



EARTHSCAPE HORTICULTURAL SERVICES
Arboricultural, Horticultural and Landscape Consultants

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**ARBORICULTURAL IMPACT
ASSESSMENT REPORT**

**PROPOSED RE-DEVELOPMENT –
BUILDINGS 1 & 2**

**UNIVERSITY OF TECHNOLOGY, SYDNEY
15 BROADWAY, ULTIMO**

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TABLE OF CONTENTS

1	INTRODUCTION.....	3
2	THE SITE	3
3	SUBJECT TREES.....	4
4	HEALTH AND CONDITION ASSESSMENT	4
4.1	Methodology	4
4.2	Safe Useful Life Expectancy (SULE)	4
5	LANDSCAPE SIGNIFICANCE	5
5.1	Methodology for Determining Landscape Significance	5
5.2	Environmental Significance	5
5.3	Heritage Significance	6
5.4	Amenity Value	6
6	TREE RETENTION VALUES.....	6
7	TREE PROTECTION ZONES.....	7
7.2	Structural Root Zone (SRZ)	7
7.3	Acceptable Incursions to the Tree Protection Zone.	7
7.1	Acceptable Incursions to the Canopy.....	7
8	PROPOSED DEVELOPMENT.....	8
9	IMPACT ASSESSMENT	8
10	RECOMMENDED TREE PROTECTION MEASURES	10
10.1	Tree Protection Plan.....	10
10.2	Prohibited Activities.....	10
10.3	Tree Protection Fencing	10
10.4	Trunk Protection.....	11
10.5	Demolition Works within Tree Protection Zones	12
10.6	Excavations within Tree Protection Zones.....	12
10.7	Underground Services	13
10.8	Pavements	13
10.9	Fill Material.....	14
10.10	Canopy & Root Pruning.....	14
10.11	Tree Damage	14
10.12	Tree Removal	14
11	REPLACEMENT PLANTING.....	15
	APPENDIX 1 - CRITERIA FOR ASSESSMENT OF LANDSCAPE SIGNIFICANCE.....	17
	APPENDIX 2 – ACCEPTABLE INCURSIONS TO THE TREE PROTECTION ZONE (TPZ)	18
	APPENDIX 3 – TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE	
	APPENDIX 4 – IMPACT ASSESSMENT SCHEDULE	
	APPENDIX 5 – TREE LOCATION PLAN SHOWING RETENTION VALUES	
	APPENDIX 6 – TREE PROTECTION PLAN	

1 INTRODUCTION

- 1.1.1 This report was commissioned by the University of Technology, Sydney (UTS) to assess the health and condition of twenty-three (23) trees located within or immediately adjacent to the UTS City Campus, 15 Broadway, Ultimo. The report has been prepared to aid in the assessment of a Development Application (DA) for the re-development of Buildings 1 & 2 within the property. The proposed development includes the following works:-
- Site preparation works, including demolition and clearance of existing Building 2 down to approximately ground level and associated tree removal;
 - Retention and re-use of existing basement Level 1 and Level 2;
 - Construction and use of a new podium building fronting Broadway (Building 1 extension and new Building 2);
 - Construction and use of new floors above new Building 2 podium;
 - Public domain improvements surrounding the site;
 - Landscaping works to roof levels;
 - Retention of existing vehicle access and parking arrangements; and
 - Extension and augmentation of physical infrastructure / utilities as required.
- 1.1.2 The Project has been identified by the NSW Department of Planning & Environment as a State Significant Development (SSD) [SSD No. 7382] and is therefore also the subject of an SSD Application and Environmental Impact Assessment (EIS). This report has also been prepared to comply with the Secretary's Environmental Assessment Requirements (SEARS) to aid in the preparation of the EIS.
- 1.1.3 The purpose of this report is to assess the potential impact of the proposed development on the subject trees, together with recommendations for amendments to the design or construction methodology where necessary to minimise any adverse impact. The report also provides recommended tree protection measures to ensure the long-term preservation of the trees to be retained where appropriate. This report includes only those trees in the vicinity of the proposed development, along the Jones Street and Broadway frontages of the Campus.
- 1.1.4 This report has been prepared in accordance with the City of Sydney Council's guidelines for preparation of Arborists Reports as outlined in Schedule 8 of the *Sydney Development Control Plan* (DCP) 2012 and Sections 2.3.2 - 2.3.5 of the Australian Standard for *Protection of Trees on Development Sites* (AS 4970:2009).

2 THE SITE

- 2.1.1 The subject property is a university campus known as Lot 2012 in DP 1183894, being the University of Technology, Sydney (UTS) City Campus, 15 Broadway, Ultimo. For the purposes of this report, the subject property will be referred to as "the Site". The site is zoned Mixed Use (B4) and Broadway (road reserve) is zoned SP2 (Infrastructure – Classified Road) under the *Sydney Local Environmental Plan* (SLEP) 2012. The site contains a number of existing buildings and open space areas comprising the university campus. A number of mature trees stand on the Jones Street and Broadway frontages of the Campus, both within the site and the adjacent road reserve. These include a variety of non-local native and exotic (introduced) species, but are predominantly *Platanus x hybrida* (London Plane tree).
- 2.1.2 Soils of this area have been substantially disturbed and modified for urban development. The original soils of this area are typical of the Gynea Landscape Group (as classified in the Soil Landscapes of the Sydney 1:100,000 Sheet), consisting of "shallow to moderately deep (300 – 1000 mm) *Yellow Earths* and *Earthy Sands* on crests and inside of benches and shallow (< 200 mm) *Siliceous Sands* on leading edges of benches; localised *Gleyed Podzolic Soils* and *Yellow Podzolic Soils* on shale lenses; and shallow to moderately deep (< 1000mm) *Siliceous Sands* and

Leached Sands along Drainage Lines.”¹ Soil materials are derived Hawkesbury Sandstone and may be discontinuous with localised rock outcrop.

- 2.1.3 The original vegetation of this area consisted of open woodland typical of Hawkesbury Sandstone areas, all of which has now been cleared for urban development.² The dominant locally-indigenous tree species formerly found in this area included *Eucalyptus haemastoma* (Scribbly Gum), *Angophora costata* (Sydney Red Gum) and *Corymbia gummifera* (Red Bloodwood). Other species occurring in this vegetation community may include *Eucalyptus sieberi* (Silvertop Ash), *Corymbia eximia* (Yellow Bloodwood), *Eucalyptus punctata* (Grey Gum), *Eucalyptus globoidea* (White Stringybark), *Eucalyptus capitellata* (Brown Stringybark), *Allocasuarina littoralis* (Black She-Oak) and *Banksia serrata* (Old Man Banksia).

3 SUBJECT TREES

- 3.1.1 The subject trees were inspected by Earthscape Horticultural Services (EHS) on the 5th May 2015. Each tree has been provided with an identification number for reference purposes denoted on the attached Tree Location Plan (**Appendix 5**), based on the survey prepared by Rygate & Company Pty Ltd, dated October 2013. The numbers used on this plan correlate with the Tree Assessment Schedule (**Appendix 3**). Tree No.s T14a & T14b were not shown on the original survey and have been plotted on the drawing in their approximate positions. Note that T7 has been removed since the survey was completed.

4 HEALTH AND CONDITION ASSESSMENT

4.1 Methodology

- 4.1.1 An assessment of each tree was made using the Visual Tree Assessment (VTA) procedure.³ All of the trees were assessed in view from the ground. No aerial inspection or diagnostic testing has been undertaken as part of this assessment.
- 4.1.2 The following information was collected for each tree:-
- Tree Species (Botanical & Common Name);
 - Approximate height;
 - Canopy spread; measured using a metric tape and an average taken.
 - Trunk diameter (measured at 1.4 metres from ground level);
 - Live Crown Size; (measured by subtracting the total height of the tree from the lowest point of the crown and multiplying by the average crown spread to give a value in square metres).
 - Health & vigour; using foliage size, colour, extension growth, presence of disease or pest infestation, canopy density, presence of deadwood, dieback and epicormic growth as indicators,
 - Condition; using visible evidence of structural defects, instability, evidence of previous pruning and physical damage as indicators.
 - Suitability of the tree to the site and its existing location; in consideration of damage or potential damage to services or structures, available space for future development and nuisance issues.

This information is presented in a tabulated form in **Appendix 3**.

4.2 Safe Useful Life Expectancy (SULE)

- 4.2.1 The remaining Safe Useful Life Expectancy⁴ of the tree is an estimate of the sustainability of the tree in the landscape, calculated based on an estimate of the average age of the species in an urban area, less its estimated current age. The life expectancy of the tree has been further modified where

necessary in consideration of its current health and vigour, condition and suitability to the site. The estimated SULE of each tree is shown in **Appendix 3**.

4.2.2 The following ranges have been allocated to each tree:-

- Greater than 40 years (Long)
- Between 15 and 40 years (Medium)
- Between 5 and 15 years (Short)
- Less than 5 years (Transient)
- Dead or immediately hazardous (defective or unstable)

5 LANDSCAPE SIGNIFICANCE

5.1 Methodology for Determining Landscape Significance

5.1.1 The significance of a tree in the landscape is a combination of its amenity, environmental and heritage values. Whilst these values may be fairly subjective and difficult to assess consistently, some measure is necessary to assist in determining the retention value of each tree. To ensure in a consistent approach, the assessment criterion shown in **Appendix 1** have been used in this assessment.

5.1.2 A rating has been applied to each tree to give an understanding of the relative significance of each tree in the landscape and to assist in determining priorities for retention, in accordance with the following categories:-

1. **Significant**
2. **Very High**
3. **High**
4. **Moderate**
5. **Low**
6. **Very Low**
7. **Insignificant**

5.2 Environmental Significance

5.2.1 Tree Management Controls

All trees within the City of Sydney Local Government Area (LGA) are protected under Section 3.5.3 of the *Sydney Development Control Plan* (SDCP) 2012, made pursuant to Clause 5.9 (2) of the *Sydney Local Environmental Plan* (SLEP) 2012. The SDCP generally protects all trees of a height of five (5) metres or greater or with a canopy spread of five (5) metres or greater, or trunk diameter of 300mm or greater (measured at ground level) or any tree listed on Council's *Significant Tree Register*. Some exemptions apply. The following trees are exempt (not protected) under the provisions of the City of Sydney Council's DCP:-

Tree No.	Species	Exemption
T10*	<i>Celtis australis</i> (European Nettle Tree)	Less than prescribed dimensions
T16*	<i>Tristanopsis laurina</i> (Water Gum)	Less than prescribed dimensions

* Note that all of these trees are located on Council's nature strip (Road Reserve). Whilst these trees are exempt from SDCP 2012, they are afforded some protection under Section 138 (c) of the *Roads Act* (NSW) 1993 and Section 629 of the *Local Government Act* (NSW) 1993, being located within the adjoining Road Reserve. As such, Council approval is still required prior to the removal of these trees. The remainder of the trees are protected under SDCP 2012.

5.2.2 *Wildlife Habitat*

All of the trees are exotic (introduced) or non-local native species that would be of some benefit to native wildlife. However, none of the trees contain cavities suitable as nesting hollows for arboreal mammals or birds or other visible signs of wildlife habitation.

5.2.3 *Noxious Plants & Environmental Weeds*

None of the trees assessed are scheduled as Noxious Weeds under the meaning of *Noxious Weeds Act* (NSW) 1993.

5.2.4 *Threatened Species & Ecological Communities*

None of the subject trees are listed as Threatened or Vulnerable Species or form part of Endangered Ecological Communities (EECs) under the provisions of the *Threatened Species Conservation Act* 1995 (NSW) or the *Environmental Protection and Biodiversity Conservation Act* 1999.

5.3 Heritage Significance

5.3.1 *Heritage Items*

The site is *not* listed as an item of Environmental Heritage under Part 1, Schedule 5 of the Sydney Local Environmental Plan (SLEP) 2012.

5.3.2 *Heritage Conservation Area*

The site is *not* located within a Heritage Conservation Area under Part 2 of Schedule 5 of the Sydney Local Environmental Plan (SLEP) 2012.

5.3.3 *Significant Tree Register*

None of the subject trees are listed on Council's Register of Significant Trees Volume 2 (Significant Street Trees),⁵ Volume 3 (Significant Trees: Other Government Authorities, Institutional, Religious and Non-government Organisations)⁶ or Volume 4 (Significant Trees under Private Ownership).⁷ None of the trees have and known or suspected heritage significance.

5.4 Amenity Value

5.4.1 Criteria for the assessment of amenity values are incorporated into **Appendix 1**. The amenity value of a tree is a measure of its live crown size, visual appearance (form, habit, crown density), visibility and position in the landscape and contribution to the visual character of an area. Generally the larger and more prominently located the tree, and the better its form and habit, the higher its amenity value.

6 TREE RETENTION VALUES

6.1.1 The Retention Values shown in **Appendix 3** and **Appendix 5** have been determined on the basis of the estimated longevity of the trees and their landscape significance rating, in accordance with **Table One**. Together with guidelines contained in **Section 7** (Tree Protection Zones) this information should be used to determine the most appropriate position of building footprints and other infrastructure within the site, with due consideration to other site constraints, to minimise the impact on trees considered worthy of preservation.

TABLE 1 – TREE RETENTION VALUES – ASSESSMENT METHODOLOGY

	Landscape Significance Rating						
Estimated Life Expectancy	1	2	3	4	5	6	7
Long - Greater than 40 Years	High Retention Value						
Medium- 15 to 40 Years							
Short - 5 to 15 years			Low Ret. Value				
Transient - Less than 5 Years							
Dead or Potentially Hazardous		Very Low Retention Value					

7 TREE PROTECTION ZONES

7.1.1 The Tree Protection Zone (TPZ) is a radial distance measured from the centre of the trunk of the tree as specified in **Appendix 4**. These have been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).⁸

7.1.2 The intention of the TPZ is to ensure protection of the root system and canopy from the potential damage from construction works and ensure the long-term health and stability of each tree to be retained. Incursions to the root zone may occur due to excavations, changes in ground levels, (either lowering or raising the grade), trenching or other forms of soil disturbance such as ripping, grading or inverting the soil profile. Such works may cause damage or loss of part of the root system, leading to an adverse impact on the tree.

7.2 Structural Root Zone (SRZ)

7.2.1 The Structural Root Zone (SRZ) provides the bulk of mechanical support and anchorage for a tree. This is also a radial distance measured from the centre of the trunk as specified in **Appendix 4**. The SRZ has been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).

7.2.2 Incursions within the SRZ are not recommended as they are likely to result in the severance of woody roots which may compromise the stability of the tree or lead to its decline and demise.

7.3 Acceptable Incursions to the Tree Protection Zone.

7.3.1 Where encroachment to the TPZ is unavoidable, an incursion to the TPZ of not exceeding 10% of the area of the TPZ and outside the SRZ may be acceptable. Examples of acceptable incursions are shown in **Appendix 2**. Greater incursions to the TPZ may result in an adverse impact on the tree.

7.3.2 Where incursions greater than 10% of the TPZ are unavoidable, exploratory excavation using non-destructive methods may be required to evaluate the extent of the root system affected and determine whether or not the tree can remain viable.

7.1 Acceptable Incursions to the Canopy.

7.1.1 The removal of a small portion of the crown (foliage and branches) is generally tolerable provided that the extent of pruning required is less than 10% of the total foliage volume of the tree and the removal of branches does not create large wounds or disfigure the natural form and habit of the tree. All pruning cuts must be undertaken in accordance with AS 4373:2007. This generally

involves reduction of the affected branches back to the nearest branch collar at the junction with the parent branch, rather than at an intermediate point. The latter is referred to as “lopping” and is no longer an acceptable arboricultural practice. Generally speaking, the minimum pruning as required to accommodate any proposed works is desirable. Extensive pruning can result in a detrimental impact on tree health and may lead to exposure of remaining branches to wind forces that they were previously sheltered from, leading to a greater risk of branch failure.

- 7.1.2 Clearance to between the building line and canopy should take into account any projecting structures, such as balconies, awnings and the roofline and any requirement for temporary scaffolding to be erected during construction (typically 1-1.5 metres wide). High structures should preferably be located outside the canopy dripline (as shown indicatively on the attached plans) in order to avoid or minimise canopy pruning.

8 PROPOSED DEVELOPMENT

- 8.1.1 The proposed development includes the redevelopment of Tower Buildings 1 & 2 within the property, including the following works:-includes the

- Site preparation works, including demolition of existing Building 2 to approximately ground level and associated tree removal;
- Retention and re-use of basement levels 1 & 2;
- Construction of a new podium level fronting Broadway (extension to Building 1 and new Building 2);
- Construction of new floors above the new Building 2 podium level;
- Public domain improvements surrounding the site;
- Landscape works to roof levels;
- Retention of existing vehicle access and parking arrangements; and
- Extension and augmentation of physical infrastructure and utilities where required.

9 IMPACT ASSESSMENT

- 9.1.1 The intention of this assessment is to determine the incursions to the root zones and canopies created by the proposed development and evaluate the likely impact of the proposed works on the subject trees. Details shown on the following plans were used in this assessment:-

Title	Author	Dwg No.	Date
<i>Site and Location Plan</i>	fjmt	DA 1001 Rev A	05/2016
<i>Ground Plane and Level 4</i>	fjmt	DA 1002 Rev A	05/2016
<i>Demolition Plans (Levels 1-8)</i>	fjmt	DA 2010 - 2017 Rev A	05/2016
<i>Proposed Plans (Levels 1-17)</i>	fjmt	DA 2110 - 2126 Rev A	05/2016
<i>Roof Level</i>	fjmt	DA 2127 Rev A	05/2016
<i>Elevations</i>	fjmt	DA 3010 - 3013 Rev A	05/2016
<i>Sections</i>	fjmt	DA 3014 – 3016 Rev A	05/2016
<i>Landscape Site Plan</i>	fjmt	DA 6010 Rev A	04/2016
<i>Landscape – Level 4</i>	fjmt	DA 6011 Rev A	04/2016
<i>Landscape Sections</i>	fjmt	DA 6014 Rev A	04/2016

- 9.1.2 A summary of the impact of the proposed development on each tree within the site is shown in **Appendix 5**. The following criteria have been examined as part of this assessment:-
- Existing Relative Levels (R.L.);
 - Tree Protection Zone (TPZ);
 - Structural Root Zone (SRZ);
 - Footprint and envelope of the proposed development and temporary structures (scaffolding, hoardings etc);
 - Incursions to the TPZ & SRZ, including estimated cut & fill beyond the building footprint;
 - Incursions to the tree canopy from the building envelope and temporary structures; and
 - Assessment of the likely impact of the works on existing trees.
- 9.1.3 The proposed development will necessitate the removal of three (3) trees of low retention value. These include Tree No.s T5 & T6 (London Plane trees) & T16 (Water Gum). None of these trees are considered significant or worthy of special measures to ensure their preservation. It should be noted that T16 is located on Council's nature strip. This tree should be replaced in accordance with Section 11.
- 9.1.4 The proposed development will also necessitate the removal of nine (9) trees of moderate retention value. These include Tree No.s T4, T8 & T13 (London Plane trees), T4a & T14b (English Yew), T17 (Brushbox) and T18, T19 & T20 (Chinese Elm). These trees are not considered significant, but are in good health and condition and make a fair contribution to the amenity of the site and surrounding properties. It should be noted that T8 and T17 are located within the adjacent road reserve (nature strip). In order to compensate for loss of amenity resulting from the removal of these trees to accommodate the proposed development, consideration should be given to replacement planting within the site in accordance with Section 11.
- 9.1.5 The proposed development will also necessitate the removal of six (6) trees of high retention value. These include Tree No.s T1, T2, T3, T11, T12 & T14 (all London Plane trees). These trees have no special ecological or heritage significance, but are all in good health and condition and make a positive contribution to the amenity of the site, streetscape and surrounding properties. It should be noted that trees T1, T2, T3 & T11 are located within the adjacent road reserve. Amendments to the design to permit the retention of these trees are not considered feasible in this instance due to the position of the trees relative to the existing basement and the extent of demolition required to basement level in close proximity to the trees. Trees T1, T2 & T3 stand within 1 metre of the existing basement wall and Trees T12 & T14 are located directly over the top of the existing basement. The proximity of the new building would require substantial canopy pruning to clear the building envelope and temporary scaffolding. It is understood that the scaffold may need to extend 3-5 metres from the building to facilitate construction of the curved building façade. In order to compensate for loss of amenity resulting from the removal of these trees to accommodate the proposed development, consideration should be given to replacement planting within the site and nature strip in accordance with Section 11.
- 9.1.6 The existing building and pavements are proposed to be demolished within the TPZ of T15 (a Brushbox on the nature strip) and T10 (European Nettle Tree on the nature strip). This work should not result in any adverse impact on these trees provided that all demolition works within the TPZ are undertaken in accordance with Section 10.5 and all excavations for any new pavement sub-grade within the TPZ is undertaken in accordance with Section 10.6.
- 9.1.7 No other trees will be adversely affected by the proposed development.

10 RECOMMENDED TREE PROTECTION MEASURES

10.1 Tree Protection Plan

10.1.1 The following Tree Protection Measures should be read in accordance with the Tree Protection Plan (**Appendix 6**). The Tree Protection Plan (TPP) indicates the position of tree protection devices and other recommended measures to ensure the protection of trees within the site to be retained as part of the proposed development.

10.2 Prohibited Activities

10.2.1 The following activities should be avoided within specified Tree Protection Zones (refer **Appendix 4 & 6** for extent of the TPZ for each tree):-

- Excavations and trenching (with exception of the approved remediation works, underground services, building foundations or pavement sub-grade);
- Soil disturbance, surface grading, compaction, tining, ripping or cultivation of soil;
- Mechanical removal of vegetation, including extraction of tree stumps;
- Soil level changes including the placement of fill material (excluding imported validated fill for remediation works or placement of fill for approved works)
- Movement and storage of plant, equipment & vehicles (except within defined temporary haul roads, where ground protection has been installed, or within the footprint of existing floor slabs or paved areas);
- Erection of site sheds (except where approved by the site arborist);
- Affixing of signage, barricades or hoardings to trees;
- Storage of building materials, waste and waste receptacles;
- Stockpiling of spoil or fill;
- Stockpiling of bulk materials, such as soil, sand, gravel, roadbase or the like;
- Stockpiling of demolition waste;
- Disposal of waste materials and chemicals including paint, solvents, cement slurry, fuel, oil and other toxic liquids;
- Other physical damage to the trunk or root system; and
- Any other activity likely to cause damage to the tree.

10.3 Tree Protection Fencing

10.3.1 All trees within the site to be retained shall be protected prior to and during construction from all activities that may result in detrimental impact by erecting a suitable protective fence beneath the canopy to the full extent of the Tree Protection Zone, excluding the footprint of the proposed works and areas within adjoining properties, as indicated on the Tree Protection Plan. As a minimum, the fence should consist of temporary chain wire panels of 1.8 metres in height, supported by steel stakes as required and fastened together and supported to prevent sideways movement using corner braces where required. The fence shall be erected prior to the commencement of any work on-site and shall be maintained in good condition for the duration of construction. Where tree protection zones merge together a single fence encompassing the area is deemed to be adequate. Existing site boundary fences may form part of the enclosure.

10.3.2 Appropriate signage shall be installed on the fencing to prevent unauthorised movement of plant and equipment or entry to the Tree Protection Zone.

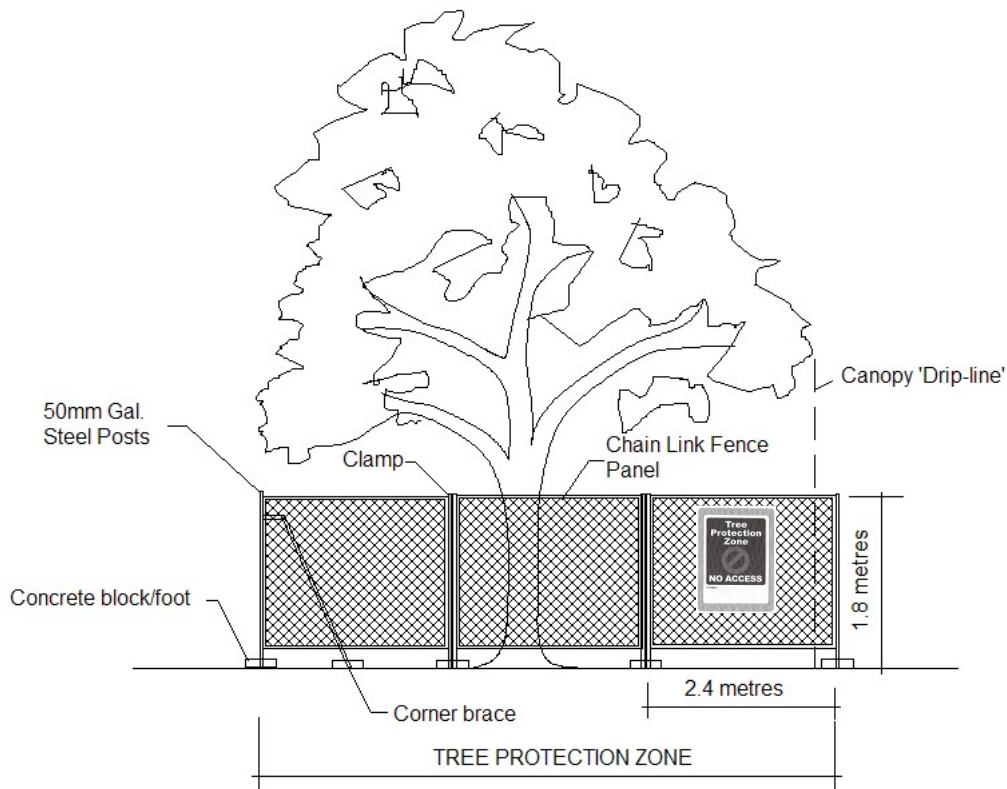


Figure 1 – Detail of Tree Protection Fence

- 10.3.3 Signs shall be installed on the Tree Protection Fence to prevent unauthorised movement of plant and equipment or entry to the Tree Protection Zone. The signs shall be securely attached to the fence using cable ties or equivalent. Signs shall be placed at minimum 10 metre intervals. The wording and layout of the sign shall comply with AS 4970-2009 as shown in **Figure 2**.

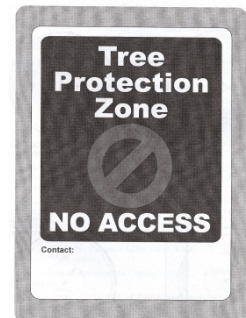


Figure 2 – Detail of Tree Protection Sign

10.4 Trunk Protection

- 10.4.1 Where provision of tree protection fencing is impractical due to its proximity to the proposed building footprint, trunk protection shall be erected around nominated trees to avoid accidental damage, as indicated on the Tree Protection Plan (**Appendix 6**). The trunk protection shall consist of a layer of carpet underfelt (or similar) wrapped around the trunk, followed by 1.8 metre lengths of softwood timbers (90 x 45mm in section) aligned vertically and spaced evenly around the trunk at 150mm centres (i.e. with a 50mm gap) and secured together with 2mm galvanised wire or galvanised hoop strap as shown in **Figure 3**. Recycled timber (such as demolition waste) may be suitable for this purpose, subject to the approval of the Project Arborist. The timbers shall be wrapped around the trunk (over the carpet underfelt), but not fixed to the tree to avoid mechanical injury or damage to the trunk. Trunk protection should be installed prior to any site works and maintained in good condition for the duration of the construction period. Carpet underfelt (alone) is sufficient for trees with a trunk diameter of less than 200mm.



Figure 3 – Detail of Trunk Protection

10.5 Demolition Works within Tree Protection Zones

- 10.5.1 Demolition of paved areas within the Tree Protection Zones of trees to be retained shall be undertaken under the supervision of the Site Arborist. The pavement surface and sub-base within the TPZ shall be gradually removed in layers of no greater than 50mm thick using a small rubber tracked excavator or alternative approved method to avoid damage to underlying roots and minimise disturbance and compaction of the underlying soil profile. The machine shall work within the footprint of the existing paved surfaces to avoid compaction of the underlying soil. The final layer of sub-base material shall be removed using hand tools were required to avoid compaction of the underlying soil profile and damage to woody roots.
- 10.5.2 Following removal of the pavement surface and sub-base, clean, friable topsoil shall be used to fill in the excavated area and bring flush with surrounding levels within new landscape areas. Soil shall only be imported and spread when the underlying soil conditions are dry to avoid compaction of the soil profile. Where there is insufficient recovered site topsoil for this purpose, any imported material shall be free of rocks, vegetation, heavy clay or other extraneous matter. Any imported soil material should be similar in texture to the existing site topsoil.
- 10.5.3 Demolition of existing walls, kerbs and other structures within the Tree Protection Zone of trees to be retained shall be undertaken under the supervision of the Site Arborist. The structures shall be demolished using equipment on stationed outside the TPZ where possible or within the footprint of existing hardstand areas. Care shall be taken to avoid the root systems, trunks and lower branches of trees in the vicinity of the structures during demolition works, with special attention required during demolition of the footings and other sub-surface members to avoid damage to woody roots.

10.6 Excavations within Tree Protection Zones

- 10.6.1 Prior to any mechanical excavations for building foundations or pavement sub-grade within the Tree Protection Zone of all trees nominated for retention, exploratory excavation using non-destructive techniques shall be taken along the perimeter of the structure or pavement within the TPZ. Non-destructive excavation techniques may include the use of hand-held implements, air pressure (using an Air-spade® device) or water pressure. The exploratory excavation shall be undertaken along the perimeter of the foundation or pavement (within the TPZ) to the depth of the foundation or to a maximum of 800mm from surface levels, to locate and expose any woody roots prior to any mechanical excavation. All care shall be undertaken to preserve woody roots intact

and undamaged during exploratory excavation. Any roots encountered of less than 50mm in diameter may be cleanly severed with clean sharp pruning implements at the face of the excavation. The root zone in the vicinity of the excavation shall be kept moist following excavation for the duration of construction to minimise moisture stress on the tree.

- 10.6.2 Where large woody roots (greater than 50mm diameter) are encountered during exploratory excavations, further advice from a qualified arborist shall be sought prior to severance. Where necessary, (to avoid severing large woody roots) consideration should be given to the installation of an elevated structure (e.g. pier and beam footing, suspended slab or floor supported on piers, cantilevered slab, up-turned edge beam etc) in preference to structures requiring a deep edge beam or continuous perimeter strip footing. The beam section of any pier and beam footing should be placed **above** grade to avoid excavation within the SRZ. Pier footings intersecting large woody roots should be slightly offset where necessary to avoid root severance.
- 10.6.3 For masonry walls or fences it may be acceptable to delete continuous concrete strip footings and replace with suspended in-fill panels (eg steel or timber pickets, lattice etc) fixed to pillars. For paved areas, consideration should be given to raising the proposed pavement level and using a porous fill material in preference to excavation where large woody roots are found within the sub-base.

10.7 Underground Services

- 10.7.1 All proposed stormwater lines and other underground services should be located outside TPZs of trees proposed to be retained wherever possible or installed by alternative measures. Alternative measures include suspending pipelines beneath the floor of a building or structure (to avoid excavation with the TPZ), non-destructive excavation methods or Horizontal Directional Drilling (HDD). Where the installation of service lines within TPZs is unavoidable, the pipelines or conduits should be installed as follows.
- 10.7.2 Where the extent of the incursion to the root zone is less than 10% of the TPZ including any excavations for benching and shoring the trench, the pipeline or conduit may be installed by open trenching using standard construction methods (excavator or trenching machine). 10% of the TPZ is equivalent to one-third of the TPZ radius on one side (refer to **Appendix 2**). Refer to **Appendix 4** for radial distances of TPZs for each tree.
- 10.7.3 Where the extent of the incursion to the root zone exceeds 10% of the TPZ, but is outside the SRZ, non-destructive excavation methods must be adopted in accordance with **Section 10.6**. Where large woody roots are encountered during excavation or trenching (root diameter greater than 50mm), these shall be retained intact wherever possible (e.g. by tunnelling beneath roots and inserting the pipeline or conduit beneath or re-routing the service etc). Where this is not practical and root pruning is the only alternative, proposed root pruning should be assessed by a qualified arborist [AQF 5] to evaluate the potential impact on the health and stability of the subject tree.
- 10.7.4 Excavations required for underground services within the Structural Root Zone of any tree to be retained should only be undertaken by sub-surface boring (Horizontal Directional Drilling). The Invert Level of the pipe, plus the pipe diameter, must be lower than the estimated root zone depth as specified. At this site a minimum depth of 1 metre to the invert level of the pipe is specified.

10.8 Pavements

- 10.8.1 Pavements should be avoided within the Tree Protection Zone of trees to be retained where possible. Proposed paved areas within the Tree Protection Zone of trees to be retained should be placed above grade to minimise excavations within the root zone and avoid root severance and damage. Pavement sub-base material should be as per Section 10.10.

10.9 Fill Material

- 10.9.1 Placement of fill material within the Tree Protection Zone of trees to be retained should be avoided wherever possible. Where placement of fill is unavoidable, the material should be a well-drained friable material, equivalent in texture to the existing site topsoil material. The fill should be free from rocks, vegetation and other extraneous material. The fill may be consolidated but should not be compacted to engineering standards. No fill material should be placed in direct contact with the trunk.
- 10.9.2 Where placement of fill is required for pavement sub-grade is required within TPZs of trees to be retained, a coarse, gap-graded material such as 20 – 50mm crushed basalt (Blue Metal) or equivalent shall be used to provide some aeration to the root zone. Note that Roadbase or crushed sandstone or other material containing a high percentage of fines is unacceptable for this purpose. The fill material should be consolidated with a non-vibrating roller to minimise compaction of the underlying soil. A permeable geotextile may be used beneath the sub-base to prevent migration of the stone into the sub-grade.

10.10 Canopy & Root Pruning

- 10.10.1 All canopy pruning work required shall be carried out in accordance with Australian Standard 4373-2007 – Pruning of Amenity Trees. Written approval from Council may be required under the Tree Preservation Order prior to undertaking this work. All pruning work shall be carried out by a qualified and experienced arborist or tree surgeon [Australian Qualification Framework Level 3] in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998). No branches of greater than 100mm in diameter should be removed or pruned without further advice from a Consulting Arborist [Australian Qualification Framework Level 5].
- 10.10.2 Where root pruning is required, roots shall be severed with clean, sharp pruning implements and retained in a moist condition during the construction phase using Hessian material or mulch where practical. Severed roots shall be treated with a suitable root growth hormone containing the active constituents Indol-3-yl-Butric Acid (IBA) and 1-Naphthylacetic Acid (NAA) to stimulate rapid regeneration of the root system.

10.11 Tree Damage

- 10.11.1 Care shall be taken when operating cranes, drilling rigs and similar equipment near trees to avoid damage to tree canopies (foliage and branches). Under no circumstances shall branches be torn-off by construction equipment. Where there is potential conflict between tree canopy and construction activities, the advice of the Site Arborist must be sought.
- 10.11.2 In the event of any tree becoming damaged for any reason during the construction period a consulting arborist [Australian Qualification Framework Level 5] shall be engaged to inspect and provide advice on any remedial action to minimise any adverse impact. Such remedial action shall be implemented as soon as practicable and certified by the arborist.

10.12 Tree Removal

- 10.12.1 The approval of City of Sydney Council shall be obtained prior to the removal or pruning of any tree protected under the Tree Preservation Order.
- 10.12.2 Tree removal work shall be carried out by an experienced tree surgeon in accordance with the NSW WorkCover Code of Practice for the Amenity Tree Industry (1998). Care shall be taken to avoid damage to other trees during the felling operation.

10.12.3 Stumps located within the TPZs of trees to be retained shall be grubbed-out where required using a mechanical stump grinder (or by hand where less than 150mm in diameter) without damage to the root system of other trees. Where trees to be removed are within the SRZ of any trees to be retained, consideration should be given to cutting the stump close to ground level and retaining the root crown intact. Stumps within the Tree Protection Zone of other trees to be retained shall **not** be pulled out using excavation equipment or similar.

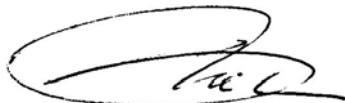
11 REPLACEMENT PLANTING

11.1.1 Where trees are proposed to be removed to accommodate the proposed development, consideration should be given to planting new trees within appropriate areas of the site in order to compensate for loss of amenity in accordance with Council's Tree Management Policy and the SDCP. Section 3.5.2 of the SDCP specifies that a minimum of 15% canopy coverage of the site should be achieved within ten (10) years of the completion of the development.

11.1.2 The following species are appropriate to the site conditions and could be considered for replacement planting:-

- *Melaleuca stypheliodes* (Prickly Paperbark)
- *Acmena smithii* (Lillypilly)
- *Syzygium paniculatum* (Magenta Cherry)
- *Syzygium leuhmannii* (Small-leaf Lillypilly)
- *Elaeocarpus reticulatus* (Blueberry Ash)
- *Lophostemon confertus* (Brushbox)
- *Harpulia pendula* (Tulipwood)
- *Jacaranda mimosifolia* (Jacaranda)
- *Fraxinus griffithii* (Evergreen Ash)
- *Magnolia grandiflora* (Bullbay Magnolia)
- *Waterhousea floribunda* (Weeping Lillypilly)
- *Tristanopsis laurina* (Water Gum).

11.1.3 Any trees to be removed that stand within the adjoining road reserve (nature strip area) should be replaced in accordance with Council's Street Tree Master Plan (SSTMP) 2011. The prescribed species for Jones Street is *Lophostemon confertus* (Brushbox) [refer to Precinct 14 – Ultimo, SSTMP] and the prescribed species for Broadway is *Celtis australis* (European or Southern Hackberry) [refer to Precinct 13 – Chippendale, SSTMP]. The landscape plan indicates six (6) new *Celtis australis* (European or Southern Hackberry) to be planted on Broadway and three (3) new *Lophostemon confertus* (Brushbox) to be planted in Jones Street. Further tree planting will also be undertaken in Jones Street as part of future public domain upgrade works in this area.



Andrew Morton
EARTHSCAPE HORTICULTURAL SERVICES
29th April 2016

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- ³ Mattheck, Dr. Claus & Breloer, Helge (1994) – Sixth Edition (2001)
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The Stationery Office, London, England
- ⁴ Barrell, Jeremy (1996)
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Proceedings of the International Conference on Trees and Building Sites (Chicago)
International Society of arboriculture, Illinois, USA
- ⁵ Ruting, Noel (November 2005)
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- ⁶ Ruting, Noel (November 2005)
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- ⁷ Ruting, Noel (November 2005)
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Landarc Pty Ltd & the Council of the City of Sydney, Sydney NSW
- ⁸ Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney

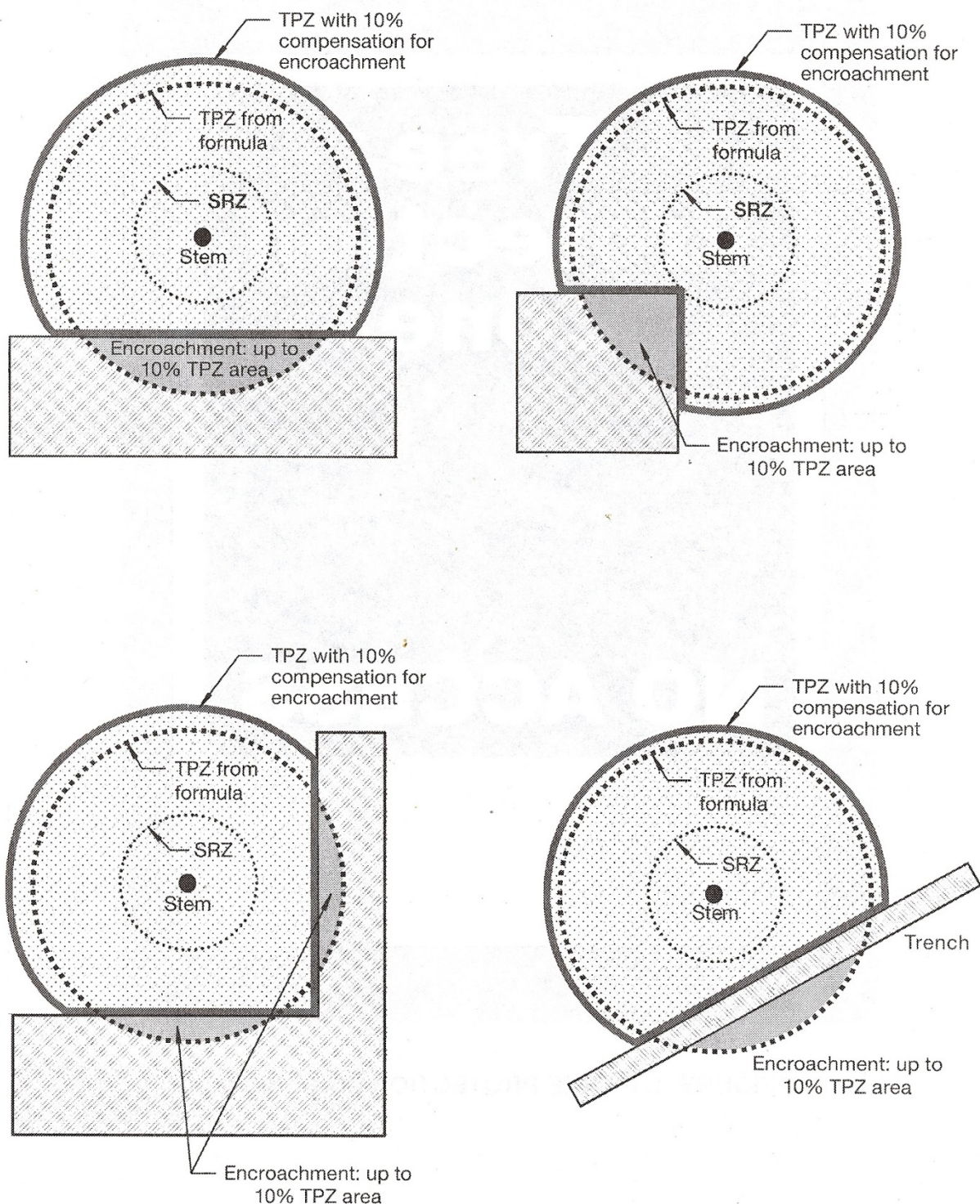
APPENDIX 1 - CRITERIA FOR ASSESSMENT OF LANDSCAPE SIGNIFICANCE

RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
1. SIGNIFICANT	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed on Council's Significant Tree Register	The subject tree is scheduled as a Threatened Species as defined under the Threatened Species Conservation Act 1995 (NSW) or the Environmental Protection and Biodiversity Conservation Act 1999	The subject tree has a very large live crown size exceeding 300m ² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species
	The subject tree forms part of the curtilage of a Heritage Item (building /structure /artefact as defined under the LEP) and has a known or documented association with that item	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event	The subject tree is a Remnant Tree, being a tree in existence prior to development of the area	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
2. VERY HIGH	The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally-indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 200m ² ; a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area
3. HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence	The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value	The subject tree has a large live crown size exceeding 100m ² ; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% (normal); The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area
4. MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting.	The subject tree is a non-local native or exotic species that is protected under the provisions of this DCP.	The subject tree has a medium live crown size exceeding 40m ² ;The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crown density of more than 50% (thinning to normal); and
			The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.
5. LOW	The subject tree detracts from heritage values or diminishes the value of a heritage item	The subject tree is scheduled as exempt (not protected) under the provisions of this DCP due to its species, nuisance or position relative to buildings or other structures.	The subject tree has a small live crown size of less than 40m ² and can be replaced within the short term (5-10 years) with new tree planting
6. VERY LOW	The subject tree is causing significant damage to a heritage Item.	The subject tree is listed as an Environment Weed Species in the relevant Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).
7. INSIGNIFICANT	The tree is completely dead and has no visible habitat value	The tree is a declared Noxious Weed under the Noxious Weeds Act (NSW) 1993 within the relevant Local Government Area.	The tree is completely dead and represents a potential hazard.

Ref:- Morton, A (2006) **Determining the Retention Value of Trees on Development Sites**

TreeNet - Proceedings of the 7th National Street Tree Symposium 2006 Government of South Australia Department for Transport, Energy and Infrastructure

APPENDIX 2 – ACCEPTABLE INCURSIONS TO THE TREE PROTECTION ZONE (TPZ)



NOTE: Less than 10% TPZ area and outside SRZ. Any loss of TPZ compensated for elsewhere.

REF:- Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
 Standards Australia, Sydney

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m ²)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
1	<i>Platanus x hybrida</i> (London Plane)	15	16	567	208	M	Appears stable with sound branching structure. Exhibits a prominent lean to the SE. Surrounded by asphalt pavement.	Selectively pruned.	Good	Low foliar insect infestation (Sycamore Lace Bug)	Long - more than 40 years	2	High	Nature strip
2	<i>Platanus x hybrida</i> (London Plane)	16	16	420	192	SM	Appears stable with sound branching structure. Exhibits a prominent lean to the SE. Surrounded by asphalt pavement. Close to masonry wall/retaining wall. Crown suppressed on east side due to crowding. Exhibits minor dieback with 5% deadwood & 5% epicormic growth.	Deadwooded	Good	Low foliar insect infestation (Sycamore Lace Bug)	Long - more than 40 years	3	High	Nature strip
3	<i>Platanus x hybrida</i> (London Plane)	12	16	532	144	M	Appears stable with sound branching structure. Exhibits a prominent lean to the SE. Surrounded by asphalt pavement. Close to existing bus shelter (20mm clearance between roof and primary limb).	Selectively pruned & deadwooded	Good	Low foliar insect infestation (Sycamore Lace Bug)	Long - more than 40 years	3	High	Nature strip
4	<i>Platanus x hybrida</i> (London Plane)	9	10	274	60	SM	Appears stable with sound branching structure. Crown suppressed on north side due to crowding. Exhibits minor dieback with 5% deadwood. Surrounded by granite pavement.	Selectively pruned.	Fair	Low foliar insect infestation (Sycamore Lace Bug)	Medium 15-40 Years	4	Moderate	On-site
5	<i>Platanus x hybrida</i> (London Plane)	7	8	210	32	SM	Appears stable with fair branching structure. Exhibits a prominent lean to the south. Exhibits some dieback with 15% deadwood	Deadwooded	Fair with thinning crown	Low foliar insect infestation (Sycamore Lace Bug)	Short 5-15 Years	4	Low	On-site
6	<i>Platanus x hybrida</i> (London Plane)	7	8	188	24	SM	Appears stable with fair branching structure. Exhibits some dieback with 5% deadwood & 5% epicormic growth.	Selectively pruned	Fair with slightly thinning crown	Low foliar insect infestation (Sycamore Lace Bug)	Short 5-15 Years	4	Low	On-site
8	<i>Platanus x hybrida</i> (London Plane)	11	13	344	104	SM	Appears stable with sound branching structure.	Selectively pruned	Good	Low foliar insect infestation (Sycamore Lace Bug)	Long - more than 40 years	4	Moderate	On-site

		APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE												
Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m ²)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
10	<i>Celtis australis</i> (European Nettle Tree)	3	2	60	4	I	Appears stable with sound branching structure.	Crown lifted to 1 metre	Good	No Evidence	Long - more than 40 years	5	Moderate	On-site
11	<i>Platanus x hybrida</i> (London Plane)	15	14	392	182	SM	Appears stable with sound branching structure.	Crown lifted to 4 metres	Very Good	Low foliar insect infestation (Sycamore Lace Bug)	Long - more than 40 years	3	High	Nature strip
12	<i>Platanus x hybrida</i> (London Plane)	20	20	732	340	M	Appears stable with sound branching structure. Crown suppressed on the NW side due to crowding.	Selectively pruned & deadwooded	Good	Low foliar insect infestation (Sycamore Lace Bug)	Long - more than 40 years	2	High	On-site
13	<i>Platanus x hybrida</i> (London Plane)	19	13	500	182	M	Appears stable with fair branching structure. Exhibits a moderate, partly welded bark inclusion at 3 metres at junction of co-dominant primary limbs. Crown suppressed on SE & NW sides due to crowding. 5% deadwood.	No Evidence	Good	Low foliar insect infestation (Sycamore Lace Bug)	Medium 15-40 Years	3	Moderate	On-site
14	<i>Platanus x hybrida</i> (London Plane)	20	20	682	340	M	Appears stable with sound branching structure. Crown suppressed on the SE side due to crowding.	Deadwooded	Good	Low foliar insect infestation (Sycamore Lace Bug)	Long - more than 40 years	2	High	On-site
14a	<i>Taxus baccata</i> (English Yew)	7	5	170 + 120x2	25	SM	Appears stable with fair branching structure. Exhibits a high bark inclusion at GL.	Crown lifted to 1 metre	Good	No Evidence	Long - more than 40 years	5	Moderate	On-site
14b	<i>Taxus baccata</i> (English Yew)	5	5	90x3 + 70x2	17.5	SM	Appears stable with sound branching structure.	Crown lifted to 1 metre	Very Good	No Evidence	Long - more than 40 years	5	Moderate	On-site
15	<i>Lophostemon confertus</i> (Brushbox)	7	6	325	24	SM	Appears stable with sound branching structure. Multiple moderate occluded wounds at GL-3 metres due to vehicle injury.	Tertiary limbs pruned to clear powerlines	Good	Moderate Myrtle Rust infection	Long - more than 40 years	4	Moderate	Nature strip
16	<i>Tristaniopsis laurina</i> (Water Gum)	3.5	3	140	3	I	Appears stable with poor branching structure. Exhibits a high bark inclusion at 1 metre. Multiple moderate wounds at 1-2 metres due to branch loss with decay evident.	Crown lifted to 2 metres	Fair	Moderate borer infestation	Short 5-15 Years	5	Low	Nature strip

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m ²)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
17	<i>Lophostemon confertus</i> (Brushbox)	5	4	140	12	I	Appears stable with sound branching structure.	Crown lifted to 2 metres. Previously topped at 4 metres to clear powerlines	Very Good	No Evidence	Long - more than 40 years	5	Moderate	Nature strip
18	<i>Ulmus parvifolia</i> (Chinese Elm)	5	5	150	25	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	Moderate	On-site
19	<i>Ulmus parvifolia</i> (Chinese Elm)	5	5	150	25	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	Moderate	On-site
20	<i>Ulmus parvifolia</i> (Chinese Elm)	5	5	150	25	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	Moderate	On-site
21	<i>Ulmus parvifolia</i> (Chinese Elm)	5	5	150	25	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	Moderate	On-site
22	<i>Ulmus parvifolia</i> (Chinese Elm)	5	5	150	25	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	Moderate	On-site
23	<i>Ulmus parvifolia</i> (Chinese Elm)	5	5	150	25	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	Moderate	On-site

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m ²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
1	<i>Platanus x hybrida</i> (London Plane)	M	8.5	2.6	227.0	Existing courtyard and associated retaining wall offset 3.3 metres NW to be demolished to basement level. Existing basement on boundary (offset 0.6 metres NW). Demolition works within SRZ. Proposed new building offset 2.3 metres NW. Excavations for building foundations within SRZ. Substantial canopy pruning required to clear building envelope and temporary scaffolding.	Proposed works will necessitate removal (High Retention Value). There are no feasible alternative that would permit the retention of this tree given the proximity of the existing basement and proximity of the new building.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
2	<i>Platanus x hybrida</i> (London Plane)	M	8.0	2.3	201.0	Existing courtyard and associated retaining wall offset 2.1 metres NW to be demolished to basement level. Existing basement on boundary (offset 0.4 metres NW). Demolition works within SRZ. Proposed new building offset 1.9 metres NW. Excavations for building foundations within SRZ. Substantial canopy pruning required to clear building envelope and temporary scaffolding.	Proposed works will necessitate removal (High Retention Value). There are no feasible alternative that would permit the retention of this tree given the proximity of the existing basement and proximity of the new building.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
3	<i>Platanus x hybrida</i> (London Plane)	M	8.0	2.5	199.8	Existing steps and associated retaining walls offset 3.7 metres NW to be demolished to basement level. Existing basement on boundary (offset 0.7 metres north). Demolition works within SRZ. Proposed new building offset 2.2 metres NE. Excavations for building foundations within SRZ. Substantial canopy pruning required to clear building envelope and temporary scaffolding.	Proposed works will necessitate removal (High Retention Value). There are no feasible alternative that would permit the retention of this tree given the proximity of the existing basement and proximity of the new building.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
4	<i>Platanus x hybrida</i> (London Plane)	M	6.0	1.9	113.0	Located within footprint of proposed building.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m ²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
5	<i>Platanus x hybrida</i> (London Plane)	M	4.5	1.7	63.6	Located within footprint of proposed building.	Proposed works will necessitate removal.	Remove tree.
6	<i>Platanus x hybrida</i> (London Plane)	M	4.5	1.6	63.6	Located within footprint of proposed building.	Proposed works will necessitate removal.	Remove tree.
8	<i>Platanus x hybrida</i> (London Plane)	M	8.0	2.1	201.0	Existing pavements to be demolished to existing basement level (offset 0.9 metres north) within SRZ. Proposed new entry stairs offset 4.1 metres north.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
10	<i>Celtis australis</i> (European Nettle Tree)	M	1.5	1.0	7.1	New street pavement treatment within TPZ.	No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fence in accordance with Section 10.3. Undertake all demolition works within TPZ in accordance with Section 10.5 and all excavations for new pavement sub-grade in accordance with Section 10.6.
11	<i>Platanus x hybrida</i> (London Plane)	M	7.0	2.2	153.9	Existing pavements to be demolished to existing basement level (offset 4.1 metres north) within TPZ. Existing pavement within TPZ to be demolished & new pavement installed at similar level. Substantial canopy pruning required to clear building envelope and temporary scaffolding.	Proposed works will necessitate removal (High Retention Value).	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
12	<i>Platanus x hybrida</i> (London Plane)	M	11.0	2.9	379.1	Existing landscape area to be demolished over top existing basement (tree located over existing basement).	Proposed works will necessitate removal (High Retention Value).	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m ²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
13	<i>Platanus x hybrida</i> (London Plane)	M	7.5	2.5	176.6	Existing landscape area to be demolished over top existing basement (tree located over existing basement).	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
14	<i>Platanus x hybrida</i> (London Plane)	M	10.2	2.8	328.2	Existing landscape area to be demolished over top existing basement (tree located over existing basement).	Proposed works will necessitate removal (High Retention Value).	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
14a	<i>Taxus baccata</i> (English Yew)	M	3.6	1.8	40.7	Located within footprint of proposed building.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
14b	<i>Taxus baccata</i> (English Yew)	M	2.7	1.6	22.9	Located within footprint of proposed building.	Proposed works will necessitate removal.	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
15	<i>Lophostemon confertus</i> (Brushbox)	M	4.9	2.1	74.6	Exiting building offset 3.6 metres NE to be demolished to basement levels. Proposed new building offset 6.5 metres east (no encroachment to TPZ. Existing pavements within TPZ to be demolished and new pavement installed within TPZ.	No adverse impact provided that all demolition works within TPZ and all excavations for new pavement sub-grade within TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Trunk Protection in accordance with Section 10.3.
16	<i>Tristaniaopsis laurina</i> (Water Gum)	M	2.1	1.4	13.9	Existing pavements within TPZ to be demolished and new pavement installed within TPZ.	Proposed to be removed to accommodate new landscape works	Remove tree.
17	<i>Lophostemon confertus</i> (Brushbox)	M	2.4	1.4	18.1	Existing pavements within TPZ to be demolished and new pavement installed within TPZ.	Proposed to be removed to accommodate new landscape works	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
18	<i>Ulmus parvifolia</i> (Chinese Elm)	M	3.4	1.5	36.3	Located within footprint of proposed building.	Proposed works will necessitate removal	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
19	<i>Ulmus parvifolia</i> (Chinese Elm)	M	4.4	1.5	60.8	Located within footprint of proposed building.	Proposed works will necessitate removal	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
20	<i>Ulmus parvifolia</i> (Chinese Elm)	M	5.4	1.5	91.6	Located within footprint of proposed building.	Proposed works will necessitate removal	Undertake replacement planting elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
21	<i>Ulmus parvifolia</i> (Chinese Elm)	M	6.4	1.5	128.6	No encroachment to TPZ	No adverse impact	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Trunk Protection in accordance with Section 10.3.
22	<i>Ulmus parvifolia</i> (Chinese Elm)	M	7.4	1.5	171.9	No encroachment to TPZ	No adverse impact	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Trunk Protection in accordance with Section 10.3.
23	<i>Ulmus parvifolia</i> (Chinese Elm)	M	8.4	1.5	221.6	No encroachment to TPZ	No adverse impact	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Trunk Protection in accordance with Section 10.3.



APPENDIX 5
TREE LOCATION PLAN SHOWING
TREE RETENTION VALUES
 University of Technology, Sydney (UTS)
 15 Broadway, ULTIMO, NSW



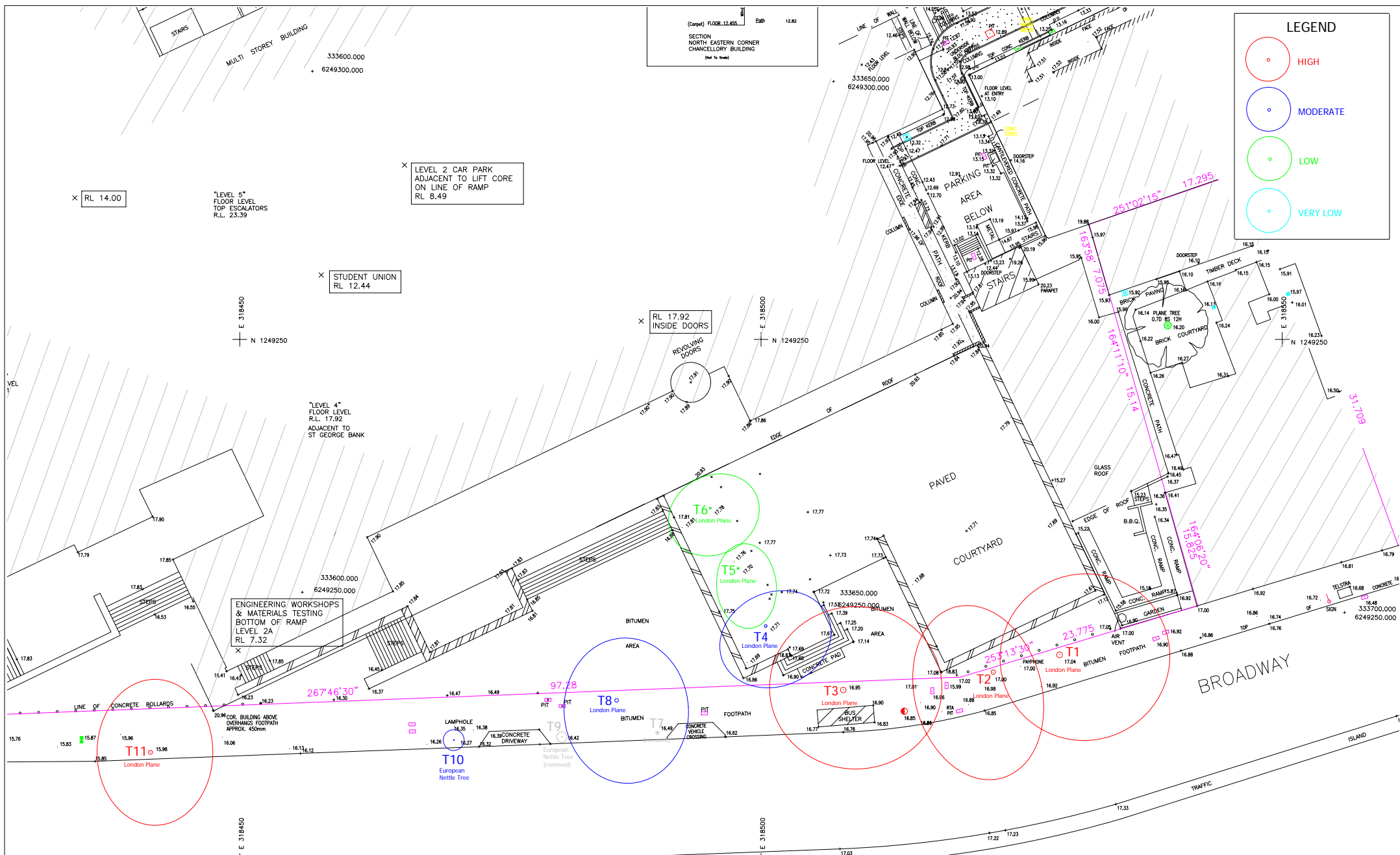
Earthscape Horticultural Services
 Arboricultural and Horticultural Consultants
 PO Box 364
 BEROWRA NSW 2081
 Ph: 02 9456 4787
 Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
 prepared by Rygate & Company Pty Ltd.
 Dwg Ref No.
 Dated October 2013



DWG No. T15-051401 KEY PLAN

DATE: 29/04/2016



APPENDIX 5
TREE LOCATION PLAN SHOWING
TREE RETENTION VALUES
University of Technology, Sydney (UTS)
15 Broadway, ULTIMO, NSW



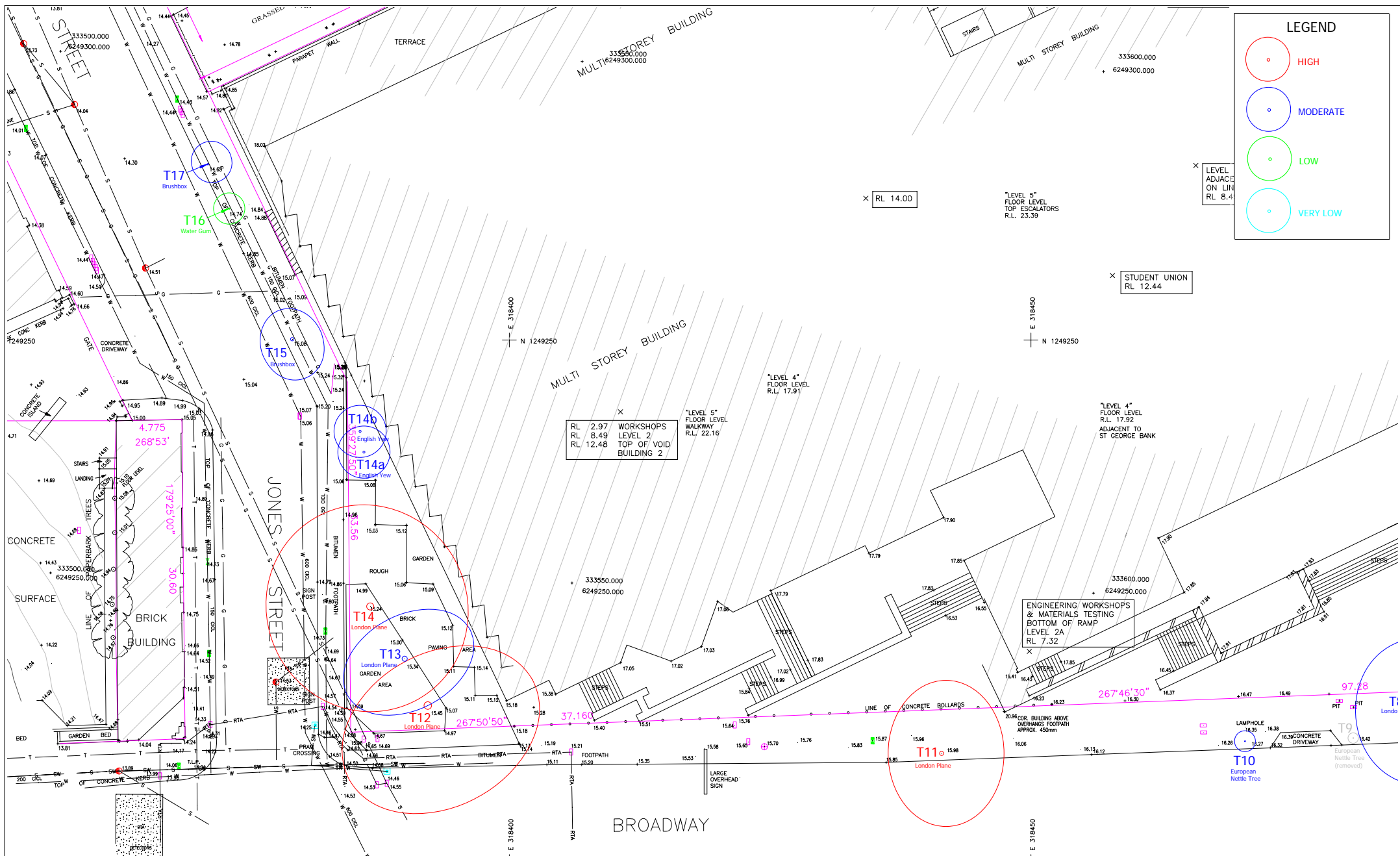
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DWG No. T15-051401 SHEET 1

DATE: 29/04/2016



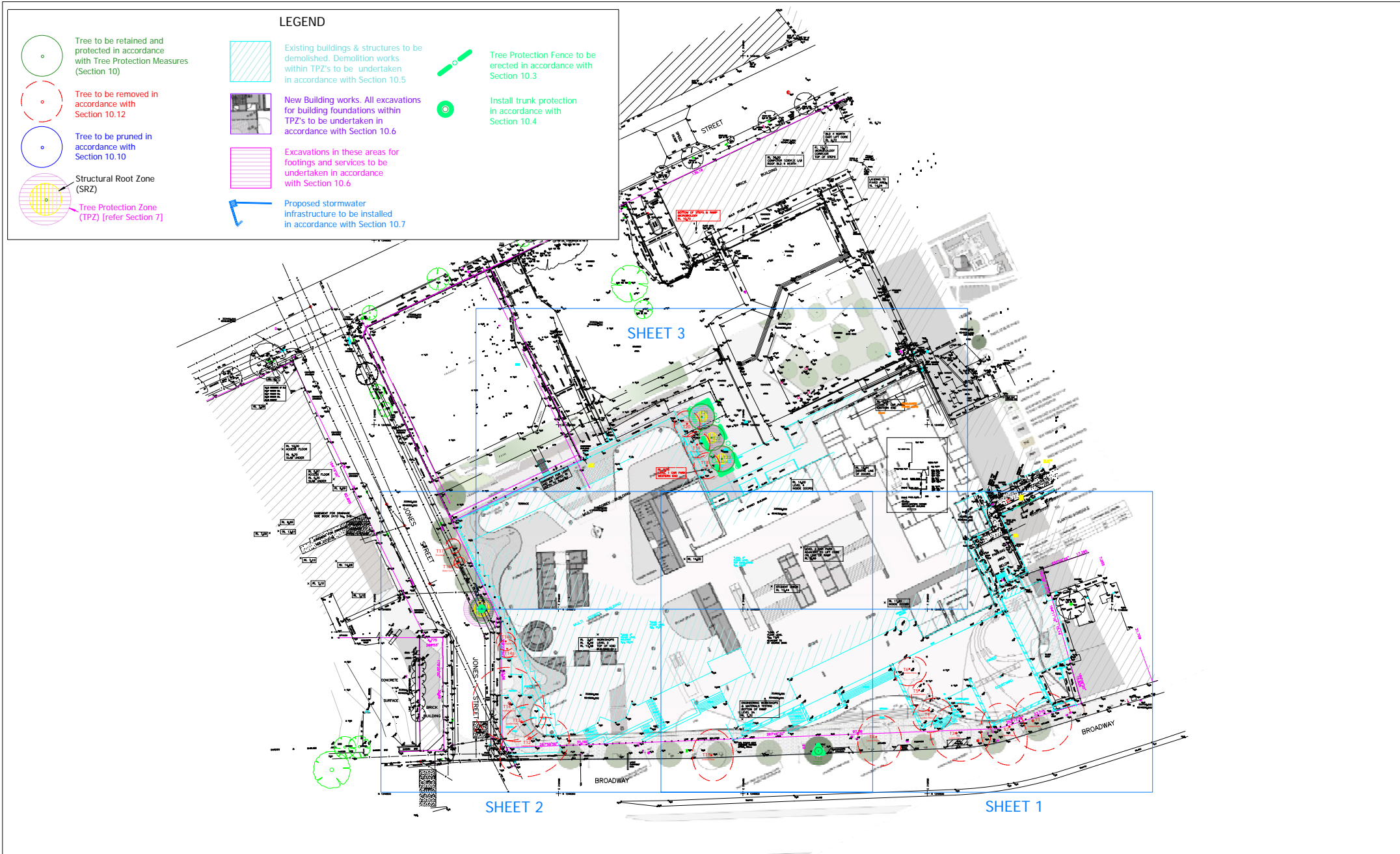
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DWG No. T15-051401 SHEET 2

DATE: 29/04/2016



APPENDIX 6 TREE PROTECTION PLAN

University of Technology, Sydney (UTS)
City Campus - 15 Broadway, ULTIMO, NSW



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DWG No. T15-051402 KEY PLAN

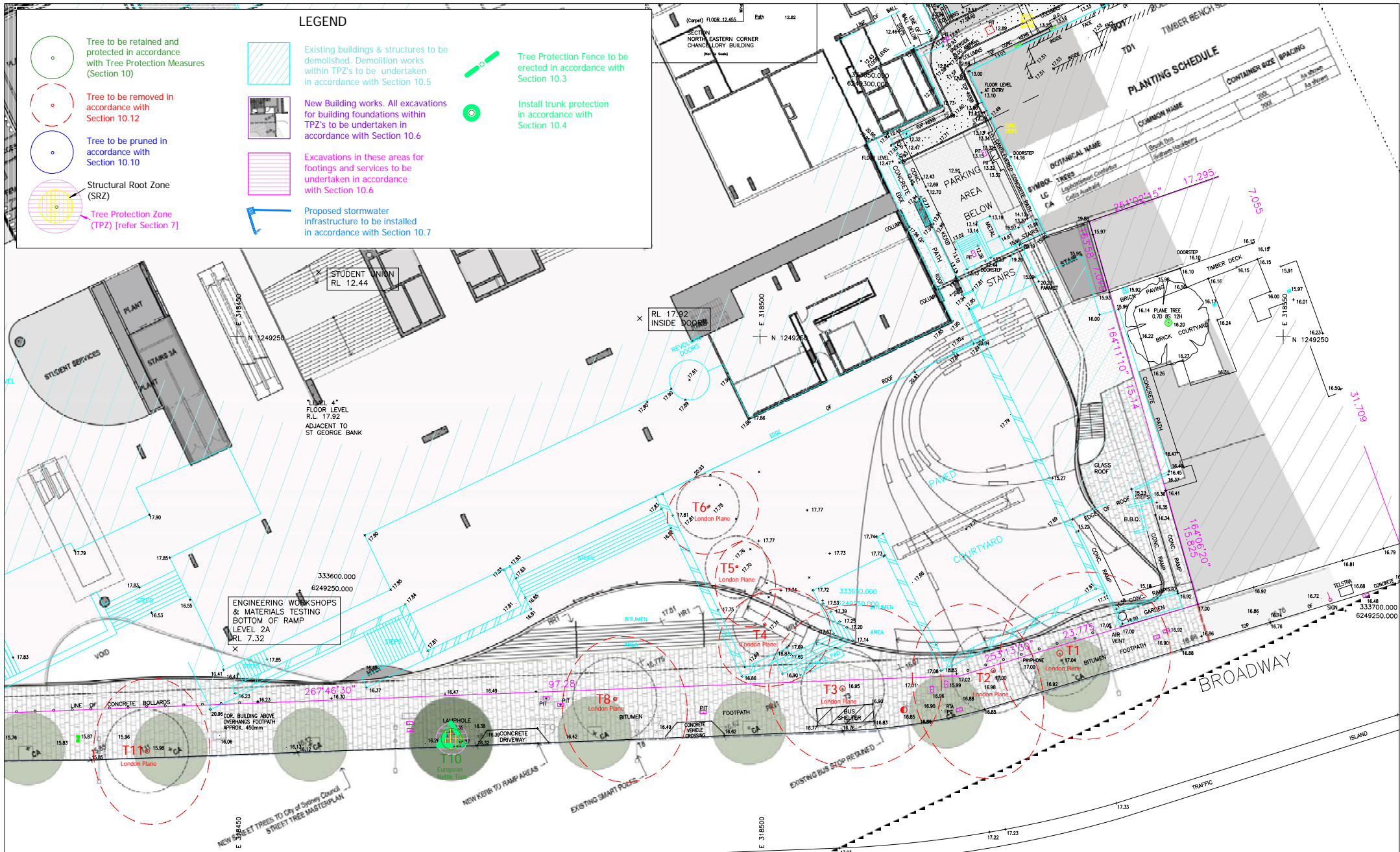
DATE: 28/04/2016

LEGEND

- Tree to be retained and protected in accordance with Tree Protection Measures (Section 10)
- Tree to be removed in accordance with Section 10.12
- Tree to be pruned in accordance with Section 10.10
- Structural Root Zone (SRZ)
- Tree Protection Zone (TPZ) [refer Section 7]

- Existing buildings & structures to be demolished. Demolition works within TPZ's to be undertaken in accordance with Section 10.5
- New Building works. All excavations for building foundations within TPZ's to be undertaken in accordance with Section 10.6
- Excavations in these areas for footings and services to be undertaken in accordance with Section 10.6
- Proposed stormwater infrastructure to be installed in accordance with Section 10.7

- Tree Protection Fence to be erected in accordance with Section 10.3
- Install trunk protection in accordance with Section 10.4



APPENDIX 6 TREE PROTECTION PLAN

University of Technology, Sydney (UTS)
City Campus - 15 Broadway, ULTIMO, NSW



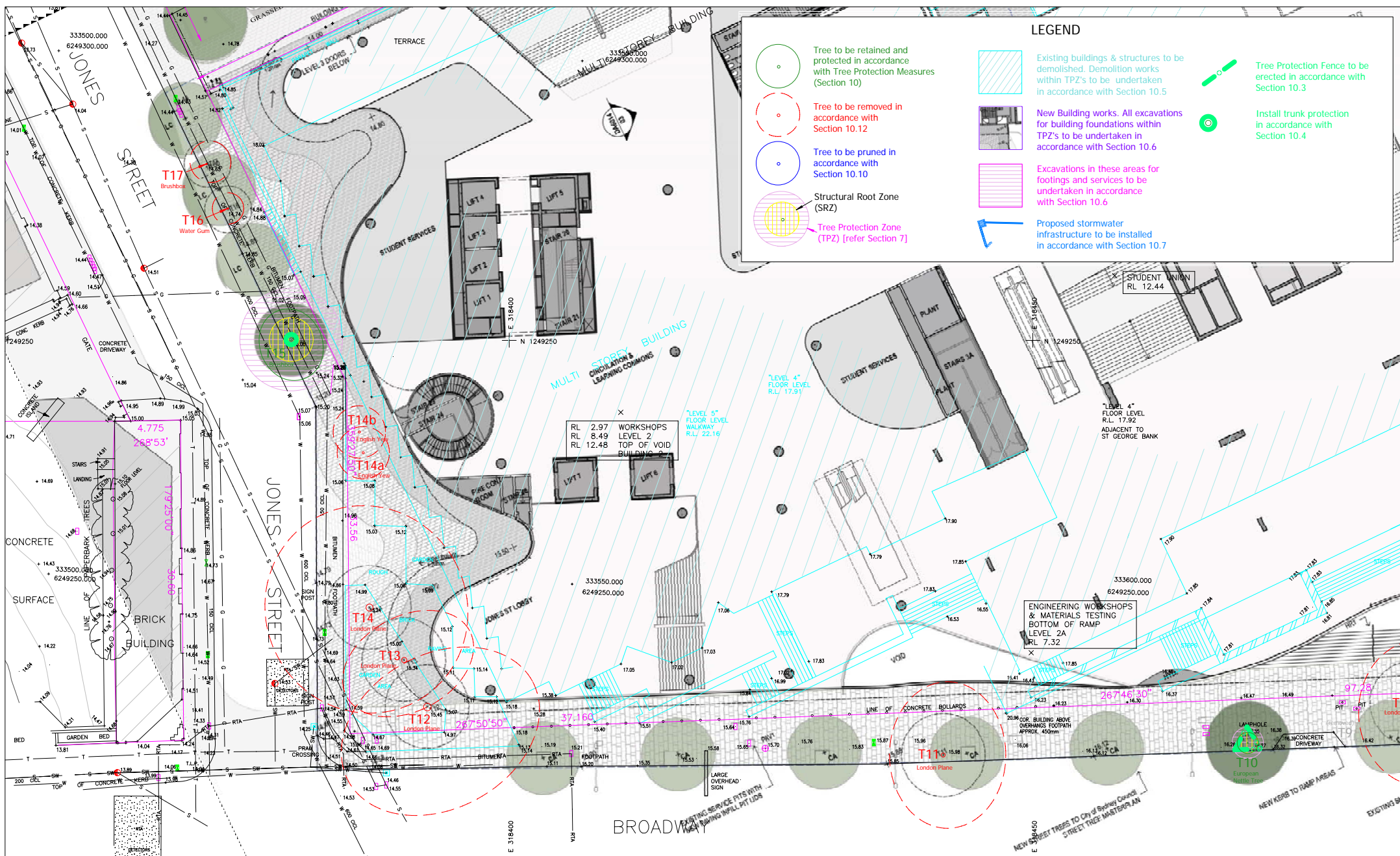
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