EARTHSCAPE HORTICULTURAL SERVICES
Arboricultural, Horticultural and Landscape Consultants

ABN 36 082 126 027

ARBORICULTURAL IMPACT ASSESSMENT REPORT

PROPOSED BOARDING HOUSE

19 DARLING POINT ROAD, DARLING POINT

November 2023

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1 INTRODUCTION

1.1.1 This report was commissioned by Tribe Studio Architects on behalf of Ascham School to assess the health and condition of nine (9) trees located within or immediately adjacent to 19 Darling Point Road, Darling Point. The report has been prepared to aid in the assessment of a Development Application (DA) for the alterations and additions to the existing residential flat building within the property for adaptive re-use as a Boarding House for student accommodation, together with associated landscape works.

1.1.2 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 (Tree Protection Plan and Specification) to ensure the long-term preservation of the trees to be retained where appropriate.

1.1.3 This report has been prepared in accordance with Woollahra Council's guidelines for preparation of Arborists Reports as outlined in Attachment 4 of Council's *Development Application Guide* 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 Strata Plan (SP) allotment known as SP 67209, being 19 Darling Point Road, Darling Point. For the purposes of this report, the subject allotment will be referred to as 'the site'. The total area of the site is approximately 962 m². The site is zoned Medium Density Residential [R3] under the *Woollahra Local Environmental Plan 2014* (WLEP).

2.1.2 The site contains an existing four-storey residential flat building located centrally within the lot, together with a detached single storey brick building (laundry) located near the south-eastern corner. The site has a steep westerly gradient, with terraced lawns in the front and rear yard area and high retaining walls alongside the eastern and western boundaries. The site contains a few mature and semi-mature trees. These include a variety of non-local native and exotic (introduced) species.

2.1.3 The soils of this area are typical of the Gymea 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.

2.1.4 The original vegetation of this area has been substantially cleared for urban development. The original vegetation community consisted of open forest & woodland typical of Hawkesbury Sandstone areas.[2] The dominant locally-indigenous tree species formerly occurring in this area may have included *Angophora costata* (Sydney Red Gum), *Corymbia gummifera* (Red Bloodwood) and *Eucalyptus haemastoma* (Scribbly Gum). Other species occurring in this vegetation community may include *Allocasuarina littoralis* (Black She-Oak), *Eucalyptus globoidea* (White Stringybark), *Eucalyptus punctata* (Grey Gum), *Eucalyptus piperita* (Sydney Peppermint) and *Banksia serrata* (Old Man Banksia). *Glochidion ferdinandi* (Cheese Tree) and *Ficus rubiginosa* (Port Jackson Fig) may also be found on the lower slopes of sheltered sites.

3 SUBJECT TREES

3.1.1 The subject trees were inspected by Earthscape Horticultural Services (EHS) on the 22nd November 2022. 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 drawings prepared by Rygate & Company Pty Ltd Surveyors, Dwg. Ref No. 79877 [D] dated 22/09/2022 (19 Darling Point Road) and Dwg. Ref No. 76389 [C] dated 10/11/2014 (Duntrim & Ascham School). The numbers used on this plan correlate with the Tree Assessment Schedule (**Appendix 3**). Tree No.s T8 & T9 were not shown on the original survey and have been plotted on the drawing in their approximate positions by taking offsets from existing features.

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 laser distance measurer in four directions and an average taken);
- **Trunk diameter** (measured with a diameter tape 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);
- **Maturity Class -** the Maturity Class for each tree has been divided into the following categories:-
  - **OM** Over-mature – greater than 80% of the life expectancy for the species;
  - **M** Mature – 50-80% of the life expectancy for the species;
  - **SM** Semi-mature – 20-50% of the life expectancy for the species;
  - **I** Immature – less than 20% of the life expectancy for the species.
- **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); and
- **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).

4.1.3 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 Expectancy[4] 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)

4.2.1 SULE ratings are intended to provide a general overview of the long-term sustainability of the trees within the site in consideration of these factors. The allocated ranges are not intended to be absolute. This information is useful in guiding future planning by highlighting the probable lifespan of individual trees, for which a clear pattern may emerge. This information may be helpful in forecasting likely tree senescence and planning for replacement planting to ensure continuity in tree canopy across the site. It should be noted that SULEs *may* be extended or reduced depending on the way trees are managed. Intervention and remedial works may extend the SULE of some trees.

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 environmental, heritage and amenity 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 a consistent approach, the assessment criteria 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

Prescribed trees within the Municipality of Woollahra are protected under Section E.3.2.1 of the *Woollahra Development Control Plan 2015* (WDCP) made pursuant to Part 3, Clause 9 of the *State Environmental Planning Policy (Vegetation in Non-rural Areas) 2017* (Vegetation SEPP). The WDCP generally protects all trees and palms with a canopy spread of three (3) metres or greater or any tree or palm with a height of five (5) metres or greater (regardless of crown spread). The WDCP also protects any tree or palm listed on Council's *Significant Tree Register* or any tree located within a property listed as a Heritage Item in the WLEP or within a Heritage Conservation Area as listed in the in the WLEP. Some exemptions apply. The following trees are exempt (not protected) under the provisions of the WDCP:-

Tree No.	Species	Exemption
T7	*Dracaena draco* (Dragon Tree)	Less than the Prescribed Dimensions

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 that would be suitable as nesting hollows for arboreal mammals or birds. There were no other visible signs of wildlife habitation.

5.2.3 Noxious Plants & Environmental Weeds

None of the subject trees are scheduled as a potential 'Biosecurity Risk' ('Priority Weed' – formerly 'Noxious Weed') within NSW under the provisions of the *Biosecurity Act 2015.*

None of the subject trees are listed as Environmental Weed Species within the Woollahra LGA.

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 *Biodiversity Conservation Act 2016* (NSW) or the *Environment Protection and Biodiversity Conservation Act 1999.*

5.2.5 Biodiversity, Bushfire & Riparian Lands

The NSW Office of Environment and Heritage (OEH) *Biodiversity Values Map and Threshold Tool* (refer https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap), indicates that there is no vegetation on or near the site that is subject to the Biodiversity Offset Scheme (BOS).

The site is *not* within a 'Designated Bush Fire Prone Area' as defined by the NSW Rural Fire Service (RFS). The site is *not* within a 'Designated 10/50 Vegetation Clearing Entitlement Area' as defined by the NSW RFS.

5.3 Heritage Significance

5.3.1 Heritage Items

The subject property is *not* listed as an item of Environmental Heritage under Schedule 5, Part 1 of the *Woollahra Local Environmental Plan 2014* (WLEP).

The adjoining property to the east, formerly known as 'Duntrim' (37 Darling Point Road, Darling Point), is listed as a Heritage Item [Item 87] under Schedule 5, Part 1 of the WLEP 2014. The listing includes the original building (formerly a house) and grounds, including a Norfolk Island Pine [T1].

'Duntrim' was designed by architect Maurice Halligan in the Federation Arts and Crafts style and constructed in 1911 on the foundations of 'Glanworth', an early Victorian Mansion built c. 1852. T1, an *Araucaria heterophylla* (Norfolk Island Pine) is thought to have been planted as part of the original estate (Glanworth House), being typical of the plantings of the mid to late Victorian Era. This tree is considered to be a visually significant specimen and landmark planting, being a remnant of the early cultural plantings of Darling Point.[5] This tree is visible as a semi-mature specimen in early photos of Duntrim (taken c.1911).

Prior to purchase of Duntrim by Ascham, the building was used by Sydney Hospital as a nurses' home from 1954 until 1981, after which it became the Sydney Dialysis Centre. The property (former 'Sydney Dialysis Centre') was formerly listed on the NSW Department of Health Heritage and Conservation Register (NSW State Agency Heritage Register) under Section 170 of the *Heritage Act* 1977. However, this listing was dissolved following purchase of the property by Ascham School (as Ascham is not a NSW State Agency).

Duntrim was altered c. 2014 and adaptively re-used as a boarding facility now forming part of Ascham School.

5.3.2 Heritage Conservation Area

The site is *not* located within a Heritage Conservation Area under Schedule 5, Part 2 of the WLEP 2014.

5.3.3 Significant Tree Register

T1, an *Araucaria heterophylla* (Norfolk Island Pine) is listed on Woollahra Council's *Register of Significant Trees* Volume 1 (Significant Trees under Private Ownership).[6] This tree is estimated to be about 120 years old (probably planted c. 1890's). It is therefore likely to pre-date Duntrim and was probably planted in association with the original Glanworth estate.

5.3.4 General

The 1943 Aerial Photograph of Sydney (SIX Maps) indicates that site had been cleared and developed for residential housing at this time, with the present residential flat building extant. T1 (Norfolk Island Pine) is visible as a mature specimen at this time. T5 (Hills Weeping Fig), is visible as a young specimen at this time. This tree was probably planted in the Inter-War Era (1919-1939) being typical of civic plantings in this locality during this era. None of the other trees have any 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 1**. 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			Moderate Retention Value				
Short - 5 to 15 years				Low Ret. Value			
Transient - Less than 5 Years				Very Low Retention Value			
Dead or Potentially Hazardous							

6.1.2 The following table describes the implications of the retention values on site layout and design.

TABLE 2 – TREE RETENTION PRIORITES.

RETENTION VALUE	RECOMMENDED ACTION
"High"	These trees considered worthy of preservation; as such careful consideration should be given to their retention as a priority. Proposed site design and placement of buildings and infrastructure should consider the recommended setbacks as discussed in the following section (refer also **Appendix 2**) to avoid any adverse impact on these trees. In addition to Tree Protection Zones, the extent of the canopy (canopy drip-line) should also be considered, particularly in relation to high rise developments. Significant pruning of the trees to accommodate the building envelope or temporary scaffolding is generally not acceptable.
"Moderate"	The retention of these trees is desirable, but not essential. These trees should be retained as part of any proposed development if possible. However, these trees are considered less critical for retention. If these trees must be removed, replacement planting should be considered in accordance with Council's Tree Replenishment Policy to compensate for loss of amenity (refer also **Section 9**).
"Low"	These trees are not considered to worthy of any special measures to ensure their preservation, due to current health, condition or suitability. They do not have any special ecological, heritage or amenity value, or these values are substantially diminished due to their SULE. These trees should not be considered as a constraint to the future development of the site.
"Very Low"	These trees are considered potentially hazardous or very poor specimens, or may be environmental or noxious weeds. The removal of these trees is therefore recommended regardless of the implications of any proposed development.

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).[7]

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 or 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 Encroachments 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

7.4 Acceptable Encroachments to the Canopy

7.4.1 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.

7.4.2 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 alterations and additions to the existing residential flat building and adaptive re-using as a boarding house for student accommodation at Ascham School, together with associated landscape works. A new pathway (ramp and associated retaining walls) forming a pedestrian link between the site and the school grounds will also be constructed, extending through the south-eastern corner of the site.

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. [Rev.]	Date
Site Analysis Plan	Tribe Studio Architects	1007 A-02-001 [S1]	15/11/2023
Demolition Plans – Ground Floor	Tribe Studio Architects	1007 A-06-008 [S1]	15/11/2023
Demolition Plans – First Floor	Tribe Studio Architects	1007 A-06-011 [S1]	15/11/2023
Demolition Plans – Roof	Tribe Studio Architects	1007 A-06-020 [S1]	15/11/2023
Proposed Site & Roof Plan	Tribe Studio Architects	1007 A-10-002 [S1]	15/11/2023

General Arrangement Plans - Ground Level	Tribe Studio Architects	1007 A-11-008 [S1]	15/11/2023
General Arrangement Plans - Level 1	Tribe Studio Architects	1007 A-11-011 [S1]	15/11/2023
General Arrangement Plans - Level 2	Tribe Studio Architects	1007 A-11-012 [S1]	15/11/2023
General Arrangement Plans - Level 3	Tribe Studio Architects	1007 A-11-013 [S1]	15/11/2023
Elevations - East and West Elevation	Tribe Studio Architects	1007 A-21-010 [S1]	15/11/2023
Elevations - South and North Elevation	Tribe Studio Architects	1007 A-21-012 [S1]	15/11/2023
General Arrangement Sections - Section AA	Tribe Studio Architects	1007 A-31-001 [S1]	15/11/2023
Stormwater Concept Plan	Harris Page & Associates	7224 SW-00 to SW-04 [A]	29/09/2023
Landscape Documentation (Plans and Details)	360°	L-DA-00 to L-DA-20 [E]	23/10/2023

9.1.2 A summary of the impact of the proposed development on each tree within the site is shown in **Appendix 4**. 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 two (2) trees of moderate retention value. These include Tree No.s T3 (Bangalow Palm) and T4 (Avocado tree). 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. 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 with new trees elsewhere within the site in accordance with **Section 11**.

9.1.4 A proposed new garden terrace is located within the TPZs of T1 (Norfolk Island Pine) and T2 (Brushbox). Creation of the terrace will require raising the existing ground levels by approximately 1.8 metres, to the height of the existing retaining wall on the common boundary between Ascham School and the site. This work will not result in an any actual incursion to the root zones of these trees given the barrier to root growth created by the existing wall. As such, this work will not result in any adverse impact on the subject trees.

9.1.5 A proposed new pedestrian ramp and associated retaining wall is located within the TPZs of T1 (Norfolk Island Pine) and T2 (Brushbox). Bulk excavation for the ramp and associated retaining wall foundations (east of the existing boundary retaining wall) will result in an encroachment to the TPZs of these trees 5% and 6% respectively, which is considered within acceptable limits under AS4970:2009. It should be noted, however, that a large portion of the remaining root zones of both trees is already covered with existing buildings and pavements, estimated at 30-40% and 10-15% of the TPZ respectively. The proposed works will not result in any adverse impact on

these trees, provided that all excavation for the ramp and associated retaining walls within the TPZs is undertaken in accordance with **Section 10.9**.

9.1.6 A proposed new paved area ('extended works') is located within the TPZ of T1 (Norfolk Island Pine), resulting in a cumulative encroachment to the TPZ of 17%, which exceeds acceptable limits under AS4970:2009. Given the extent of built upon area within the remainder of the TPZ, excavations and compaction for a conventional pavement system sub-grade within the TPZ has the potential to result in an adverse impact on this tree. It should be noted that a portion of this area is already covered with existing pavement (to be demolished). In order to avoid any adverse impact on this tree, the proposed pavement should be elevated slightly above grade (100-200mm) and a permeable pavement surface and permeable sub-base material installed (in lieu of a conventional pavement system) in accordance with **Sections 10.12** and **10.13**.

9.1.7 Proposed new stormwater pipelines are located within the TPZs of T5 (Hill's Weeping Fig) and T6 (Frangipani). In both instances, the pipelines are located beyond existing retaining walls. As such, open trenching for the pipelines will not result in any actual incursion to the root zones and therefore the proposed works will not result in any adverse impact on these trees.

9.1.8 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, tyning, 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 Damage

10.3.1 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.

10.3.2 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.

10.4 Tree Removal

10.4.1 The removal of Trees [**T3 & T4**] 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.

10.4.2 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.

10.5 Tree Protection Fencing

10.5.1 Trees [**T1 & T2**] shall be protected prior to and during construction from all activities that may result in detrimental impact by erecting a suitable protective fence in the positions as indicated on the Tree Protection Plan (**Appendix 6**). As a minimum, the fence shall 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.

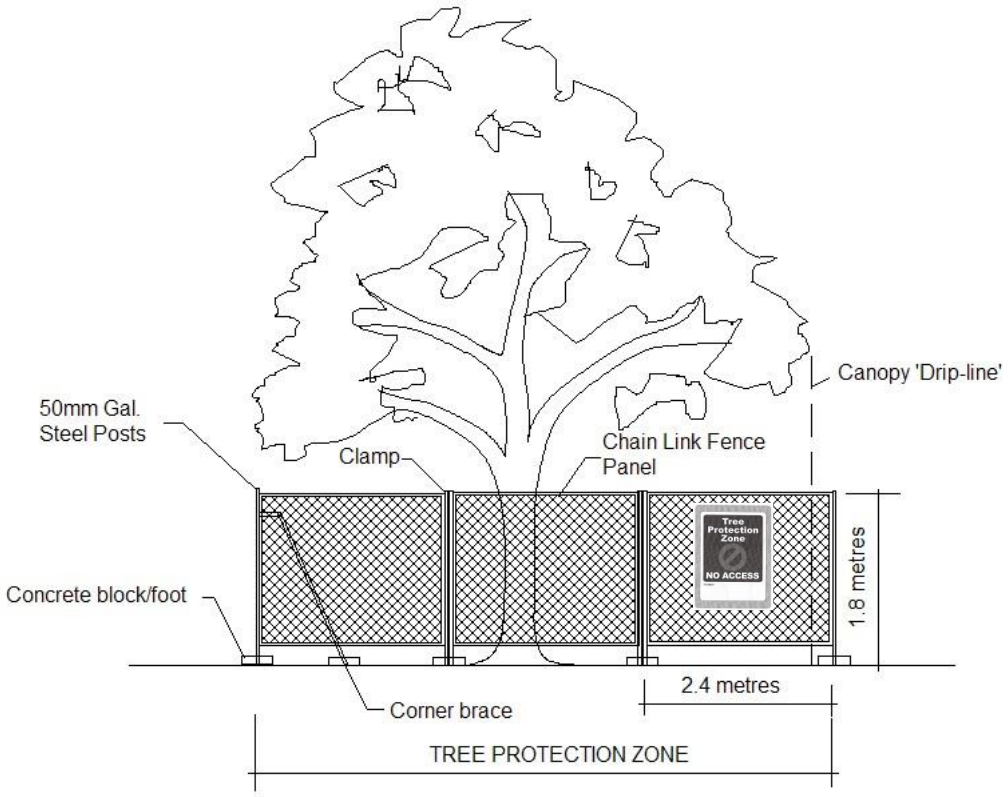

Figure 1 – Detail of Tree Protection Fence

10.6 Tree Protection Signs

10.6.1 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**.

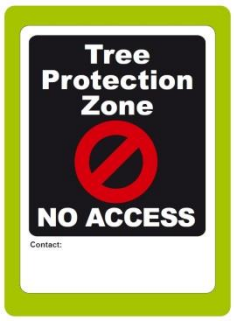

Figure 2 – Detail of Tree Protection Sign

10.7 Ground Protection

10.7.1 Construction haul routes shall be confined to existing paved areas wherever possible. Where this is not feasible and construction haul routes or access for plant and equipment must traverse soft landscape areas within TPZs of [**any tree nominated for retention**], 20mm thick marine ply sheets or truck mats (such as Envirex Versadeck® access mats) (refer **Figure 4** shall be placed over the top of the ground surface to minimise compaction and disturbance of the underlying soil profile and root zone.

Figure 4 – Showing typical detail for truck mats.

10.7.2 Ground protection shall be installed prior to any site works and maintained in good condition for the duration of the construction period. On completion of the works, ground protection shall be removed without damage or disturbance to the underlying soil profile.

10.8 Demolition Works within Tree Protection Zones

10.8.1 Existing Turfgrass & Low Vegetation

No mechanical soil cultivation (using ripping tynes, rotary hoes or the like) is permitted within Tree Protection Zones (TPZs). Where existing turfgrass is proposed to be removed (demolished) within the TPZs of Trees [**any tree nominated for retention**], the turfgrass shall be first treated with a non-selective herbicide with the active constituent Glyphosate (Round-up ® or equivalent) at the manufacturers recommended rate and allowed to dehisce. Once the turfgrass in the effected area is completely dead, any high grass may be slashed/mown close to ground level.

Any residual vegetation (dead grass etc) may then be carefully scraped-off the surface using a small rubber tracked excavator with a broad sand bucket (i.e. without tynes/teeth), taking care to remove the minimum topsoil necessary (no more than 20mm deep) (refer to **Figure 5**). An observer shall be used to ensure that no woody surface roots of any trees are damaged during this process.

Figure 5 – Showing method for removal of residual surface vegetation from Tree Protection Zones following herbicide treatment and slashing.

10.8.2 Paved Areas

Demolition of paved areas within the Tree Protection Zones (TPZs) of trees [**T1 & T2**] shall be undertaken under the supervision of a qualified Arborist [Australian Qualification Framework (AQF) Level 5].

Concrete pavements shall be demolished by breaking the slab into manageable sections (using a rock hammer or similar) and asphalt pavements shall be removed by breaking the topcoat into manageable pieces. The broken sections shall be carefully lifted and folded over the remaining paved surface to minimise disturbance and compaction of the underlying soil profile (refer to **Figure 6**). Special care shall be taken where underlying woody roots have lifted or displaced the pavement. Any plant or equipment used in demolition work shall operate within the footprint of existing paved areas and avoid traversing soft landscape areas. Where this is unavoidable, suitable ground protection shall first be installed in accordance with **Section 10.7**.

Figure 6 – Showing method for removal of concrete pavement, by carefully lifting sections and folding over the remaining paved surface.

The pavement sub-base within the TPZ shall be gradually removed (where required) in layers of no greater than 50mm thick using a small rubber tracked excavator or alternative approved method to avoid excessive disturbance and compaction of the underlying soil profile and damage to underlying roots and minimise. The machine shall work within the footprint of the existing path footprint 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 avoid damage to any underlying woody roots.

10.8.3 Structures & Retaining Walls

Demolition of existing walls, kerbs and other structures within the TPZ of trees [**T1 & T2**] (where required) shall be undertaken under the supervision of a qualified Arborist [AQF level 5]. 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. An observer ('spotter') shall be employed to assist the plant operator in order to detect and avoid damage to underlying woody roots during demolition. Trunk and/or branch protection shall be installed where there is a potential risk of damage to trees in proximity or overhead of the work.

10.9 Excavations within Tree Protection Zones

10.9.1 Prior to any mechanical excavations for building foundations or pavement sub-grade within the TPZs of Trees [**T1 & T2**] 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 (hydro-excavation in combination with a vacuum extraction unit). 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.

10.9.2 All care shall be undertaken to preserve woody roots intact and undamaged during exploratory excavation. Any roots encountered of less than 40mm 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. Where large woody roots (greater than 40mm diameter) are encountered during exploratory excavations, further advice from a qualified arborist shall be sought prior to severance.

10.10 Alternative Construction Methods

10.10.1 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.

10.10.2 For masonry walls or fences it may be acceptable to delete continuous concrete strip footings and replace with suspended in-fill panels (e.g. steel or timber pickets, lattice etc) fixed to pillars. For retaining walls, consideration should be given to eliminating continuous strip footings and substituting with pier and beam footings, pier footings (using a post and caisson type wall) or mass wall such as gabions or mass stone that can be placed without a structural footing.

10.10.3 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.

10.11 Underground Services

10.11.1 Trenching for underground services and stormwater pipes within the TPZs of Trees [**any tree nominated for retention**], shall be undertaken using non-destructive excavation in accordance with **Section 10.8**. Where large woody roots are encountered during excavation or trenching (root diameter greater than 40mm), 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.

10.12 Pavements

10.12.1 Proposed paved areas within the TPZs of Trees [**T1**] (with exception of the proposed pedestrian ramp) shall be placed above grade (100-200mm, except were marrying to existing paved surfaces) to minimise excavations within the root zone and avoid severance and damage of woody roots. A permeable pavement system (such as gravel, porous pavers, porous (no-fines) concrete or porous (no-fines asphalt) should be used in preference to a conventional pavement system. The pavement sub-base material should be supplied and installed in accordance with **Section 10.13**.

10.13 Pavement Sub-base

10.13.1 Pavement sub-base material within TPZs of trees [**T1**] shall be a coarse, gap-graded aggregate such as 10-20mm diameter crushed basalt (Blue Metal) or equivalent no-fines gravel material to provide aeration and moisture permeation to the root zone. Note that road base or crushed sandstone or other similar material containing a high percentage of fines is unacceptable for this purpose. The fill material should be consolidated using a non-vibrating roller or similar to

minimise compaction of the underlying soil. A permeable geotextile such as Tensar Triax Geogrid should be used beneath the sub-base to prevent migration of the aggregate into the sub-grade and provide greater load capacity for the pavement.

10.14 Root Pruning

10.14.1 Where root pruning of [**any tree nominated for retention**] is required to facilitate construction, 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.

10.14.2 Any required root pruning shall be carried out in accordance with Australian Standard 4373-2007 – *Pruning of Amenity Trees* 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 roots of greater than 40mm in diameter should be removed or pruned without further advice from a Consulting Arborist [Australian Qualification Framework Level 5].

11 REPLACEMENT PLANTING

11.1.1 In order to compensate for loss of amenity resulting from the removal of trees to accommodate the proposed development, a minimum number of three (3) new trees capable of attaining a height of at least ten (10) metres at maturity should be planted within the allotment.

11.1.2 Replacement trees should preferably include some locally indigenous species. These will be most appropriate to the site conditions and be most valuable in terms of preserving the landscape character and wildlife habitat of the area. The following species are appropriate to the site conditions and could be considered for replacement planting:-

Local native species:-

- *Eucalyptus haemastoma* (Scribbly Gum),
- *Angophora costata* (Sydney Red Gum)
- *Corymbia gummifera* (Red Bloodwood)
- *Eucalyptus sieberi* (Silvertop Ash)
- *Eucalyptus capitellata* (Brown Stringybark)
- *Banksia serrata* (Old Man Banksia)
- *Ficus rubiginosa* (Port Jackson Fig)
- *Glochidion ferdinandi* (Cheese Tree)

Non-local native species:-

- *Acmena smithii* (Lillypilly)
- *Waterhousea floribunda* (Weeping Lillypilly).
- *Elaeocarpus reticulatus* (Blueberry Ash)
- *Syzygium paniculatum* (Magenta Cherry)
- *Syzygium luehmannii* (Small-leaf Lillypilly)
- *Melaleuca stypheliodes* (Prickly Paperbark)

Andrew Morton
EARTHSCAPE HORTICULTURAL SERVICES
24th November 2023

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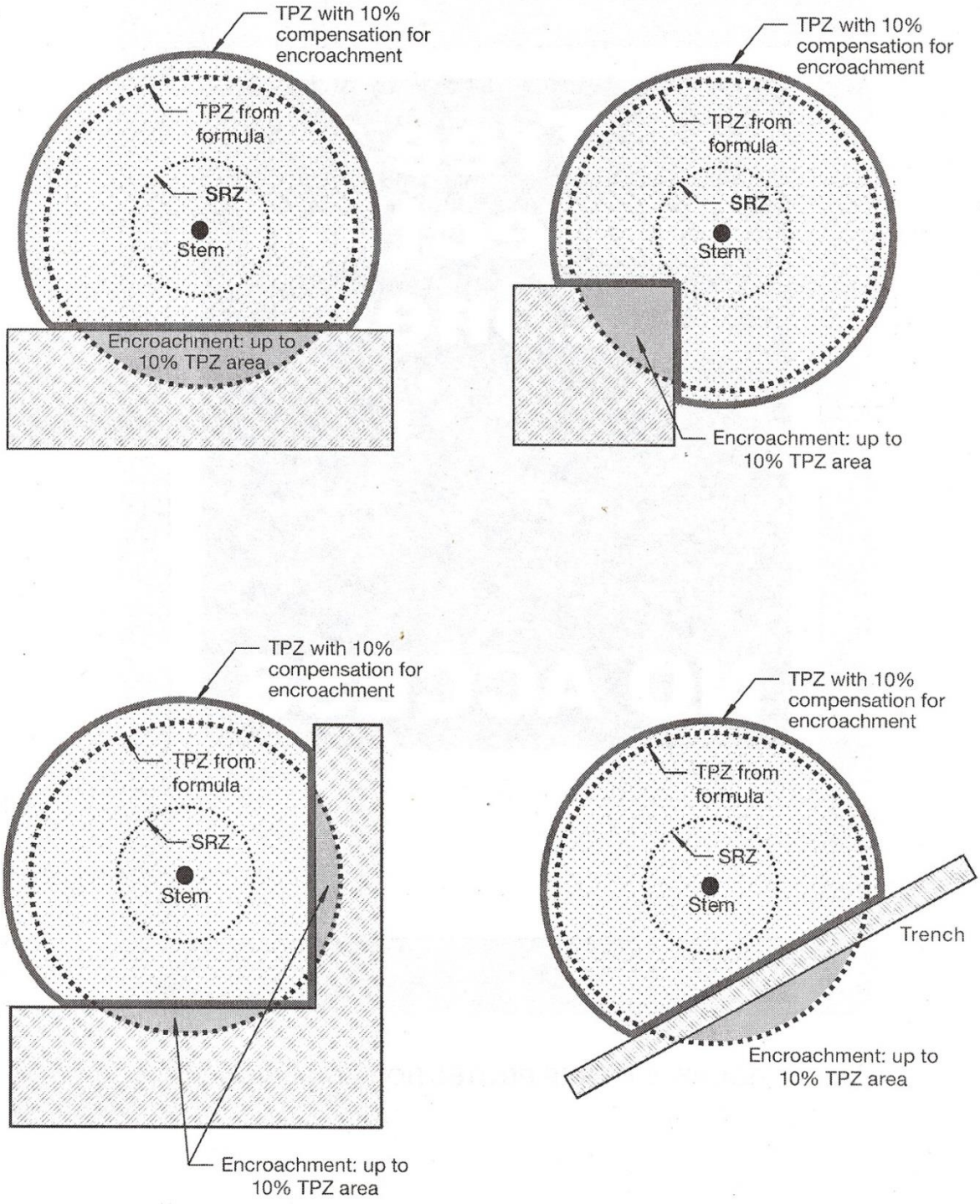
Standards Australia, Sydney

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 or Vulnerable Species as defined under the provisions of the *Biodiversity Conservation Act 2016* (NSW) or the *Environment Protection and Biodiversity Conservation Act 1999*.	The subject tree has a very large live crown size exceeding 300m² 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 200m²; 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 100m²; 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 the local or state planning controls (Development Control Plan etc).	The subject tree has a medium live crown size exceeding 40m²; 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 the local or state planning controls (DCP etc) 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 40m² 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 known heritage value (or any habitat value)	The tree is scheduled as a potential 'Biosecurity Risk' ('Priority Weed' – formerly 'Noxious Weed') within NSW or within the relevant Local Government Area under the provisions of the *Biosecurity Act 2015*	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) at 1.4 metres	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	***Araucaria heterophylla*** (Norfolk Island Pine)	27	12	984	300	M	Appears stable with sound branching structure.	Crown lifted to 4 metres	Very Good	No Evidence	Long - more than 40 years	1	**High**	Adjoining property
2	***Lophostemon confertus*** (Brushbox)	11	8	446	56	M	Appears stable with sound branching structure. Exhibits a prominent lean to the north.	Crown lifted to 6-7 metres	Good	No Evidence	Long - more than 40 years	4	**Moderate**	Adjoining property
3	***Archontophoenix cunninghamii*** (Bangalow Palm)	12	7	232	28	SM	Appears stable with sound branching structure.	No evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	On-site
4	***Persea americana*** (Avocado tree)	10	8	404	56	M	Appears stable with sound branching structure. Growing on steep embankment.	Selectively crown thinned & deadwooded	Very Good	No Evidence	Medium 15-40 Years	4	**Moderate**	On-site
5	***Ficus microcarpa var. hillii*** (Hills Weeping Fig)	22	30	2000	540	M	Appears stable with fair branching structure. Exhibits multiple moderate bark inclusions at junctions of co-dominant PLs at 3-4 metres. Primary woody roots growing over kerb. Roots lifting and displacing asphalt footpath.	Crown lifted to 10 metres east side Selectively pruned.	Very Good	No Evidence	Long - more than 40 years	2	**High**	Nature strip
6	***Plumeria acutifolia*** (Frangipani)	6	4.5	120x2	22.5	SM	Appears stable with sound branching structure. Located close to existing reatining wall and partially growing over/supported by wall.	Crown lifted to 2 metres	Fair with slightly thinning crown	Moderate Frangipani Rust	Short 5-15 Years	5	**Low**	Adjoining property
7	***Dracaena draco*** (Dragon Tree)	3.5	1.5	207	0.75	SM	Appears stable with fair branching structure. Exhibits 3 x co-dominant PLs arising at 2.5 metres.	May have been previously topped at 2.5 metres (crown restored)	Good	No Evidence	Medium 15-40 Years	6	**Low**	On-site
8	***Podocarpus elatus*** (Plum Pine)	12	5	300	45	SM	Appears stable with fair branching structure. Exhibits a high bark inclusion at junction of co-dominant PLs at 3 metres. Prominent lean to the north (self-corrected).	No evidence	Good	No Evidence	Long - more than 40 years	4	**Moderate**	Adjoining property
9	***Magnolia grandiflora*** (Bullbay Magnolia)	6	5.5	100	24.75	I	Appears stable with fair branching structure. Main leader broken out/suppressed at 6 metres.	No evidence	Good	No Evidence	Medium 15-40 Years	5	**Low**	Adjoining property

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
1	***Araucaria heterophylla*** (Norfolk Island Pine)	M	11.8	3.4	8.0	437.9	Proposed garden terrace offset 9.4 metres west at RL46.30 (top of existing retaining wall). Placement of non-engineered fill for garden terrace within TPZ (beyond existing retaining wall, 1.8 metres high). No actual encroachment to root zone due to barrier created by the existing wall. Proposed pedestrian pathway/ramp and associated part retaining wall offset 5.6 metres south at RL45.80 (650mm below grade) to RL 46.15 (close to existing grade) bulk excavation for ramp and retaining wall foundations within TPZ. Encroachment to TPZ = 5%. Proposed paved area ('extended works) offset 5 to 10 metres south to south-east at RL46.15 to RL46.24 (close to existing grade). Excavations for pavement sub-grade within TPZ (partially within the footprint of existing paved areas to be demolished) Cumulative encroachment to TPZ = 17%. Note that approximately 30-40% of the remaining TPZ is already covered with buildings and paved areas.	Extent of encroachment to the TPZ exceeds acceptable limits under AS4970:2009. The tree will tolerate the level of encroachment proposed, provided that all proposed works within the TPZ are undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fence in accordance with Section 10.5. Demolish existing paved areas /pathways (where required) within TPZ in accordance with Section 10.8. maintain the existing retaining wall to the west intact. Undertake all excavation for the new ramp pavement sub-grade and associated retaining walls within TPZ in accordance with Section 10.9. Install the pavement to the 'extended works' area 100-200mm above existing surface levels to minimise excavation for pavement sub-grade in accordance with Section 10.12 using a permeable pavement material and sub-base in accordance with Section 10.13.

PL = Primary Limb; SL = Secondary Limb;
TL = Tertiary Limb. GL = Ground Level

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
2	***Lophostemon confertus*** (Brushbox)	M	5.4	2.4	3.6	89.9	Proposed garden terrace offset 2.4 metres west at RL46.30 (top of existing retaining wall). Placement of non-engineered fill for garden terrace within TPZ (beyond existing retaining wall, 1.8 metres high). No actual encroachment to root zone due to barrier created by the existing wall. Proposed pedestrian pathway/ramp and associated part retaining wall offset 4.2 metres south at ≈RL45.80 (650mm below grade). Bulk excavation for ramp and retaining wall foundations within TPZ. Encroachment to TPZ = 6%. Note that approximately 10-15% of the remaining TPZ is already covered with buildings and paved areas.	Extent of encroachment to root zone is less than 10% of the TPZ, which is within acceptable limits under AS4970:2009. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fence in accordance with Section 10.5. Maintain the existing retaining wall to the west intact. Undertake all excavation for the new ramp pavement sub-grade and associated retaining wall foundations within TPZ in accordance with Section 10.9.
3	***Archontophoenix cunninghamii*** (Bangalow Palm)	G	3.6	2.0	2.4	40.7	Located within footprint of proposed garden terrace and associated retaining wall.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
4	***Persea americana*** (Avocado tree)	M	4.9	2.4	3.3	74.0	Located within footprint of proposed additions.	Proposed works will necessitate removal.	Undertake replacement planting with a new tree elsewhere within the site to compensate for loss of amenity in accordance with Section 11.
5	***Ficus microcarpa var. hillii*** (Hills Weeping Fig)	M	15.0	4.4	10.2	706.5	Proposed stomwater pipeline and pit offset 10 metres south-east at IL? (assumed 400-600 mm below grade). Open trenching for pipeline within TPZ (beyond existing high retaining wall). No actual encroachment to root zone due to barrier created by the existing wall.	No adverse impact	To be retained - no special tree protection measures required.

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
6	***Plumeria acutifolia*** (Frangipani)	M	2.3	1.7	1.6	16.6	Proposed stomwater pipeline and pit offset 0.7 metres south-east at IL? (assumed 400-600 mm below grade). Open trenching for pipeline within TPZ (beyond existing retaining wall). Proposed path and stairs offset 1.7 metres south at RL41.08 (Close to existing grade) to RL 42.04 (400mm above grade, beyond existing wall. No actual encroachment to root zone due to barrier created by the existing wall.	No adverse impact	To be retained - no special tree protection measures required.
7	***Dracaena draco*** (Dragon Tree)	G	2.5	1.8	1.7	19.4	No proposed works within TPZ (soft landscape works only).	No adverse impact	To be retained - no special tree protection measures required.
8	***Podocarpus elatus*** (Plum Pine)	M	3.6	2.1	2.4	40.7	No proposed works within TPZ.	No adverse impact	To be retained - no special tree protection measures required.
9	***Magnolia grandiflora*** (Bullbay Magnolia)	M	2.6	1.4	1.8	21.2	No proposed works within TPZ.	No adverse impact	To be retained - no special tree protection measures required.

APPENDIX 5
TREE LOCATION PLAN SHOWING
TREE RETENTION VALUES

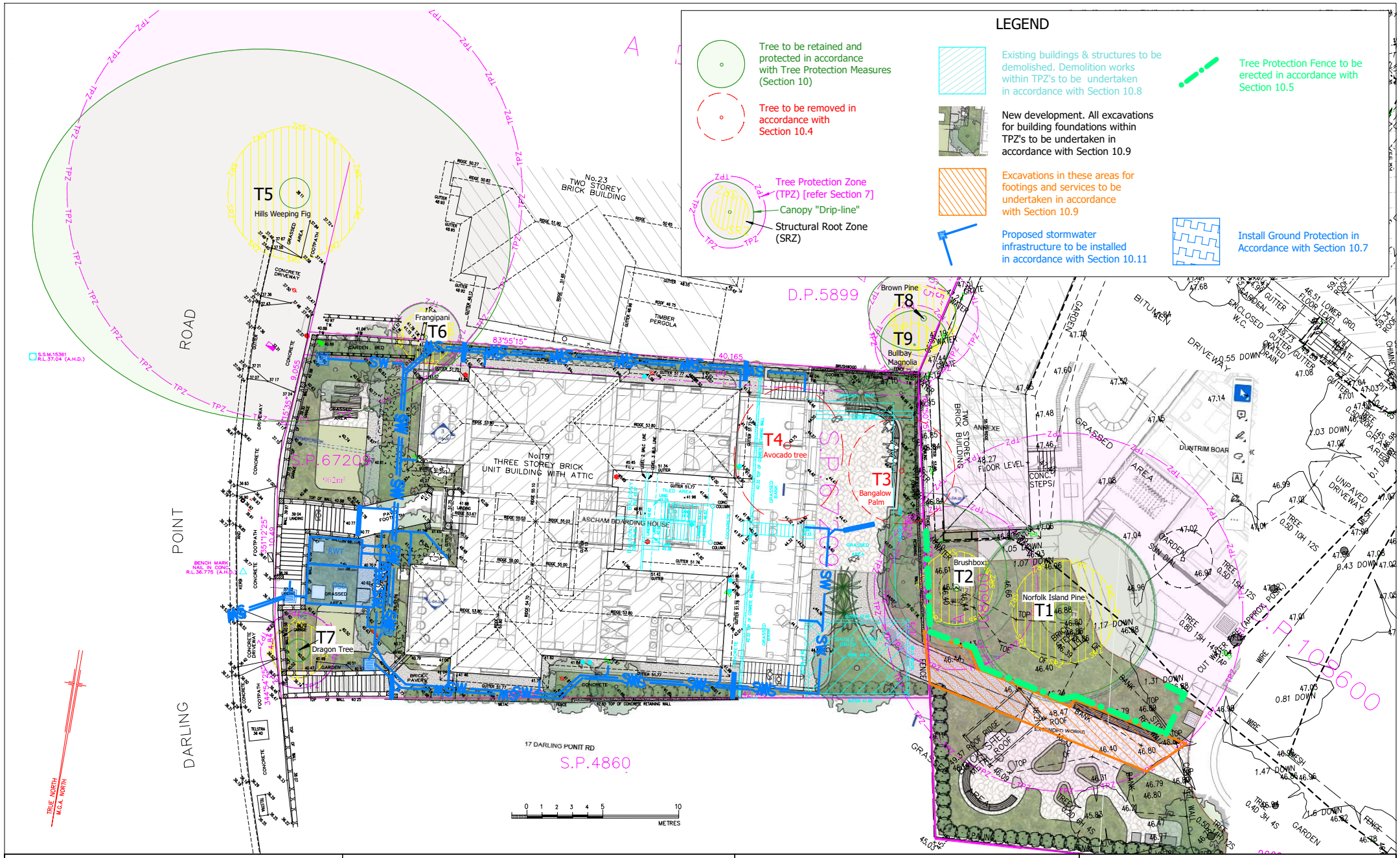
19 Darling Point Road, DARLING POINT, NSW

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 Surveyors
Dwg Ref No. 79877 [A]
Dated 22/03/2022

DWG No. T22-1202/01 [A]

DATE: 02/12/2022



APPENDIX 6

TREE PROTECTION PLAN

19 Darling Point Road, DARLING POINT, NSW

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PO Box 364
BEROWRA NSW 2081
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Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing prepared by Rygate Surveyors

Dwg Ref No. 79877 [A]

Dated 22/03/2022

DWG No. T22-1202/02 [B]

DATE: 24/11/2023