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**ARBORICUTURAL IMPACT ASSESSMENT  
REPORT**

**NEWCASTLE COURTHOUSE REDEVELOPMENT  
NIHON UNIVERSITY**

**CHRUCH STREET NEWCASTLE NSW**

Prepared for  
**dwp AUSTRALIA Pty Ltd**

**17<sup>th</sup> NOVEMBER 2018**

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**Diploma in Arboriculture**

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## EXECUTIVE SUMMARY

Joseph Pidutti (AQF Level 5 Arborist) has been commissioned by dwp Australia Pty Ltd to undertake an Arboricultural Impact Assessment on all trees within the subject site as well as 5 street trees as part of the development application.

In general the trees display relatively good overall condition and as a group have a high retention value. However individually the majority of trees have small live crown sizes and canopies that have formed asymmetrical crowns (especially those that are positioned on the outer edge of the group) and as such individually most trees have been assessed as having low retention values.

### Based on the 1<sup>st</sup> Floor Site and Landscape Plans

- Tree Nos. 13, 14, 17, 18, 19, 20 & 21 are within the building footprint and as such their removal would be necessary to facilitate the development as proposed
- Earthworks associated with demolition of the existing driveway, carparking area and retaining wall along the rear southwestern boundary and construction of the new buildings and other associated infrastructure works will encroach well into the calculated TPZ's and SRZ's and canopy structure of Tree Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 22, 23, 24, 25, 26, 27, 28 & 29.

Due to the close proximity of the demolition and construction works in relation to the extent of encroachment into their TPZ /SRZ it is likely that the trees will be adversely impacted upon by the development that will be detrimental to stability and / or health and vitality and as such their removal would be necessary to facilitate the development as proposed

- Tree Nos. 10, 12, 17, 18, 19, 21, 22, 24 & 28 have been assessed as having moderate retention values and under Section 4.2 of the Urban Forest Technical Manual (Updated February 2018) alternative design options are to be considered where removal of trees of moderate or high value (as determined in accordance with Section 4.1) is proposed.

However under section 4.3 Compensatory planting of the Urban Forest Technical Manual (Updated February 2018) where it has been demonstrated that it is not reasonable to retain tree compensatory planting will be required.

Due to their small live crown size (less than 40m<sup>2</sup>) individually Tree Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 14, 15, 16, 20 & 23 are considered to have low retention values.

Tree No. 25 is a dead tree and would be removed regardless of the impacts of development

Due to their invasive seeds Tree Nos. 26, 27 & 29 (*Cinnamomum camphora*) are generally considered to be an undesirable species and combined with their poor canopy structure have been assessed as having very low retention values.

The retention of any trees on site would require a significant reduction in the overall size of the development or substantial changes to the development footprint to be free of construction activity to accommodate a TPZ of no less than TPZ less 10% (unless it can be otherwise demonstrated), that will enable them to be retained and tolerate the impacts of construction.

However it is considered that protection zones required to retain the tree in good, safe condition that any re-design options will be difficult to achieve and likely to always result in conflict between tree roots and construction.

- Due to the potential for skin irritations (upon dispersal as the seeds can cause a strong irritation to the skin) *Lagunaria patersonii* are generally not a suitable species in areas that are high in pedestrian activity or where people will frequently congregate and as a result of the changed surrounding use of the area are not likely to be suitable for long term retention.
- Trees on the adjoining property to the west are to be retained however as they are situated approximately 1.8m on top of a brick retaining wall that divides the two boundaries it is considered that given their small size and the limitations on the depth of root growth that the proposed development would not have any impact on these trees. However care will need to be taken to ensure damage upper parts of the tree is avoided during the demolition stage.
- As part of the overall development the existing street footpath is to be renewed. With a careful approach during the removal of existing pavement and associated preparation works and laying of new pavement so that damage to roots within the TPZ / SRZ is avoided, combined with the implementation of the Tree Protection Measures it is considered that the Tree Nos. 30, 31, 32, 33 & 34 can be retained and should be able to tolerate the impacts of construction.

Some pruning of lower branches that overhang the path may be required to eliminate conflict between branches and construction and to provide overhead clearance. However excessive pruning should be avoided so that their current habit and form is generally maintained and is carried out in accordance with Australian Standard 4373 –2007 Pruning of Amenity Trees.

## 1. INTRODUCTION

Joseph Pidutti (AQF Level 5 Arborist) has been commissioned by dwp Australia Pty Ltd to undertake an Arboricultural Impact Assessment on all trees within the subject site as well as 5 street trees as part of the development application.

The report has been prepared in accordance with Newcastle DCP Section 5.03 Vegetation Management Plan. The report type will be in accordance with section 4.0. Tree removal on private land associated with development & Section 7.0 Protection measures as outlined in the NCC Urban Forest Technical Manual (updated February 2018).

The report will take into consideration the health, condition and structural integrity of the trees and assess the impact of construction.

Conclusions and recommendations of this assessment will be based on the results of information collected during site inspections.

The assessment of trees and subsequent outcomes **is** to be based on matters relating to tree health, structural condition and impacts of construction only. Although the site is within a Heritage Conservation area the report does not take into account any heritage significance of trees.

Habitat value or ecological significance of trees is not be addressed in this report and should be assessed separately by a suitably qualified Ecologist if required.

The report should be read and considered in its entirety.

## **1.1 Scope of Works**

The scope of works will be to provide an Arboricultural Impact Assessment on all trees located within the subject site as well as 5 street trees as part of the development application.

### **Assessment and outcomes of the report will be based on the:**

- Detail Survey Plan by adw Johnson – Drawing Ref: 239815-DET-001-A, Version A Dated 10.09.18
- First Floor Plan by AZUSA SEKKEI Drawing No. A-102 Dated 2018.10
- Landscape Plan – 1<sup>st</sup> Floor by Moir Landscape Architecture Project No. 1691 Sheet 4 of 6 Drawing No. LP04 Revision C Dated 15.11.2018

Inspection of the trees will be in the form of a Visual Tree Inspection (VTA) and conducted from the ground only.

### **Assessment does not include:**

- Any soil testing, root inspection, aerial inspection, testing for structural strength, decay or any other investigative inspection methods.

### **The final report will contain the following information:**

- Tree Assessment
- Tree Retention Values
- Impacts of development
- Tree Protection Plan
- Recommendations

## 2. LOCATION & SITE DESCRIPTION

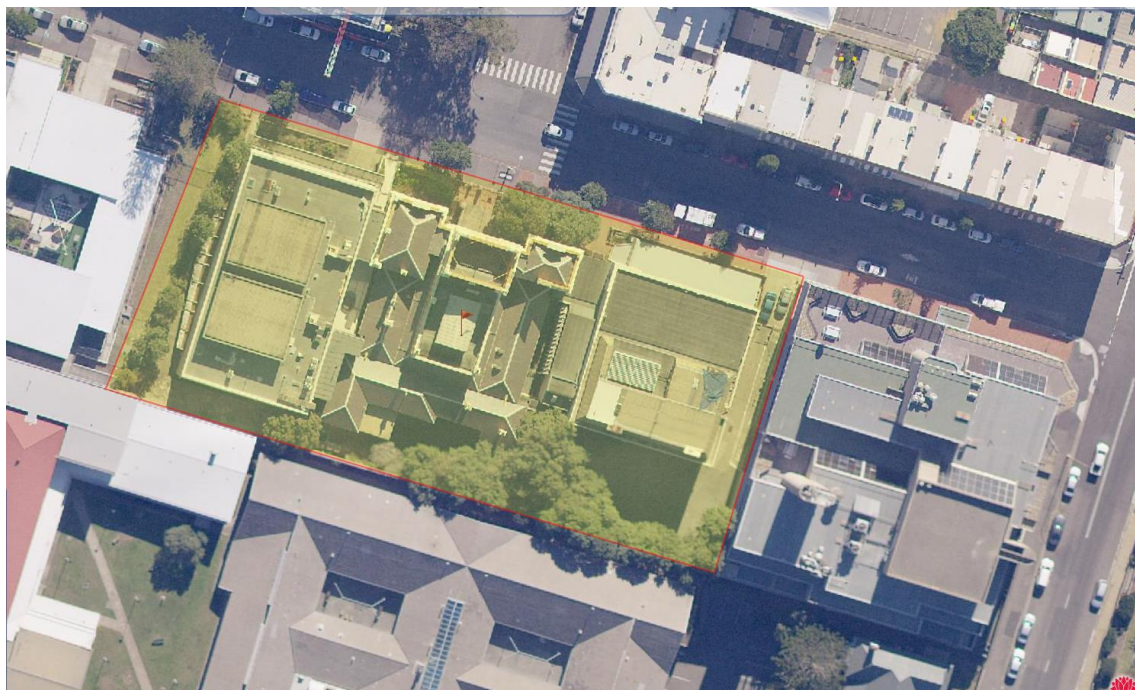
**Address:** Church Street Newcastle NSW

The site was formerly the Newcastle Courthouse building located in the Newcastle Central Business District.

The site has a northerly aspect and has been cut and retained along the southern and western side boundaries to create a relatively flat block. The vast majority of the site is occupied by the existing buildings with a driveway entry on the eastern side that leads to a carparking area in the rear southeastern corner.

Existing vegetation within the site consists mostly of mature and semi mature *Lagunaria patersonii* (Norfolk Island Hibiscus) and a few other exotic species that are generally located in the rear southeastern end of the site behind the old courthouse building and the building to the east. Two other trees and some smaller size shrubs are also located approximately midway along the front northern boundary in a garden bed in front of the old courthouse building.

The site is bordered by Newcastle Police Headquarters to the east, other large commercial / residential buildings to the south and west and by street frontage to the north.



**Figure 1 – Development Site**



### 3. METHODOLOGY

A visual tree assessment was made on the 17<sup>th</sup> of November 2018 to evaluate the health and condition of these trees in relation to the impacts of development.

Assessment was by means of a level 2 - Basic Assessment as described in the International Society of Arboriculture (ISA) Tree Risk Assessment Manual and undertaken from the ground only.

A level 2 Basic Assessment consists of a detailed visual inspection of a tree and its surrounding site. It involves a complete walk around the tree looking at the site, buttress roots, trunk and branches. The tree is also looked at from a distance and close up to consider crown shape and surroundings. The use of simple tools to acquire more information about the tree or any potential defects may be used but is not mandatory.

Trunk diameters were measured using a diameter tape. In general tree heights and canopy spreads were estimated however some taller trees were measured using a Haglof EC11 height measuring device to obtain their height and also used as a guide in estimating heights of the others.

Tree data was recorded on a hand-held Trimble TDC100 GPS device.

Photographs were taken using a digital camera; no enhancements were made to any photographs used in this report.

Assessment did not include soil testing, root inspection, aerial inspection or any other investigative inspection methods.

### 4. SULE – Safe Useful Life Expectancy

The SULE method (developed by Jeremy Barrell) of assessment involves classifying trees, after an inspection, into one of five categories that will give an indication of its safe useful life expectancy. The value system is a planning tool only and should be taken in context with other attributes, characteristics or site conditions. These values would change as a result of the proposed development.

SULE takes into consideration the species, age, location, health and condition in trying to determine the possible outcomes and future potential of a tree (Appendix 1)

## 5. LIMITATIONS

Tree health and environmental conditions can change at any time due to unforeseen circumstances and as such the contents contained in this assessment refer to the tree's condition on the day of inspection only.

Assessment of the tree was by visual inspection from the ground only and as such not all faults may have been detected or extent of defects able to be fully determined. In such cases further more advanced assessment techniques such as aerial inspections for evaluation of structural defects in trunks and branches, decay testing to determining the amount of sound and root inspections would need to be undertaken in further determining the structural integrity of the trees.

A visual assessment can only take into consideration the outward signs of a trees condition. There are many problems that can occur inside a tree that cannot be seen, such as fungal diseases and undetected structural faults such as decay and hollows. Problems can also occur within the root systems due to contaminated soils and root diseases.

These issues would require further investigative methods to be undertaken in further determining the health and condition of the tree.

No guarantee can be given nor can it be predicted that branch failure or uprooting (windthrow) would not occur as a result of extreme winds, storm activity, lightning strike and /or excessive rainfall.

No tree can be declared completely safe and total mitigation of risk can only be achieved by removal. As such there is always some degree of risk that branch or root crown failure may occur

## 6. TREE ASSESSMENT

Table 1

Tree No	Botanical Name Common Name	Age	HGT (m)	Canopy Spread NSEW (m)	DBH (mm)	Structure	Health	Condition	SULE
1	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	15	3213	160 370	Good	Good	5	2d
2	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	S/M	6	1111	110	Good	Good	5	2b
3	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	S/M	14	1002	170	Good	Good	5	2d
4	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	S/M	14	1211	220	Good	Good	5	2d
5	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	14	3214	350	Good	Good	5	2d
6	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	13	2402	160 180 100	Good / Fair	Good	5	2d
7	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	S/M	8	1001	130	Good	Good	5	3b
8	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	13	3411	270	Good	Good	5	2d
9	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	S/M	13	4020	210	Good	Good	5	2d
10	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	14	4434	420	Good	Good	5	2d
11	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	14	4431	340	Good	Good	5	2d
12	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	15	5453	520	Good	Good	4	2d
13	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	12	3152	240 220	Good / Fair	Good	5	2d

Tree No	Botanical Name Common Name	Age	HGT (m)	Canopy Spread NSEW (m)	DBH (mm)	Structure	Health	Condition	SULE
14	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	15	3125	360	Good	Good	5	2d
15	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	14	1414	280	Good	Good	5	2d
16	<i>Magnolia spp.</i> Magnolia	S/M	7	1214	220	Good	Good	5	3d
17	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	15	3543	260 350	Good / Fair	Good	5	2d
18	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	15	6252	240 340	Good	Good	5	2d
19	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	15	5255	440	Good	Good	5	2d
20	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	14	2225	300 210	Good / Fair	Good	5	2d
21	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	14	2526	200 300	Good / Fair	Good	4	2d
22	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	15	6365	360 460	Good / Fair	Good	4	2d
23	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	S/M	12	6114	250	Good / Fair	Good	4	3d
24	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	17	5425	440	Good	Good	4	2d
25	Dead tree	M	5	5131	250 250	Poor	Poor	1	4a
26	<i>Cinnamomum camphora</i> Camphor Laurel	S/M	7	2343	Multi avg. 7x150	Poor	Good	4	3b
27	<i>Cinnamomum camphora</i> Camphor Laurel	S/M	6	4414	150 150 100	Poor	Good	4	3b
28	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	M	12	5454	300 500	Good / Fair	Good	5	2d

Tree No	Botanical Name Common Name	Age	HGT (m)	Canopy Spread NSEW (m)	DBH (mm)	Structure	Health	Condition	SULE
29	<i>Cinnamomum camphora</i> Camphor Laurel	M	12	5525	Multi Avg. 12x 120	Poor	Good	3	3b
30	<i>Magnolia grandiflora</i> 'Little Gem'	S/M	4	1213	140 120	Good	Good	5	1b
31	<i>Magnolia grandiflora</i> 'Little Gem'	S/M	7	2324	210	Good	Good	5	1b
32	<i>Magnolia grandiflora</i> 'Little Gem'	S/M	5	2222	170	Good	Good	6	1b
33	<i>Magnolia grandiflora</i> 'Little Gem'	S/M	5	2334	220	Good	Good	5	1b
34	<i>Magnolia grandiflora</i> 'Little Gem'	S/M	5	3223	220	Good	Good	6	1b

## 7. TREE RETENTION VALUES

## 7.1 Assessment of sustainability

The health, condition and longevity of a tree increase or diminishes depending on its quality, intactness and state of maturity. A measure of sustainability is an estimate of the relative length of time that a tree can provide amenity and other benefits.

## 7.2 Assessment of Landscape Significance

A considered evaluation of each trees landscape significance has been made having regard for their environmental, heritage and amenity values. These values relate to individual trees and groups of trees in particular situations. These values vary according to the species and size of the tree and their position in the landscape.

### 7.3 Tree Retention Values

Once there is a measure of a trees sustainability and significance in the landscape factors can be weight up using the matrix below (Figure 2) which categorizes the tree or trees according to its suitability or desirability for retention (Refer to Appendix 4).

### Figure 2

TREE RETENTION VALUES – ASSESSMENT METHODOLOGY							
	Landscape Significance Rating						
Tree Sustainability	1	2	3	4	5	6	7
Greater than 40 years	High Retention Value						
15 to 40 years			Moderate				
5 to 15 years			Low				
Less than 5 years		Very Low Retention Value					
Dead or Hazardous							

#### 7.4 Assessment of Sustainability within the Landscape

In general the trees display good health and vigour and crown density, growth and foliage size appears to be normal. No significant signs of dieback of branches, thinning of crown foliage or deadwood was noticeable that would indicate that the trees are in decline.

No fungal brackets or infestation of insects etc. was noticeable that could indicate problems associated with pest or disease.

No significant damage, structural defects or signs of decay, bulges, cracking or splitting were observed that would indicate major tree or branch failure was imminent or probable.

No significant leans, soil mounding, soil lifting, soil cracking or root damage was noticeable at the time of inspection that could indicate root crown failure was imminent or probable

The trees are not causing damage to any structures indicating that in their current setting are suitable to position.

Whilst no significant defects were observed, trees grouped together as a cluster collectively form a large canopy spread, have strength and contribute to maintaining each other's environment providing shelter and buffering and lessen the impacts of high winds and other climatic conditions.

However this has resulted in branch and foliage orientation of individual trees forming asymmetrical crowns especially on trees that are positioned on the outer edge of the clusters

Upon dispersal the seeds of *Lagunaria patersonii* can cause a strong irritation to the skin and as such are generally not a suitable species in areas that are high in pedestrian activity or where people will frequently congregate

Based on their health, vigour, condition and suitability to position it appears that with some minor remedial works these trees would be retainable however due to the potential for skin irritations may not be sustainable over the long term.

Table 2

Tree No	Botanical Name Common Name	Assessment of Sustainability within the Landscape
1	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects Tree is within 3m of the existing dwelling it is exempt under Section 5.03.01 Declared Vegetation - Control 1 (g) (i) a tree is located within 3m of the wall of an existing principal building
2	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects Poor habit & form canopy spread substantially suppressed by larger surrounding trees Tree is within 3m of the existing dwelling it is exempt under Section 5.03.01 Declared Vegetation - Control 1 (g) (i) a tree is located within 3m of the wall of an existing principal building & Control 1 (g) (ii) The tree has a circumference (measured at 1.4m above ground level), less than 450mm for a single trunk tree
3	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects tree is within 3m of the existing dwelling it is exempt under Section 5.03.01 Declared Vegetation - Control 1 (g) (i) a tree is located within 3m of the wall of an existing principal building
4	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects tree is within 3m of the existing dwelling it is exempt under Section 5.03.01 Declared Vegetation - Control 1 (g) (i) a tree is located within 3m of the wall of an existing principal building
5	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects tree is within 3m of the existing dwelling it is exempt under Section 5.03.01 Declared Vegetation - Control 1 (g) (i) a tree is located within 3m of the wall of an existing principal building
6	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline Co-dominant trunks minor bark inclusion
7	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects Poor habit & form canopy spread substantially suppressed by larger surrounding trees
8	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects
9	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects



Tree No	Botanical Name Common Name	Assessment of Sustainability within the Landscape
10	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects
11	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects
12	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects
13	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline Co-dominant trunks minor bark inclusion Fair habit & form Suppressed canopy orientated to the northeast
14	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects
15	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects
16	<i>Magnolia spp.</i> Magnolia	No significant signs of dieback or decline No significant structural defects Poor habit & form Suppressed canopy orientated to the west
17	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline Co-dominant trunks minor bark inclusion
18	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline Co-dominant trunks no significant bark inclusions
19	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects
20	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline Co-dominant trunks minor bark inclusion
21	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects
22	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline Co-dominant trunks moderate bark inclusion Excessive end weight on smaller size bowed branches
23	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects Excessive end weight on smaller size bowed branches Poor habit & form Suppressed canopy orientated to the north
24	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline No significant structural defects Excessive end weight on smaller size bowed branches
25	Dead tree	Dead Tree No hollows noticeable that would appear to support hollow dependant fauna

Tree No	Botanical Name Common Name	Assessment of Sustainability within the Landscape
26	<i>Cinnamomum camphora</i> Camphor Laurel	No significant signs of dieback or decline Multi stemmed co-dominant trunks low bark inclusion Basal epicormic shoots re-sprouting from stump Not suitable to position for long term retention
27	<i>Cinnamomum camphora</i> Camphor Laurel	No significant signs of dieback or decline Multi stemmed co-dominant trunks low bark inclusion Basal epicormic shoots re-sprouting from stump Not suitable to position for long term retention
28	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	No significant signs of dieback or decline Co-dominant trunks minor bark inclusion
29	<i>Cinnamomum camphora</i> Camphor Laurel	No significant signs of dieback or decline Multi stemmed co-dominant trunks low bark inclusion Basal epicormic shoots re-sprouting from stump Not suitable to position for long term retention
30	<i>Magnolia grandiflora</i> 'Little Gem'	Dieback of some small branches but no significant signs of decline No significant structural defects Fair habit & form unsymmetrical canopy spread orientated to the southwest
31	<i>Magnolia grandiflora</i> 'Little Gem'	Dieback of some small branches but no significant signs of decline No significant structural defects
32	<i>Magnolia grandiflora</i> 'Little Gem'	No significant signs of dieback or decline No significant structural defects
33	<i>Magnolia grandiflora</i> 'Little Gem'	No significant signs of dieback or decline No significant structural defects Split in lower branch to south over footpath
34	<i>Magnolia grandiflora</i> 'Little Gem'	No significant signs of dieback or decline No significant structural defects

## 7.5 Landscape Significance Ratings

### 7.5.1 Rating as a cluster of trees

**Table 3**

Tree No.	Landscape Significance	Sustainability	Retention Value
Collective as a cluster of trees	<p>Based on their combined numbers that links them together to the trees from a large live crown size, have strength and contribute to maintaining each other's environment providing shelter and buffering and lessen the impacts of strong winds and other climatic conditions.</p> <p>Good representative of the species in terms of their form and branching habit however trees that are positioned on the outer edge and against the retaining wall have formed asymmetrical crowns</p> <p>As a group they make a fair contribution to the amenity and aesthetic value of the area</p> <p>Whilst the trees are visible from the adjacent property to the south, they are partially obscured by other build form and as such are not visually prominent or visible from the street</p>	15- 40 years	Moderate

### 7.5.2 Ratings as Individual Trees

**Table 4**

<b>Tree No.</b>	<b>Landscape Significance</b>	<b>Landscape Rating</b>	<b>Sustainability</b>	<b>Retention Value</b>
1	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting	15 - 40 years	Low
2	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting Poor representative of the species - Suppressed	5 - 15 years	Low
3	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting	15 - 40 years	Low
4	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting	15 - 40 years	Low
5	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting	15 - 40 years	Low
6	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting	15 - 40 years	Low
7	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting Poor representative of the species - Suppressed	5 - 15 years	Low
8	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting	15 - 40 years	Low
9	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting	15 - 40 years	Low
10	4 Moderate	The tree has a medium live crown size exceeding 40m <sup>2</sup> Fair representative of the species Makes a fair contribution to the visual character of the area	15 - 40 years	Moderate
11	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting	15 - 40 years	Low

Tree No.	Landscape Significance	Landscape Rating	Sustainability	Retention Value
12	4 Moderate	The tree has a medium live crown size exceeding 40m <sup>2</sup> Fair representative of the species Makes a fair contribution to the visual character of the area	15 - 40 years	Moderate
13	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting	15 - 40 years	Low
14	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting	15 - 40 years	Low
15	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting	15 - 40 years	Low
16	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting Poor representative of the species - Suppressed	5 - 15 years	Low
17	4 Moderate	The tree has a medium live crown size exceeding 40m <sup>2</sup> Fair representative of the species Makes a fair contribution to the visual character of the area	15 - 40 years	Moderate
18	4 Moderate	The tree has a medium live crown size exceeding 40m <sup>2</sup> Fair representative of the species Makes a fair contribution to the visual character of the area	15 - 40 years	Moderate
19	4 Moderate	The tree has a medium live crown size exceeding 40m <sup>2</sup> Fair representative of the species Makes a fair contribution to the visual character of the area	15 - 40 years	Moderate
20	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting	15 - 40 years	Low
21	4 Moderate	The tree has a medium live crown size exceeding 40m <sup>2</sup> Fair representative of the species Makes a fair contribution to the visual character of the area	15 - 40 years	Moderate
22	4 Moderate	The tree has a medium live crown size exceeding 40m <sup>2</sup> Fair representative of the species Makes a fair contribution to the visual character of the area	15 - 40 years	Moderate
23	5 Low	The tree has a small live crown size of less than 40m <sup>2</sup> and can be replaced within the short term with new tree planting Poor representative of the species - Suppressed	5 - 15 years	Low
24	4 Moderate	The tree has a medium live crown size exceeding 40m <sup>2</sup> Fair representative of the species Makes a fair contribution to the visual character of the area	15 - 40 years	Moderate

Tree No.	Landscape Significance	Landscape Rating	Sustainability	Retention Value
25	7 Insignificant	Poor representative of the species - Dead tree Detracts from the visual character of the area	Less than 5 years	Very Low
26	6 Very Low	The tree has a small live crown size of less than 40m2 and can be replaced within the short term with new tree planting Poor representative of the species	Less than 5 years	Very Low
27	6 Very Low	The tree has a small live crown size of less than 40m2 and can be replaced within the short term with new tree planting Poor representative of the	Less than 5 years	Very Low
28	4 Moderate	The tree has a medium live crown size exceeding 40m2 Fair representative of the species Makes a fair contribution to the visual character of the area Visible from surrounding properties & the street	15 - 40 years	Moderate
29	5 Low	The tree has a medium live crown size exceeding 40m2 Poor representative of the species Makes a fair contribution to the visual character of the area Visible from surrounding properties & the street	5 – 15 years	Low
30	5 Low	The tree has a small live crown size of less than 40m2 and can be replaced within the short term with new tree planting	Greater than 40 Years	Moderate
31	5 Low	The tree has a small live crown size of less than 40m2 and can be replaced within the short term with new tree planting	Greater than 40 Years	Moderate
32	5 Low	The tree has a small live crown size of less than 40m2 and can be replaced within the short term with new tree planting	Greater than 40 Years	Moderate
33	5 Low	The tree has a small live crown size of less than 40m2 and can be replaced within the short term with new tree planting	Greater than 40 Years	Moderate
34	5 Low	The tree has a small live crown size of less than 40m2 and can be replaced within the short term with new tree planting	Greater than 40 Years	Moderate

## 8. PROTECTION ZONES

### 8.1 Tree Protection Zones

Tree Protection Zones (TPZ) are the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The TPZ incorporates the Structural Root Zone (SRZ) (Figure 3).

The method used to determine the TPZ and SRZ for these trees have been based on Australian Standard 4970 – 2009 Protection of Trees on Development Sites 3.3.5.

### 8.2 TPZ - Tree Protection Zones

Australian Standard 4970 – 2009 Protection of Trees on Development Sites requires that the Diameter at Breast Height (DBH) of the trunk measured 1.4m above ground be multiplied by 12 to obtain the radius of a Tree Protection Zones (TPZ).

It is possible that minor encroachments can be established for these trees provided that encroachment is less than 10% and outside their Structural Root Zone and that the area lost to encroachment can be compensated for elsewhere and contiguous with the TPZ.

**Note:** A TPZ should not be less than 2 meters nor greater than 15 meters

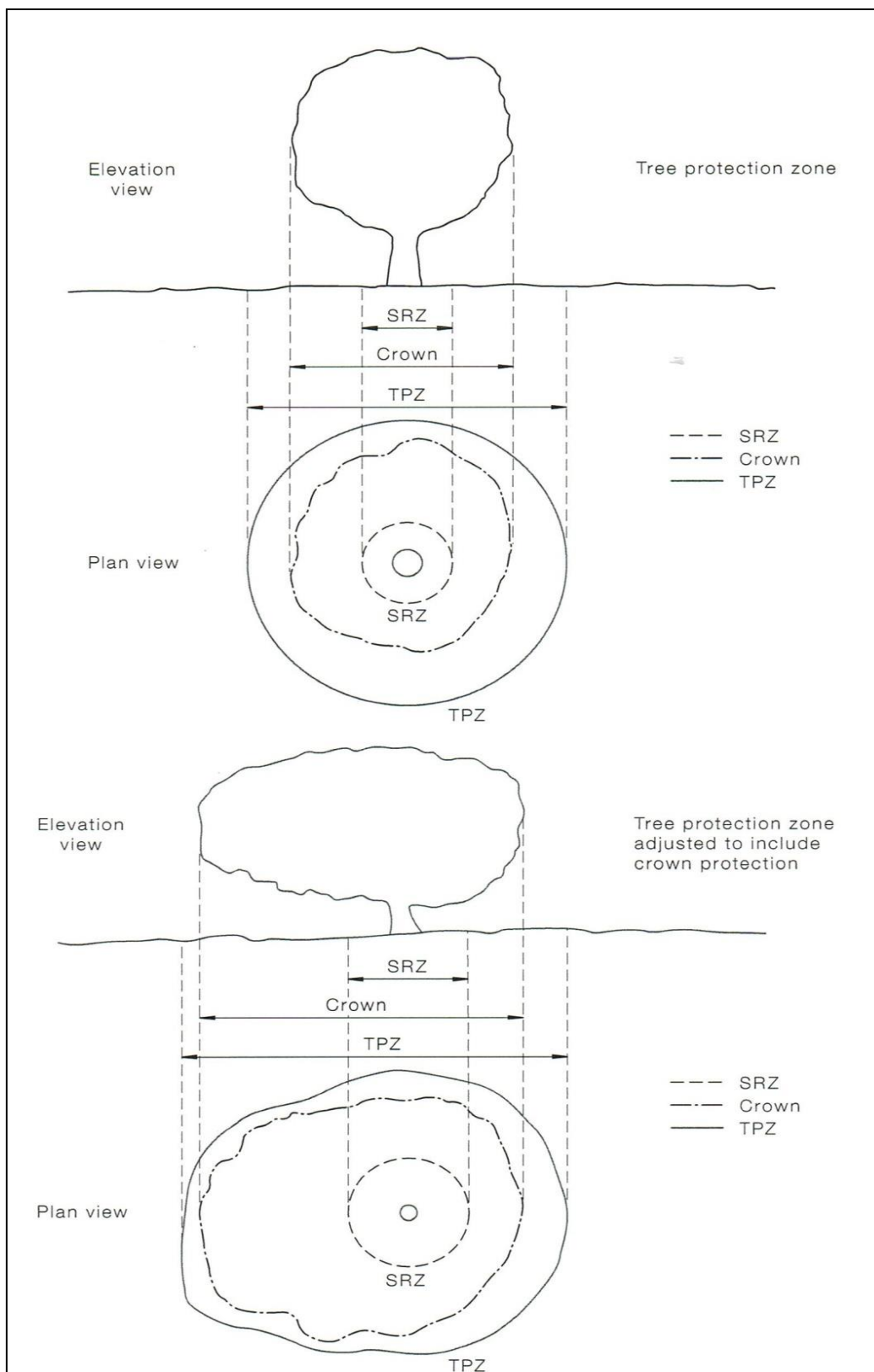
### 8.3 SRZ – Structural Root Zones

Where major encroachment into the TPZ is expected the Structural Root Zone (SRZ) requires to be calculated. **The SRZ considers the trees structural stability only.** The woody root growth and soil cohesion in this area are necessary to hold the tree upright.

The method used to determine the SRZ for these trees have been based on Australian Standard 4970 – 2009 Protection of Trees on Development Sites 3.3.5.

**Note:** An SRZ should not be less than 1.5 meters

- **Refer to Table 4 in reference to calculated TPZ's & SRZ's and outline of Potential Impacts**

**Figure 3 – Indicative Tree Protection Zones**



**Table 5 - TPZ & SRZ**

Tree No	Botanical Name Common Name	DBH (mm)	DGL (mm)	TPZ Radius (m)	SRZ Radius (m)	Impacts
1	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	160 370	650	4.8	2.76	Potential damage to roots within the SRZ
2	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	110	150	2.0	1.49	Potential damage to roots within the SRZ
3	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	170	220	2.0	1.75	Potential damage to roots within the SRZ
4	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	220	280	2.6	1.94	Potential damage to roots within the SRZ
5	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	350	400	4.2	2.25	Potential damage to roots within the SRZ
6	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	160 180 100	380	3.1	2.20	Potential damage to roots within the SRZ
7	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	130	240	2.0	1.82	Potential damage to roots within the SRZ
8	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	270	300	3.2	2.00	Potential damage to roots within the SRZ
9	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	210	300	2.5	2.00	Potential damage to roots within the SRZ
10	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	420	500	5.0	2.47	Potential damage to roots within the SRZ
11	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	340	500	4.0	2.47	Potential damage to roots within the SRZ
12	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	520	610	6.2	2.69	Potential damage to roots within the SRZ
13	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	240 220	410	4.0	2.28	Within the building footprint
14	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	360	500	4.3	2.47	Within the building footprint
15	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	280	350	3.3	2.13	Potential damage to roots within the SRZ
16	<i>Magnolia spp.</i> Magnolia	220	250	2.6	1.85	Potential damage to roots within the SRZ
17	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	260 350	510	5.2	2.49	Within the building footprint

18	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	240 340	470	5.0	2.41	Within the building footprint
19	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	440	490	5.2	2.45	Within the building footprint
20	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	300 210	430	4.4	2.32	Within the building footprint
21	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	200 300	480	4.3	2.43	Within the building footprint
22	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	360 460	700	7.0	2.85	Potential damage to roots within the SRZ
23	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	250	360	3.0	2.15	Potential damage to roots within the SRZ
24	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	440	590	5.2	2.65	Potential damage to roots within the SRZ
25	Dead tree	250 250	400	4.2	2.25	Potential damage to roots within the SRZ
26	<i>Cinnamomum camphora</i> Camphor Laurel	Multi avg. 7x150	800	5.0	3.01	Potential damage to roots within the SRZ
27	<i>Cinnamomum camphora</i> Camphor Laurel	150 150 100	380	3.1	2.20	Potential damage to roots within the SRZ
28	<i>Lagunaria patersonii</i> Norfolk Island Hibiscus	300 500	740	7.0	2.92	Potential damage to roots within the SRZ
29	<i>Cinnamomum camphora</i> Camphor Laurel	Multi Avg. 12x 120	1000	5.0	3.31	Potential damage to roots within the SRZ
30	<i>Magnolia grandiflora</i> 'Little Gem'	140 120	200	2.1	1.68	Potential damage to roots within the SRZ
31	<i>Magnolia grandiflora</i> 'Little Gem'	210	270	2.5	1.91	Potential damage to roots within the SRZ
32	<i>Magnolia grandiflora</i> 'Little Gem'	170	220	2.0	1.75	Potential damage to roots within the SRZ
33	<i>Magnolia grandiflora</i> 'Little Gem'	220	290	2.6	1.97	Potential damage to roots within the SRZ
34	<i>Magnolia grandiflora</i> 'Little Gem'	220	270	2.6	1.91	Potential damage to roots within the SRZ

## 9. IMPACTS OF DEVELOPMENT

### 9.1 Tree Nos. 13, 14, 17, 18, 19, 20 & 21

Based on the 1<sup>st</sup> Floor Site and Landscape Plans Tree Nos. 13, 14, 17, 18, 19, 20 & 21 are within the building footprint and as such their removal would be necessary to facilitate the development as proposed (Photo 1)

Whilst Tree Nos. 17, 18, 19 & 21 have been assessed as having moderate retention values it is considered that any re-design options that will enable them to be retained, survive the impacts of construction and achieve a desired design outcome would not be possible without a significant reduction in the size of the overall development footprint.

Tree Nos. 17, 18, 19 & 21 have also been assessed as having moderate retention values and under Section 4.2 of the Urban Forest Technical Manual (Updated February 2018) alternative design options are to be considered where removal of trees of moderate or high value (as determined in accordance with Section 4.1) is proposed.

However under section 4.3 Compensatory planting of the Urban Forest Technical Manual (Updated February 2018) where it has been demonstrated that it is not reasonable to retain tree compensatory planting will be required.

Due to their small live crown size (less than 40m<sup>2</sup>) individually Tree Nos. 13, 14 & 20 are considered to have low retention values.



**Photo 1 - Trees within the development footprint**

## **9.2 Tree Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 22, 23, 24, 25, 26 & 27**

Based on the proposed Site Plan, earthworks associated with demolition of the existing driveway, carparking area and retaining wall along the rear southwestern boundary and construction of the new buildings and other infrastructure works will encroach well into the calculated TPZ's and SRZ's of these trees (Photo's 2, 3, 4, 5, 6 & 7).

The main area of concern is damage that may be caused to structural roots and canopy structure.

Damage to structural roots will significantly increase the risk of failure, especially during high winds. Tree roots anchor the tree and their continued function is an important factor in a tree's survival during any construction. Decrease in structural stability will result regardless of species although to what degree depends on many factors such as how many and how close to the tree roots are cut.

Severing of roots on one side of a tree (such as may occur when excavation is past a tree trunk but still within the drip zone), may weaken the tree making it unstable and likely to collapse sometime in the future. Excessive removal of soil from around the root zone can significantly reduce roots anchorage capacity increasing the risk of root crown failure.

Excessive damage to secondary and minor roots may initiate decline in tree health and vigour. Excessive removal of smaller absorbing roots can cause immediate water stress. The survival of the tree is linked to its tolerance of water stress and the ability of the tree to form new root rapidly.

Buildings will also encroach well into canopies of the trees and a substantial amount of pruning would also be required to eliminate conflict between branches and development. This would result in trees with unbalanced crowns display poor habit & form and become aesthetically unappealing and would not comply with Australian Standard 4373 – 2007 Pruning of Amenity Trees.

Due to the close proximity of the demolition and construction works in relation to the extent of encroachment into their TPZ /SRZ it is likely that the trees will be adversely impacted upon by the development that will be detrimental to stability and / or health and vitality and as such their removal would also be necessary to facilitate the development as proposed

Tree Nos. 10, 12, 22 & 24 have been assessed as having moderate retention values and under Section 4.2 of the Urban Forest Technical Manual (Updated February 2018) alternative design options are to be considered where removal of trees of moderate or high value (as determined in accordance with Section 4.1) is proposed.

However under section 4.3 Compensatory planting of the Urban Forest Technical Manual (Updated February 2018) where it has been demonstrated that it is not reasonable to retain tree compensatory planting will be required.

Whilst Tree Nos. 10, 12, 22 & 24 have been assessed as having moderate retention values it is considered that any re-design options that will enable them to be retained, survive the impacts of construction and achieve a desired design outcome would not be possible without a significant changes or reduction in the size of the overall development footprint.

The retention of any of these trees would require changes to the development footprint to be free of construction activity to accommodate a TPZ of no less than TPZ less 10% (unless it can be otherwise demonstrated), that will enable them to be retained and tolerate the impacts of construction.

However it is considered that protection zones required to retain the tree in good, safe condition that re-design options will be difficult to achieve and likely to always result in conflict between tree roots and construction.

Due to their small live crown size (less than 40m<sup>2</sup>) individually Tree Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 15, 16 & 23 are considered to have low retention values.

Tree No. 25 is a dead tree and would be removed regardless of the impacts of development

Due to their invasive seeds Tree Nos. 26 & 27 (*Cinnamomum camphora*) are generally considered to be an undesirable species and combined with their poor canopy structure have been assessed as having very low retention values.



**Photo 2 – Trees adversely impacted upon by development**

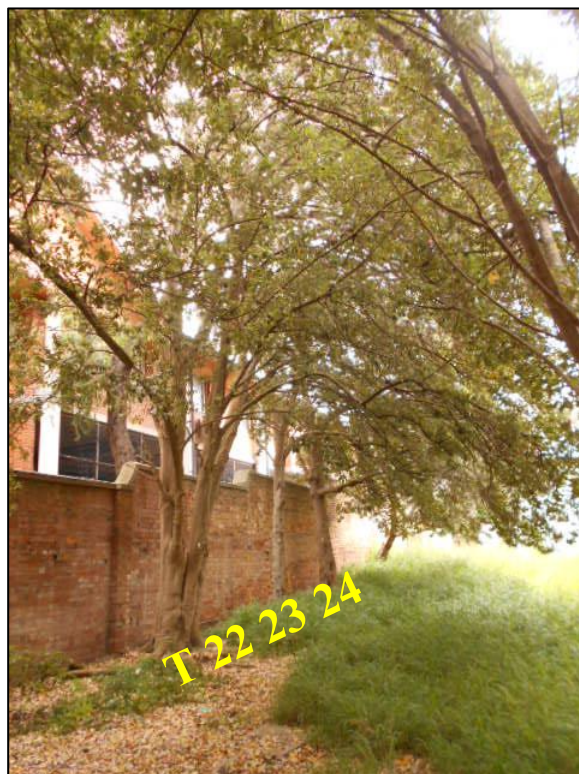


**Photo 3 – Trees adversely impacted upon by development**





**Photo 4 – Trees adversely impacted upon by development**



**Photo 5 – Trees adversely impacted upon by development**



**Photo 6 – Dead tree**



**Photo 7 – Trees adversely impacted upon by development**

### 9.3 Tree Nos. 28 & 29

The development of the site involves some earthworks within the TPZ of these trees in matters relating to drainage issues within the area and construction of the entry area.

The proposed earthworks will encroach into the SRZ's of these trees that is likely to result in cutting or damage to roots.

Due to the close proximity of construction works in relation to the extent of encroachment into their TPZ /SRZ it is likely that the trees will be adversely impacted upon by the development that will be detrimental to stability and / or health and vitality and as such their removal would be necessary to facilitate the development as proposed (Photo 8).

Tree No. 28 has been assessed as having a moderate retention value and under Section 4.2 of the Urban Forest Technical Manual (Updated February 2018) alternative design options are to be considered where removal of trees of moderate or high value (as determined in accordance with Section 4.1) is proposed.

However under section 4.3 Compensatory planting of the Urban Forest Technical Manual (Updated February 2018) where it has been demonstrated that it is not reasonable to retain tree compensatory planting will be required.

Due to their invasive seeds Tree No. 29 (*Cinnamomum camphora*) is generally considered to be an undesirable species and combined with its poor canopy structure and habit and form has been assessed as having a very low retention value and not considered suitable species for long term retention in its current position.

Whilst their removal will be noticeable from street it is will provide space for new plantings with species of Japanese origins proposed to be established as part of the overall landscape theme.



**Photo 8**  
**Trees adversely impacted**  
**upon by development**



#### 9.4 Trees on the Adjoining Property to the West

These trees are located on the adjoining property to the north and as they are to be retained consideration must be given to the impacts construction may have on their condition

However the subject trees are situated approximately 1.8m above existing ground level on top of a brick retaining wall that divides the two boundaries that is to be retained (Photo 9).

In considering the potential impacts it is likely that the wall and associated foundation footings would act as a form of root barrier preventing radial spread of roots. Roots are forced to grow down and/ or linearly along the wall.

Typically, most roots are found within the top 900mm of soil, and most of the fine roots active in water and nutrient absorption are in the top 300mm of soil. This is the area where root systems acquire most of the nutrients.

Root density also declines with soil depth mostly due to the physical limitation of the soil. Normally soil bulk density increases with depth and pore space decline. As such in deeper soil there is a mechanical impedance to root growth and sufficient oxygen for adequate root growth is also not present deep in the soil.

Based on observation made given that the small size of the trees and the limitations on the depth of root growth it is considered that roots are not likely to have penetrated deep enough into the soil and extent into the subject property. As such it is considered that the development of the site would not have any impact on these trees.

However care will need to be taken to ensure damage upper parts of the tree is avoided during the demolition stage.



**Photo 9**  
**Trees on neighbouring**  
**property to west not expected**



### 9.5 Tree Nos. 30, 31, 32, 33 & 34

As part of the overall development the existing street footpath is to be renewed. Although excavation is not expected to be extensive extreme care must be taken to avoid damage to roots. Typically, most roots are found within the top 900mm of soil, and most of the fine roots active in water and nutrient absorption are in the top 300mm of soil. Large roots can also be encountered close to the surface.

To avoid excessive damage to roots the demolition of the existing path and construction of the new path must be undertaken with extreme care to avoid severance or damage to roots within the SRZ and excessive damage to roots within the TPZ.

It is possible that the existing pavement can be removed without significantly impacting on the trees however must be lifted in a manner that will not cause damage to roots.

Removal of pavement should not be undertaken by means of crushing or shattering or by other means that involve pounding as the force of pounding impacts could result in damage to roots that may be close to the surface or compaction of soil (Photo 10)

Provided that the extent of excavation is limited to allow for thickness of new pavement (approximately 125mm) it is possible that the works can be undertaken and tolerated by the trees.

Some pruning of lower branches that overhang the path may be required to eliminate conflict between branches and construction and to provide overhead clearance. The trees should tolerate some minor pruning however should not exceed more than 10% of the total canopy spread and is carried out in accordance with Australian Standard 4373 –2007 Pruning of Amenity Trees.

Excessive pruning of overhanging branches should be avoided so that its current habit and form is generally maintained.

With a careful approach during the removal of existing pavement and associated preparation works and laying of new pavement so that damage to roots within the TPZ / SRZ is avoided, combined with the implementation of the Tree Protection Measures it is considered that the Tree Nos. 30, 31, 32, 33 & 34 can be retained and should be able tolerate the impacts of construction.

**Photo 10**  
**Renewal of footpath**  
**next to street trees**



## 10. TREE PROTECTION MEASURES

The purpose of the Tree Protection Measures is to provide the developers with a guide so that the trees to be retained can be protected whilst construction is undertaken.

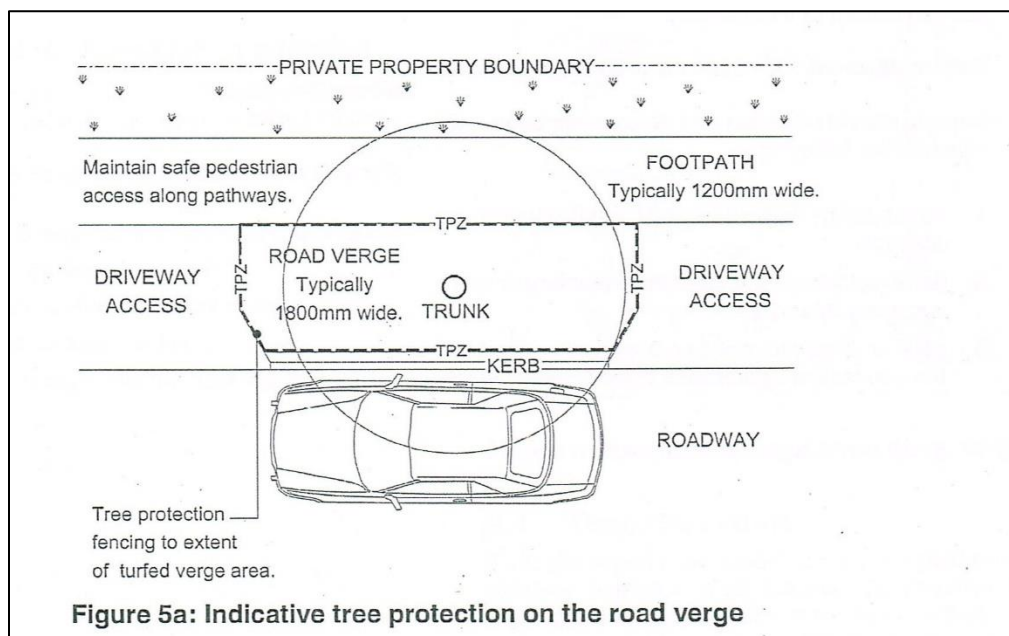
Due to site constraints it is inevitable that construction activity will occur within the nominated TPZ's and as such optimal TPZ's that would comply with Australian Standard 4970 – 2009 Protection of Trees on Development Sites will not be achievable.

Tree Protection Measures and works within nominated Tree Protection Zones must comply with Australian Standard 4970 – 2009 Protection of Trees on Development Sites

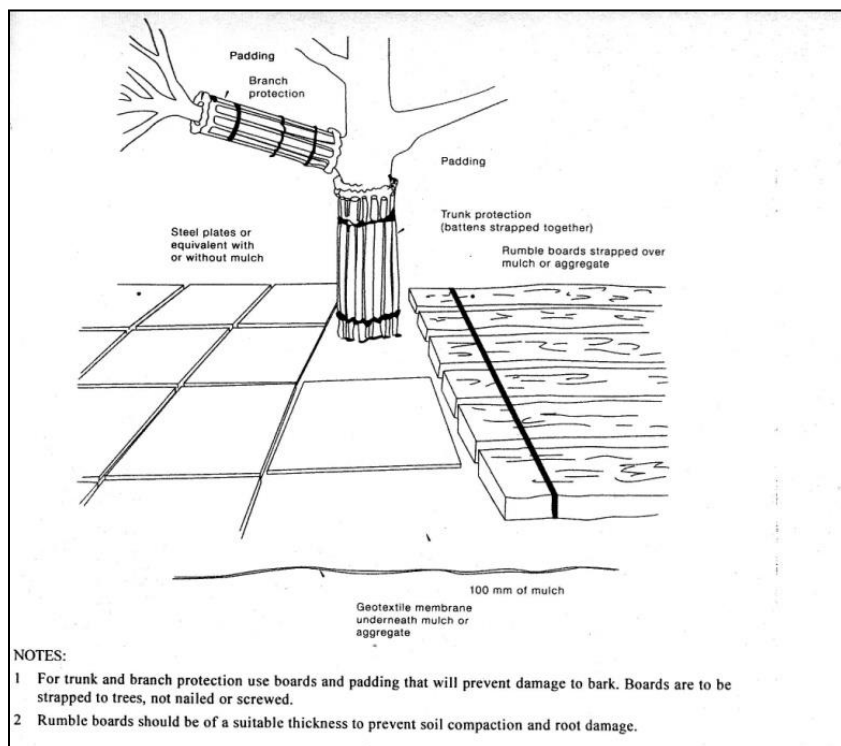
The following protection measures as outlined in Table 6 below should be implemented prior to the commencement of any construction activity:

**Table 6**  
**Tree Inventory of Trees to be Protected**

Tree Nos.	Protection Measures
30 31 32 33 34	<ul style="list-style-type: none"> <li>• Tree Protection Zones shall encompass the footpath between the road side curb and as much as practicable to the south that will still enable pedestrian access (Figure 4). Fencing should extend 2m past each trunk to the east and west</li> <li>• The limits of Tree Protection Zones shall be staked and 1800mm high chain link temporary fencing installed.</li> <li>• Where fencing may not be appropriate or practical boards and padding should be used for trunk and branch protection that will help to prevent damage to bark when manoeuvring and operating machinery near surrounding trees. Boards must be strapped to trees not nailed (Figure 5).</li> <li>• No materials, equipment, spoils, waste water or chemicals of any description may be disposed of or stored within this area.</li> <li>• Any electrical cables, gas pipes, sewer pipes or other plumbing services to be routed outside the TPZ.</li> <li>• Protection areas are to be clearly marked as a NO GO AREA and inspected by the consulting arborist.</li> <li>• Protection measures are to remain until all site work has been completed</li> </ul>



**Figure 4 - Indicative tree protection zone**



**Figure 5 - Trunk & branch protection**

## 11. REPLANTING

Replanting has not been addressed in this report. A detailed Landscape Plan has been prepared as part of the development application and should be referred to in regards to new plantings

## 12. CONCLUSION

Based on the 1<sup>st</sup> Floor Site and Landscape Plans and after an inspection and assessment of impacts of development on these trees, it is concluded that all trees within the proposed development site would need to be removed to facilitate the development as proposed.

- Tree Nos. 13, 14, 17, 18, 19, 20 & 21 are within proposed building footprints whilst Tree Nos. 19, 28, 29 & 30 and as such their removal would be necessary to facilitate the development as proposed.
- Due to the close proximity of works associated with demolition of existing structures and construction of buildings and surrounding infrastructure associated with the development in relation to the extent of encroachment into their TPZ and SRZ's it is considered that Tree Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 22, 23, 24, 25, 26, 27, 28 & 29 will be adversely impacted upon by the development that would be detrimental to both stability and their overall condition and as such their removal would also be necessary to facilitate the development as proposed.

The retention of any trees would require in significant changes to the design to be made and would need to allow for adequate TPZ's to be established that will enable them to survive the impacts of construction in good condition.

- With a careful approach during the removal of existing pavement and associated preparation works and laying of new pavement so that damage to roots within the TPZ / SRZ is avoided combined with the implementation of the Tree Protection Measures it is considered that the Tree Nos. 30, 31, 32, 33 & 34 can be retained and tolerate the impacts of construction.
- Whilst construction is not expected to have an impact on the trees on the neighbouring property to the west care will still need to be taken to ensure damage upper parts of the trees is avoided during the demolition stage.

### 13. RECOMMENDATIONS

Based on the 1<sup>st</sup> Floor Site and Landscape Plans and after an inspection and assessment of impacts of development on these trees following outcomes are recommended:

**1. Removal of Tree Nos. 13, 14, 17, 18, 19, 20 & 21**

**Reason:**

The trees are within the development footprint and such their removal would be necessary to facilitate the development as proposed.

**2. Removal of Tree Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 22, 23, 24, 25, 26, 27, 28 & 29**

**Reason:**

Due to the close proximity of works associated with demolition and construction their removal would be necessary as they will be adversely impacted upon by the development that will be detrimental stability and/ or their overall condition

**3. Retention of Tree Nos. 30, 31, 32, 33 & 43**

**Reason:**

It is considered that with a careful approach during the removal of existing pavement and associated preparation works and laying of new pavement combined with the implementation of the Tree Protection Measures that the trees can be retained and tolerate the impacts of construction.

**4. Care to be taken to ensure damage upper parts of the trees located on the adjoining property to the west is avoided during the demolition stage**

**Reason:**

So that they can be retained and not impacted upon by the development

**5. Tree Protection Measures must comply with Australian Standard 4970 – 2009**

**Protection of Trees on Development Sites.**

**Reason:**

To ensure best practices are implemented for the planning and protection of trees on or within close proximity to a development site.

**6. Any works within a nominated Tree Protection Zones must comply with Australian Standard 4970 – 2009 Protection of Trees on Development Sites.**

**Reason:**

To ensure best practices for the protection of trees to be retained are followed

## 14. REFERENCES

Matheny, Nelda and Clark, James R. 1998, Trees and Development: A Technical Guide to Preservation of Trees During Land Development, International Society of Arboriculture Champaign, USA.

Dunster, Julian A., E. Thomas Smiley, Nelda Matheny, and Sharon Lilly. 2013 Tree Risk Assessment Manual. Champaign, Illinois: International Society of Arboriculture

Australian Standards – AS 4970 – 2009, Protection of Tree on Development Sites  
Standards Australia Sydney

[www.treetec.net.au/TPZ\\_SRZ\\_DBH\\_calculator.php](http://www.treetec.net.au/TPZ_SRZ_DBH_calculator.php)

Newcastle City Council DCP Section 5.03 – Vegetation Management

Newcastle Urban Forest, Technical Manual (Updated February 2018)

Jim Clarke and Nelda Matheny April 1999, Care and Management of Trees on Development Sites

## 15. DISCLAIMER

The conclusions and recommendations contained in this report refer to the tree's condition on the day of inspection only. The report should be read and considered in its entirety. All care has been taken using the most up to date arboricultural information in the preparation of this report.

The report is based on visual inspection only. No guarantee can be given nor can it be predicted that branch failure or uprooting (windthrow) would not occur as a result of high winds and /or excessive rainfall and other unpredictable events. Tree health and environmental conditions can change at any time due to unforeseen circumstances.

**Report by**



**Diploma of Arboriculture**

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## **APPENDIX 1**

### **SULE - Safe Useful Life Expectancy**

#### **1. Long SULE**

- a. Structurally sound and can accommodate future growth
- b. Long term potential with minor remedial treatment
- c. Trees of special significance which warrant extra care

#### **2. Medium SULE**

- a. Will live between 15-40 years
- b. Will live for more than 40 years but would be removed for safety or nuisance reasons
- c. May live for more than 40 years but will interfere with more suitable specimens and need removal eventually
- d. More suitable for retention in the medium term with some remedial care

#### **3. Short SULE**

- a. Trees that may only live between 5-15 more years
- b. May live for more than 15 years but would need removal for safety or other reasons
- c. Will live for more than 15 years but will interfere with more suitable specimens or provide space for replacement plantings
- d. Require substantial remedial care but are only suitable for short term retention

#### **4. Removals**

- a. Dead, dying or seriously diseased
- b. Dangerous trees through instability or loss of adjacent trees
- c. Structural defects such as cavities
- d. Damaged that are clearly not safe to retain
- e. May or are causing damage to structures
- f. That will become dangerous

#### **5. Moved or Replaced**

Trees, which can be reliably moved or replaced

- a. Small trees less than 5 meters
- b. Young trees between 5-15 years
- c. Trees that have been regularly pruned to control growth

## **APPENDIX 2**

### **CONDITION RATINGS**

Each tree or groups of trees have been placed into categories ranging from 1 to 6, with no.1 being in the worst condition through to no.6 in a health condition.

This is based on observations of their health and structure.

1. A dead tree.
2. A tree in severe decline. Major structural damage that cannot be repaired, dieback of trunk or scaffold branches and the majority of foliage consist of epicormic growth.
3. A tree in decline. Significant structural damage that cannot be repaired, dieback of medium to larger branches and epicormic growth.
4. A tree moderate vigor, dieback of smaller branches and twigs, thinning of crown, poor leaf colour and moderate structural defects that could be mitigated with regular care.
5. A tree in slight decline with only a small amount of twig dieback and minor structural damage that could be easily rectified.
6. A healthy vigorous tree that shows reasonably free signs of pest and diseases and good structural form.

## **APPENDIX 3**

### **AGE CLASS**

J - Juvenile  
S/M - Semi Mature  
Y/M - Young mature  
M - Mature  
O/M - Over Mature