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**ARBORICULTURAL IMPACT
ASSESSMENT REPORT**

**TRANSPORT ACCESS PROGRAM
(TAP) 3**

**WARRAWEE (RAILWAY) STATION
HEYDON AVENUE, WARRAWEE**

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1 INTRODUCTION

1.1.1 This report was commissioned by WSP Australia on behalf of Transport for NSW (TfNSW) to assess the health and condition of fourteen (14) trees located in the vicinity of Warrawee Railway Station, Heydon Avenue, Warrawee. The report has been prepared to aid in the assessment of a *Review of Environmental Factors* (REF) for proposed upgrade works at the Station associated with the Transport Access Program (TAP) 3. The TAP3 is an initiative to provide a better experience for public transport customers by delivering accessible, modern, secure and integrated transport infrastructure.

1.1.2 The upgrade to Warrawee Station as part of TAP3 will include the following works:-

Scope element	Proposal –Lift to Platform, 1 Lift	Location within station precinct
Stair upgrades	Upgrade of the existing stairs at the station to include new compliant handrails, tactiles and nosing.	Station entry and Platforms 1 and 2
Lift	Installation of a new lift and landing to provide access between Heydon Avenue and Warrawee Avenue. The lift would provide a connection between the platform and the existing pedestrian bridge.	Station entry and Platforms 1 and 2
Family accessible toilet	Adjustment to an existing internal wall of the station building to accommodate a new family accessible toilet and a unisex ambulant toilet. Additional amendments would include: o lowering the floor slab to allow for level access from the platform o adjustment of the existing door width.	Station building
Accessible parking and kiss and ride areas	Three kiss-and-ride bays to be provided on Warrawee Avenue and two accessible car parking bays and a kiss and ride bay on Heydon Avenue would be provided on together with an upgrade to the existing footpath and new kerb ramps	Station entrances opposite existing pedestrian bridge
TGSI upgrades	Provision of new TGSI along the full length of the platform to create a platform edge warning zone.	Platforms 1 and 2
Lighting, signage, CCTV and hearing augmentation	Upgrading the general railway station infrastructure including DDA signage and wayfinding signage, CCTV, lighting and hearing augmentation loop.	Various locations within station precinct
Platform regrade	Replacement of the existing non-compliant tactiles along Platforms 1 & 2 with a new yellow line and tactile indicators.	Platforms 1 and 2

1.1.3 The purpose of this report is to assess the potential impact of the proposed development on the subject trees, together with recommendations for amendments to the design or construction methodology where necessary to minimise any adverse impact. The report also provides recommended tree protection measures to ensure the long-term preservation of the trees to be retained where appropriate.

1.1.4 This report has been prepared in accordance with Ku-ring-gai Council's guidelines for preparation of Arborists Reports as outlined in Section 5 of Council's *Development Application Guide* dated

October 2010 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 known as part of Lot 100 in DP 1169206, being Warrawee Station, Heydon Avenue, Warrawee. For the purposes of this report, the subject property will be referred to as ‘the site’. The site is zoned Infrastructure [SP2] (Infrastructure) under the *Ku-ring-gai Local Environmental Plan* (KLEP) 2015. The adjoining area adjacent the main pedestrian entry on the western side of the Station is zoned Public Recreation [RE1] and the eastern side in the vicinity of the Warrawee Avenue pedestrian entry is zoned Low Density Residential [R2] under the KLEP 2015. The site contains the Warrawee Station building located on a central island platform within the North Shore [railway] Line together with associated infrastructure, including a pedestrian overbridge. A number of trees are located on the platform and on the eastern and western sides of the site in the vicinity of the pedestrian overbridge. These include a variety of locally-indigenous, non-local native and exotic (introduced) species.
- 2.1.2 The soils of this area are typical of the Glenorie Soil Landscape Group (as classified in the *Soil Landscapes of the Sydney 1:100,000 Sheet*), consisting of “shallow to moderately deep (less than 1000mm) *Red Podzolic Soils* on crests, moderately deep (700 – 1500 mm) *Red & Brown Podzolic Soils* on upper slopes and deep (greater than 2000mm) *Yellow Podzolic Soils* on lower slopes”. Soil materials are derived from Wianamatta shales. The landscape of the area generally consists of undulating to rolling low hills with slopes of 5-20%.¹
- 2.1.3 The original vegetation of this area consisted of tall open forest (Blue Gum High Forest) which was progressively logged for timber-getting from early in the nineteenth century then cleared for agricultural use (mainly orchards and market gardens) and later for residential development.² The dominant locally-indigenous tree species found in this area include *Eucalyptus saligna* (Sydney Blue Gum) and *Eucalyptus pilularis* (Blackbutt). Other species occurring in this vegetation community may include *Syncarpia glomulifera* (Turpentine), *Eucalyptus paniculata* (Grey Ironbark), *Angophora floribunda* (Rough Barked Apple), *Eucalyptus acmenoides* (White Mahogany), *Angophora costata* (Sydney Red Gum), *Eucalyptus resinifera* (Red Mahogany) and *Allocasuarina torulosa* (Forest Oak).

3 SUBJECT TREES

- 3.1.1 The subject trees were inspected by Earthscape Horticultural Services (EHS) on the 14th January 2019. Each tree has been provided with an identification number for reference purposes denoted on the attached Tree Location Plan (**Appendix 5**), based on the Site Plan prepared by Design Inc Pty Ltd, Dwg No. TAP-150111-AR-1001 [4], dated 14/11/18. The numbers used on this plan correlate with the Tree Assessment Schedule (**Appendix 3**). Tree No.s T2, T4, T11 & T12 were not shown on the site plan and have been plotted on the drawing in their approximate positions.

4 HEALTH AND CONDITION ASSESSMENT

4.1 Methodology

- 4.1.1 An assessment of each tree was made using the Visual Tree Assessment (VTA) procedure.³ All of the trees were assessed in view from the ground. No aerial inspection or diagnostic testing has been undertaken as part of this assessment.
- 4.1.2 The following information was collected for each tree:-
- Tree Species (Botanical & Common Name);
 - Approximate height;

- Canopy spread; measured using a metric tape and an average taken.
- Trunk diameter (measured at 1.4 metres from ground level);
- Live Crown Size; (measured by subtracting the total height of the tree from the lowest point of the crown and multiplying by the average crown spread to give a value in square metres).
- Health & vigour; using foliage size, colour, extension growth, presence of disease or pest infestation, canopy density, presence of deadwood, dieback and epicormic growth as indicators,
- Condition; using visible evidence of structural defects, instability, evidence of previous pruning and physical damage as indicators.
- Suitability of the tree to the site and its existing location; in consideration of damage or potential damage to services or structures, available space for future development and nuisance issues.

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 Expectancy⁴ of the tree is an estimate of the sustainability of the tree in the landscape, calculated based on an estimate of the average age of the species in an urban area, less its estimated current age. The life expectancy of the tree has been further modified where necessary in consideration of its current health and vigour, condition and suitability to the site. The estimated SULE of each tree is shown in **Appendix 3**.

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

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

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 Ku-ring-gai are protected under Part 13 (Tree and Vegetation Preservation) of Volume A of the *Ku-ring-gai Development Control Plan 2015* (KDCP), made pursuant to Clause 9 of the *State Environmental Planning Policy (Vegetation in Non-rural Areas) 2017* (SEPP VNRA). The KDCP generally protects all trees of a height of five (5) metres or greater or with a trunk diameter of 150mm or greater. Some exemptions apply. However, all of the subject trees are protected under the provisions of the KDCP 2015 (being located within a Heritage Conservation Area and within land identified as a Heritage Item).

5.2.2 Wildlife Habitat

Angophora floribunda (Rough-barked Apple) [T6] and *Eucalyptus pilularis* (Blackbutt) [T7] are both locally-indigenous species, representative of the original vegetation of the area and would be of benefit to native wildlife. T7 contains several large cavities that may 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

Olea europaea subsp. africana (African Olive) [T2] is scheduled as a potential 'Biosecurity Risk' ('Priority Weed' – formerly 'Noxious Weed') within NSW under the provisions of the *Biosecurity Act 2015*. The growth of this plant species must be managed in a manner that continuously inhibits the ability of the plant to spread (so far as is reasonably practicable) and the plant must not be sold, propagated or knowingly distributed.

5.2.4 Threatened Species & Ecological Communities

None of the subject trees are listed as Threatened or Vulnerable Species under the provisions of the *Biodiversity Conservation Act 2016* (NSW) or the *Environment Protection and Biodiversity Conservation Act 1999*.

The National Parks and Wildlife Service (NPWS) 1:25000 Mapping Series (*Native Vegetation of the Cumberland Plain*)⁵ indicates that the dominant native vegetation community within the site is classified as Blue Gum High Forest (BGHF). BGHF is listed as a Critically Endangered Ecological Community (EEC) under the *Threatened Species Conservation Act 1995* (NSW) and the *Environment Protection and Biodiversity Conservation Act 1999*. The NSW Scientific Community has determined that highly modified relics of this vegetation community may persist as small clumps of trees without a native understorey. As such, small groups and individual remnants of locally-indigenous trees may form part of this EEC even if they are not contiguous with any bushland area or larger stand of trees.

Eucalyptus pilularis (Blackbutt) [T7] is a Positive Diagnostic Species of BGHF⁶ and *Angophora floribunda* (Rough-barked Apple) [T6] is an associated canopy species, occurring less frequently in this EEC. These trees are likely to be self-sown progeny of the original forest and therefore are considered to form part of the BGHF EEC.

5.2.5 Biodiversity

The western side of the site in the vicinity of the intersection of Heydon Avenue and Borambil Street is indicated as containing 'Areas of Biodiversity Significance' as indicated on Council's Natural Resources Biodiversity Map forming part of the KLEP 2015. This correlates with the location of T6 & T7.

Council's Greenweb Map indicates that western side of the site contains 'Landscape Remnants' in the same area (as identified as Biodiversity) correlating with T6 & T7, with some 'Canopy Remnants' on the eastern side of the railway on the rail embankment adjacent to the pedestrian overbridge. Note that there are no Canopy Remnants remaining on the eastern side of the station. The map does *not* show any 'Core Biodiversity Lands', 'Support for Core Biodiversity Lands' or 'Biodiversity Corridor and Buffer Areas' in the vicinity of the site.

The site does *not* contain any 'Riparian Land' as indicated on Council's Natural Resources Riparian Land Map forming part of the KLEP 2015.

5.3 Heritage Significance

5.3.1 Heritage Items

The subject property is listed as an item of Environmental Heritage [Item 1105 – 'Warrawee Railway Station Group'] of Local Significance under Schedule 5, Part 1 of the KLEP 2015. The site is also listed as a Heritage Item on the *NSW State Agency Heritage Register* (State Rail Authority of NSW) and the RailCorp *Section 170 Heritage and Conservation Register*. The original station platform was constructed c. 1900, then demolished and an island platform with brick station building constructed c. 1909, following duplication of the railway line. The precast concrete footbridge was constructed c. 1977, with gable steel roof added c. 1995.⁷

5.3.2 Heritage Conservation Area

The western side of the rail corridor site is located within a Heritage Conservation Area (HCA) [Area C2 – Heydon Avenue, Warrawee and Woodville Avenue, Wahroonga Conservation Area] and the eastern side is also located within an HCA [Area C3 – Warrawee Conservation Area] under Schedule 5, Part 2 of the KLEP 2015.

5.3.3 Significant Tree Register

Ku-ring-gai Council does *not* currently maintain a Register of Significant Trees.

5.3.4 General

None of the 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 PRIORITIES.

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).⁸

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

7.2 Structural Root Zone (SRZ)

- 7.2.1 The Structural Root Zone (SRZ) provides the bulk of mechanical support and anchorage for a tree. This is also a radial distance measured from the centre of the trunk as specified in **Appendix 4**. The SRZ has been calculated in accordance with AS 4970-2009 (Protection of Trees on Development Sites).
- 7.2.2 Incursions within the SRZ are not recommended as they are likely to result in the severance of woody roots which may compromise the stability of the tree or lead to its decline and demise.

7.3 Acceptable 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 (*Pruning of Amenity Trees*). 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 upgrade of the station platform and building as well as pedestrian approaches to the Station (refer to **Section 1.1.2** of this report for a detailed summary of the proposed works).

9 IMPACT ASSESSMENT

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

Title	Author	Dwg No.	Date
<i>Site Plan</i>	DesignInc	TAP-150111 AR-1001 [4]	14/11/2018

- 9.1.2 A summary of the impact of the proposed development on each tree within the site is shown in **Appendix 5**. The following criteria have been examined as part of this assessment:-

- Existing Relative Levels (R.L.);
- Tree Protection Zone (TPZ);
- Structural Root Zone (SRZ);
- Footprint and envelope of the proposed development and temporary structures (scaffolding, hoardings etc);
- Incursions to the TPZ & SRZ, including estimated cut & fill beyond the building footprint;
- Incursions to the tree canopy from the building envelope and temporary structures; and
- Assessment of the likely impact of the works on existing trees.

- 9.1.3 The proposed development will necessitate the removal of two (2) trees of low retention value, which are located on the eastern side of the rail corridor along Warrawee Avenue, north of the pedestrian footbridge, where the proposed footpath widening works are to occur (refer **Appendix 6**). These include Tree No.s T15 (Cedar Wattle) & T16 (Chinese Elm). Neither of these trees are considered significant or worthy of special measures to ensure their preservation. The removal of these trees to accommodate the proposed development is therefore considered warranted in this instance. 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 The proposed development will also necessitate the removal of three (3) trees of moderate retention value. These include Tree No.s T8 (Evergreen Ash), located on the central island platform, and T11 & T12 (Chinese Elm), which are located on the eastern side of the rail corridor along Warrawee Avenue south-east of the pedestrian footbridge, where the proposed footpath widening works are to occur (refer to **Appendix 6**). None of these trees have any special ecological or heritage significance, being fairly recent plantings. However, all of these trees are in good health and condition and make a fair contribution to the amenity of the streetscape. 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**.

- 9.1.5 Widening and resurfacing the footpath on the western side of the station (in Heydon Avenue) may require part demolition and re-sheeting of the asphalt and paved footpath within the TPZs of Trees T1 (Jacaranda), T2 & T4 (Lillypilly) and T3 (African Olive) in order to meet the new levels of the kerb and parking bays. Given that any new pavement will be in the same footprint and similar level to the existing pavement, this work will not result in any increase to the present encroachment, nor result in any actual incursion to the root zones of these trees. As such, the proposed works will not result in any adverse impact on these trees, provided that all demolition work within the TPZs (where required) is undertaken in accordance with **Section 10.5** and any required excavation within the TPZs (for the new pavement sub-grade) is undertaken in accordance with **Section 10.6**.

9.1.6 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, 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, excavators and similar plant & 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 [**T8, T11, T12, T15 & T16**] 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

10.5 Demolition Works within Tree Protection Zones

- 10.5.1 Demolition of paved areas within the Tree Protection Zones (TPZs) of trees [**T1, T2, T3, T4, T13 & T14**] (where required) shall be undertaken under the supervision of a qualified Arborist [Australian Qualification Framework (AQF) Level 5].
- 10.5.2 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. 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.
- 10.5.3 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 where required to avoid compaction of the underlying soil profile and avoid damage to any underlying woody roots.
- 10.5.4 Demolition of existing walls, kerbs and other structures within the TPZ of trees [**T1, T2, T3, T4, T13 & T14**] shall be undertaken under the supervision of a qualified Arborist [AQF level 5]. The structures shall be demolished using equipment stationed outside the TPZ where possible or within the footprint of existing hardstand areas.
- 10.5.5 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.

10.6 Excavations within Tree Protection Zones

- 10.6.1 Prior to any mechanical excavations for building foundations or pavement sub-grade within the TPZs of Trees [**T1, T2, T3, T4, T13 & T14**] exploratory excavation using non-destructive techniques shall be taken along the perimeter of the structure or pavement within the TPZ. Non-destructive excavation techniques may include the use of hand-held implements, air pressure (using an Air-spade® device) or water pressure. The exploratory excavation shall be undertaken along the perimeter of the foundation or pavement (within the TPZ) to the depth of the foundation or to a maximum of 800mm from surface levels, to locate and expose any woody roots prior to any mechanical excavation.
- 10.6.2 All care shall be undertaken to preserve woody roots intact and undamaged during exploratory excavation. Any roots encountered of less than 50mm in diameter may be cleanly severed with clean sharp pruning implements at the face of the excavation. The root zone in the vicinity of the excavation shall be kept moist following excavation for the duration of construction to minimise moisture stress on the tree. Where large woody roots (greater than 50mm diameter) are encountered during exploratory excavations, further advice from a qualified arborist shall be sought prior to severance.

- 10.6.3 Where necessary, (to avoid severing large woody roots) consideration should be given to raising the proposed pavement level and using a porous fill material in preference to excavation where large woody roots are found within the sub-base.

10.7 Underground Services

- 10.7.1 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 10.6**. 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.

10.8 Pavements

- 10.8.1 Proposed paved areas within the TPZs of Trees [**any tree nominated for retention**] shall be placed at or slightly above grade where possible to minimise excavations within the root zone and avoid severance and damage of woody roots. The pavement sub-base material should be supplied and installed in accordance with **Section 10.10**.

10.9 Pavement Sub-base

- 10.9.1 Pavement sub-base material within TPZs of trees [**any tree nominated for retention**] shall be a coarse, gap-graded material such as 20 – 50mm crushed basalt (Blue Metal) or equivalent no-fines gravel material to provide some 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 may be used beneath the sub-base to prevent migration of the stone into the sub-grade and provide greater load capacity.

10.10 Canopy & Root Pruning

- 10.10.1 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.
- 10.10.2 Any required root pruning 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 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, new trees shall be planted elsewhere within appropriate areas in accordance with the TfNSW *Vegetation Offset Guideline* (2017) [9TP-SD087/1.0]. **Table 1** in

Section 5.2 of The *Vegetation Offset Guideline* specifies the ratio of trees to be replaced in relation to trees to be removed as follows:-

Table 1 - Offsetting for Individual Tree Removal

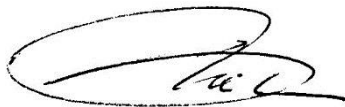
Tree Type	Offset
Large tree (DBH greater than 60 cm)	Plant minimum 8 trees
Medium tree (DBH greater than 15 cm, but less than 60 cm)	Plant minimum 4 trees
Small young tree (DBH less than 15 cm)	Plant minimum 2 trees

Ref: Extract from *Vegetation Offset Guideline* (2017) [9TP-SD087/1.0].

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

- *Fraxinus graffithii* (Evergreen Ash) [Station Platform].
- *Ulmus parvifolia* (Chinese Elm)
- *Magnolia grandiflora* (Bullbay Magnolia)
- *Elaocarpus reticulatus* (Blueberry Ash)
- *Glochidion ferdinandi* (Cheese Tree).

11.1.3 Careful consideration should be given to new planting locations to avoid the existing overhead High Voltage powerlines on the eastern side of the railway line.



Andrew Morton
EARTHSCAPE HORTICULTURAL SERVICES
5th February 2019

12 REFERENCES

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⁵ National Parks and Wildlife Service of NSW (October 2002)

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⁶ Tozer, Mark (2003)

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⁷ Office of Environment and Heritage (March 2009)

Warrawee Railway Station Group

State Heritage Inventory (Heritage Database)

<https://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=4802042>

⁸ Council of Standards Australia (August 2009)

AS 4970 – 2009 – Protection of Trees on Development Sites

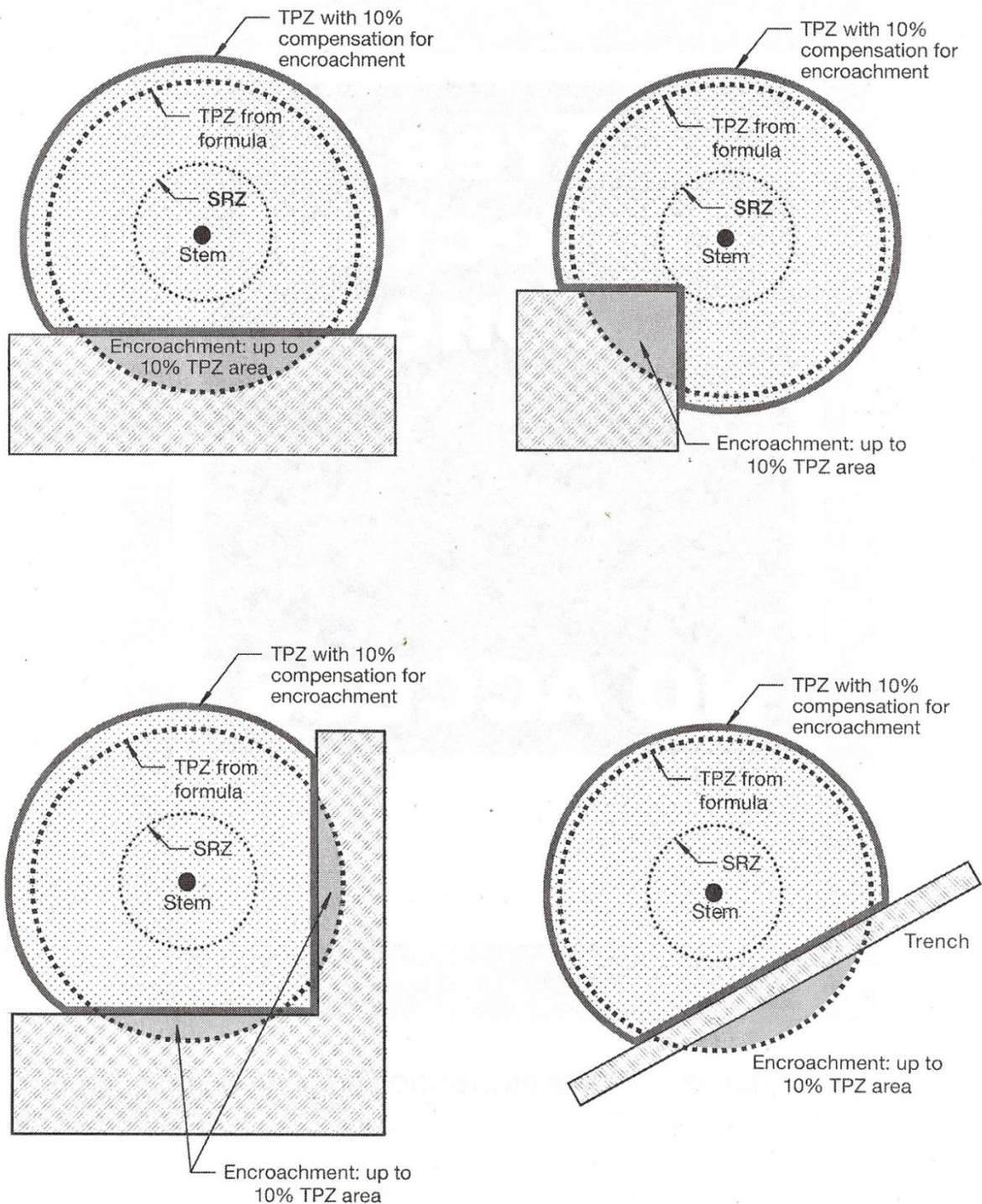
Standards Australia, Sydney

APPENDIX 1 - CRITERIA FOR ASSESSMENT OF LANDSCAPE SIGNIFICANCE

RATING	HERITAGE VALUE	ECOLOGICAL VALUE	AMENITY VALUE
1. SIGNIFICANT	The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed on Council's Significant Tree Register	The subject tree is scheduled as a Threatened Species as defined under the <i>Biodiversity Conservation Act 2016</i> or the <i>Environmental Protection and Biodiversity Conservation Act 1999</i>	The subject tree has a very large live crown size exceeding 300m ² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species
	The subject tree forms part of the curtilage of a Heritage Item (building /structure /artefact as defined under the LEP) and has a known or documented association with that item	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event	The subject tree is a Remnant Tree, being a tree in existence prior to development of the area	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
2. VERY HIGH	The tree has a strong historical association with a heritage item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally-indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 200m ² ; a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area
3. HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence	The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value	The subject tree has a large live crown size exceeding 100m ² ; The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% (normal); The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area
4. MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting.	The subject tree is a non-local native or exotic species that is protected under the provisions of the relevant DCP.	The subject tree has a medium live crown size exceeding 40m ² ; The tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crown density of more than 50% (thinning to normal); and
			The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.
5. LOW	The subject tree detracts from heritage values or diminishes the value of a heritage item	The subject tree is scheduled as exempt (not protected) under the provisions of the relevant DCP due to its species, nuisance or position relative to buildings or other structures.	The subject tree has a small live crown size of less than 40m ² and can be replaced within the short term (5-10 years) with new tree planting
6. VERY LOW	The subject tree is causing significant damage to a heritage Item.	The subject tree is listed as an Environment Weed Species in the relevant Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).
7. INSIGNIFICANT	The tree is completely dead and has no visible habitat value	The tree is a declared Noxious Weed under the <i>Biosecurity Act 2015</i> within the relevant Local Government Area.	The tree is completely dead and represents a potential hazard.

Ref:- Morton, A (2006) **Determining the Retention Value of Trees on Development Sites**TreeNet - Proceedings of the 7th National Street Tree Symposium 2006 Government of South Australia Department for Transport, Energy and Infrastructure

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



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

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

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m ²)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
1	<i>Jacaranda mimosifolia</i> (Jacaranda)	7	8	260	24	SM	Appears stable with fair branching structure. Exhibits some dieback with 10% deadwood and 10% epicormic growth.	Selectively crown thinned and deadwooded.	Fair with thinning crown	No Evidence	Short 5-15 Years	4	Low	19 Heydon Avenue
2	<i>Syzygium leuhmannii</i> (Small-leaf Lillypilly)	6	5	150	20	I	Appears stable with sound branching structure.	Crown lifted to 2 metres.	Good	No Evidence	Long - more than 40 years	5	Moderate	19 Heydon Avenue
3	<i>Olea europaea subsp. africana</i> (African Olive)	9	12	380	72	M	Appears stable with fair branching structure. Crown suppressed on SW side due crowding. Prominent lean to the north-east. 15% deadwood.	Crown lifted to 2 metres. Selectively pruned to clear power pole.	Fair with slightly thinning crown	No Evidence	Medium 15-40 Years	6	Low	19 Heydon Avenue
4	<i>Syzygium leuhmannii</i> (Small-leaf Lillypilly)	5	5	170	15	I	Appears stable with sound branching structure. Crown suppressed on south side due crowding.	No Evidence	Good	No Evidence	Medium 15-40 Years	5	Low	19 Heydon Avenue
5	<i>Ulmus parvifolia</i> (Chinese Elm)	4.5	6	150	21	I	Appears stable with sound branching structure.	No Evidence	Good	No Evidence	Long - more than 40 years	5	Moderate	Railway Corridor
6	<i>Angophora floribunda</i> (Rough-barked Apple)	7	6	250	36	SM	Appears stable with poor branching structure. Exhibits poor form and habit with contorted branches.	No Evidence	Good	No Evidence	Short 5-15 Years	3	Moderate	Nature strip
7	<i>Eucalyptus pilularis</i> (Blackbutt)	25	11	650	165	M	Appears stable with poor branching structure. Exhibits some dieback with 10% deadwood and 10% epicormic growth. Exhibits multiple wounds at 12-15 metres due previous remedial pruning or storm damage (crown restored). Multiple moderate and large cavities in trunk at 12-15 metres	Previously lopped (remedial pruning) at 12-15 metres (Crown restored)	Fair with slightly thinning crown	No Evidence	Short 5-15 Years	2	Moderate	Nature strip
8	<i>Fraxinus graffithii</i> (Evergreen Ash)	6	7	180	28	SM	Appears stable with sound branching structure.	Crown lifted to 2 metres.	Good	No Evidence	Long - more than 40 years	5	Moderate	Railway Platform
9	<i>Fraxinus graffithii</i> (Evergreen Ash)	5	7	220	21	SM	Appears stable with sound branching structure. Exhibits multiple co-dominant leaders at 1.5 metres.	Crown lifted to 2 metres.	Good	No Evidence	Long - more than 40 years	5	Moderate	Railway Platform
10	<i>Fraxinus graffithii</i> (Evergreen Ash)	5	5	180	15	SM	Appears stable with sound branching structure. Exhibits multiple co-dominant leaders at 1.5 metres.	Crown lifted to 2 metres.	Good	No Evidence	Long - more than 40 years	5	Moderate	Railway Platform

APPENDIX 3 - TREE HEALTH AND CONDITION ASSESSMENT SCHEDULE

Tree Identification No.	Species	Height (m)	Spread (m)	Trunk Diameter (mm)	Live Crown Size (m ²)	Maturity Class	Condition	Previous Pruning	Health		Remaining Safe Useful Life Expectancy (SULE)	Landscape Significance Rating	Retention Value	Location
									Vigour	Pest & Disease				
11	<i>Ulmus parvifolia</i> (Chinese Elm)	5	6	150	30	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	Moderate	Railway Corridor
12	<i>Ulmus parvifolia</i> (Chinese Elm)	5	5	150	25	I	Appears stable with sound branching structure.	No Evidence	Very Good	No Evidence	Long - more than 40 years	5	Moderate	Railway Corridor
13	<i>Ulmus parvifolia</i> (Chinese Elm)	5	3	70	15	I	Appears stable with fair branching structure. Exhibits a moderate wound at GL due to previous pruning.	Previously cut to GL. Crown lifted to 4 metres	Very Good	No Evidence	Medium 15-40 Years	5	Low	Railway Corridor
14	<i>Ulmus parvifolia</i> (Chinese Elm)	7	7	200	49	SM	Appears stable with sound branching structure. 20% epicormic growth.	No Evidence	Fair with slightly thinning crown	No Evidence	Medium 15-40 Years	4	Moderate	Railway Corridor
15	<i>Acacia elata</i> (Cedar Wattle)	6	6	200 + 150	30	SM	Appears stable with poor branching structure. Poor form and habit - disfigured due to previous pruning.	Lopped at 4-5 metres to clear overhead powerlines.	Good	Moderate borer infestation	Short 5-15 Years	5	Low	Railway Corridor
16	<i>Ulmus parvifolia</i> (Chinese Elm)	5	5	180	20	SM	Appears stable with poor branching structure. Poor form and habit.	Lopped at 4-5 metres to clear overhead powerlines.	Good	No Evidence	Short 5-15 Years	5	Low	Railway Corridor

APPENDIX 4 - IMPACT ASSESSMENT SCHEDULE

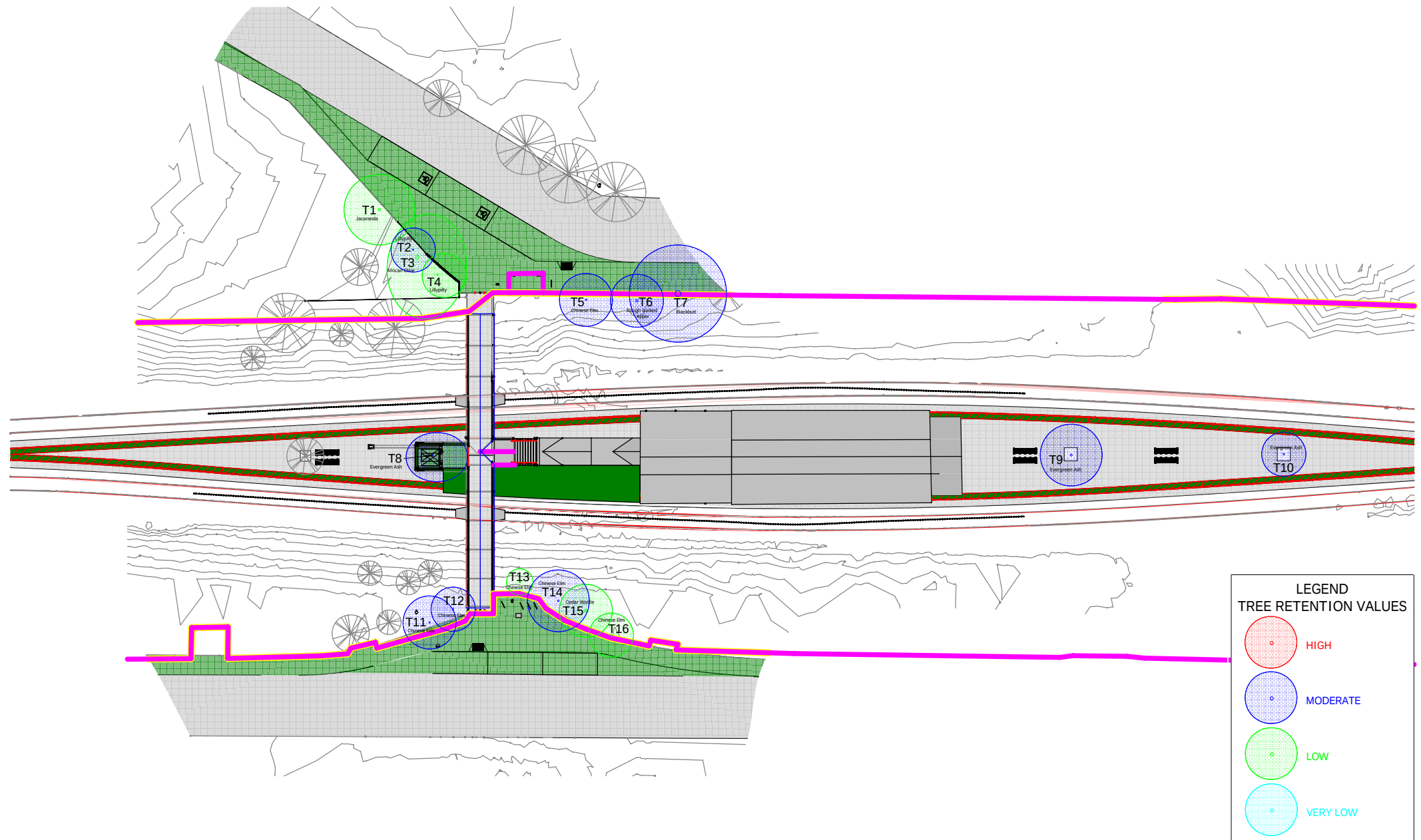
Tree Identification No.	Species	Construction Tolerance	Tree Protection Zone (m R)	Structural Root Zone (m R)	TPZ (m²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
1	<i>Jacaranda mimosifolia</i> (Jacaranda)	M	4.2	1.9	55.4	Existing asphalt pavement offset 0.6 metres west proposed to be widened and extended (within footprint of existing road and footpath). No increase to present encroachment.	No adverse impact, provided that any required demolition work is undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Demolish existing pavement (where required) in accordance with Section 10.5. Undertake any required excavations for pavement sub-grade in accordance with Section 10.6.
2	<i>Syzygium leuhmannii</i> (Small-leaf Lillypilly)	M	2.7	1.5	22.9	Existing asphalt pavement offset 0.8 metres west proposed to be widened and extended (within footprint of existing road and footpath). No increase to present encroachment.	No adverse impact, provided that any required demolition work is undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Demolish existing pavement (where required) in accordance with Section 10.5. Undertake any required excavations for pavement sub-grade in accordance with Section 10.6.
3	<i>Olea europaea subsp. africana</i> (African Olive)	M	5.5	2.2	95.0	Existing asphalt & unit pavement offset 1.0 metres west proposed to be widened and extended (within footprint of existing road and footpath). No increase to present encroachment.	No adverse impact, provided that any required demolition work is undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Demolish existing pavement (where required) in accordance with Section 10.5. Undertake any required excavations for pavement sub-grade in accordance with Section 10.6.
4	<i>Syzygium leuhmannii</i> (Small-leaf Lillypilly)	M	3.5	1.6	38.5	Existing asphalt pavement offset 0.9 metres west proposed to be widened and extended (within footprint of existing road and footpath). No increase to present encroachment.	No adverse impact, provided that any required demolition work is undertaken as recommended.	Retain in accordance with recommended Tree Protection Measures (Section 10). Demolish existing pavement (where required) in accordance with Section 10.5. Undertake any required excavations for pavement sub-grade in accordance with Section 10.6.
5	<i>Ulmus parvifolia</i> (Chinese Elm)	M	3.2	1.5	32.2	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
6	<i>Angophora floribunda</i> (Rough-barked Apple)	P	3.2	1.8	32.2	No proposed works within TPZ.	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)	TPZ (m²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
7	<i>Eucalyptus pilularis</i> (Blackbutt)	P	7.8	2.8	191.0	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
8	<i>Fraxinus graffithii</i> (Evergreen Ash)	M	2.2	1.6	14.6	Located within footprint of proposed lift.	Proposed works will necessitate removal	Undertake replacement planting with a new tree elsewhere on the platform to compensate for loss of amenity in accordance with Section 11.
9	<i>Fraxinus graffithii</i> (Evergreen Ash)	M	3.2	1.8	32.2	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
10	<i>Fraxinus graffithii</i> (Evergreen Ash)	M	3.5	1.6	38.5	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
11	<i>Ulmus parvifolia</i> (Chinese Elm)	M	3.2	1.5	32.2	Existing asphalt pavement offset 0.8 metres north proposed to be widened and extended New pavement offset 0.4 metres north. Excavations for new pavement sub-grade within SRZ.	Excavations for new pavement sub-grade are likely to result in severance of woody roots, leading to a significant adverse impact.	Undertake replacement planting with a new tree elsewhere on the platform to compensate for loss of amenity in accordance with Section 11.
12	<i>Ulmus parvifolia</i> (Chinese Elm)	M	2.7	1.5	22.9	Existing asphalt pavement offset 0.8 metres north proposed to be widened and extended New pavement offset 0.4 metres north. Excavations for new pavement sub-grade within SRZ.	Excavations for new pavement sub-grade are likely to result in severance of woody roots, leading to a significant adverse impact.	Undertake replacement planting with a new tree elsewhere on the platform to compensate for loss of amenity in accordance with Section 11.
13	<i>Ulmus parvifolia</i> (Chinese Elm)	M	2.0	1.1	12.6	No proposed works within TPZ.	No adverse impact.	To be retained - no special tree protection measures required.
14	<i>Ulmus parvifolia</i> (Chinese Elm)	M	3.5	1.7	38.5	No proposed works within TPZ.	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)	TPZ (m²)	Incursions To Root Zone &/or Canopy	Likely Impact	Recommendation
15	<i>Acacia elata</i> (Cedar Wattle)	M	3.2	1.9	33.0	Existing asphalt pavement offset 1.8 metres east proposed to be widened and extended New pavement offset 1.4 metres east. Excavations for new pavement sub-grade within SRZ.	Excavations for new pavement sub-grade are likely to result in severance of woody roots, leading to a significant adverse impact.	Remove tree.
16	<i>Ulmus parvifolia</i> (Chinese Elm)	M	2.7	1.6	22.9	Existing asphalt pavement offset 0.3 metres east proposed to be widened and extended New pavement offset 0.1 metres east. Excavations for new pavement sub-grade within SRZ.	Excavations for new pavement sub-grade are likely to result in severance of woody roots, leading to a significant adverse impact.	Remove tree.



APPENDIX 5
TREE LOCATION PLAN SHOWING
TREE RETENTION VALUES
Warrawee [Railway] Station
Heydon Avenue, WARRAWEE



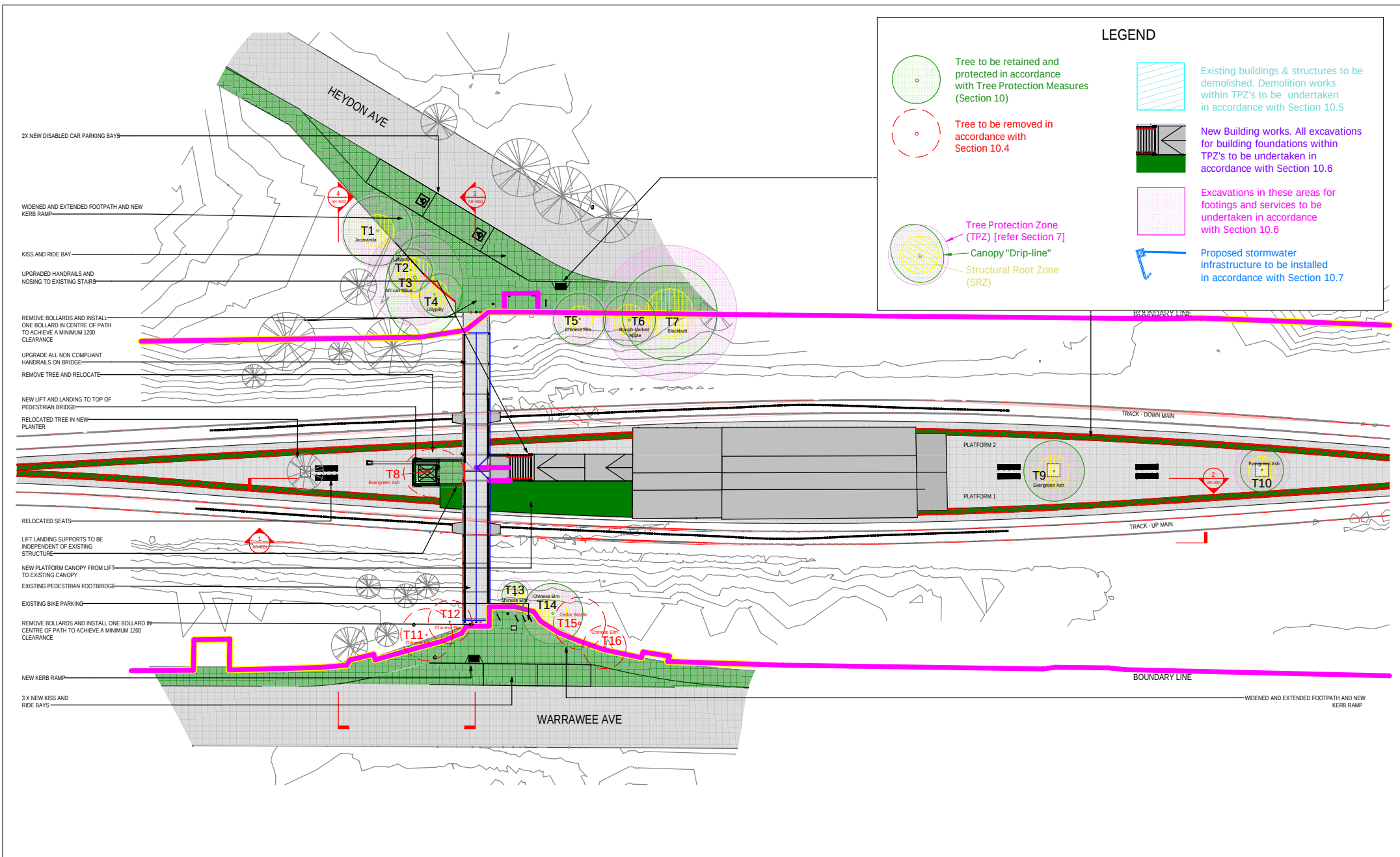
Earthscape Horticultural Services
Arboricultural and Horticultural Consultants
PO Box 364
BEROWRA NSW 2081
Ph: 02 9456 4787
Fax: 02 9456 5757 e: earthscape@iinet.net.au

Based on the Site Plan
prepared by DesignInc Pty Ltd
Dwg Ref No. TAP-150111-AR-1001 [4]
Dated 14/11/2018



DWG No. T19-012101 [A]

DATE: 21/01/2019



APPENDIX 6 TREE PROTECTION PLAN

Warrawee [Railway] Station
Heydon Avenue, WARRAWEE



Earthscape Horticultural Services
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PO Box 364
BEROWRA NSW 2081
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Based on the Site Plan
prepared by DesignInc Pty Ltd
Dwg Ref No. TAP-150111-AR-1001 [4]
Dated 14/11/2018



DWG No. T19-012102 [A]

DATE: 21/01/2019