Transport for NSW

Erskineville Station Upgrade

Supporting Studies

Artist's impression of the Erskineville Station Upgrade, subject to detailed design

March 2021

ALLIED TREE
CONSULTANCY
Level 5 and 8 Arboriculturist

Arboricultural Impact Assessment Report

For the site address
Erskineville Station, ERSKINEVILLE, NSW

Prepared for
Transport for NSW
7 Harvest Street
Macquarie Park, NSW 2113

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1.0 Introduction

1.1 *Allied Tree Consultancy* (ATC) has been commissioned by *RPS* on behalf of *Transport for NSW* (TfNSW) to prepare an Arboricultural Impact Assessment for the Erskineville Station Upgrade. This proposal includes work related to upgrading the Station infrastructure to meet requirements of the Commonwealth *Disability Discrimination Act 1992*. This report includes thirty-five (35) trees located on and adjacent to the site and discusses the viability of these trees based on the proposed work.

1.2 This report will address for these trees, the:

- species' identification, location, dimensions, and condition;
- SULE (Safe Useful Life Expectancy) and STARS (Significance of a Tree Assessment Rating System) rating;
- discussion and impact of the proposed work on each tree;
- tree protection zones and protection specifications for trees recommended for retention.

2.0 Standards

2.1 ATC provides an ethical and unbiased approach to all assignments, possessing no association with private utility arboriculture or organisations that may reflect a conflict of interest.

2.2 This report must be made available to all contractors during the tendering process so that any cost associated with the required work for the protection of trees can be accommodated.

2.3 It is the responsibility of the project manager to provide the requirements outlined in this report relative to the Protection Zones, Measures (Section 7.0), and Specifications (Section 8.0) to all contractors associated with the project before the initiation of work.

2.4 All tree-related work outlined in this report is to be conducted in accordance with the:

- Australian Standard – AS4373; Pruning of Amenity Trees.
- Guide to Managing Risks of Tree Trimming and Removal Work[1].
- all tree work must be carried out at a tertiary level (minimum Certificate-level 3) qualified and experienced (minimum five years) arboriculturist.
- for any work in the vicinity of electrical lines, the arboriculturist must possess the ISSC26 endorsement (Interim guide for operating cranes and plant in proximity to overhead powerlines).

[1] Safe Work Australia; July 2016; Guide to Managing Risks of Tree Trimming and Removal Work, Australia

2.5 As a minimum requirement, all trees recommended for retention in this report must have removed all dead, diseased, and crossing limbs and branch stubs to be pruned to the branch collar. This work must comply with the local government tree policy (City of Sydney Council) and Section 2.4.

2.6 Any tree stock subject to conditions for work carried out in this report must be supplied by a registered Nursery that adheres to the AS 2303; 2015[2].

- All tree stock must be of at least 'Advanced' size (minimum 75 litre) unless otherwise requested.
- All tree stock requested must be planted with adequate protection. This may include tree guards (protect stem and crown) and, if planted in a lawn area, a suitable barrier (planter ring) of an area, at least one square metre, to prevent grass from growing within the area adjacent to the stem.

3.0 Disclosure Statement

Trees are living organisms and, for this reason, possess natural variability. This cannot be controlled. However, risks associated with trees can be managed. An arborist cannot guarantee that a tree will be safe under all circumstances, nor predict the time when a tree will fail. To live or work near a tree involves some degree of risk, and this evaluation does not preclude all the possibilities of failure.

4.0 Methodology

4.1 The following tree assessment was undertaken using criteria based on the guidelines laid down by the International Society of Arboriculture.

4.2 The format of the report is summarised below;

4.2.1 **Plan 1;** Tree Location Relative to Site: This is an unscaled plan reproduced from the Survey Plan, as referenced in Section 4.4.1, depicting the area of assessment.

4.2.2 **Table 1;** This table compiles the tree species, dimensions**,** brief assessment (history, structure, pest, disease, or any other variables subject to the tree), significance, allocation of the zones of protection (i.e., Tree Protection Zone[3] ;TPZ and Structural Root Zone; SRZ) for each tree illustrated in Plan 1, Section 5.0. All measurements are in metres.

[2] Australian Standard; 2015, AS2303, Tree stock for landscape use, Australia

[3] Australian Standard, 4970; 2009 – Protection of Trees on Development Sites, Australia

4.2.3 Discussion relating to the site assessment and proposed work regarding the trees.

4.2.4 Protection Specification; Section 8.0 details the requirements for that area designated as the Tree Protection Zone (TPZ), for those trees recommended for retention.

4.3 The opinions expressed in this report, and the material, upon which they are based were obtained from the following process and data supplied:

4.3.1 Site assessment on the 29 October 2020 and 31 January 2021 using the method of the Visual Tree Assessment[4]. This has included a Level 2 risk assessment, being a *Basic Assessment*[5]. The assessment has been conducted by Warwick Varley[6] on behalf of ATC. The meeting on the 29th October has included staff from *RPS* including a tour throughout the site for the intent of identifying areas and trees requested for inclusion, as well as a description of prospective work.

4.3.2 Trees included in this report are those that conform to the description of a prescribed tree by the local government policy.

4.3.3 All measurements, unless specified otherwise, are taken from the tree centre.

4.3.4 Raw data from the preliminary assessment, including the specimen's dimensions, were compiled by use of a diameter tape, height clinometer, angle finder, compass, steel probes, Teflon hammer, binoculars, and recording instruments.

4.4 Documentation provided

The following documentation has been provided to ATC and utilised within the report.

4.4.1 Design and report

Drawn by *Design Inc. Sydney P/L*
Date: 20 November 2020
Reference: P20-069
Drawing No: 25 Sheets, Revision 3
Note 1: See Section 4.5.1

[4] Mattheck, C. Breloer, H.,1994, The Body Language of Trees – A handbook for failure analysis The Stationary Office, London
[5] Dunster J.A., 2013, Tree Risk Assessment Manual, International Society of Arboriculture, 2013, USA
[6] Consulting Arborist, Graduate Certificate and Diploma of Arboriculture (level 8 and 5)

Note 3: See Section 4.5.3

4.4.2 Landscape

Drawn by *Design Inc. Sydney P/L*
Date: 20 November 2020
Reference: P20-069
Drawing No: 5 Sheets, Revision 3
Note 2: See Section 4.5.2
Note 3: See Section 4.5.3

4.4.3 Engineer Design

Drawn by *Arcadis P/L*
Date: 26 November 2020
Reference: -
Civil Design
Drawing No: 38 Sheets, Revision 3
Electrical Services
Drawing No: 22 Sheets, Revision 1
HV Cables
Drawing No: 4 Sheets, Revision 1

4.4.4 Document

Review of Environmental Factors
Author: *Transport for NSW*
Date: March 2021
Reference: 6548591
Page Number: 15 Pages

4.5 Limitations of the assessment/discussion process

4.5.1 Numerous trees have been included on the drawings that do not exist, and many more, although exist, have not been included on the drawings. Trees No. 4, 10-12, 15-17, 20, and 21-32 have been omitted from the plans provided, however, are required for inclusion because they conform to the definition of a prescribed tree within the local government tree policy. The tree location has been plotted onto the Plan 1 by *ATC.* The tree location was established by using survey points included in the plan. *ATC* is not a registered surveyor, and, however, the accuracy of the survey is attempted; the true position of the trees may marginally deviate. Any such deviation provides the potential for changing the actual impact (encroachment) provided to a tree.

4.5.2 The landscape drawings[7] provide for different tree number and locations than the architectural drawings[8]. The landscape drawings appear to present consistency with the site, and have been used in conjunction with the architectural drawings to determine tree impacts by design. Any apparent discrepancy with the tree locations can result with the potential impact referred to in this report to differ from the actual impact. Based on this limitation, Transport for NSW have specified the project arborist to attend site prior to construction works to confirm which trees are to be removed and retained and respective protection measures applied.

4.5.3 The scope of work requested for inclusion for the tree assessment has been illustrated in Plan 1 (Section 5.0) by the dark blue outline. This has been confirmed at the time of assessment (Section 4.3.1). Based on the Station upgrade work, this provides the trees that fall within the area of work related to the proposed lifts connecting to the footbridge. In addition, the public street trees have been requested for inclusion.

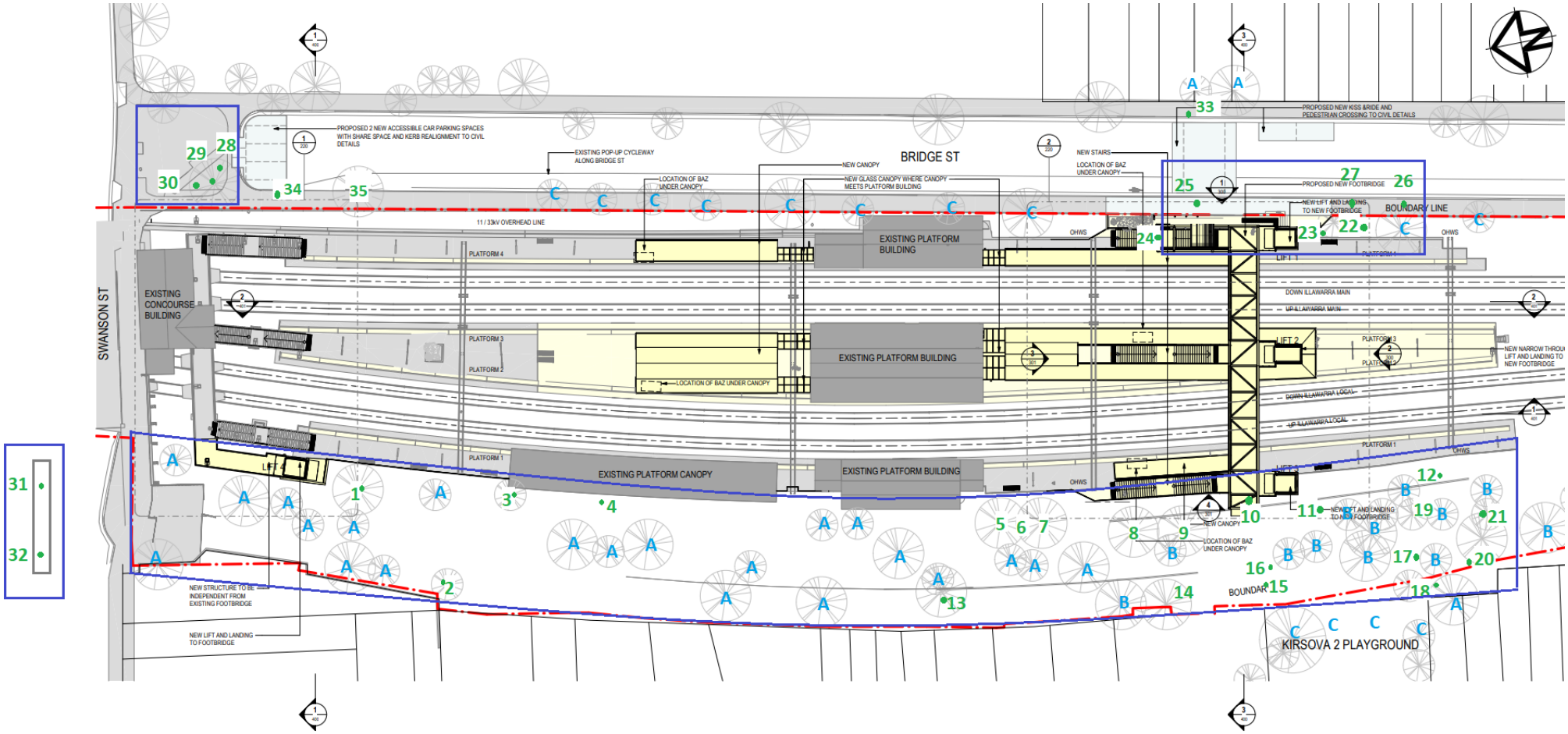
4.5.4 The assessment has considered only those target zones that are apparent to the author and the visually apparent tree conditions during the time of assessment.

4.5.5 Any tree, regardless of apparent defects, would fail if the forces applied to exceed the strength of the tree or its parts, for example, extreme storm conditions.

4.5.6 The assessment has been limited to that part of the tree, which is visible, existing from the ground level to the crown. Root decay can exist and, in some circumstances, provide no symptoms of the presence. This assessment responds to all the symptoms provided by a tree, however, cannot provide a conclusive recommendation regarding any tree that may have extensive root decay that leads to windthrow without the appropriate symptoms.

[7] See Drawing No. 150335-ERS-LA-DRG- 101-103 (3)
[8] See Drawing No. 150335-ERS-AR-DRG-122 (3) and 150335-ERS-AR-DRG-130 (3)

5.0 Plan 1; Area of assessment illustrating tree location



Not to scale
Trees labelled A, B and C, see Section 7.0.
Scope of work (Dark blue outline) See Section 4.5.4
Source: Adapted from *Design Inc. Sydney P/L,* Drawing 150335-ERS-AR-DRG-122 (3), see Section 4.4.1

6.0 Table 1 – Tree Species Data

Terminology/references provided in Appendix A.

Tree No.	*Botanical Name* Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
1	*Acacia spp.* Wattle	11	0.39	7 x 7	M	D	N	A	**3A**	**Medium**	**4.68**	**2.23**
Assessment This tree poses a northern bias (15°) stem bias as a result of a codominant class shared with a tree since removed. The habit is otherwise typical. Crown dieback exists and is attributed to senescence.											**Development Impact** **See Section 7.1.1 and 7.1.2**	
2	*Eucalyptus botryoides* Bangalay	15	0.65	16 x 12	M	C	E	A	**1A**	**High**	**7.80**	**2.76**
Assessment This tree poses the habit typical for the species. This tree poses an eastern bias (10°) stem bias as a result of a codominant class shared with the large brick retaining wall.											**Development Impact** **See Section 7.1.1**	
3	*Callistemon viminalis* Weeping Red Bottlebrush	4	0.27[B]	3 x 3	M	C	N	A	**2A**	**Medium**	**3.24**	**1.91**
Assessment This tree presents the habit typical for the species.											**Development Impact** **See Section 7.1.1**	
4	*Acacia spp.* Wattle	9	0.23	4 x 4	M	D	Sym.	A	**2A**	**Medium**	**2.76**	**1.79**
Assessment This tree presents the habit typical for the species.											**Development Impact** **See Section 7.1.1**	
5	*Melaleuca citrinus* Crimson Bottlebrush	3	0.20[B,C]	3 x 3	M	D	Sym.	A	**2A**	**Medium**	**2.40**	**1.68**
Assessment This tree presents the habit typical for the species. Trees No. 5-12 are a linear screen planting composed predominately of large shrub species that have attained sufficient height to present as a tree and inclusion within the assessment. They are predominately globose habits, and some gaps exist											**Development Impact** **See Section 7.1.1**	

Tree No.	*Botanical Name* Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
within the planting from plants that have been removed.												
6	*Grevillea banksii alba* White Silky Oak	3	0.18[B,C]	4 x 4	M	I	Sym.	A	**3A**	**Low**	**2.16**	**1.61**
Assessment This shrub presents the habit typical for the species. Trees No. 5-12 are a linear screen planting composed predominately of large shrub species that have attained sufficient height to present as a tree and inclusion within the assessment. They are predominately globose habits, and some gaps exist within the planting from plants that have been removed.											**Development Impact** **See Section 7.1.1 and 7.1.2**	
7	*Melaleuca citrinus* Crimson Bottlebrush	3	0.20[B,C]	3 x 3	M	D	Sym.	A	**2A**	**Medium**	**2.40**	**1.68**
Assessment This tree presents the habit typical for the species. Trees No. 5-12 are a linear screen planting composed predominately of large shrub species that have attained sufficient height to present as a tree and inclusion within the assessment. They are predominately globose habits, and some gaps exist within the planting from plants that have been removed.											**Development Impact** **See Section 7.1.1**	
8	*Callistemon viminalis* Weeping Red Bottlebrush	4	0.30[B,C]	5 x 5	M	D	Sym.	A	**2A**	**Medium**	**3.60**	**2.00**
Assessment This tree presents the habit typical for the species. Trees No. 5-12 are a linear screen planting composed predominately of large shrub species that have attained sufficient height to present as a tree and inclusion within the assessment. They are predominately globose habits, and some gaps exist within the planting from plants that have been removed.											**Development Impact** **See Section 7.1.4**	
9	*Melaleuca citrinus* Crimson Bottlebrush	3	0.14[B,C]	4 x 4	M	D	Sym.	A	**2A**	**Medium**	**1.68**	**1.45**
Assessment This tree presents the habit typical for the species. Trees No. 5-12 are a linear screen planting composed predominately of large shrub species that have attained sufficient											**Development Impact** **See Section 7.1.4**	

Tree No.	*Botanical Name* Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
height to present as a tree and inclusion within the assessment. They are predominately globose habits, and some gaps exist within the planting from plants that have been removed.												
10	*Callistemon viminalis* Weeping Red Bottlebrush	5	0.30	4 x 4	M	D	N	A	**2A**	**Medium**	**3.60**	**2.00**
Assessment This tree presents the habit typical for the species. Trees No. 5-12 are a linear screen planting composed predominately of large shrub species that have attained sufficient height to present as a tree and inclusion within the assessment. They are predominately globose habits, and some gaps exist within the planting from plants that have been removed.											**Development Impact** **See Section 7.1.3**	
11	*Callistemon viminalis* Weeping Red Bottlebrush	4	0.20[B,C]	6 x 3	M	D	Sym.	A	**2A**	**Medium**	**2.40**	**1.68**
Assessment This tree presents the habit typical for the species. Trees No. 5-12 are a linear screen planting composed predominately of large shrub species that have attained sufficient height to present as a tree and inclusion within the assessment. They are predominately globose habits, and some gaps exist within the planting from plants that have been removed.											**Development Impact** **See Section 7.1.4**	
12	*Callistemon viminalis* Weeping Red Bottlebrush	5	0.20[B,C]	4 x 3	M	D	Sym.	A	**2A**	**Medium**	**2.40**	**1.68**
Assessment This tree presents the habit typical for the species. Trees No. 5-12 are a linear screen planting composed predominately of large shrub species that have attained sufficient height to present as a tree and inclusion within the assessment. They are predominately globose habits, and some gaps exist within the planting from plants that have been removed.											**Development Impact** **See Section 7.1.1**	

Tree No.	*Botanical Name* Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
13	*Eucalyptus saligna x botryoides* Wollongong Woollybutt	15	0.54	12 x 12	M	D	Sym.	A	**1A**	**High**	**6.48**	**2.55**
Assessment This tree presents the habit typical for the species.											**Development Impact** **See Section 7.1.1**	
14	*Washingtonia robusta* Mexican Fan Palm	14	0.50[C]	4 x 4	M	D	Sym.	A	**1A**	**High**	**6.00**	**2.47**
Assessment This tree presents the habit typical for the species.											**Development Impact** **See Section 7.1.1**	
15	*Eucalyptus saligna x botryoides* Wollongong Woollybutt	13	0.41	15 x 9	M	C	E	A	**2A[C]**	**Medium**	**4.92**	**2.28**
Assessment This tree provides a strong eastern bias to the crown mass, a result of the co-dominant class with a building and mature plantings to the west. The area surrounding this tree has dense mulch (garden refuse), groundcover and weed stock and has limited the assessment. The root flare is not apparent.											**Development Impact** **See Section 7.1.1**	
16	*Celtis sp.*[A] Hackberry	7	0.19 0.15	7 x 7	M	S	E	A	**2B**	**Low**	**2.90**	**1.82**
Assessment This self-sown tree provides the habit typical for the species, the rating is based on the weed status.											**Development Impact** **See Section 7.1.1 and 7.1.2**	

Tree No.	*Botanical Name* Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
17	*Ficus rubiginosa* Port Jackson Fig	6	0.30[C]	8 x 5	Y	C	E	A	**2A**	**Medium**	**5.00**	**2.50**
Assessment This is two trees growing within 1m of one another, and based on the close association, are considered as a single tree. They have an eastern bias to the crown mass due to the larger tree No. 18 which they are likely the progeny of. The habit of one tree is composed of four leaders (0.10m-0.15m in diameter) and the other has the Dbh of 0.3m. The crown mass has merged to form a single canopy. The area surrounding this tree has dense mulch (garden refuse), groundcover and weed stock and has limited the assessment.											**Development Impact** **See Section 7.1.1**	
18	*Ficus rubiginosa* Port Jackson Fig	8	0.70[C,B]	12 x 14	M	C	E	A	**2A**	**High**	**8.40**	**2.85**
Assessment This tree presents the habit typical for the species. The crown has an eastern bias to the dominant trees in the adjacent public reserve. Extensive buttress and aerial roots shroud the stem, limiting the estimation of the Dbh. The area surrounding this tree has dense mulch (garden refuse), groundcover and weed stock and has limited the assessment.											**Development Impact** **See Section 7.1.1**	
19	*Salix matsudana 'Tortusa'* Tortured Willow	7	0.26	3 x 3	M	I	Sym.	A	**2B**	**Low**	**3.12**	**1.88**
Assessment This tree presents the habit typical for the species.											**Development Impact** **See Section 7.1.1 and 7.1.2**	
20	*Cupressus leylandii* Leyland Cypress[A]	10	0.43 0.36	6 x 9	M	I	N	A	**3D**	**Low**	**6.73**	**2.60**
Assessment This tree has presented typical form, although succumbed to partial windthrow in the past resulting with the bend in the stem and new formation of an apical growth. The tree is considered to present poor form and a potential risk. Further assessment would be required to determine the risk. The area surrounding this tree has dense mulch (garden refuse), groundcover and weed stock and has limited the assessment.											**Development Impact** **See Section 7.1.1 and 7.1.2**	

Tree No.	*Botanical Name* Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
21	*Araucaria columnaris* Cook Pine	16	0.47[C]	4 x 4	M	D	Sym.	A	**1A**	**High**	**5.64**	**2.41**
Assessment This tree presents the habit typical for the species.											**Development Impact** **See Section 7.1.1**	
22	*Eucalyptus punctata* Grey Gum[A]	12	0.41	6 x 10	M	I	Sym.	B	**4C**	**Low**	**4.92**	**2.28**
Assessment This tree has been subject to excessive pruning; part of this is for powerline clearance. The predominant crown mass is western biased, and some of these appear end weighted, posing an increased risk for failure. The only branch extension towards the east is recently died, and an active bracket fungus (*Phellinus* sp.) exists on a wound on the eastern side. Based on the biased crown extension, this places the area containing the greatest proportion of decay in tension, which increases the risk related to failure. Epicormic growth exists over the stem, and coupled with recent dieback, and the resulting poor form, the opportunity for mitigating work is unviable.											**Development Impact** **See Section 7.1.3 and 7.1.2**	
23	*Celtis sp.*[A] Hackberry	5	0.13	3 x 4	Y	C	N	A	**2B**	**Low**	**1.56**	**1.40**
Assessment This self-sown tree provides the habit typical for the species, the rating is based on the weed status.											**Development Impact** **See Section 7.1.3 and 7.1.2**	
24	*Eucalyptus sp.*[A] Gum tree	6	0.12	2 x 2	Y	D	Sym.	A	**1A**	**Medium**	**1.44**	**1.36**
Assessment The young age has removed from a confident identification. It is unknown whether this is a recent planting or coppiced regrowth due to the dense ground cover obscuring the base of the tree.											**Development Impact** **See Section 7.1.3**	

Tree No.	*Botanical Name* Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
25	*Lophostemon confertus* Brush Box	7	0.44	5 x 7	M	D	NW	A	**2D**	**Medium**	**5.28**	**2.34**
Assessment This street tree planting forms typical form as a street tree, other than the pruning conducted for power line clearance. Trees No. 25 to 27 are street tree plantings located on Bridge Street.											**Development Impact** **See Section 7.1.3**	
26	*Lophostemon confertus* Brush Box	5	0.40	5 x 6	M	D	Sym.	A	**2D**	**Medium**	**4.80**	**2.25**
Assessment This street tree planting forms typical form as a street tree, other than the pruning conducted for power line clearance. Trees No. 25 to 27 are street tree plantings located on Bridge Street.											**Development Impact** **See Section 7.1.1**	
27	*Elaeocarpus reticulatus* Blue-berry Ash	2	0.05	1 x 1	Y	D	Sym.	A	**1A**	**Low**	**0.60**	**0.94**
Assessment This council-owned tree presents the habit typical for the age. Trees No. 25 to 27 are street tree plantings located on Bridge Street.											**Development Impact** **See Section 7.1.3**	
28	*Elaeocarpus reticulatus* Blue-berry Ash	6	0.14 0.14	5 x 3	M	C	E	B	**2A**	**Medium**	**2.38**	**1.68**
Assessment This council-owned tree presents the habit typical for the age. Dieback of the crown structure exists, and no apparent reason exists for this. Trees No. 28 to 30 are located adjacent to one another and within an island garden bed at the end of Bridge Street.											**Development Impact** **See Section 7.1.4**	
29	*Elaeocarpus reticulatus* Blue-berry Ash	5	0.16	4 x 2	M	I	Sym.	C	**3A**	**Low**	**1.92**	**1.53**
Assessment This council-owned tree presents the habit typical for the age. Excessive dieback of the crown structure exists, and no apparent reason exists for this. Trees No. 28 to 30 are located adjacent to one another and within an island garden bed at the end of Bridge Street.											**Development Impact** **See Section 7.1.4 and 7.1.2**	

Tree No.	*Botanical Name* Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
30	*Elaeocarpus reticulatus* Blue-berry Ash	6	0.16	5 x 4	M	D	Sym.	B	**2A**	**Medium**	**1.92**	**1.53**
Assessment This council-owned tree presents the habit typical for the age. Dieback of the crown structure exists and no apparent reason exists for this. Trees No. 28 to 30 are located adjacent to one another and within an island garden bed at the end of Bridge Street.											**Development Impact** **See Section 7.1.4**	
31	*Pistacia chinensis* Chinese Pistachio	3	0.10	2 x 2	Y	D	Sym.	A	**2A**	**Medium**	**1.20**	**1.26**
Assessment This council-owned tree presents the habit typical for the age. Trees No. 31 to 32 are located adjacent to one another and within the median strip of Erskineville Road.											**Development Impact** **See Section 7.1.1**	
32	*Pistacia chinensis* Chinese Pistachio	3	0.10	2 x 2	Y	D	Sym.	A	**2A**	**Medium**	**1.20**	**1.26**
Assessment Trees No. 31 to 32 are located adjacent to one another and within the median strip of Erskineville Road.											**Development Impact** **See Section 7.1.1**	
33	*Lophostemon confertus* Brush Box	7	0.30	7 x 4	M	D	E	A	**2A**	**Medium**	**3.60**	**2.00**
Assessment This council-owned street tree presents the habit typical for the age. Some crown lifting has occurred to the western side to accommodate parking.											**Development Impact** **See Section 7.1.3**	
34	*Pistacia chinensis* Chinese Pistachio	3	0.08	2 x 2	Y	D	Sym.	A	**1A**	**Low**	**2.00**	**1.00**
Assessment This council-owned street tree presents the habit typical for the age.											**Development Impact** **See Section 7.1.3**	

Tree No.	*Botanical Name* Common Name	Height (m)	DBH (m)	Crown Spread (m)	Age	Crown Class	Crown Aspect	Vitality Rating	SULE Rating	STARS Rating	TPZ	SRZ
35	*Tristaniopsis laurina* Water Gum	4	0.10-0.19	7 x 7	M	D	Sym.	A	**D3**	**Medium**	**5.0**	**2.4**
Assessment This council-owned street tree is composed of nine leaders. Initially composed of three leaders that initiate from a small stem, the removal of a single leader has been replaced with four mature epicormic shoots. The decaying wound face is apparent beneath these shoots, and the attachment points are likely poor where an increased risk for failure exists for each of the crowded leaders. Pruning for powerline clearance has distorted the crown mass.											**Development Impact** **See Section 7.1.2 and 7.1.3**	

A. Incomplete identification of species due to insufficiently available plant material
B. Diameter taken below 1.4m due to low stem bifurcation
C. Estimate due to the overgrown area and/or limited access
D. Deciduous species, void of foliage at the time of assessment
E. Level 3 assessment required to determine the accurate rating
F. Height measured from platform

7.0 Site Assessment

The area of assessment comprises the roadway fronting Erskineville Station (Erskineville Road), a portion of the roadway bordering the eastern side of the Station (Bridge Street), and plantings that occur within the western side of the Station and a portion bordering Bridge Street. All trees included in this report are planted, and none are remnant. The tree species are a combination of exotic and native and provide common use within the landscape industry. A description for each of the areas containing these trees is discussed separately.

Western side of assessment

Erskineville Station comprises four platforms, where the island platform (2 and 3) contains no plantings. The area between the station western boundary and Platform 1 is disused, and void of any tracks. This area is a partially maintained lawn that batters as an access ramp from Erskineville Road, where double swung gates secure the area. The southern half is unmaintained plantings. The elevated concrete Platform one is the eastern boundary of these plantings, and a large brick retaining wall predominately serves as the western extent and boundary, although this wall reduces in height towards the southern end from where the rear walls of the buildings form the extent of assessment until a public reserve (No. 136 George Street) occurs. The remnants of a brick/concrete platform extend along and parallel with a portion of the western boundary line. The southern end of this area is a marsh containing water (likely related to recent rain) and water-based plants along with extensive overgrowth and weed stock. This portion of the area is unmaintained. The area adjacent to the rear of the private lots on the southern end has extensive rubbish dumped throughout, including predominately garden refuse from where many plantings have originated. An area behind No. 142A George Street has a landscaped area with tables, chairs, and a leveled area cleared of vegetation, likely related to the tenants on George Street.

Trees No. 5-12 are a linear screen planting that extends adjacent to a 1.5m high fence that separate the platform from the overgrown area. These trees are at the same grade as the platform and adjacent to a retaining wall that contains the marsh at the base of the wall. These trees are composed predominately of large shrub species that have attained sufficient height to present as a tree and inclusion within the assessment. They are predominately globose habits, and some gaps exist within the planting from plants that have been removed. The area beneath these trees is maintained (slashed) weed stock.

Eastern side of assessment

Platform four backs onto Bridge Street with a varying size batter that dissipates towards the south to where the area of assessment forms, being a gate servicing the platform and Bridge Street. Other than the brick buildings on this

platform, a garden bed extends the length of the platform and borders the eastern side with a 2.5m high steel fence and footpath for Bridge Street. The plantings are predominately native and weed stock. This area contains trees No. 22-24. Adjacent to these trees is the street tree plantings, being trees No. 25-27 and 33. These are located on the edge of a sandstone kerb, within a narrow (<1000mm wide) garden strip fronting the footpath. A concrete crossover, although void of a layback, services the double swung gate to the platform. Bridge Street caters for an inconsistent avenue planting of mixed tree species, although the majority are Brushbox that have been misshaped for powerline clearance.

Northern side of assessment

The corner of Bridge Street and Erskineville Road contains trees No. 28-30, 34 and 35. The northern end of Bridge Street has been blocked and as part of this is a small island garden bed surrounded by concrete footpath where these trees (No. 28-30) occur. Small shrubs occur around these trees, and a small lawn area containing benches and bins occur. Trees No. 34 and 35 form part of an inconsistenly spaced planting adjacent to the kerb and footpath.

Trees No. 31 and 32 are two small plantings within a median strip opposite the entrance to the western side of the Station, being the battered access road described in the *Western side of assessment.* These trees occur in a garden bed approximately 1000mm wide by 2000mm long, where the remaining median strip is paved.

Casuarina planting on Railway Parade

This isolated tree group consists of five mature specimens located on the verge of Railway Parade and opposite the intersection with Sydney Lane. This is an area north of the Station and Erskineville Road. The trees constitute street tree plantings and the property of the City of Sydney Council. They reside adjacent to a side road that extends parralel with Railway Parade, and within 1000mm of the fence dividing the rail corridor. The root zones and driplines extend well within the rail corridor where electrical infrastructure occurs. The footpath is asphalt and the sandstone kerb has obvious root disturbance.

The trees labeled as A, B, and C, that have been included on the drawing set (Plan 1), however, excluded from this report because of the failure to conform to the description of a prescribed tree based on the definition of a tree to be greater than 3m in height.

Tree A: trees that do not occur on site

Tree B: trees below 3m in height or less than 100mm in diameter

Tree C: trees that are outside the scope of works

7.1 Proposed development

The proposed development consists of the upgrading of the Station infrastructure to meet requirements of the *Disability Discrimination Act 1992*. A list of the scope follows.

- a new southern station entrance off Bridge Street including a new footbridge with three new lifts and stairs connecting to all platforms
- extension of the existing northern footbridge with a new lift and lift landing to the western side of Platform 1 whilst retaining the existing overhead booking office, footbridge and stairs
- one new kiss and ride area and one accessible parking space at the northern terminus of Bridge Street providing an accessible path of travel to the existing (northern) Station entrance
- a new kiss and ride area with capacity for two cars and a new pedestrian crossing on Bridge Street opposite the new southern station entrance
- new canopies on the platforms to provide weather protection
- a new family accessible toilet, female ambulant toilet and male ambulant toilet within the Platform 2/3 building
- modifications to the family accessible toilet on Platform 1 for improved accessibility
- upgrade work along the footpaths approaching the northern and southern station entrances
- kerb modifications and line marking at the southern station entrance to provide access to the new kiss and ride areas
- improvements to customer information and communication systems including wayfinding modifications, public address (PA) system modifications and new hearing induction loops
- localised platform regrading and the installation of new tactiles along the platforms
- improvements to station lighting and CCTV to improve safety and security
- landscaping work, tree removal and adjustments to wayfinding
- electrical upgrades for the new infrastructure and service relocations.

This report discusses the potential impact of on-site trees (contained in Table 1, Section 6.0), and includes work to the verge of Erskineville Road and Bridge Street. No stormwater drawings have been included as part of the document set. The calculations included in the following discussion has not considered subsurface utilities that have not been included in the design. These may also increase the encroachment and impact on the opportunity for tree retention.

Public trees

Trees No. 25-35 are located in the adjacent areas outside of the Station lot, therefore constitute ownership by a second party, being City of Sydney Council. Any proposed work within the zones of protection for these trees must not adversely impact these zones, and the trees shall be retained and protected from any site work unless permission for removal is granted by City of Sydney Council.

The calculations included in the following discussion have not considered;

- subsurface utilities that have not been included in the design,
- work methods related to subsurface utilities, for example, concrete encasing or replacement of existing lines
- work methods related to construction (stockpiling, site sheds, scaffolding) unless otherwise specified.

These may also increase the encroachment and tree impact and, therefore, the opportunity for tree retention.

Assumption 1: Zones of protection (TPZ, SRZ)

The calculations of the zones of protection (TPZ, SRZ) contained in Table 1 are based on the arbitrary formulae provided in the AS 4970, and this document provides scope for modifying this zone, however, with supporting evidence.

Regarding trees No. 25-27 and 33-35

The kerb/road provides an area that does not commonly support strong root growth and can act as a barrier or partial barrier. This would act as a barrier and reduce root extension into the area where the TPZ/SRZ appears to extend into. Therefore suggesting an asymmetrical root zone can exist, which to compensate, would result in increased root extension and biomass along the verge and into the rail corridor. Therefore, any work that encroaches on the area of the TPZ that exists within the verge and adjacent rail corridor would likely have more impact than the calculated radius of the zones of protection.

Regarding trees No. 3-12, 13 and 14

The elevated brick retaining walls that separate Platform 1 and the western side of the Station (Trees No. 13 and 14) are of sufficient height coupled with the assumed depth of the footing to likely contain all root system from these trees, irrespective of the extension past these walls described by the calculated zones of protection (i.e. SRZ/TPZ). The height of these walls will limit root extension, and this is based on the natural depth where roots will proliferate and will limit root extension outside of this contained area. Therefore, any work that encroaches up to the base of these walls is not considered to pose an adverse impact on these trees.

This report discusses the impact of the proposed design on the trees. Thirty-five (35) trees have been listed within this report based upon the vicinity of the proposed work. This has included trees where any part of the zones of protection; Tree Protection Zone (TPZ), and Structural Root Zone (SRZ) to encroach into the area proposed for work and areas nominated for inclusion. Recommendations based on the tree significance and condition, together with the impact on these trees, regarding the development, follow.

7.1.1 Trees and zones of protection (TPZ/SRZ) outside of the proposed design

Trees No. 1-7, 12-21, 26, 31, and 32.

Based on the drawing set, and the assumed locations (see Section 4.5.1) for these trees, none of the proposed work conflict with the location of these trees or respective zones of protection. These trees can be retained without impact by the proposed design.

However, not included in the drawing set is the requirement for the construction storage and compound. This has been nominated to be located in the area adjacent to the western boundary of the Station, where the predominant trees are located, being No. 1-21. The size or constraints for this are unknown, and therefore the following list provides the trees that should be retained and protected based on the significance assigned as opposed to those that could be removed for a work compound.

- Trees that should be retained;
  Trees No. 2, 3, 4, 12, 13, 14, 15, 17, 18, 21, 26, 31 and 32
- Trees that can be removed;
  Trees No. 1, 5, 6, 7, 16, 19 and 20

7.1.2 Trees providing a limited useful life expectancy

Trees No. 1, 6, 16, 19, 20, 22, 24, 29 and 35

These trees provide poor form and do not provide sufficient significance to retain and design around. These trees could be removed irrespective of work.

Tree No. 22 poses a potential risk for failure based on the existing structure, and active decay pathogen. This tree will be required to be removed in the short term based on the target zone.

Trees No. 29 and 35 are council assets and would require consent from the City of Sydney Council to remove.

7.1.3 Trees directly conflicting with the design

Trees No. 10, 22, 23, 24, 25, 27, 33, 34 and 35

These trees are in the footprint of the proposed design and would require removal based on this premise alone. The conflict is summarised as the new southern station entrance on Bridge Street, including a new footbridge with three new lifts and stairs connecting to all platforms and modification to the kerb and footpath.

Trees No. 25, 27, 33, 34 and 35 are council assets and would require consent from the City of Sydney Council to remove. Two of these five trees, Trees No. 25 and 33, provide sufficient significance and useful life expectancy to consider amendment to the design to retain and incorporate into the design.

7.1.4 Trees subject to encroachment by design

Trees No. 8, 9, 11, 28, 29 and 30

The following trees have proposed work that extend into the zones of protection (i.e. TPZ/SRZ). These are discussed relative to the tree significance and potential impact imposed by the design work.

Trees No. 8, 9 and 11

These trees are not directly located in the footprint of the proposed design, however, are subject to a major encroachment. These trees have not been included in the design and have been scaled onto the drawings by ATC; therefore, a limitation on the impact exists (see Section 4.5.1). Based on the vicinity and work methodologies estimated to be required, these trees are unlikely to be capable of retention. Although, a potential for retention exists, the viability for this will require further discussion with the designer and works contractor.

Tree No. 28-30

Based on the landscape drawing[9] four trees have been included in this area of the council island garden bed, although only three occur. The proposed works within the zones of protection are retaining the existing footprints although 'repaving path with new concrete paving'. Based on the trees having grown in accordance with the existing surfaces that are proposed to be replaced, minimal impact should occur. Although this will be pending the work methodology employed where a potential for damage to the underlying root system can occur. For this reason, conditions for protection must be employed to allow for these works. See Section 7.3.1.

[9] See Drawing No. 150335-ERS-LA-DRG- 101 (3)

Based on the limited life expectancy attributed to tree No. 29, this could be removed and replaced pending consent from the City of Sydney Council.

Casuarinas on Railway Parade

Based on the Electrical Services drawing[10] five trees extend along the verge as a linear planting. The specific tree location has not been illustrated on the drawing, therefore the opportunity for determining the potential encroachment and therefore impact on these trees is unavailable. Although existing electrical infrastructure exists in the area, (as apparent on aerial mapping) and based on the location of this relative to the proposed addition of a "new ATS in weather proof kiosk…sub-main to be run from….", it is apparent that these works can impact on the Structural Root Zone, and most certainly the Tree Protection Zones of one or more trees. The trees (*Casuarina cunninghamiana*) provide typical form and normal vitality and an average stem diameter (Dbh) of 0.6m, therefore constitute a TPZ of 7.2m radius and SRZ of 2.9m radius. The drawing location of the existing and proposed infrastructure adjacent to these trees is considered not to be to scale and does not represent the actual locations. Therefore, is generic and assumed to present some flexibility with the location for the proposed works. Based on this premise, the following conditions for protection are proposed for these trees.

1. No excavation shall occur within 3000mm from any tree centre.
2. Any works within 5000mm of any tree centre will require the project arborist to be in attendance to manage and assess the viability of the works.
3. Any design that falls within 5000mm of a tree centre must include consultation with the project arborist before works proceed.

7.2 Sub-surface utilities

No drawings have been provided for the proposed route of sub-surface utilities. Any trenching other than what has been allowed for shall be avoided within the area of the TPZ. Any proposed route shall be re-routed outside of the TPZ. Under boring may be required if a limitation for the route of a service is restricted to an area that falls within the TPZ. Any excavation in the area of a TPZ must be authorised and conditioned by the project arborist.

7.3 Protection measures

Tree protection measures will be required during the demolition and construction stage. However, the design of these will be pending the work methodology and final design. The project arborist shall be contracted after the completion/confirmation of design work for the instruction of the protection

[10] See Drawing No. 150335-ERS-LV-DRG- 01100 (1)

measures implementation, that is, the Arboricultural Method Statement. Examples of the protection measures are contained in Appendix B.

7.3.1 Conditions of demolition

The following conditions are required during the demolition stages for the zones of protection.

1. The demolition process must remove all other site structures before removal of the concrete surfaces that are within the TPZ. These will be the final structures removed from the site.
2. Machinery can be used for part of this removal, however, must always be retained to a hard surface (drive or slab). No machine should, on any occasion, work on a soil/lawn based surface within the area of the TPZ.
3. That part of the concrete surface that falls within the area of 4m radius from the girth of the tree must be removed via hand tools, e.g., Jackhammers, etc. removal of the remaining concrete must disturb as little area beneath the drive surface as possible. That is, the removal of this area should not carry any soil with it.
4. If machinery is required to enter the TPZ where no hard surface exists, then ground protection methods are required to be employed. Any machinery used within this process must provide for a minimum height of 2500mm, and that sufficient clearance is offered beneath the branch structure and machine to avoid injury. No pruning can occur for access to machinery.
5. After removal of the concrete surface, a soil conditioner is required to be applied immediately over the TPZ previously covered by the slab.
   Soil Conditioner: A non-synthetic type is recommended, such as 'Seasol,' 'Tri-Kelp' and applied as a diluted root drench via a hose applicator, appropriate to the manufacturer's recommendations. In addition to the soil drench, a surfactant (wetting agent) and carbohydrate treatment will aid with the wetting and movement of water in the ground. The carbohydrate treatment includes the addition of 25-50 gms of caster sugar per litre of water. These three ingredients can be combined and applied via a single application.

7.3.2 Conditions for compliance

The following conditions are required before any work proceeds on site.

Site induction; All workers related to the construction process and before entering the site must be briefed about the requirements/conditions outlined in this report relative to the zone of protection, measures, and specifications before the initiation of work. This is required as part of the site induction process.

Project Arborist; A project arborist who conforms to the requirements of the AS 4970 is required to be nominated immediately after a *Notice of Determination* is issued, and they are to be provided with all related site documents.

7.4 Compliance Documentation

The following stages would require assessment and documentation (report, letter, certification) by the project arborist or person responsible for the specific work type, and the related documentation is to be issued to the principal certifying agent.

7.4.1 Table 2; Assessment/Certification hold points

Hold points	Work type	Document required
Pre-demolition	Installation of the protection measures, Section 7.3	Certificate
Excavation within TPZ's	Project arborist on-site during excavation	Certificate
During construction	Any further work required within the area of the TPZ or decline related to the trees that have not been covered by this report.	Report Brief
During construction	Any crown modification, including pruning or root disturbance.	Report Brief

Construction refers to the time between the initiation of demolition and until an occupation certificate is issued.

Project Arborist person nominated as responsible for the provision of the tree assessment, arborist report, consultation with stakeholders, and certification for the development project. This person will be adequately experienced and qualified with a minimum of a level 5 (AQF); Diploma in Horticulture (Arboriculture)[11].

8.0 Protection Specification

The retention and protection of these trees requires the remaining Tree Protection Zone (TPZ) not subject to encroachment to conform to the conditions outlined below. These conditions provide the limitations of work permitted within the area of the Tree Protection Zone (TPZ) and must be adhered to unless otherwise stated.

1. Crown pruning can be accommodated, however, must conform to the AS 4373; *Pruning of Amenity Trees*, and not misshape the crown nor remove in excess of 10-15 per cent of the existing crown, pending on the species,

[11] Based upon the definition of a 'consulting arborist' from the AS 4970; Protection of trees on development sites; 2009, Section 1.4.4, p 6.

and vitality. The opportunity for, type and proportion of pruning will be required to be nominated by the project arborist.

2. Soil levels within the TPZ must remain the same. Any excavation within the TPZ must have been previously specified and allowed for by the project arborist:

   a) So it does not alter the drainage to the tree.

   b) Under specified circumstances,

      - Added fill soil does not exceed 100 millimetres in depth over the natural grade. Construction methodologies exist that can allow grade increases in excess of 100 millimetres, via the use of an impervious cover, an approved permeable material or permanent aeration system or other approved methods.

      - Excavation cannot exceed a depth of more than 50 millimetres within the area of the TPZ, not including the SRZ. The grade within the SRZ cannot be reduced without the consent from a project arborist.

3. No form of material or structure, solid or liquid, is to be stored or disposed of within the TPZ.

4. No lighting of fires is permitted within the TPZ.

5. All drainage runoff, sediment, concrete, mortar slurry, paints, washings, toilet effluent, petroleum products, and any other toxic wastes must be prevented from entering the TPZ.

6. No activity that would cause excessive soil compaction is permitted within the TPZ. That is, machinery, excavators, etc. must refrain from entering the area of the TPZ unless measures have been taken to protect the rootzone, in consultation with the project arborist.

7. No site sheds, amenities or similar site structures are permitted to be located or extend into the area of the TPZ unless the project arborist provides prior consent.

8. No form of construction work or related activity such as the mixing of concrete, cutting, grinding, generator storage or cleaning of tools is permitted within the TPZ.

9. No part of any tree may be used as an anchorage point, nor should any noticeboard, telephone cable, rope, guy, framework, etc. be attached to any part of a tree.

10. (a) All excavation work within the TPZ will utilise methods to preserve root systems intact and undamaged. Examples of methods permitted are by hand tools, hydraulic, or pneumatic air excavation technology.

(b) Any root unearthed which is less than 50 millimetres in diameter must be cleanly cut and dusted with a fungicide, and not allowed to dry out, with minimum exposure to the air as possible.

(c) Any root unearthed which is greater than 50 millimetres in diameter must be located regarding their directional spread and potential impact. A project arborist will be required to assess the situation and determine future action regarding retaining the tree in a healthy state.

9.0 Summary of tree impact

Based on the design supplied, the following summary provides the impacts imposed on the trees included in this report. However, limitations for the accuracy of this data occur and are based on the inconsistencies between the tree location illustrated on the drawing sets contained in Sections 4.4.1 and 4.4.2. This can alter the impacts imposed on some trees where either additional impacts or none can occur for some trees.

9.1 Trees and zones of protection (TPZ/SRZ) estimated to be outside of the proposed design

Trees No. 1-7, 12-21, 26, 31, and 32.

These trees are not adversely impacted by the design; that is, they conform to a minor encroachment or less and the nominated zones of protection (TPZ, SRZ) based on the requirements of the Protection Specification, Section 8.0. The proposed design does not adversely affect these trees, although this has not included work methodology, including the material storage and work compound. For this reason, the following list provides the trees that should be retained and protected based on the significance assigned as opposed to those that could be removed for a work compound.

- Trees that should be retained;
  Trees No. 2, 3, 4, 12, 13, 14, 15, 17, 18, 21, 26, 31 and 32
- Trees that can be removed;
  Trees No. 1, 5, 6, 7, 16, 19 and 20

9.2 Trees estimated to be conflicting with the design

Trees No. 8, 9, 10, 11, 22, 23, 24, 25, 27, 33, 34 and 35

These trees are estimated to be subject to impact by the proposed design and would require removal for this reason only. Tree No. 22, see Section 9.4.

9.2.1 Council-owned assets

Trees No. 25, 27, 33, 34 and 35 are council assets and would require consent from the City of Sydney Council to remove. Two of these five trees, Trees No. 25 and 33, provide sufficient significance and useful life expectancy to consider amendment to the design to retain and incorporate into the design.

9.2.2 Trees No. 8, 9 and 11

Based on the vicinity and work methodologies estimated to be required, these trees are unlikely to be capable of retention. Although, a potential for retention exists, the viability for this will require further discussion with the designer and works contractor.

9.3 Trees estimated to be impacted by the design

Trees No. 28-30 and Casuarina planting on Railway Parade

Trees No. 28-30

The trees No. 28-30 could be impacted by the proposed works, although conditions contained in Section 7.3.1 will offset any potential impact.

Casuarinas on Railway Parade

The following conditions for protection are proposed for these trees in relation to the proposed electrical works.

1. No excavation shall occur within 3000mm from any tree centre.
2. Any works within 5000mm of any tree centre will require the project arborist to be in attendance to manage and assess the viability of the works.
3. Any design that falls within 5000mm of a tree centre must include consultation with the project arborist before works proceed.

9.4 Trees providing a limited useful life expectancy

Trees No. 1, 6, 16, 19, 20, 22, 24 and 29

These trees provide low useful life expectancy and do not provide sufficient significance to retain and design around. These trees could be removed irrespective of work.

- Tree No. 22 poses a potential risk for failure based on the existing structure, and active decay pathogen will be required to be removed in the short term based on the target zone.
- Tree No. 29 is a council asset and would require consent from the City of Sydney Council to remove.

9.5 Sub-surface utilities

No drawings have been provided for the proposed route of sub-surface utilities. Any trenching, other than what has been allowed for, should be avoided within the area of the TPZ's for any tree nominated for retention. Any proposed route shall be re-routed outside of the TPZ. Under boring may be required if a limitation for the route of service is restricted to an area that falls within the TPZ from any tree. Any excavation in the area of a TPZ must be authorised and conditioned by the project arborist.

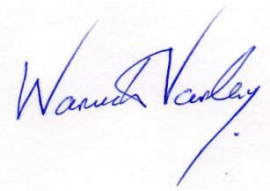
9.6 Protection measures

Protection measures (outlined in Section 7.3 and 7.4) are required to be implemented for the trees nominated for retention (referenced in Section 9.1) and installed before initiation of site work (including demolition/excavation) and retained until the landscaping work are required unless otherwise specified.

All workers related to the construction process and before entering the site must be briefed about the requirements/conditions outlined in this report relative to the zone of protection, measures, and specifications before the initiation of work.

A project arborist is required to be nominated, and the stages and related certification or similar documentation is to be issued to the principal certifying agent.

The opinions expressed in this report by the author have been provided within the capacity of a Consulting Arborist. Any further explanation or details can be provided by contacting the author.



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10.0 Appendix A- Terminology Defined

Height

Is a measure of the vertical distance from the average ground level around the root crown to the top surface of the crown, and on palms - to the apical growth point.

DBH

Diameter at Breast Height – being the stem diameter in meters, measured at 1.4m from ground level, including the thickness of the bark.; Mult. refers to multiple stems, that is in excess of 4 stems.

Crown Spread

A two-dimension linear measurement (in metres) of the crown plan. The first figure is the north-south span, the second being the east-west measurement.

Age

Is the estimate of the specimen's age based upon the expected lifespan of the species. This is divided into three stages.

Young (Y)	Trees less than 20% of life expectancy.
Mature (M)	Trees aged between 20% to 80% life expectancy.
Over-mature (O)	Trees aged over 80% of life expectancy with probable symptoms of senescence.

Crown Aspect

In relation to the root crown, this refers to the aspect the majority of the crown resides in. This will be either termed Symmetrical (Sym.) where the centre of the crown resides over the root crown or the cardinal direction the centre of the crown is biased towards, being either North (N), South (S), East (E) or West (W).

Vitality Rating

Is a rating of the health of the tree, irrespective and independent of the structural integrity, and defined by the 'ability for a tree to sustain its life processes' ((Draper, Richards, 2009). This is divided between three variables, and based on the assessment of symptoms including, but not limited to; leaf size, colour, crown density, woundwood development, adaptive growth formation, and epicormic growth.

A: Normal vitality, typical for the species

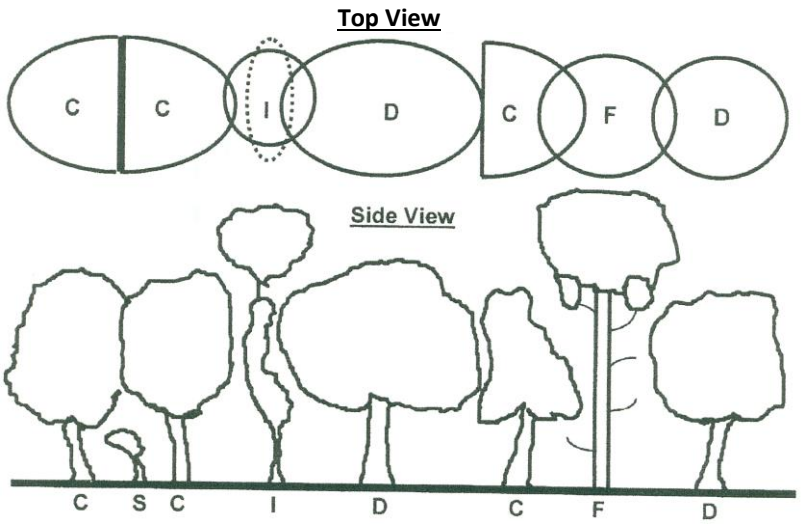
B: Below average vitality, possibly temporary loss of health, partial symptoms.

C: Poor vitality; obvious decline, potentially irreversible

Crown Class

Is the differing crown habits as influenced by the external variables within the surrounding environment. They are:

D	– *Dominant*	Crown is receiving uninterrupted light from above and sides, also known as emergent.
C	– *Codominant*	Crown is receiving light from above and one side of the crown.
I	– *Intermediate*	Crown is receiving light from above but not the sides of the crown.
S	– *Suppressed*	Crown has been shadowed by the surrounding elements and receives no light from above or sides.
F	– *Forest*	Characterised by an erect, straight stem (usually excurrent) with little stem taper and virtually no branching over the majority of the stem except for the top of the tree which has a small concentrated branch structure making up the crown.



D C, I & S, and side view, after (Matheny, N. & Clark, J. R. 1998, Trees Development, Published by International Society of Arboriculture, P.O. Box 3129, Champaign IL 61826-3129 USA, p.20, adapted from the Hazard Tree Assessment Program, Recreation and Park Department, City of San Francisco, California).

Levels of assessment

Level 1: Limited visual: a visual tree assessment to manage large populations of trees within a limited period and in order to identify obvious faults which would be considered imminent.

Level 2: Basic assessment: a standard performed assessment providing for a detailed visual assessment including all parts of the tree and surrounding environment and via the use of simple tools.

Level 3: Advanced assessment: specific type assessments conducted by either arborist who specialise with specific areas of assessment or via the use of specialised equipment. For example, aerial assessment by use of an EWP or rope/harness, or decay detection equipment.

TPZ; Tree Protection Zone

Is an area of protection required for maintaining the trees vitality and long-term viability. Measured in meters as a radius from the trees centre. The requirements of this zone are outlined within the Protection Specification, Section 8.0, and are to be adhered to unless otherwise stated.

The size of the Tree Protection Zone (TPZ) has been calculated from the *Australian Standard, 4970; 2009* – Protection of Trees on Development Sites

The TPZ does not provide the limit of root extension, however, offers an area of the root zone that requires predominate protection from development work. The allocated TPZ can be modified by some circumstances; however will require compensation equivalent to the area loss, elsewhere and adjacent to the TPZ.

SRZ; Structural Root Zone

Is the area around the tree containing the woody roots necessary for stability. Measured in meters as a radius from the trees centre. The requirements of this zone are outlined within the Protection Specification, Section 8.0, and are to be adhered to unless otherwise stated.

Protection Measures

These are required for the protection of trees during demolition/construction activities.
Protective barriers are required to be installed before the initiation of demolition and/or construction and are to be maintained up to the time of landscaping. Samples of the recommended protection measures are illustrated in Appendix B.

All other definitions are referenced from;

Draper D.B., Richards P.A., 2009, Dictionary for Managing Trees in Urban Environments
CSIRO Pub., Australia

Significance Rating, Significance of a Tree Assessment Rating System (S.T.A.R.S), IACA, 2010[12]

Tree Significance – Assessment Criteria

1. High Significance in landscape

- The tree is in good condition and good vitality;
- The tree has a form typical for the species;
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age;
- The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register;
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity;
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commorative values;
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions.

2. Medium Significance in landscape

- The tree is in fair-good condition and good or low vitality;
- The tree has form typical or atypical of the species;
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,
- The tree provides a fair contribution to the visual character and amenity of the local area,
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vitality;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,

[12] IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,
- The tree is a declared noxious weed by legislation.

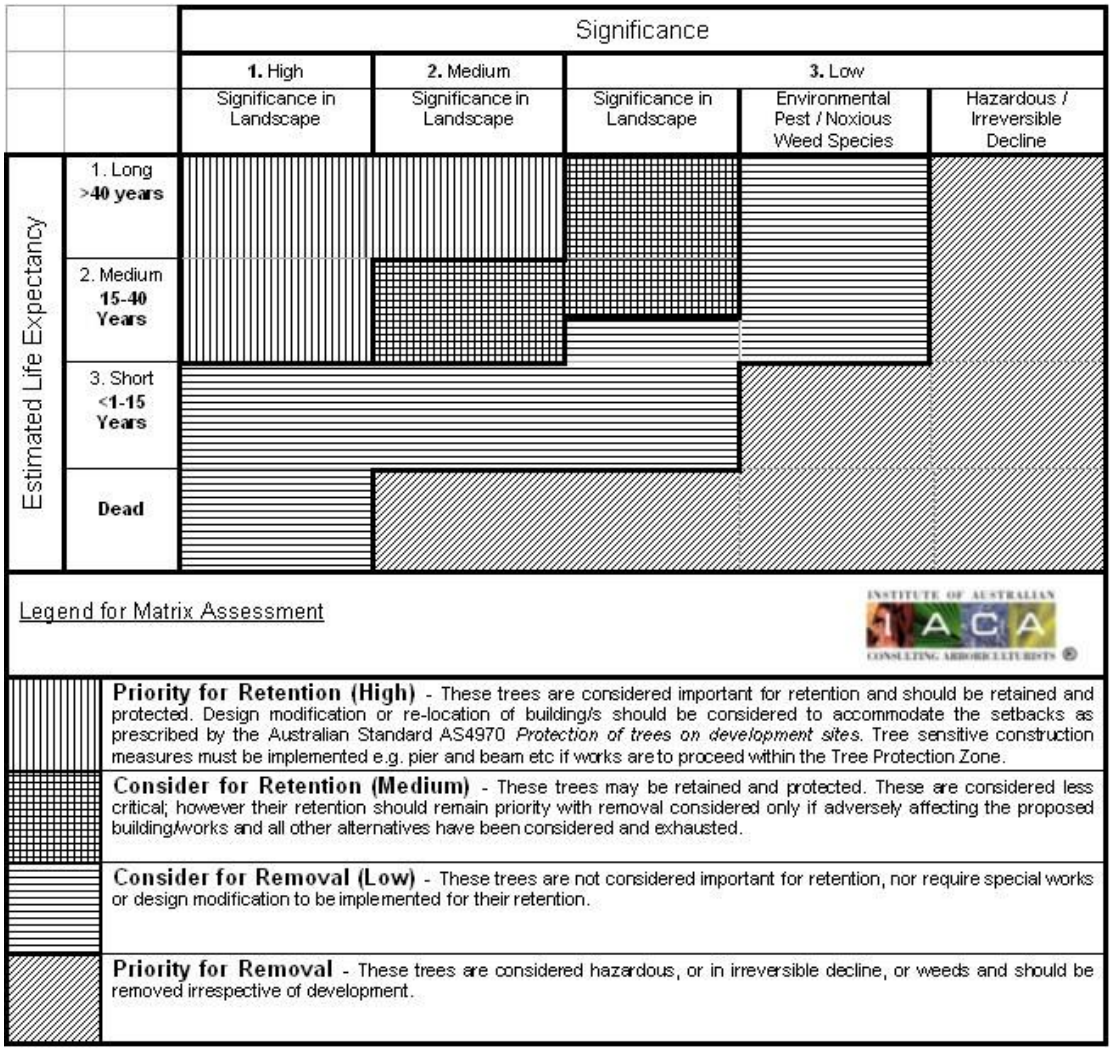
Hazardous/Irreversible Decline

- The tree is structurally unsound and/or unstable and is considered potentially dangerous, - The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short-term.

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

Note: The assessment criteria are for individual trees only, however, can be applied to a monocultural stand in its entirety e.g.

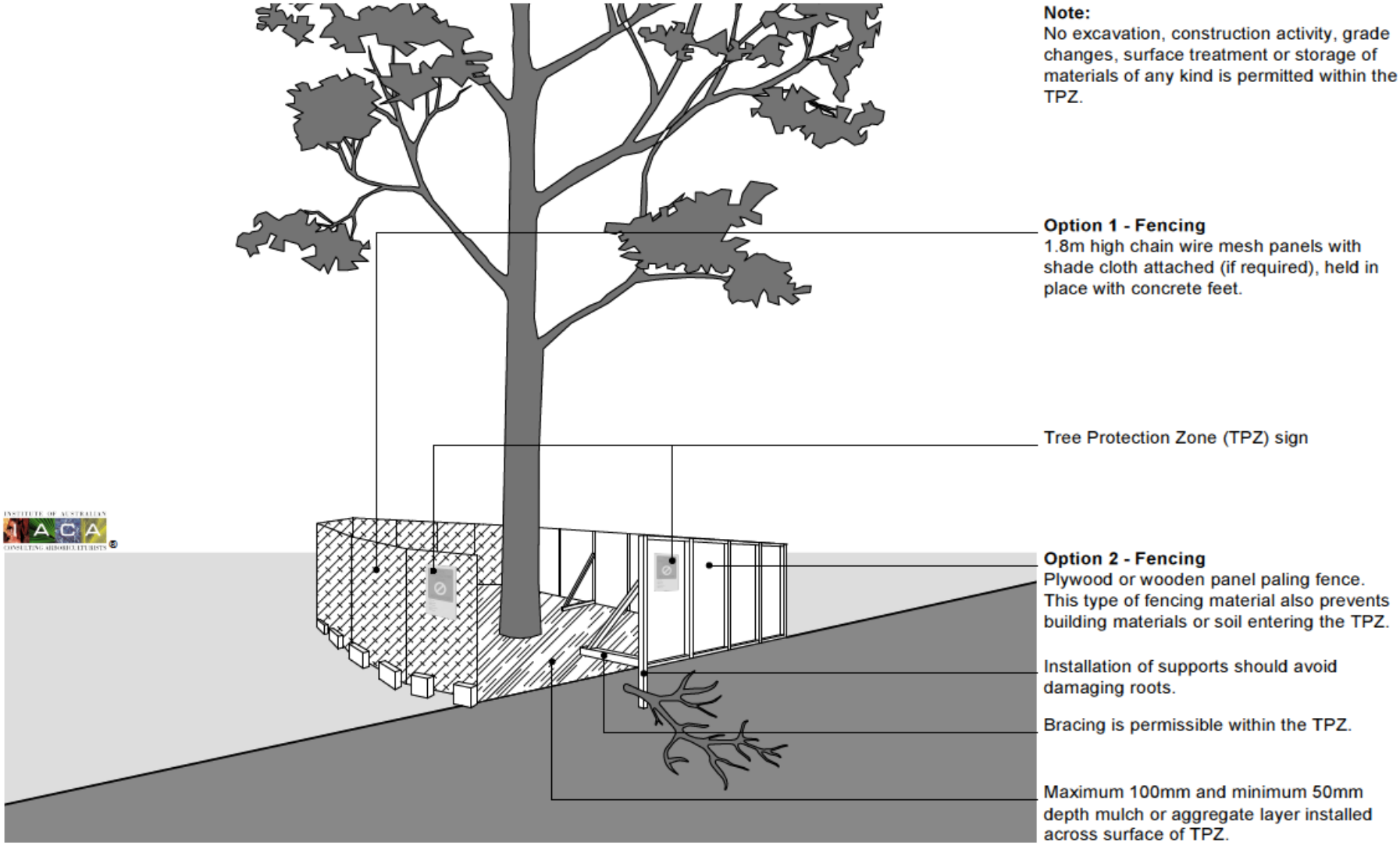
Table 3; Tree Retention Value – Priority Matrix.



Safe Useful Life Expectancy – S.U.L.E (Barell 1995)

	1. Long	2. Medium	3. Short	4. Removal	5. Moved or Replaced
	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.	Trees that appeared to be retainable at the time of assessment for 15 – 40 years with an acceptable level of risk.	Trees that appeared to be retainable at the time of assessment for 5 – 15 years with an acceptable level of risk.	Trees that should be removed within the next 5 years.	Trees which can be reliably moved or replaced.
A	Structurally sound trees located in positions that can accommodate future growth.	Trees that may only live between 15 and 40 years.	Trees that may only live between 5 and 15 more years.	Dead, dying, suppressed or declining trees through disease or inhospitable conditions.	Small trees less than 5m in height.
B	Trees that could be made suitable for retention in the long term by remedial tree care.	Trees that may live for more than 40 years but would be removed for safety or nuisance reasons.	Trees that may live for more than 15 years but would be removed for safety or nuisance reasons.	Dangerous trees through instability on recent loss of adjacent trees.	Young trees less than 15 years old but over 5m in heights
C	Trees of special significance for historical, commorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.	Trees that may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees that may live for more than 15 years but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Damaged trees through structural defects including cavities, decay, included bark, wounds or poor form.	Trees that have been pruned to artificially control growth.
D		Trees that could be made suitable for retention in the medium term by remedial tree care.	Trees that require substantial remedial tree care and are only suitable for retention in the short term.	Damaged trees that are clearly not safe to retain.	
E				Trees that may live for more than 5 years but should be removed to prevent interference with more suitable individuals or to provide space for new plantings.	
F				Trees that are damaging or may cause damage to existing structures within 5 years.	
G				Trees that will become dangerous after removal of other trees for reasons given in (A) to (F).	

Appendix B- Protection measures;
Protective fence



Stem and Ground protection