EARTHSCAPE HORTICULTURAL SERVICES
Arboricultural, Horticultural and Landscape Consultants

ABN 36 082 126 027

ARBORICULTURAL IMPACT ASSESSMENT REPORT

PROPOSED YOUTH RECREATION FACILITY

RUSHCUTTERS BAY PARK,
2A NEW SOUTH HEAD ROAD, DARLING POINT

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Prepared for: Roger Faulkner
Open Space and Recreation Planning Team Leader
Woollahra Municipal Council
536 New South Head Road
DOUBLE BAY NSW 2028

Ph:- 02 9391 7000

Prepared by: Andrew Morton
Dip. (Arboriculture) [AQF Level 5]
B. App. Sci. (Horticulture)
A. Dip. App. Sci. (Landscape)

EARTHSCAPE HORTICULTURAL SERVICES
Ph: - 0402 947 296

Member of Arboriculture Australia
Member International Society of Arboriculture - Australian Chapter (ISAAC)

PO Box 364, BEROWRA NSW 2081
Ph: (02) 9456 4787 Mobile: 0402 947 296 Fax: (02) 9456 5757
Email: earthscape@iinet.net.au

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1 INTRODUCTION

1.1.1 This report was commissioned by Woollahra Municipal Council to assess the health and condition of twenty (20) trees located within Rushcutters Bay Park, 2a New South Head Road, Darling Point. The report has been prepared to aid in the assessment of a Development Application (DA) for the construction of a new Youth Recreation Facility (YRF) within the park, together with associated landscape works. The assessment has been limited to the trees in the south-western corner of the park (east of the stormwater canal), in the vicinity of the proposed YRF.

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 public reserve known as Lot 7321 in DP 1165813, being Rushcutters Bay Park, 2a New South Head Road, Darling Point. The western portion of the park (west of the stormwater canal) is under the care, control and management of the City of Sydney Council and the eastern portion of the site is under the care, control and management of Woollahra Municipal Council. For the purposes of this report, the eastern portion of the park will be referred to as 'the site'. The site is zoned Public Recreation [RE1] under the *Woollahra Local Environmental Plan 2014* (WLEP).

2.1.2 The site contains open lawn areas with mature trees alongside the boundaries and internal path network, with a typical parkland character. The site is relatively flat for the most part with a raised embankment on the south side adjacent New South Head Road. A concrete lined trapezoidal drainage channel, constructed c. 1882-1898, is located along the western boundary of the site. A café restaurant is located centrally within the site. The site contains a number of mature and semi-mature trees. These include a variety of locally-indigenous, non-local native and exotic (introduced) species.

2.1.3 Soils within this area have been extensively disturbed & modified for urban development. The soil materials of this site are likely to be highly variable, probably consisting of imported fill material which may include dredged estuarine sand and mud, rubble and rock mixed with local soil materials. Grassed areas are typically capped with up to 400mm of sandy loam. [1] The landscape generally consists of level to undulating terrain with slopes ranging usually less than 30% grade. The original soils of this area were probably typical of the Deep Creek Landscape Group (as classified in the Soil Landscapes of the Sydney 1:100,000 Sheet), consisting of "deep (greater than 2000 mm) *Silaceous Sands* and *Humus Podzols*" normally found along alluvial floodplain areas draining Hawkesbury Sandstone.[2] It is understood that the former alluvial floodplain was filled and graded during the 1870's, to create a roughly level open space area.

2.1.4 The original vegetation of this area probably consisted of swamp woodland.[3] Locally-indigenous tree species formerly occurring in this area may have included *Eucalyptus robusta* (Swamp Mahogany), *Eucalyptus botryoides* (Bangalay) and *Casuarina glauca* (Swamp Oak) and possibly *Melaleuca quinquenervia* (Broad-leaved Paperbark) in low lying, poorly drained areas and *Angophora costata* (Sydney Red Gum) *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus*

piperita (Sydney Peppermint) in better drained areas. *Ficus rubiginosa* (Port Jackson Fig) and *Glochidion ferdinandi* (Cheese Tree) may also have been present in sheltered well-drained areas. Tidal mudflats adjoining the original bay foreshore probably contained mainly salt marsh and presumably some macrophyte plants.

3 SUBJECT TREES

3.1.1 The subject trees were inspected by Earthscape Horticultural Services (EHS) on the 5th December 2023. 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 Kevin Brown and Associates, Dwg. Ref No. S-17201 [-] dated 18/02/2003 and ATS Land and Engineering Surveyors Pty Ltd, Dwg No. 10611-00 [A] dated 21/01/2019. The numbers used on this plan correlate with the Tree Assessment Schedule (**Appendix 3**). Tree No. T6 was not shown on the original survey and has been plotted on the drawing in its approximate position 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.[4] 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[5] 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 Part E, Chapter E3, Section E3.2.1 of the *Woollahra Development Control Plan 2015* (WDCP) made pursuant to Chapter 2, Part 2.3 of the *State Environmental Planning Policy (Biodiversity and Conservation) 2017* (Biodiversity 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. However, all of the subject trees are protected under the provisions of the WLEP, being either within the site of a Heritage Item, listed as a Heritage Item or listed on Council's Significant Tree Register (refer **Section 5.3**).

5.2.2 Wildlife Habitat

Ficus rubiginosa (Port Jackson Fig) [T2, T5, T6, T8 & T12], is a locally-indigenous species, representative of the original vegetation of the area and would be of 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

Rushcutters Bay Park is listed as an item of Environmental Heritage [Item 670] under Schedule 5, Part 1 of the *Woollahra Local Environmental Plan 2014* (WLEP). The Park is also listed on the State Heritage Register [Listing No. 02041] under Section 170 of the *Heritage Act 1977.*

The area of Rushcutters Bay originally contained swampy marshland. Rushes suitable for thatching huts were collected by early European settlers from the area, hence the name.

Rushcutters Bay Park was designed by engineer Fredrick Augustus Franklin, designer of Sydney Centennial Park. The park incudes a nineteenth century sandstone seawall and stormwater canal, which formalised a former natural watercourse traversing the site. Reclamation and filling of the former marshland commenced c. 1878. Some of the larger Moreton Bay Figs along New South Head Road are thought to have been planted from the 1860's. However, most of the original tree planting was undertaken after the reclamation and formalisation of the area as public open space, completed in c.1883. The dominant plantings included Port Jackson Figs, Moreton Bay Figs, London Plane trees and Broad-leaved Paperbarks. Plantings of Hills Weeping Figs along beach road were probably undertaken in the Inter-War Era (1919-1939).

5.3.2 Heritage Conservation Area

The site is *not* located within a Heritage Conservation Area under Schedule 5, Part 2 of the WLEP 2013.

5.3.3 Significant Tree Register

Rushcutters Bay Park is listed on Council's *Register of Significant Trees* Volume 4 (Significant Trees in Public Parks). This listing includes approximately thirteen (13) Moreton Bay Figs, one (1)

London Plane tree and five (5) Port Jackson Figs. These trees are thought to have been planted c. 1860-1890, being typical of the species used in Public Parks in the late Victoria Era.[6]

5.3.4 General

The 1943 Aerial Photograph of Sydney (SIX Maps) indicates that site had been formalised as a public park by this time, with similar layout that exists today. Trees T1 & T11 (London Plane tree), T2, T9, T13, T14 & T18 (Moreton Bay Figs) and T5 & T12 (Port Jackson Figs) were extant at this time as mature specimens and are likely to have been planted during the early development of the park.

Based on analysis of Historical Imagery of the site (NSW Spatial Services), the alignment of the diagonal path was changed c. 2004. Trees T6 & T8 (Port Jackson Figs) appear to have been planted at this time. The smaller Moreton Bay Figs alongside New South Head Road (T10, T15 & T17) were probably also planted during this period. The three (3) Canary Island Palms (T16, T19 & T20) whilst not distinguishable on the early aerial photos, were probably planted in the Inter-War Era, being typical of public plantings during this period.

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 to avoid any adverse impact on these trees (refer also **Appendix 2** for examples of acceptable encroachments) In addition to Tree Protection Zones, the extent of the canopy (canopy drip-line) should also be considered, particularly in relation to multi-storey developments. Significant canopy 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 11**).
"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 construction of a new Youth Recreation Facility within the park.

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 Plan	Convic	18103_CD011 [B]	04/05/2022
Grading Plan	Convic	18103_CD100 [B]	04/05/2022
Surface Finishes Plan	Convic	18103_CD103 [B]	04/05/2022
Planting Plan	Convic	18103_CD107 [B]	04/05/2022
Sections 01	Convic	18103_CD200 [B]	04/05/2022
Sections 02	Convic	18103_CD201 [B]	04/05/2022
Shelter Details 02	Convic	18103_CD501 [B]	04/05/2022

Shelter Details 02	Convic	18103_CD501 [B]	04/05/2022

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 skate park and associated pathways and paved areas are located within the TPZs of T3, T4, T13, T14 & T18 (Moreton Bay Fig) and T5, T6 & T12 (Port Jackson Fig). In the case of trees T3, T4, T6, T12, T13, T14, & T18, the extent of the encroachment to the root zones is less than 10% of the TPZs, which is considered within acceptable limits under AS 4970:2009. As such, the proposed works will not result in any adverse impact on these trees. In order to avoid any adverse impact on these trees, Tree Protection Fencing should be installed in accordance with **Section 10.4** and all excavation for the pavement sub-grade and skate park element foundations within the TPZs should be undertaken in accordance with **Section 10.8**.

9.1.4 In the case of T3, large woody surface roots (200 to 400mm in diameter) were observed extending 14 metres radius south of the tree (refer to **Plates 1 & 2**). These roots may conflict with the footprint of the works and therefore some root pruning may be required to accommodate the slab sub-grade. It is noted that the slab is located slightly above grade within the TPZ (about 200mm) and therefore it may be feasible to avoid root pruning. In order to avoid any adverse impact on this tree, all excavation for the pavement sub-grade and skate park element foundations within the TPZ should be undertaken in accordance with **Section 10.8** and any required root pruning should be carried out in accordance with **Section 10.13**.

9.1.1 In the case of T5 (Port Jackson Fig), the cumulative encroachment to the TPZ is approximately 16%, which exceeds acceptable limits under AS 4970:2009. This extent of encroachment has the potential to result in some adverse impact on this tree. It is noted that the slab is located slightly above grade within the TPZ (about 200mm) and therefore it may be feasible to avoid root pruning. Where possible, the finished level of the pavement should be raised (where required) to avoid severance and damage to woody roots in accordance with **Section 10.10 & 10.11**. In order to avoid any adverse impact on this tree, all excavation for the pavement sub-grade and skate park element foundations within the TPZ should be undertaken in accordance with **Section 10.8** and any required root pruning should be carried out in accordance with **Section 10.13**.

9.1.2 A proposed drainage swale is located within the TPZ of T14, T15, T17 & T18 (Moreton Bay Figs). In all instances, the extent of the encroachment to the root zones is less than 10% of the TPZs, which is considered within acceptable limits under AS 4970:2009. As such, the proposed works will not result in any adverse impact on these trees. As a precautionary measure, all excavation for the drainage swale within the TPZs of these trees should be undertaken in accordance with **Section 10.8.**

Plate 1 – Showing large woody surface roots extending approximately 14 metres south of T3 (Moreton Bay Fig).

Plate 2 – Showing large woody surface roots extending approximately 14 metres south of T3 (Moreton Bay Fig).

9.1.3 Some canopy pruning of Trees T12 (Port Jackson Fig) and T13 & T14 (Moreton Bay Fig) will be required to provided clearance to pedestrians using the facility and also to facilitate construction. In the case of T12 & T14, the pruning will be limited to the pruning (crown lifting) of a few descending tertiary branches (refer to **Plates 3 & 4**) to no greater than 2.5 metres from ground level. The estimated extent of crown loss is less than 10% of the overall canopy volume, which is within acceptable limits under AS 4373:2007. Therefore, the required pruning will not result in any adverse impact on these trees. In order to avoid any adverse impact on these trees, any required canopy pruning (that essential to facilitate construction and provide adequate clearance to facility users) should be undertaken in accordance with **Section 10.12**.

9.1.4 In the case of T13, more substantial canopy pruning is required. This will consist of the removal of one lower lateral primary limb of approximately 500mm in diameter and 20 metres in length at the junction with the trunk, and reduction of the primary limb immediately above it to suitable junctions. The terminal foliage and descending tertiary branches of both these limbs descends close to ground level within the footprint of the proposed works (refer to **Plate 5**). In order to avoid any adverse impact on this tree, any required canopy pruning (that essential to facilitate construction and provide adequate clearance to facility users) should be undertaken in accordance with **Section 10.12**.

9.1.5 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 Protection Fencing

10.4.1 Trees [**T3, T4, T5. T6, T11, T12, T13, T14, T15, T17 & T18**] 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.

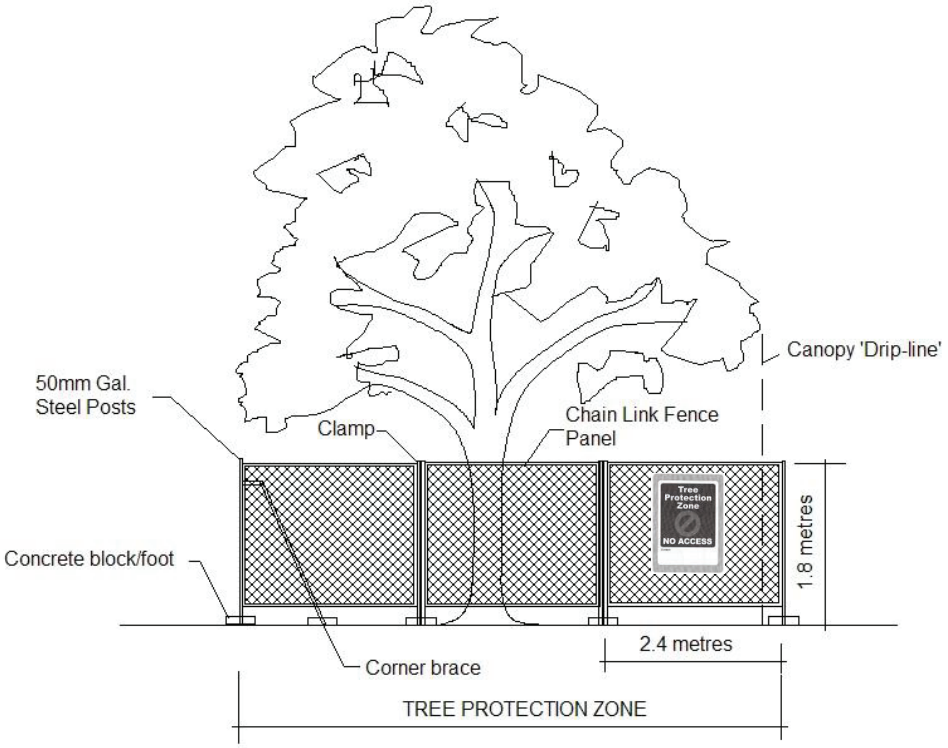

Figure 1 – Detail of Tree Protection Fence

10.5 Tree Protection Signs

10.5.1 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**.

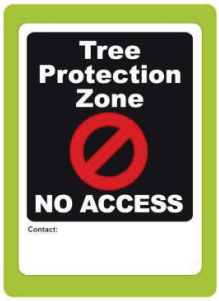

Figure 2 – Detail of Tree Protection Sign

10.6 Ground Protection

10.6.1 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.

10.6.2 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.

10.7 Demolition Works within Tree Protection Zones

10.7.1 Existing Turfgrass

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 Excavations within Tree Protection Zones

10.8.1 Prior to any mechanical excavations for building foundations or pavement sub-grade within the TPZs of Trees [**T3, T4, T5, T6, T11, T12, T13, T14, T15, T17 & T18**] 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.

10.8.2 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.

10.9 Alternative Construction Methods

10.9.1 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.

10.9.2 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.

10.9.3 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.

10.10 Underground Services

10.10.1 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.

10.10.2 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 10.9**. 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.

10.10.3 Installation of underground services and stormwater pipes within the SRZs of Trees [**any tree nominated for retention**], shall only be undertaken by Horizontal Directional Drilling (HDD) (also referred to as sub-surface boring or Micro-tunnelling for large diameter pipes). 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.

10.11 Pavements

10.11.1 Proposed paved areas within the TPZs of Trees [**T3 & T5**] shall be placed slightly above grade (200mm) where possible to minimise excavations within the root zone and avoid severance and damage of woody roots.

10.12 Canopy Pruning

10.12.1 Canopy pruning of Trees [**T12. T13 & T14**] (that essential to clear the building envelope and pedestrian access) as detailed in **Plates 3-5** shall be carried out in accordance with Australian Standard 4373-2007 – *Pruning of Amenity Trees*. 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].

Plate 3 – Showing descending tertiary branches on the north side of T12 (Port Jackson Fig) that mat require pruning to clear pedestrian access and facilitate construction.

Plate 4 – Showing descending tertiary branches on the north side of T14 (Moreton Bay Fig) that mat require pruning to clear pedestrian access and facilitate construction.

Plate 5 – Showing descending tertiary branches on the north side of T13 (Moreton Bay Fig). Branch A will need to be removed back to the junction with the trunk as there are no other satisfactory points of reduction close to the conflict. The end portion of Branch B can be reduced to the junction with a more ascending secondary branch as indicated to achieve an acceptable degree of clearance,.

10.13 Root Pruning

10.13.1 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.

10.13.2 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 any trees to accommodate the proposed development, an equivalent number of new trees capable of attaining a height of at least thirteen (13) metres at maturity should be planted in suitable locations within the park.

11.1.2 Replacement trees should be sympathetic with the historical era of the building and appropriate to the site conditions. The following species could be considered for replacement planting:-

- *Magnolia grandiflora* (Bullbay Magnolia)
- *Melaleuca leucadendra* (Cajuput)
- *Waterhousea floribunda* (Weeping Lillypilly)

- *Cupaniopsis anarcardiodes* (Tuckeroo)
- *Acmena smithii* (Lillypilly)
- *Syzygium paniculatum* (Magenta Cherry)
- *Syzygium leuhmannii* (Small-leaf Lillypilly)
- *Lophostemon confertus* (Brushbox)
- *Harpulia pendula* (Tulipwood)
- *Agathis robusta* (Queensland Kauri)
- *Araucaria heterophylla* (Norfolk Island Pine)
- *Araucaria cunninghamii* (Hoop Pine)
- *Brachychiton discolor* (Queensland Lacebark)
- *Ficus macrocarpa var. hillii* (Hills Weeping Fig)
- *Ficus rubiginosa* (Port Jackson Fig)
- *Ficus obliqua* (Small-leaf Fig)
- *Ficus macrophylla* (Moreton Bay Fig)
- *Ficus superba var henneana* (Deciduous Fig)

Andrew Morton
EARTHSCAPE HORTICULTURAL SERVICES
26th April 2024

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Kangaroo Press & The Royal Botanic Gardens, Sydney, NSW

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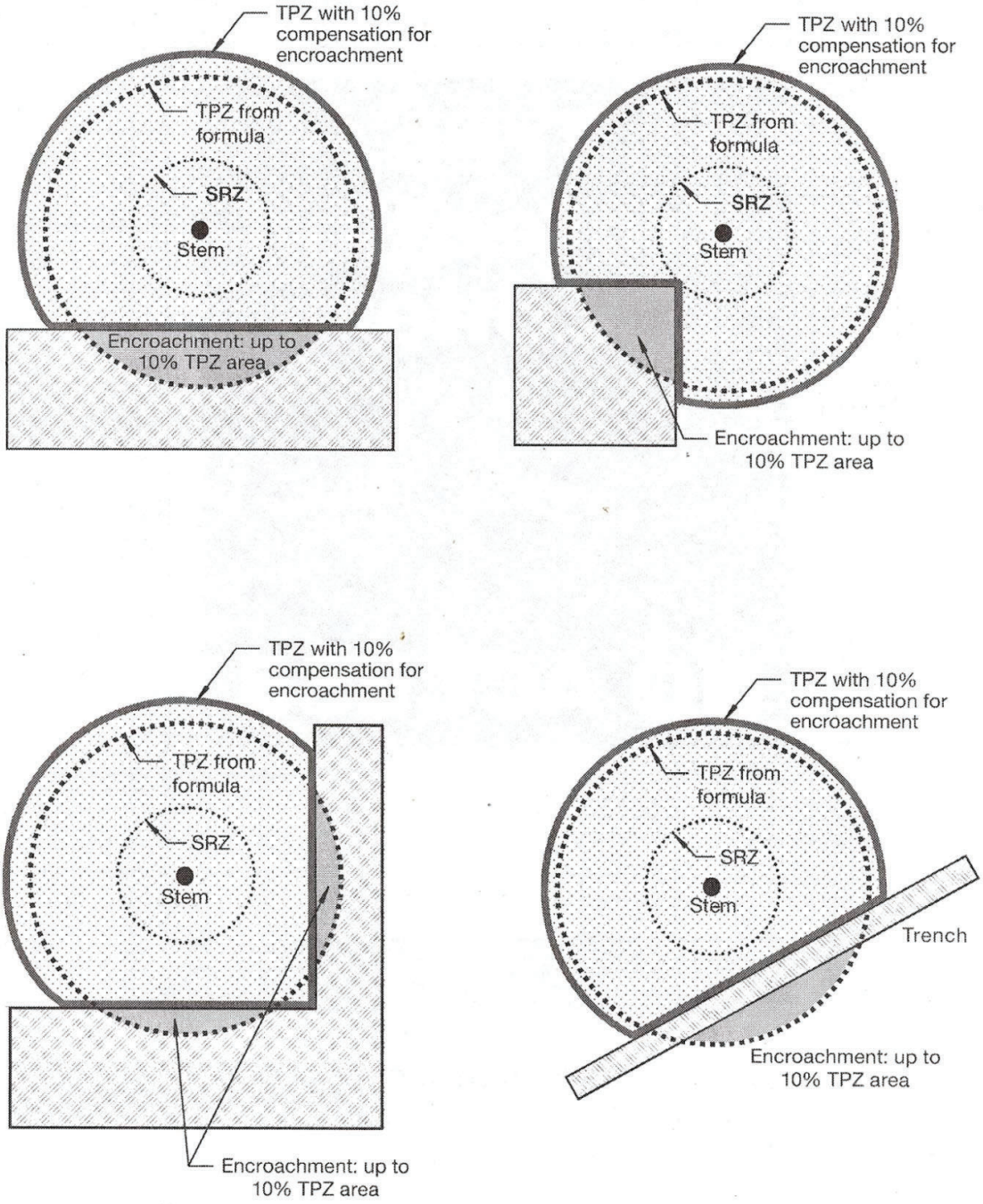
[7] Council of Standards Australia (August 2009)
AS 4970 – 2009 – Protection of Trees on Development Sites
Standards Australia, Sydney

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 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	***Platanus x hybrida*** (London Plane)	18	30	1500	510	M	Appears stable with sound branching structure. Exhibits a severe wound due borer damage in SL at 9 metres with some decay evident (overhanging pathway).	Selectively pruned. Selectively crown thinned & deadwooded	Good	Low borer infestation	Long - more than 40 years	1	High	On-site
2	***Ficus rubiginosa*** (Port Jackson Fig)	18	25	1401	375	M	Appears stable with sound branching structure. Exhibits multiple moderate wounds due to previous pruning with superficial decay at branch collars.	Selectively pruned. Selectively crown thinned & deadwooded	Fair with thinning crown	Low foliar insect infestation (Fig Psyllid)	Long - more than 40 years	1	High	On-site
3	***Ficus macrophylla*** (Moreton Bay Fig)	20	35	2600	630	M	Appears stable with fair branching structure. Exhibits multiple co-dominant lateral PLs at 4 metres. Some dieback with 5% deadwood. Large basal wound extending from GL to 3 metres with cavity and decay evident due old fire injury. Large woody surface roots (400mm in diameter) visible for 14 metres radius.	Selectively pruned. Selectively crown thinned & deadwooded	Good	Low foliar insect infestation (Fig Psyllid)	Long - more than 40 years	1	High	On-site
4	***Ficus macrophylla*** (Moreton Bay Fig)	13	10	449	120	SM	Appears stable with sound branching structure.	No Evidence	Very Good	Moderate foliar insect infestation (Fig Psyllid)	Long - more than 40 years	4	Moderate	On-site
5	***Ficus rubiginosa*** (Port Jackson Fig)	14	15	630 + 680	150	M	Appears stable with sound branching structure.	.Selectively crown thinned & deadwooded	Poor with sparse crown	No Evidence	Transient (less than 5 years)	1	Moderate	On-site
6	***Ficus rubiginosa*** (Port Jackson Fig)	8	12	525	72	SM	Appears stable with sound branching structure.	Deadwooded	Fair with slightly thinning crown	No Evidence	Long - more than 40 years	4	Moderate	On-site
7	***Platanus x hybrida*** (London Plane)	22	16	621	336	M	Appears stable with fair branching structure. Exhibits multiple moderate wounds to PLs + SLs due suspected Canker infection and possible secondary Cockatoo damage.	Crown lifted to 3 metres.	Very Good	Low foliar insect infestation (Sycamore Lace Bug)	Long - more than 40 years	3	High	On-site
8	***Ficus rubiginosa*** (Port Jackson Fig)	10	10	341	80	SM	Appears stable with sound branching structure. Exhibits moderate dieback with 30% deadwood and 30% epicormic growth.	No Evidence	Fair with thinning crown	Moderate foliar insect infestation (Fig Psyllid)	Short 5-15 Years	4	Low	On-site

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

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				
9	***Ficus macrophylla*** (Moreton Bay Fig)	20	32	2200	608	M	Appears stable with sound branching structure. Exhibits multiple moderate wounds with decay in old branch collars due previous pruning. Multiple extended lateral PLs at 4 metres.	.Selectively crown thinned & deadwooded	Very Good	No Evidence	Long - more than 40 years	1	High	On-site
10	***Ficus macrophylla*** (Moreton Bay Fig)	8	8	392	64	I	Appears stable with sound branching structure.	No Evidence	Good	Low foliar insect infestation (Fig Psyllid)	Medium 15-40 Years	4	Moderate	On-site
11	***Platanus x hybrida*** (London Plane)	23	30	1529	630	M	Appears stable with fair branching structure. Exhibits multiple moderate wounds to PLs + SLs due suspected Canker infection and possible secondary Cockatoo damage. 20% epicormic growth.	.Selectively crown thinned & deadwooded	Good	Moiderate foliar insect infestation (Sycamore Lace Bug)	Long - more than 40 years	1	High	On-site
12	***Ficus rubiginosa*** (Port Jackson Fig)	10	15	713	135	M	Appears stable with fair branching structure. Crown suppressed south side due to overshadowing with contorted branching habit.	.Selectively crown thinned & deadwooded	Fair with slightly thinning crown	Moderate foliar insect infestation (Fig Psyllid)	Medium 15-40 Years	1	High	On-site
13	***Ficus macrophylla*** (Moreton Bay Fig)	22	30	1700	660	M	Appears stable with sound branching structure. Crown suppressed south side due to crowding. Multiple extended lateral PLs	.Selectively crown thinned & deadwooded	Good	Low foliar insect infestation (Fig Psyllid)	Long - more than 40 years	1	High	On-site
14	***Ficus macrophylla*** (Moreton Bay Fig)	22	25	1800	500	M	Appears stable with fair branching structure. Exhibits a large basal cavity extending from lower trunk into root crown.	.Selectively crown thinned & deadwooded	Good	Low foliar insect infestation (Fig Psyllid)	Long - more than 40 years	1	High	On-site
15	***Ficus macrophylla*** (Moreton Bay Fig)	5	7	229	35	I	Appears stable with sound branching structure.	No evidence	Good	Low foliar insect infestation (Fig Psyllid)	Medium 15-40 Years	5	Low	On-site
16	***Phoenix canariensis*** (Canary Island Palm)	12	6	550	42	M	Appears stable with sound branching structure.	No evidence	Good	No Evidence	Long - more than 40 years	2	High	On-site
17	***Ficus macrophylla*** (Moreton Bay Fig)	6	10	230 + 280	60	I	Appears stable with sound branching structure. Upper crown suppressed due to overshadowing.	No evidence	Very Good	Low foliar insect infestation (Fig Psyllid)	Medium 15-40 Years	4	Moderate	On-site

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

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				
18	***Ficus macrophylla*** (Moreton Bay Fig)	22	30	1700	510	M	Stability suspect with sound branching structure. Exhibits a large cavity in the lower trunk	Selectively pruned. Selectively crown thinned & deadwooded	Good	No Evidence	Medium 15-40 Years	1	**High**	On-site
19	***Phoenix canariensis*** (Canary Island Palm)	14	7	600	56	M	Appears stable with sound branching structure.	No evidence	Good	No Evidence	Long - more than 40 years	2	**High**	On-site
20	***Phoenix canariensis*** (Canary Island Palm)	12	6	550	42	M	Appears stable with sound branching structure.	No evidence	Good	No Evidence	Long - more than 40 years	2	**High**	On-site

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
1	***Platanus x hybrida*** (London Plane)	M	15.0	3.9	10.2	706.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
2	***Ficus rubiginosa*** (Port Jackson Fig)	M	15.0	3.8	10.2	706.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
3	***Ficus macrophylla*** (Moreton Bay Fig)	M	16.5	4.9	11.2	854.9	Proposed paved area (half basketball court) offset 14.5 metres south-west at RL3.20 (200mm above grade). Excavations for pavement sub-grade within TPZ. Encroachment to TPZ = 3%.	Extent of encroachment to root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS4970:2009. Excavations for the pavement subgrade may conflict with some woody surface roots, necessitating root pruning.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.4. Undertake all excavations for the pavement sub-grade within the TPZ in accordance with Section 10.8. Undertake any required root pruning in accordance with Section 10.13.
4	***Ficus macrophylla*** (Moreton Bay Fig)	M	5.4	2.5	3.7	91.2	Proposed footpath offset 4.6 metres south-west at RL3.15 (close to existing grade) to RL3.35 (200mm above grade). Excavations for pavement sub-grade within TPZ. Encroachment to TPZ = 3%	Extent of encroachment to root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS4970:2009. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.4. Undertake all excavations for the pavement sub-grade within the TPZ in accordance with Section 10.8. Undertake any required root pruning 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
5	***Ficus rubiginosa*** (Port Jackson Fig)	M	10.2	3.3	6.9	326.7	Proposed footpath offset 3.2 metres north-east at RL3.15 (close to existing grade) to RL3.35 (200mm above grade). Excavations for pavement sub-grade within TPZ/SRZ. Encroachment to TPZ = 15%. Proposed skatepark offset 9.6 metres south. Excavations for foundations of trapezoidal edge block [200H Manual Pad Section 200D] within TPZ. Cummulative encroachment to TPZ = 16%	Extent of encroachment to the TPZ exceeds acceptable limits under AS4970:2009. Excavations for the pavement subgrade may conflict with some woody surface roots, necessitating root pruning, which may result in some adverse impact on this tree.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.4. Raise pathement level where required to avoid severance and damage to woody surface roots in accordance with Sections 10.10 and 10.12. Undertake all excavations for the pavement sub-grade and block foundations within the TPZ in accordance with Section 10.8. Undertake any required root pruning in accordance with Section 10.13.
6	***Ficus rubiginosa*** (Port Jackson Fig)	M	6.3	2.5	4.3	124.9	Proposed footpath offset 4.3 metres south-west at RL 4.17 to 3.58 (follows existing grade). Excavations for for pavement sub-grade within TPZ. Encroachment to TPZ = 10%.	Extent of encroachment to root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS4970:2009. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.4. Undertake all excavations for the footpath pavement sub-grade within the TPZ in accordance with Section 10.8. Undertake any required root pruning in accordance with Section 10.13.
7	***Platanus x hybrida*** (London Plane)	M	8.5	2.8	5.8	226.9	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
8	***Ficus rubiginosa*** (Port Jackson Fig)	M	5.5	2.2	3.7	95.0	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
9	***Ficus macrophylla*** (Moreton Bay Fig)	M	18.0	4.6	12.2	1017.4	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.

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
10	***Ficus macrophylla*** (Moreton Bay Fig)	M	4.7	2.3	3.2	69.4	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
11	***Platanus x hybrida*** (London Plane)	M	15.0	4.0	10.2	706.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
12	***Ficus rubiginosa*** (Port Jackson Fig)	M	9.5	2.9	6.5	283.4	Proposed pathway offset 9.3 metres north at RL3.55-3.62 (close to existing grade) and skatepark with associated earthen mound offset 6.5- 8.0 metres north-east at RL3.92 (450mm above grade). Excavations for foundations of elevated slab (downturned edge beam) and fill for mounding within TPZ. Cummulative encroachment to TPZ = 6%. Minor canopy pruning (crown-lifing of some lower descending branches) may be required to facilitate pedestrian access and construction.	Extent of encroachment to root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS4970:2009. No adverse impact. Extent of pruning is within acceptable limits under AS 4373:2007. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.4. Undertake all excavations for the wall foundations within the TPZ in accordance with Section 10.8. Undertake any required canopy pruning (crown lifting to no greater than 2 metres from GL, where required) to facilitate construction and clear pedestrian access in accordance with Section 10.12.
13	***Ficus macrophylla*** (Moreton Bay Fig)	M	16.5	4.1	11.2	854.9	Proposed skatepark with associated earthen mound offset 14.2 - 15.3 metres northt at RL3.92 (450mm above grade). Excavations for foundations of elevated slab (downturned edge beam) and fill for mounding within TPZ. Cummulative encroachment to TPZ = 2%. Some canopy pruning (crown-lifing of some lower descending branches) will be required to facilitate pedestrian access and construction. This will include removal of 1 x lower PL of approx 500mm diameter and 20 metres inlength and crown lifting one PL (refer to Plate 5)	Extent of encroachment to root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS4970:2009. No adverse impact. Extent of pruning is within acceptable limits under AS 4373:2007. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.4. Undertake all excavations for the wall foundations within the TPZ in accordance with Section 10.8. Undertake any required canopy pruning (crown lifting to no greater than 3 metres from GL, where required) to facilitate construction and clear pedestrian access in accordance with Section 10.12.

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

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

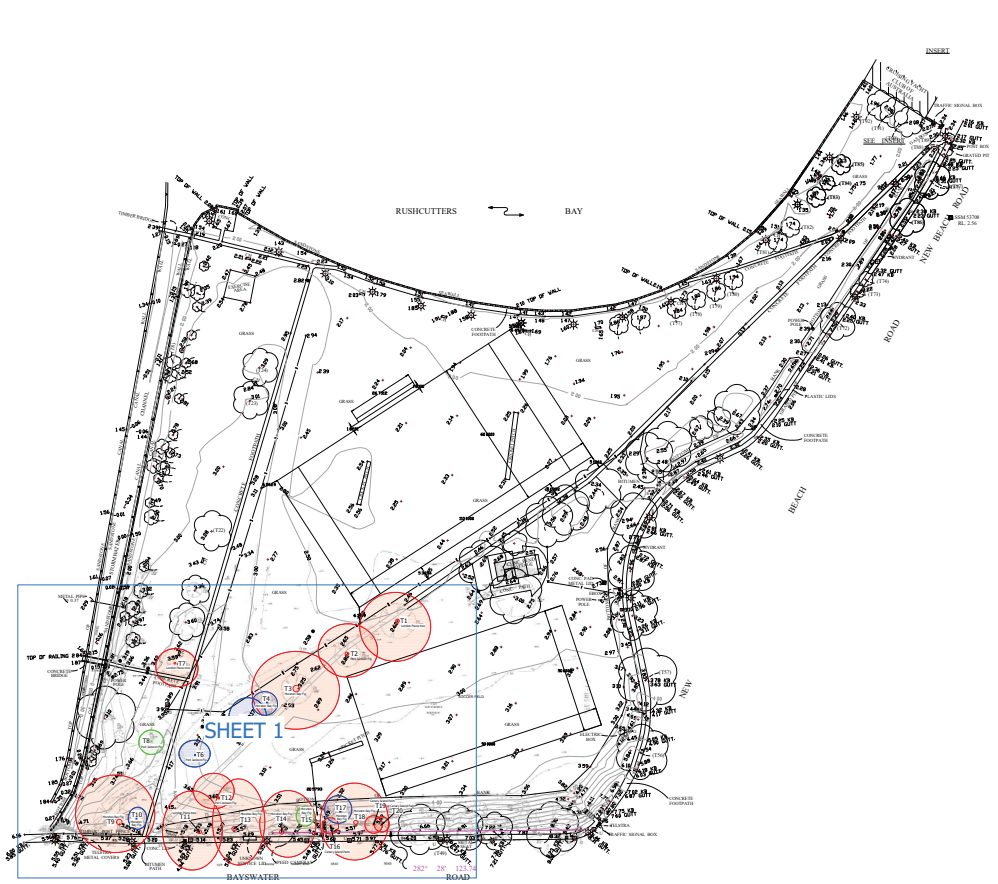
Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	Minimum Setback Distance (tangent to root plate)	TPZ (m^2)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
14	***Ficus macrophylla*** (Moreton Bay Fig)	M	15.0	4.2	10.2	706.5	Proposed skatepark offset 14.0 metres north at RL3.70 - 3.8 (200-300mm above grade). Excavations for foundations of elevated slab (downturned edge beam) and fill for mounding within TPZ. Minor encroachment to TPZ (less than 1%). Minor canopy pruning (crown-lifing of some lower descending branches) may be required to facilitate pedestrian access and construction. Proposed open swale drain offset 10 metres north at IL? (assumed 300-400mm below grade). Excavations for swale within TPZ. Potential cummulative encroachment to TPZ = 9%.	Extent of encroachment to root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS4970:2009. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.4. Undertake all excavations for the wall foundations within the TPZ in accordance with Section 10.8. Undertake any required canopy pruning (crown lifting to no greater than 3 metres from GL, where required) to facilitate construction and clear pedestrian access in accordance with Section 10.12.
15	***Ficus macrophylla*** (Moreton Bay Fig)	M	4.0	1.9	2.7	50.2	Proposed open swale drain offset 2.5 metres north at IL? (assumed 300-400mm below grade). Excavations for swale within TPZ. Potential cummulative encroachment to TPZ = 9%.	Extent of encroachment to root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS4970:2009. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.4. Undertake all excavations for the swale drain within the TPZ in accordance with Section 10.8.
16	***Phoenix canariensis*** (Canary Island Palm)	G	5.0	N/A	3.4	78.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
17	***Ficus macrophylla*** (Moreton Bay Fig)	M	6.0	2.5	4.1	113.0	Proposed open swale drain offset 2.5 metres north at IL? (assumed 300-400mm below grade). Excavations for swale within TPZ. Potential cummulative encroachment to TPZ = 9%.	Extent of encroachment to root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS4970:2009. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.4. Undertake all excavations for the swale drain within the TPZ in accordance with Section 10.8.

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
18	***Ficus macrophylla*** (Moreton Bay Fig)	M	15.0	4.2	10.2	706.5	Proposed open swale drain offset 10.7 metres north at IL? (assumed 300-400mm below grade). Excavations for swale within TPZ. Potential cummulative encroachment to TPZ = 4%.	Extent of encroachment to root zone is less than 10% of the TPZ, which is considered within acceptable limits under AS4970:2009. No adverse impact.	Retain in accordance with recommended Tree Protection Measures (Section 10). Install Tree Protection Fencing in accordance with Section 10.4. Undertake all excavations for the swale drain within the TPZ in accordance with Section 10.8.
19	***Phoenix canariensis*** (Canary Island Palm)	G	5.0	N/A	3.4	78.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
20	***Phoenix canariensis*** (Canary Island Palm)	G	5.0	N/A	3.4	78.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.

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



APPENDIX 5
TREE LOCATION PLAN SHOWING
TREE RETENTION VALUES

Rushcutters Bay Youth Recreation Facility
Rushcutters Bay Park, RUSHCUTTERS BAY

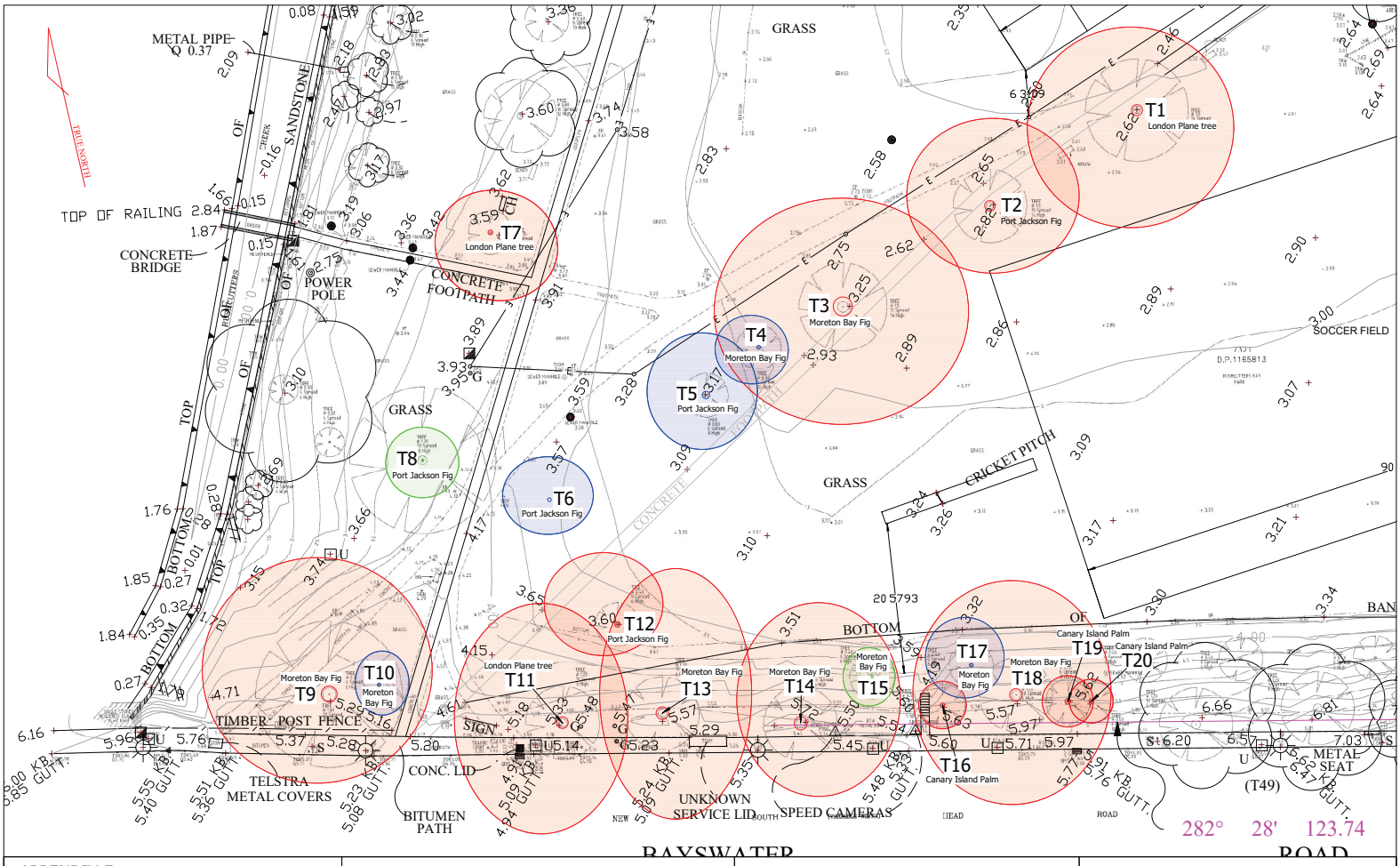
Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Survey Drawing
prepared by Kevin Brown & Associates
Dwg Ref No. S-17201 [-]
Dated 18/02/2003

DWG No. T23-1213/01 [B]

KEY PLAN

DATE: 26/04/2024



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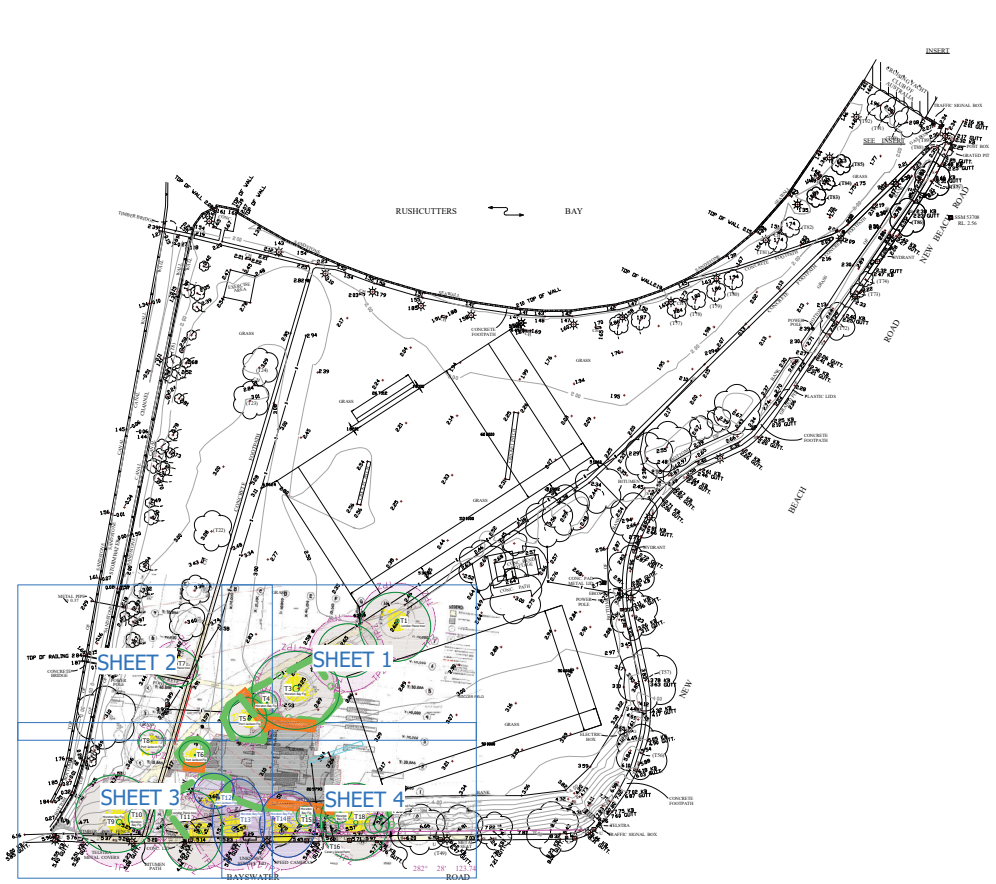

APPENDIX 6
TREE PROTECTION PLAN

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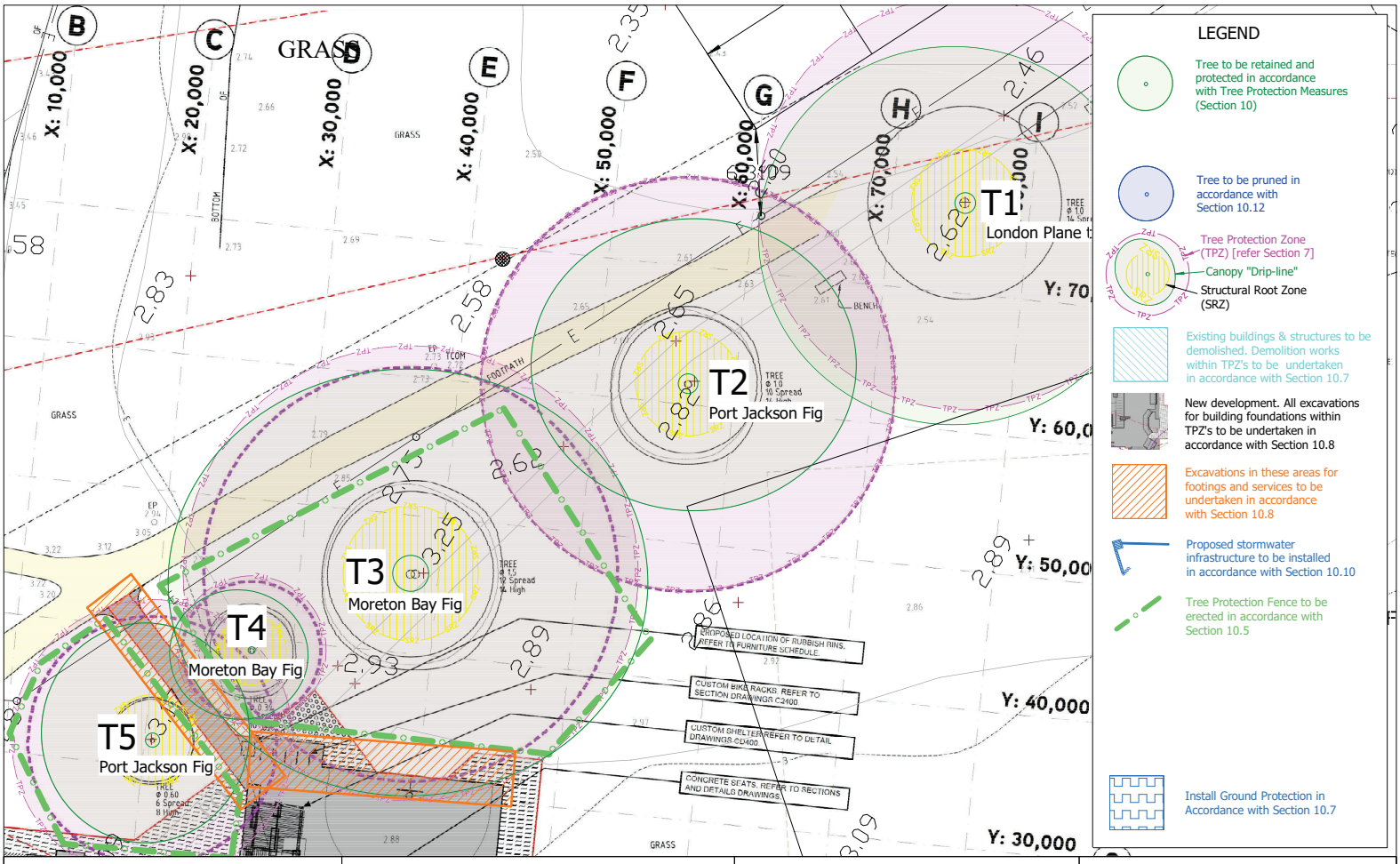

LEGEND

- Tree to be retained and protected in accordance with Tree Protection Measures (Section 10)
- Tree to be pruned in accordance with Section 10.12
- Tree Protection Zone (TPZ) [refer Section 7]
- Canopy "Drip-line"
- Structural Root Zone (SRZ)
- Existing buildings & structures to be demolished. Demolition works within TPZ's to be undertaken in accordance with Section 10.7
- New development. All excavations for building foundations within TPZ's to be undertaken in accordance with Section 10.8
- Excavations in these areas for footings and services to be undertaken in accordance with Section 10.8
- Proposed stormwater infrastructure to be installed in accordance with Section 10.10
- Tree Protection Fence to be erected in accordance with Section 10.5
- Install Ground Protection in Accordance with Section 10.7

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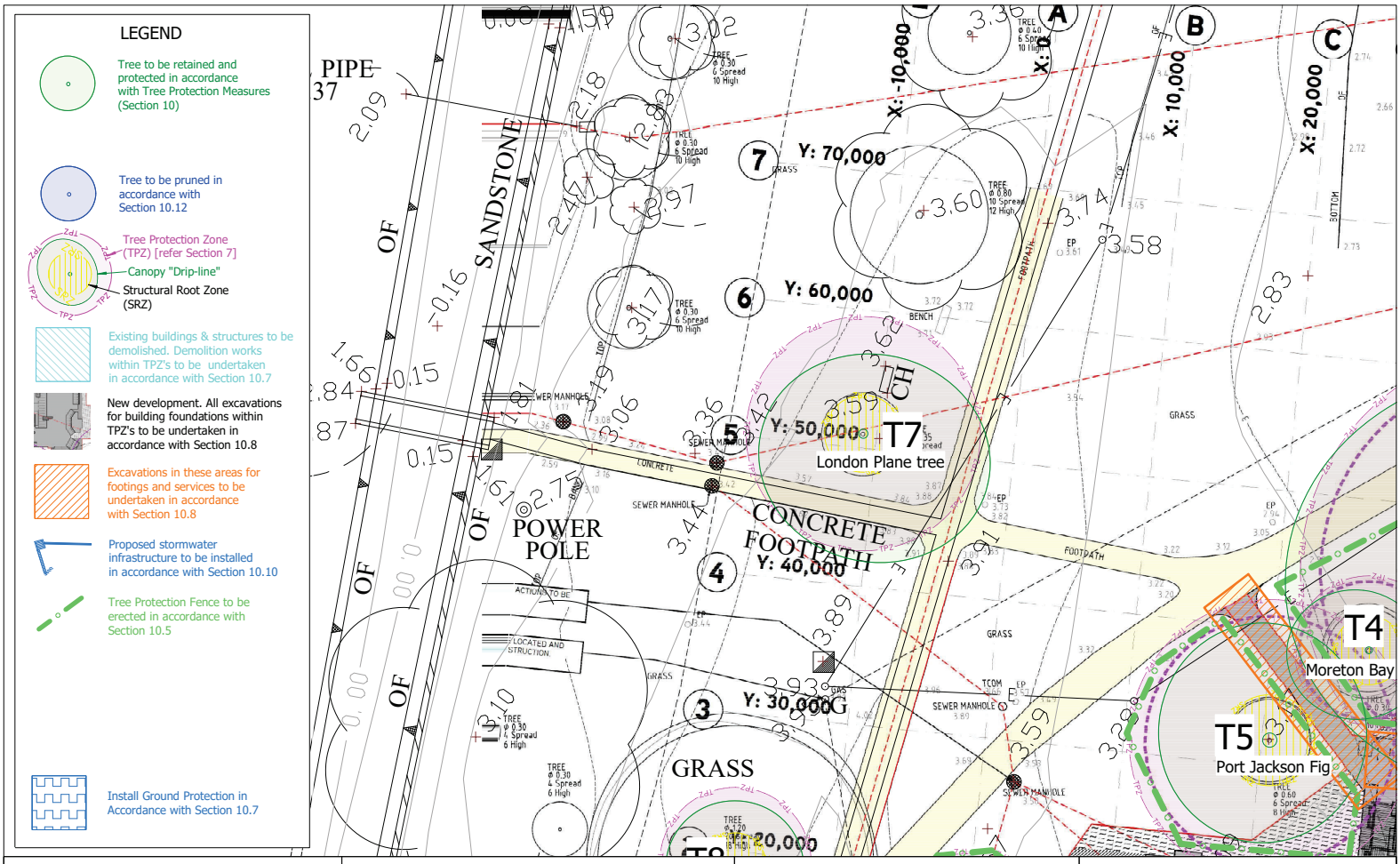

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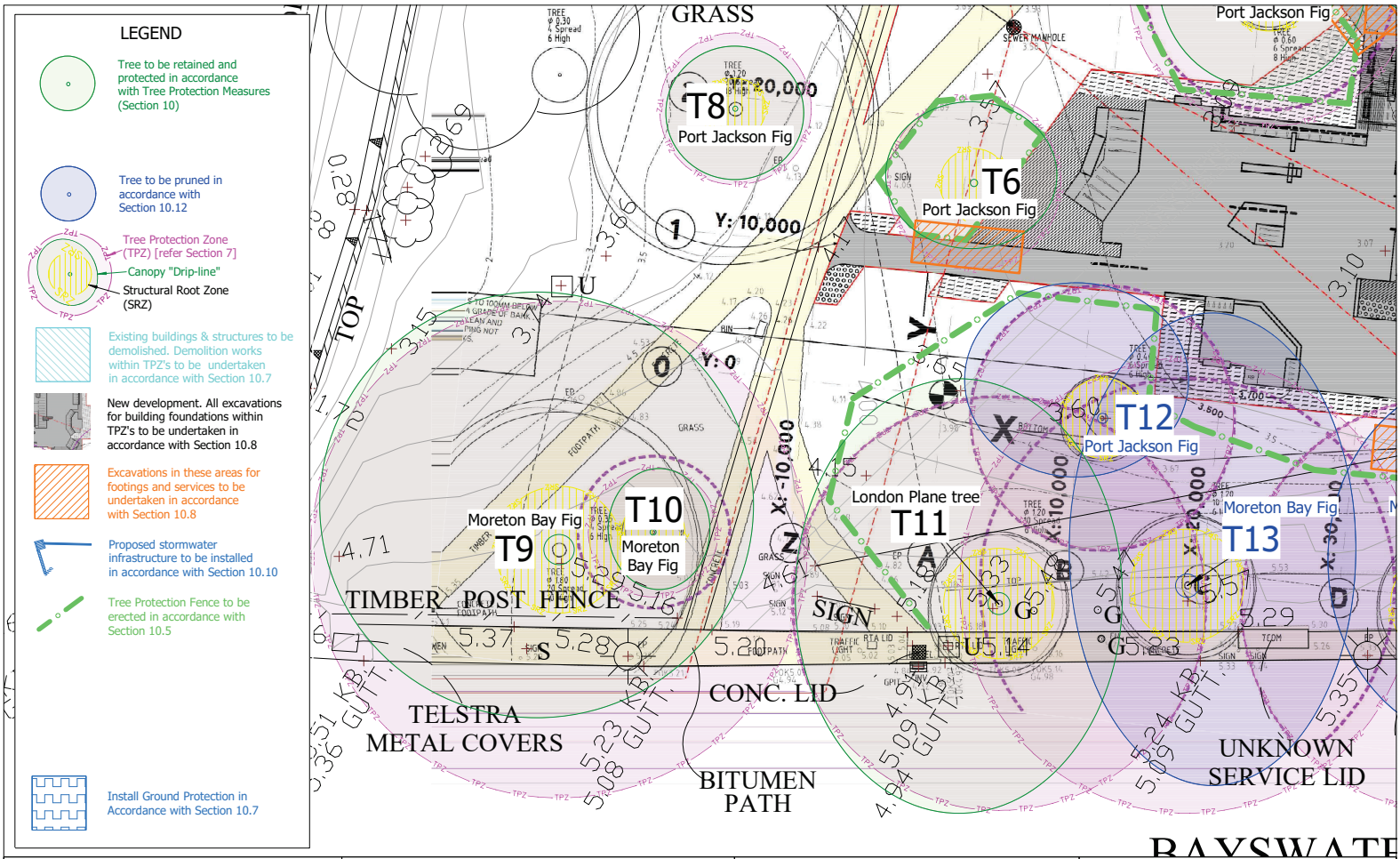

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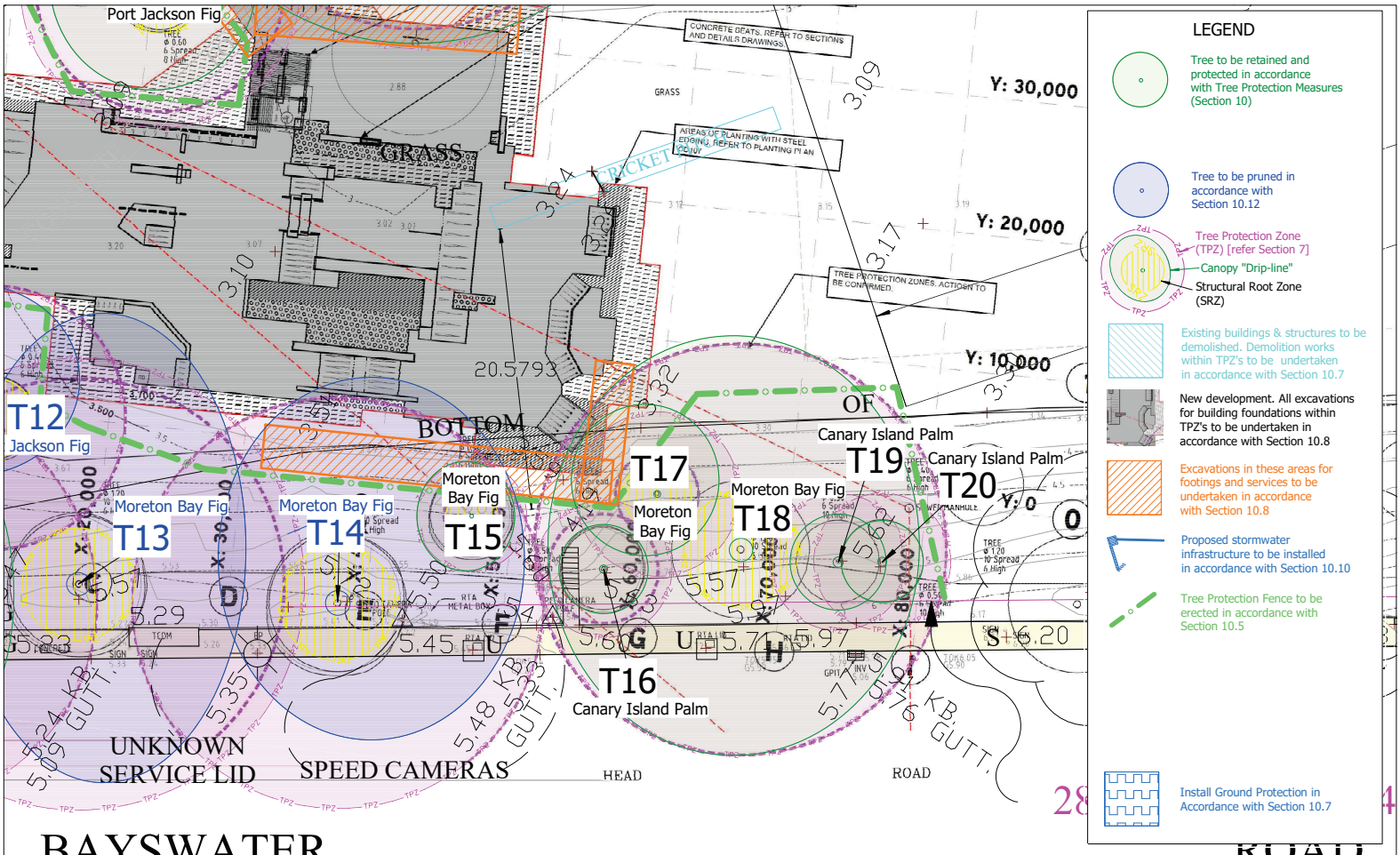

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