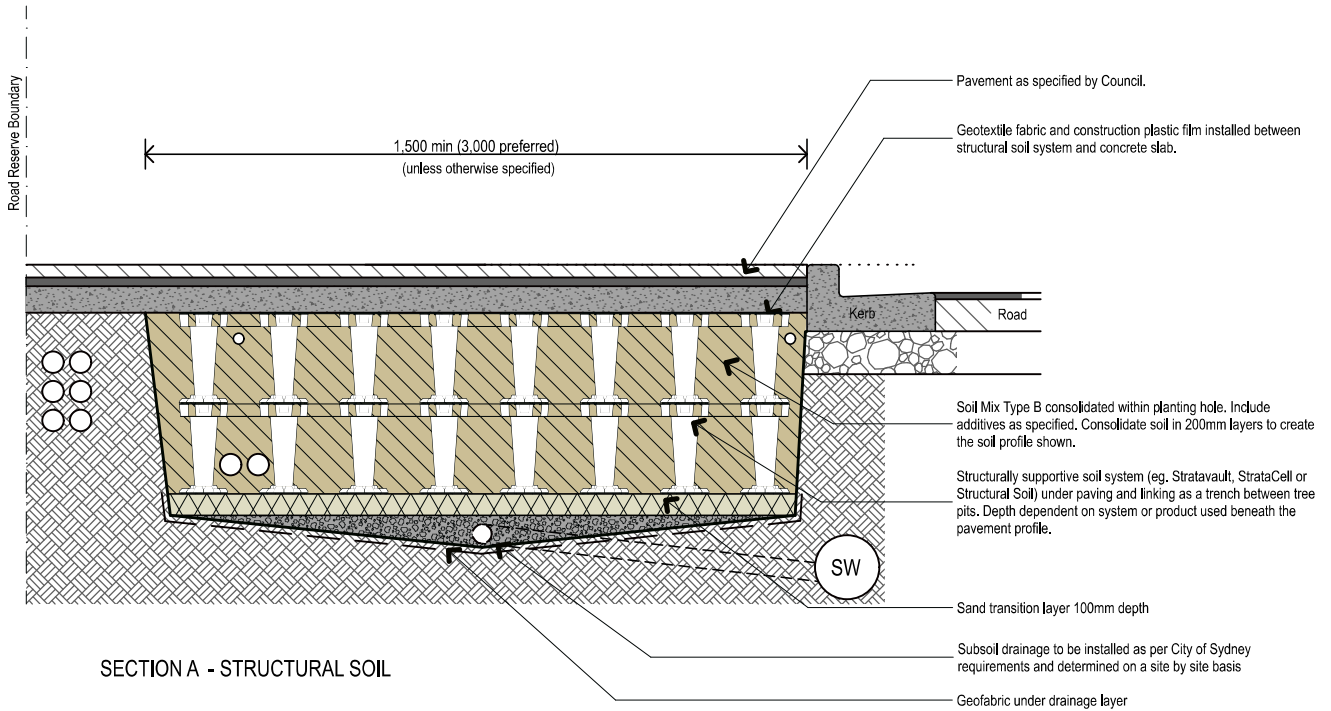
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NOTE 1:  
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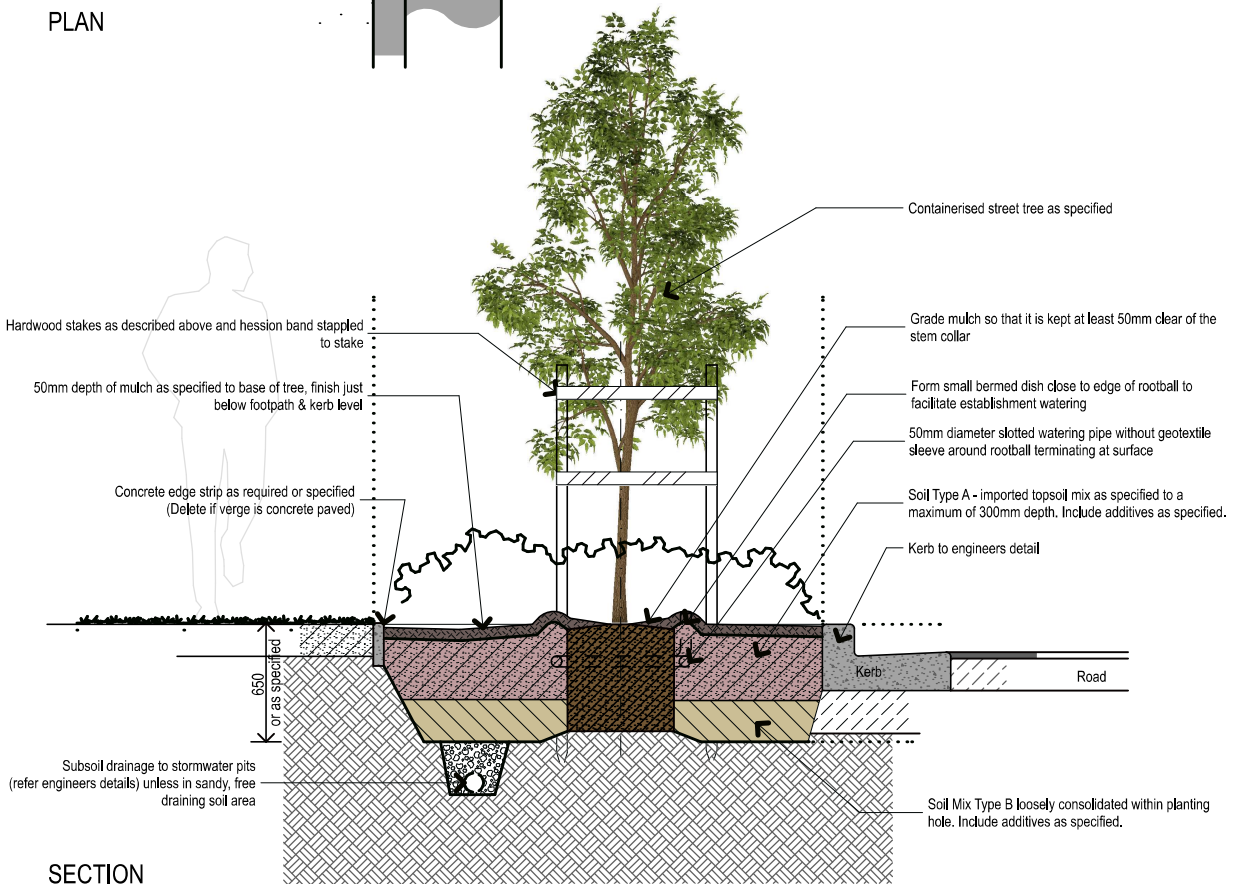
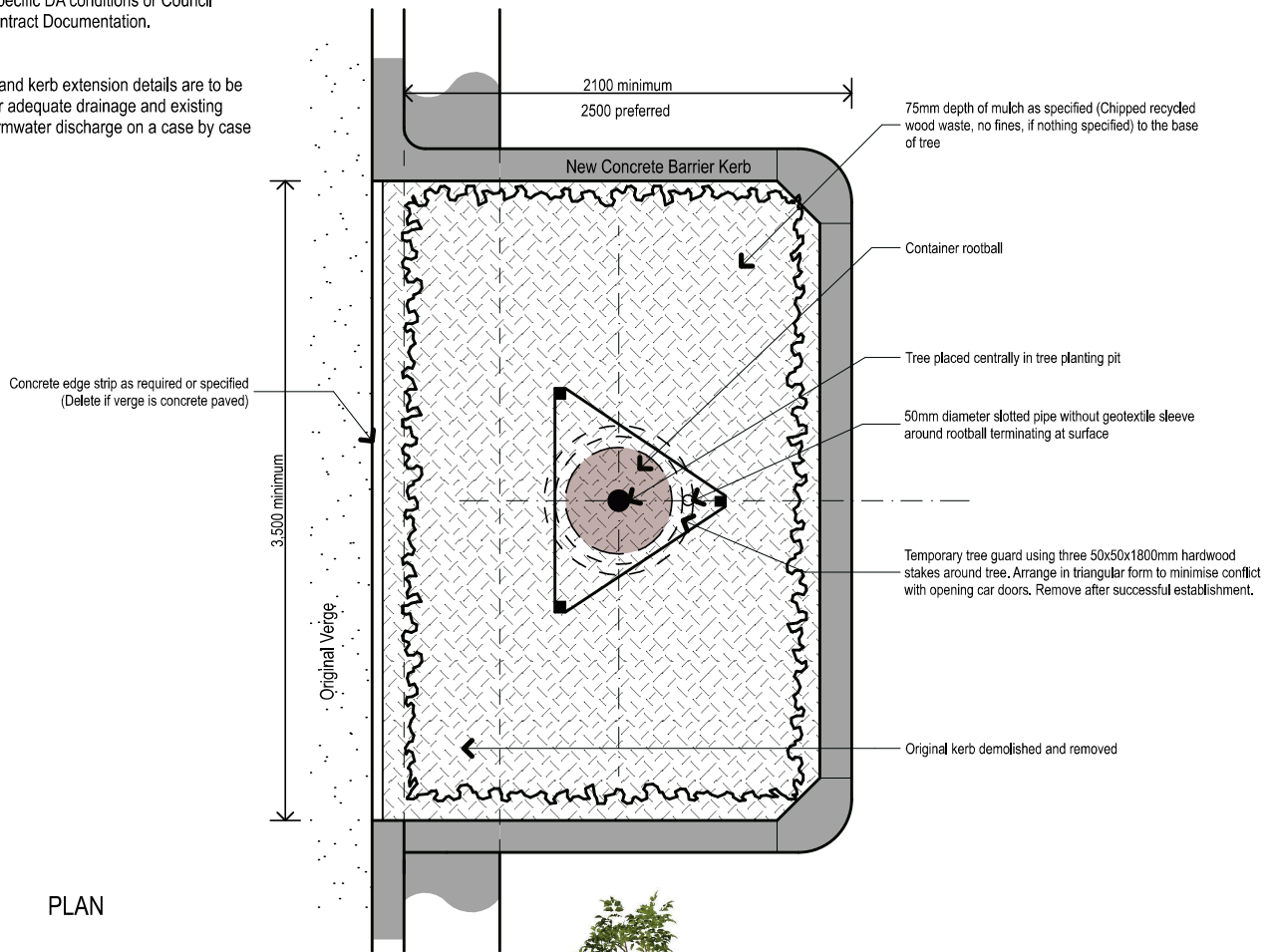
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**NOTE 1:**

All details are to be read in conjunction with any site specific DA conditions or Council issued Contract Documentation.

**NOTE 2:**

All blister and kerb extension details are to be verified for adequate drainage and existing gutter stormwater discharge on a case by case basis.



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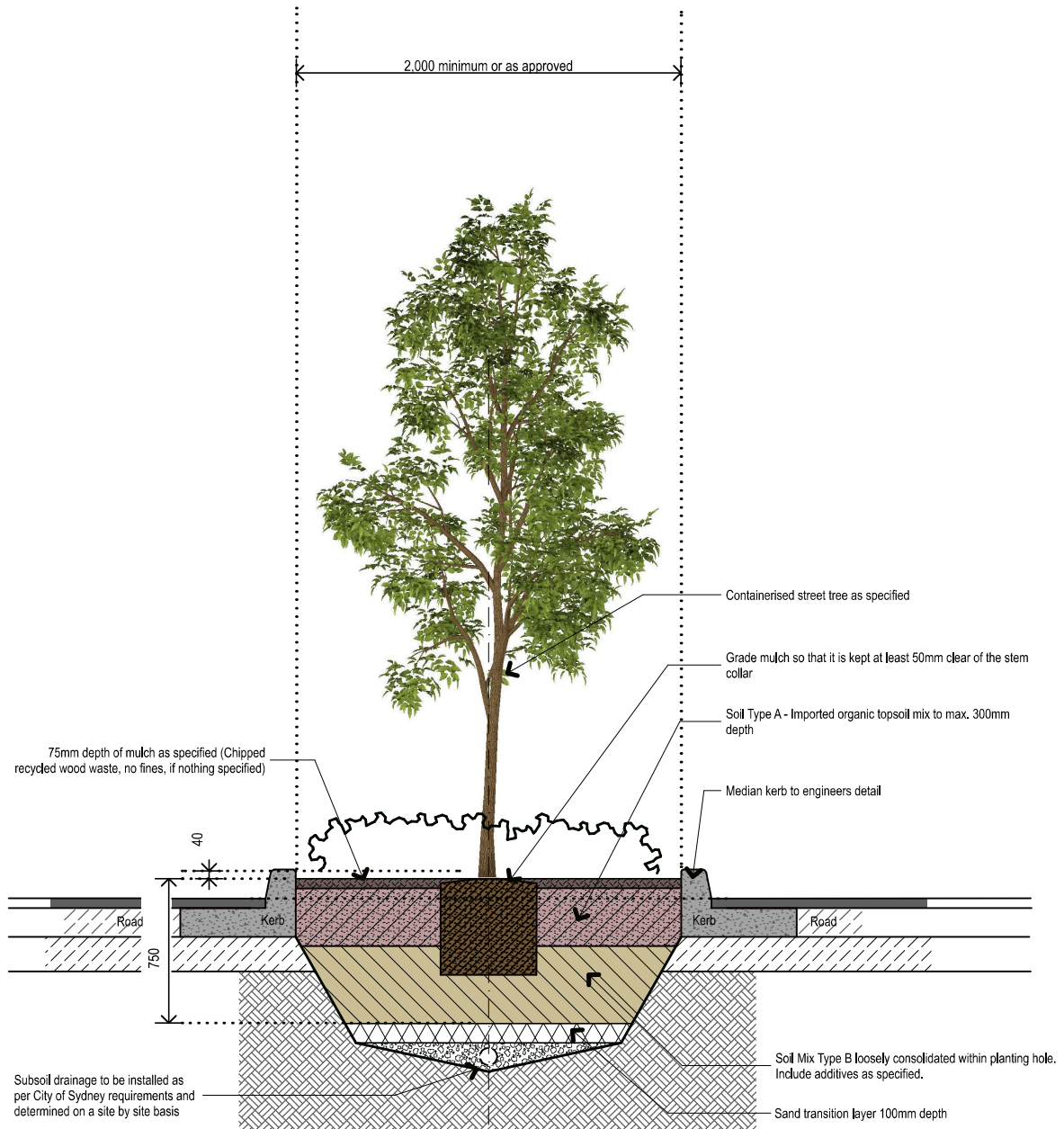


**NOTE 1:**

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**NOTE 2:**

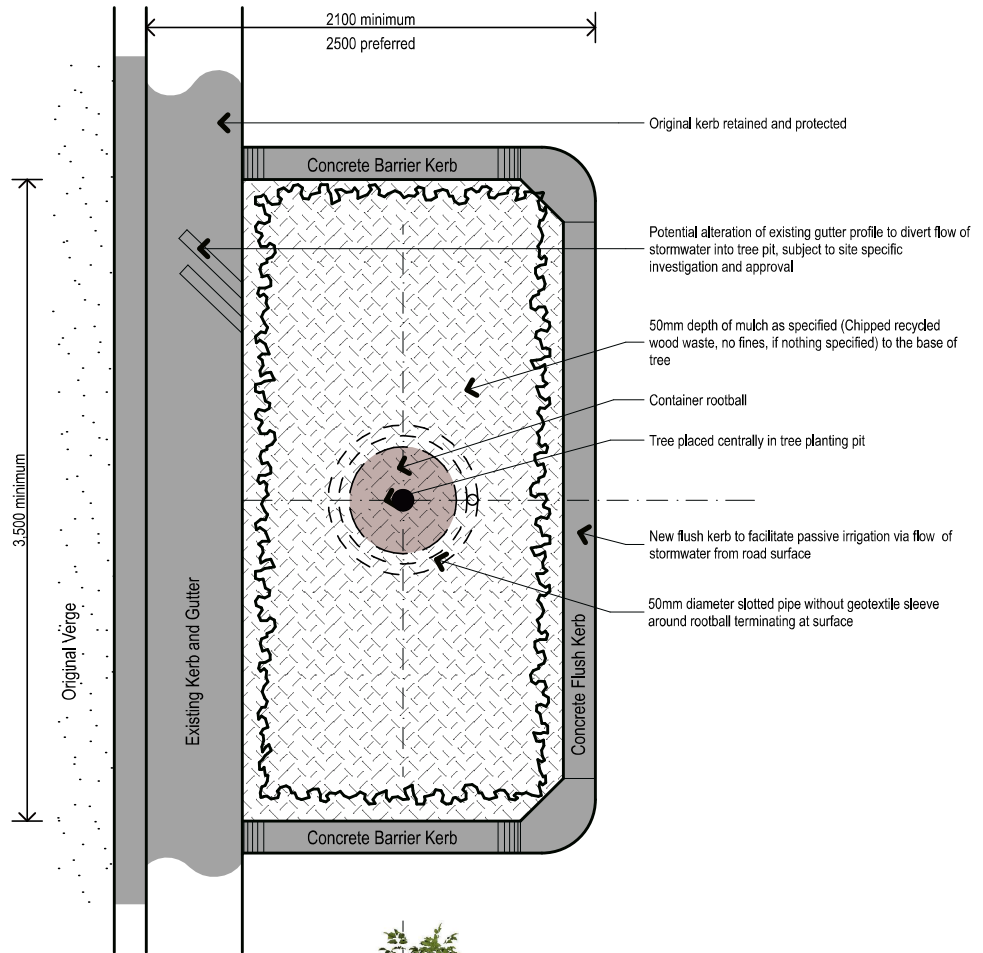
All median details are to be verified for adequate drainage and soil depths on a case by case basis.



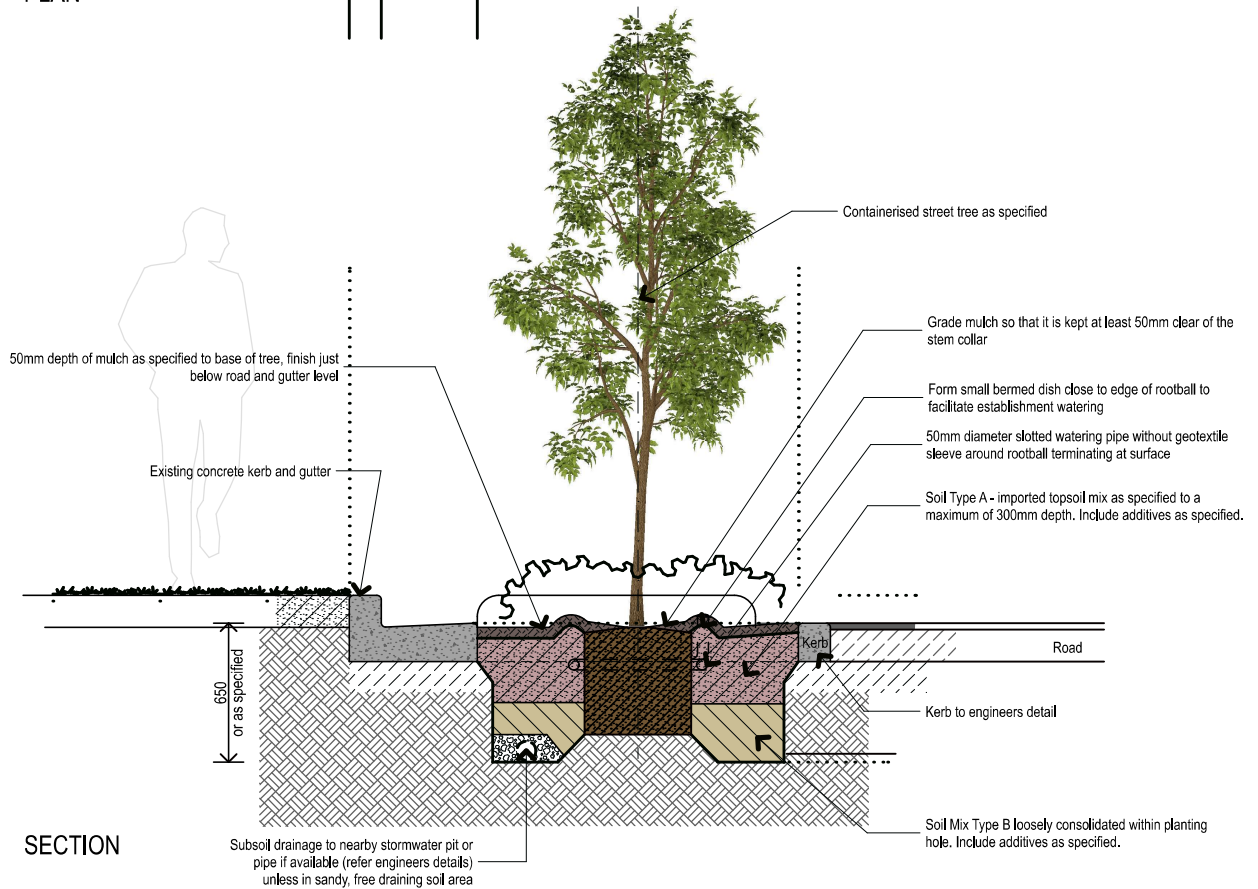
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NOTE 1:  
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NOTE 2:  
All in-road blister extension details are to be verified for adequate drainage and existing underground stormwater pipes and other services on a case by case basis.



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# 7. Tree establishment and maintenance

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## 7.1 Tree establishment period

The tree establishment period commences at the date of practical completion for a period specified by the City of Sydney.

All trees shall also be maintained immediately following their installation, as per the specifications below, up until the above tree establishment period commences.

Tree maintenance works shall be undertaken by an Arborist or Horticulturist with minimum certification in accordance with Australian Qualifications Framework Level 2.

The installer shall submit a program prior to the commencement of the tree establishment period. The program shall detail all works required during the planting establishment period including:

- Rectification of defects
- Provision of materials
- Watering
- Fertilising
- Control of weed growth
- Replacement of dead, damaged or stolen plants.

Throughout the tree establishment period, the installer must continue to maintain new trees and carry out maintenance work including, but not limited to:-

- weeding and rubbish removal from tree surrounds
- fertilising
- pest and disease control
- replanting (on approval from the City of Sydney)
- adjustment, removal or replacement of stakes & ties
- formative and selective pruning to AS 4373, and
- mulching to maintain and reinstate to depth specified.

Watering shall be incorporated into the regular maintenance schedule with the soil moisture content of the tree pits to be maintained above 60%.

Inspection results and the maintenance procedures shall be recorded and submitted to the City of Sydney every two months. The various ongoing maintenance practices shall be carried out to the satisfaction of City of Sydney.

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## 7.2 Tree guards and supports

The installer shall supply and install 3 wooden stakes with hessian ties per tree, for all trees planted up to 200 litre in size. Where advised by the City of Sydney, the installer shall allow to install metal tree guards on specified trees.



## 7.3 Fertilising

The following table details the required fertiliser program.

Timing	Product and application rate
At time of planting	Slow release landscape fertiliser suitable for trees and shrubs, 9 to 12 months release time. Osmocote or approved equivalent applied according to manufacturers directions.
6 months after planting and then monthly through to end of plant the establishment period.	Organic liquid fertiliser. Seasol or approved equivalent applied to soil as per manufacturers directions.

## 7.4 Watering pipe

The watering pipe will be 50mm slotted 'Ag-Pipe'. These will be without a geotextile sleeve.

## 7.5 Tree bases

Tree bases surrounded by pavement shall be left as soil or edges filled with decomposed granite for the first six (6) months to allow for any settlement of the root ball and backfill soil.

Following the six (6) month settlement period, the tree base as specified in the detail is to be installed.

The tree base is to be maintained in a safe and level condition at all times.

Failure of the tree bases prior to practical completion will require rectification by the installer. This failure equates to any area of the tree base slumping/lifting/cracking or creating a trip hazard.

## 7.6 Pavement rectification

Reinstate and make good to match exactly the surrounding pavement, to the satisfaction and approval of the City of Sydney, all pavement, paving, concrete, brick or other surface damaged or affected by the tree planting and tree base installation works.

Existing materials salvaged from the site must be approved by the City of Sydney for reuse and must match existing pavement.

## 7.7 Tree replacements

Where trees are damaged or die or fail to maintain vigorous growth typical of the species due to neglect or inadequate maintenance, the installer shall replace, replant and maintain trees of the same species, size and quality.



Images above show tree being planted, watering coil being installed and mulched. City of Sydney 2016.

# 8. Street tree protection measures

AS4970-2009 Protection of Trees on Development Sites shall be applied to ensure all trees potentially impacted by construction activity are adequately protected.

The following requirements are general and indicative for typical street work scenarios.

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## 8.1 Staff training and induction

All staff working involved with construction activity near trees must be properly inducted and briefed regarding tree protection prior to working on the site. All inductions shall include a description and identification of the Tree Protection Zones and any restrictions on work and activities related to trees.

The site foreman shall ensure that all staff and contractors are appropriately inducted and that toolbox meetings are conducted regularly to ensure tree protection is maintained and they are aware of the following tree protection requirements.

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## 8.2 Trunk protection

Trunk and major limb protection shall be installed to any tree within 5 metres of the work site prior to any delivery of machinery or works commencing and shall remain in place for the duration of the works.

It shall consist of wrapping of each tree trunk and any major branches within the work area with carpet underlay or similar material to limit damage, then space battens (50mm x 100mm or similar), at 100mm intervals, and fixed against the trunk with tie wire, or strapping. The trunk protection boards shall not be fixed to the tree in any instance, or in any fashion, e.g., no nails or screws are to be used. When protecting irregular trunks or larger branches the length of the protection battens may need to be tailored in length the better work with the bends and shape of the branches.

For smaller and recently planted street trees, the trees may be better protected using temporary fencing panels or suitably positioned water-filled barricades.

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## 8.3 Trenching and excavation near trees

During any trenching or excavation works, the use of mechanical equipment must stop if tree roots greater than 50mm diameter are encountered. Approval must be sought from the City's Street Tree Coordinator (ph 9265 9333) to cut any root greater than 50mm diameter. Excavation shall be done by hand, or other approved non-destructive method, in any area known to, or suspected of having roots larger than 50mm diameter.

All the excavations and trenching within the Structural Root Zones radius of street trees shall be by non-destructive methods only.

Engage an appropriately qualified (AQF5) consulting arborist to supervise or direct works when necessary or specified by the City.

Hand excavation using suitable hand tools is the preferred method of excavation. If water jet and vacuum extraction are employed, the water pressure must be kept as low to minimise the likelihood of damaging the bark surrounding any exposed roots.

All roots greater than 50mm diameter are to be retained. Conduits and services, if required to be installed are to be carefully threaded through and under roots to minimise any root damage and protect the trees.

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## 8.4 Pruning

The Contractor shall not undertake pruning of any branch of any street tree without permission. If pruning or small branches or limbs are required for machinery access, or any other reason, contact the City's Street Tree Coordinator.

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## 8.5 Kerb removal adjacent to trees

Existing sections of kerbs adjacent to any street tree shall not be removed without approval from the Street Tree Coordinator. Removal of kerbs adjacent to mature trees can cause trees to become unstable and fail.

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## 8.6 Signs - tree protection

Temporary signs, or any other items, shall not be fixed or attached to any street tree.

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## 8.7 Stockpiling and storage of materials

Fuel or any type of liquid waste shall not be stored or disposed of in the vicinity of any street tree.

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## 8.8 Damage to trees to be retained

Any damage sustained to any street trees is to be immediately reported to the City's Street Tree Coordinator to determine the appropriate response for maintaining the health and structural integrity of the tree/s.

Should any damage occur to Council's trees and not be rectified by the Contractor to a satisfactory standard, as directed by City's Street Tree Coordinator, the City will undertake the necessary works, which may include the full replacement of trees, and all associated costs will be recovered. Damage to street trees may also result in a prosecution being sought under Sections 626 and 629 of the Local Government Act for an offence where such damage occurred wilfully or negligently.

Significant financial penalties can be imposed for such offences.



Street tree protection. Arterra 2022





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