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ARBORICULTURAL IMPACT ASSESSMENT REPORT

MAITLAND GAOL
6-18 JOHN STREET
EAST MAITLAND

Prepared for

MAITLAND CITY COUNCIL

13th JANUARY 2023

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1. INTRODUCTION

Maitland Gaol is the longest continuously operating correctional institution in New South Wales. The facility closed in 1998 and was converted to a tourism facility in 2000 under the management of Maitland City Council.

In January 2022 the NSW State and Federal Governments announced a funding grant for the redevelopment of the Gaol to deliver a substantial part of its 2020 Development Plan including capital investment in a new activity hub with enhance access and connectivity, innovative interpretation, along with the provision of event infrastructure and boutique accommodation. The Maitland Gaol Redevelopment will be staged across three separate Development Applications consisting of:

Development Application 1:
Redevelopment of the 'Store' building (Building 14) to provide:
- A new ticketing office and gift store;
- New administration office space;
- Upgraded amenities;
- Construction of DDA access, ramps and stairs;
- Demolition of existing laundry; and
- Construction of a new loading dock.

Redevelopment of the 'Gaol Staff / Warder's Amenities' building (Building 22) consisting of:
- Demolition of Building 22;
- Construction of a new café/restaurant;
- External and internal landscaping; and
- Construction of enhanced access points.

Construction of new carpark:
- Construction of 16 space car park including two accessible parking spaces;
- Associated landscaping; and
- Construction of accessible pathways.

Development Application 2:
Refurbishment of the 'Lieutenant Governor and Governor's residences' (Buildings 2 and 3) to provide:
- Boutique accommodation consisting of several guest rooms.

Development Application 3:
Future works for the redevelopment of the 'Store' Building to provide:
- Additional amenities;
- Renovated theatre with bar, foyer, amphitheatre (pax:256);
- Renovated back of house; and
- Construction of external DDA ramp

1.1 Scope of Works

An Arboricultural Impact Assessment has been undertaken at the requested of Maitland City Council on 16 trees within the subject site where new works are proposed to upgrade the Goal facilities.

Assessment will take into consideration the health and structural integrity of the trees and impacts of construction.

Impact Assessment will be in accordance with Australian Standards – AS 4970 – 2009, Protection of Tree on Development Sites

Tree Assessment will be in the form of a Level 2 'Basic' Tree Assessment as described in the International Society of Arboriculture (ISA) Tree Risk Assessment Manual and conducted from the ground only

Whilst comment is given regarding tree conditions this evaluation is not intended for use for any other purposed other than that proposed. Assessments and recommendations are not provided for in this evaluation regarding the management of these trees in relation to their existing health and vitality or structural condition.

Native habitat or ecological significance of trees are not addressed in this report and should be assessed separately by a suitably qualified Ecologist.

Assessment and outcomes of this report will be based on the:

Assessment and outcomes will be based on the design by Maitland City Council:

- Basement Plan – Revision M Date 24/07/23
- Demolition Plan – Basement No. DA-121_C Revision C Date 24/11/22
- Demolition Plan – Ground Floor No. DA-122_C Revision C Date 24/11/22

The report will contain the following information:

- Tree Assessment
- Impact Assessment
- Tree Protection Plan
- Recommendations

The report should be read and considered in its entirety

2. SITE LOCATION

Site Address: Maitland Gaol
6-18 John Street Maitland NSW

Photo A - Development site (courtesy Six maps)

3. METHODOLOGY

A visual tree assessment was made on the 23rd of November 2022 to evaluate the health and condition of these trees in relation to the impacts of the proposed development.

Impact Assessment is in accordance with Australian Standards – AS 4970 – 2009, Protection of Tree on Development Sites

Assessment of tree condition was undertaken by means of a Visual Tree Inspection (VTA) Level 2 – Basic Tree Assessment as described in the International Society of Arboriculture (ISA) Tree Risk Assessment Manual and conducted 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 and canopy spreads were estimated

In general tree heights were estimated however some taller trees were measures using a Haglof EC11 height measuring device to obtain their height and also used as a guide in estimating heights of the others

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

Assessment of all trees 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.

Only those trees specified in the scope of works were assessed and assessments were performed within the limitation specified.

Assessment of trees 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 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.

Any tree whether it has visible weaknesses or not will fail if the force applied exceed the strength of the tree or its parts

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 complete removal of trees. As such the risk that branch, trunk or root crown failure may occur is always present.

As root systems are neither symmetrical or entirely predictable in their depth and are affected by topography, characteristics of soil or substrate and underground obstructions their location and subsequent extent of potential damage is often unpredictable and assessing the impacts of construction can often be difficult to determine.

Whilst careful planning and thorough assessment of the potential impacts of construction, excavation procedures and adequate protection of the trees during construction it is possible that the changed surrounding conditions may inadvertently affect their condition in the future

6. 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 A).

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.

6.1 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 (Figure B).

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

6.2 SRZ – Structural Root Zones

Where major encroachment into the TPZ is expected the Structural Root Zone (SRZ) requires to be calculated (Figure B). **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.

Note: An SRZ should not be less than 1.5 meters

- **Refer to Tree Evaluation Sheet (Appendix 5) in reference to calculated TPZ's & SRZ's and outline of Potential Impacts**

Figure A – Indicative TPZ & SRZ

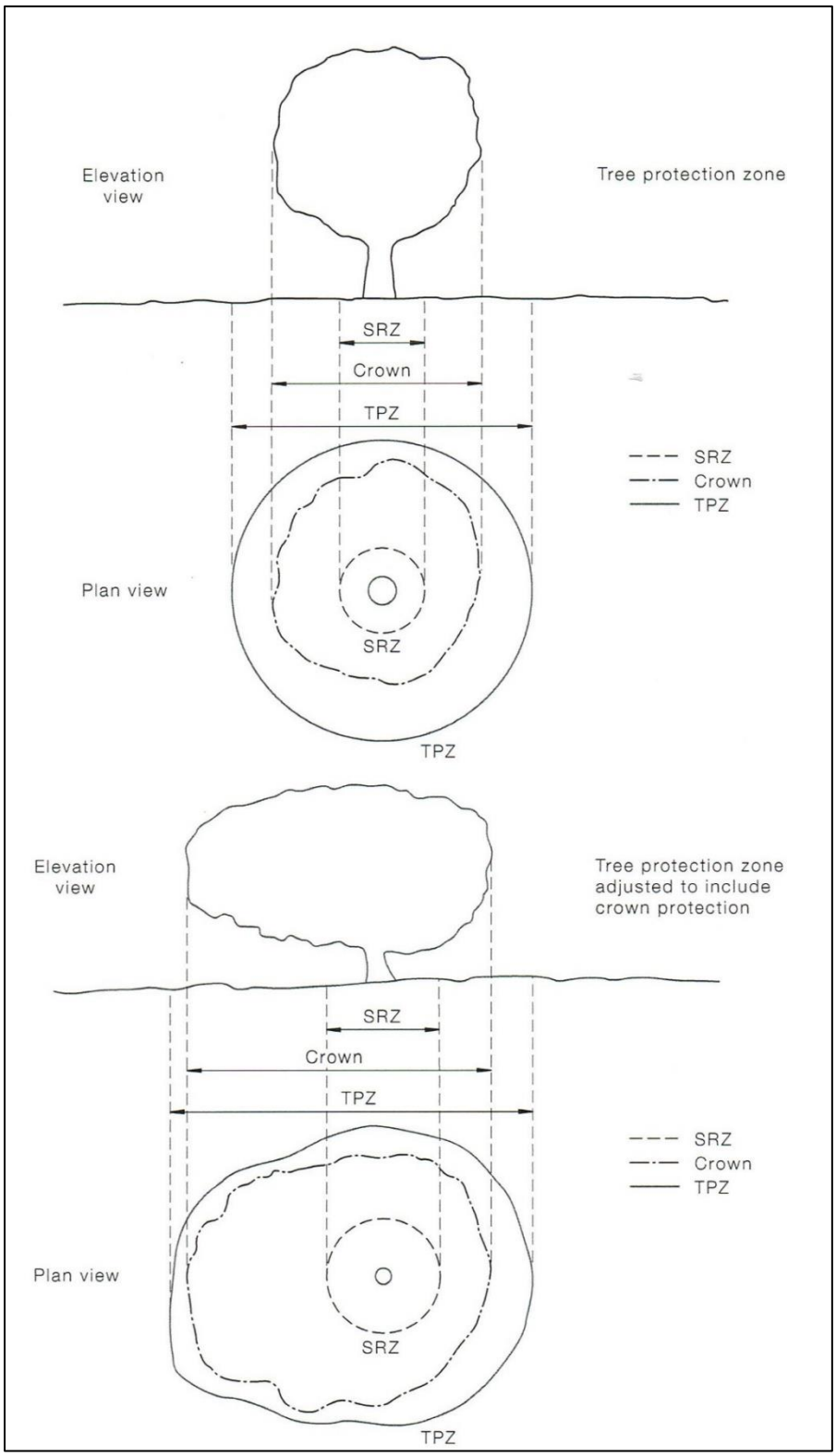


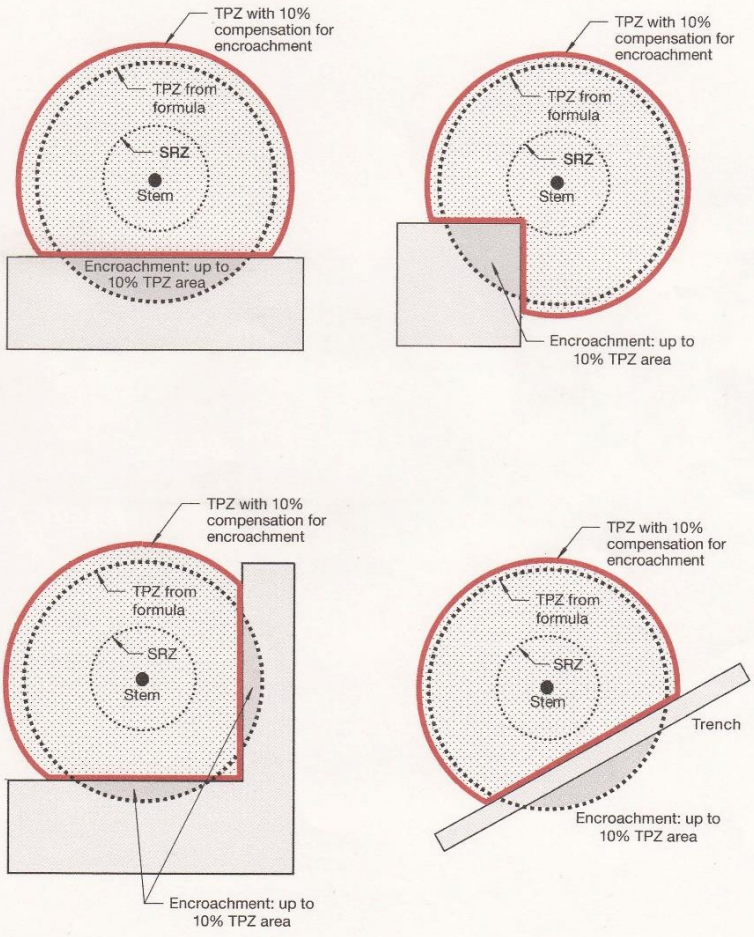
Figure B - Example of TPZ encroachment

APPENDIX D

ENCROACHMENT INTO TREE PROTECTION ZONE

(Informative)

Encroachment into the tree protection zone (TPZ) is sometimes unavoidable. Figure D1 provides examples of TPZ encroachment by area, to assist in reducing the impact of such incursions.



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

FIGURE D1 EXAMPLES OF MINOR ENCROACHMENT INTO TPZ

7. IMPACT ASSESSMENT

7.1 Tree No. 1

Based on the Basement and Demolition plans demolition of the existing surrounding structures and construction of new facilities will encroach well into the TPZ and SRZ of the tree.

Encroachment is considered to be major where construction will encroach into the SRZ or encroach more than 10% into the calculated TPZ of a tree (See Appendix 6- Basement Plan).

The main area of concern is severance / damage to roots within the SRZ and excessive damage to roots within the TPZ.

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.

Damage or severance to roots within the SRZ 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 within the TPZ is also likely to initiate a 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.

Due to the close proximity of demolition / construction and extent of encroachment into its TPZ and SRZ it is considered that the tree will be adversely impacted upon that will be detrimental to both stability and health & vigour and as such would need to be removed to facilitate the development as proposed (Photo's 1 & 2).

Due to its size, longevity and visual presence tree has been assessed as having a high retention value.

The retention of the tree would require significant changes to the design / development footprint and alternative construction methods to be utilized that would enable it to be retained and survive 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 always likely to result in conflict between tree roots and construction that will have a detrimental impact on the tree reducing its retention value

Photo 1 – Tree proposed to be removed

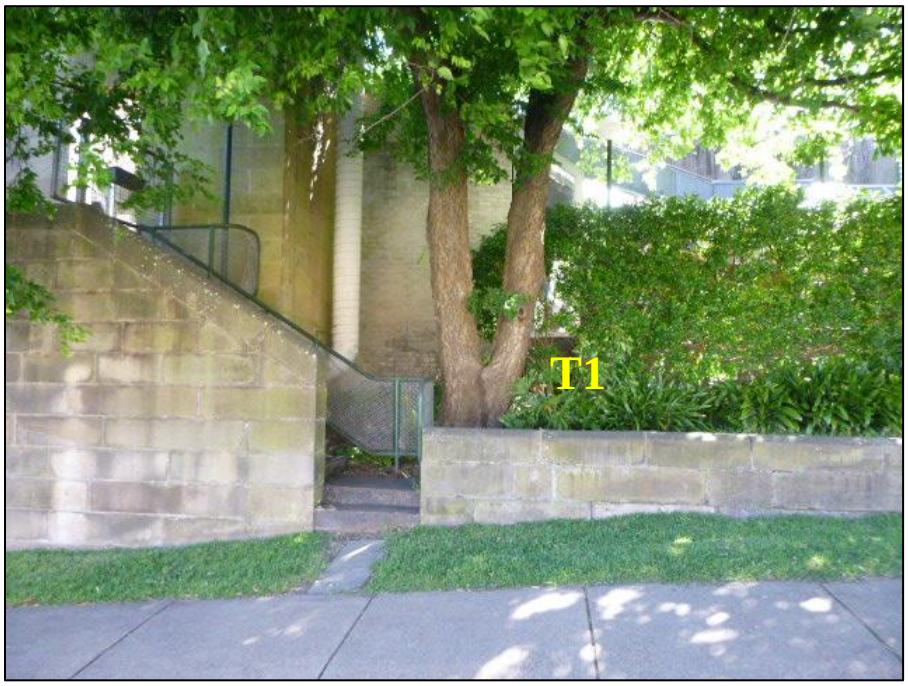


Photo 2 – Tree impacted upon by demolition of existing structures and construction associated with the new development

7.2 Tree No. 2

Based on the Basement and Demolition plans it is proposed to demolish the existing adjacent building and construct a new Café building in its place.

Tree No. 2 (*Araucaria cunninghamii* - Hoop Pine) is not listed specifically as a heritage item however the tree has a close historical association with the heritage significance of the building and as such is to be retained (Photo3).

As demolition / construction is within the TPZ / SZR of the trees the main area of concern is severance / damage to roots within the SRZ and excessive damage to roots within the TPZ during both the demolition and construction stages of the development (See Appendix 6 Basement Plan).

To minimize the impacts to roots it is proposed to demolish the existing wall to ground level. This will enable the foundation footings to be retained and minimize the impacts to roots.

At this stage it is envisaged foundation footings are likely to have acted as a form of root barrier preventing radial spread of roots. Roots are forced to grow down and/ or linearly along the wall (Photo 4).

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 and the limitations on the depth of root growth it is possible that roots are not likely to have penetrated deep into the soil and come back up towards the surface on the other side of the wall however this is largely dependent on the depth of foundation footing.

If foundation footings are relatively shallow it may also be possible that have extended under the foundation footings and as such any excavation with TPZ should be undertaken with care to avoid potential damage / severance to roots.

Damage to roots within the SRZ will increase the risk of failure, especially during high winds however 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 damage to secondary and minor roots within the TPZ can initiate a decline in tree health & vigour.

This does not mean that excavation can take place without regard to the damage that might be caused to the root system. Extreme care must be taken regardless not to damage the bark, rip or tear wood of any roots.

Prior to excavation machine operators are to be instructed in the requirements for the prevention of damage to tree roots and instructed to proceed with extreme care

It is recommended that a suitably qualified arborist (AQF level 5 or equivalent) is on site to supervise excavation works within the TPZ of these trees to assess impacts in relation to retention / removal during excavation works.

Alternatively, upon excavation if roots are encountered within the TPZ / SRZ beyond the wall works should cease and a qualified arborist should be consulted to determine the amount of roots that can removed or whether re-assessment is necessary.

Based on the results it can then be determined whether retention and design can be achieved or that alternative solutions are required

If only a few over 25mm or less in diameter are found, the tree will probably tolerate the impact.

However if larger roots are encountered evaluation of the impact of damage or cutting of these roots should be assessed.

The arborist can determine the amount of roots that can removed and still retain the tree or whether re-assessment is necessary.

Upon excavation:

- No roots greater than 25mm in diameter within the calculated SRZ, including on the inside of the footings, shall be cut without consulting a suitably qualified arborist.
- Roots between 25 – 50mm in diameter outside the SRZ should only be cut if absolutely necessary.
- Roots over 50mm in diameter outside the SRZ but within the TPZ should only be cut after consultation with a suitably qualified arborist.
- Roots to be removed should have the soil removed and cut cleanly with a sharp saw or secateurs flush with the edge of excavation.

If it is determined that cutting of roots will be detrimental to tree stability and / or health alternative measures to reduce the impact within the root zone of the tree would need to be considered.

In assessing the potential impacts, it is considered that provided excavation is undertaken with extreme care to any damage to roots is minimal that the works can be undertaken as proposed and tolerated by the tree.

In general older established trees are less tolerant of changes to their surrounding site conditions and construction within their root zone could have immediate (depending on amount of root loss) and long-term effects on their condition.

Old trees are less able to respond to changes brought about by site development. Their ability to acclimatize to new site conditions and tolerate environmental stresses of all types declines with age.

As such there is no absolute certainty that the tree would tolerate the impacts and whilst careful planning and assessment of the potential impacts have been considered and tree protection measures implemented it is still possible that the changed surrounding conditions may inadvertently affect their condition.

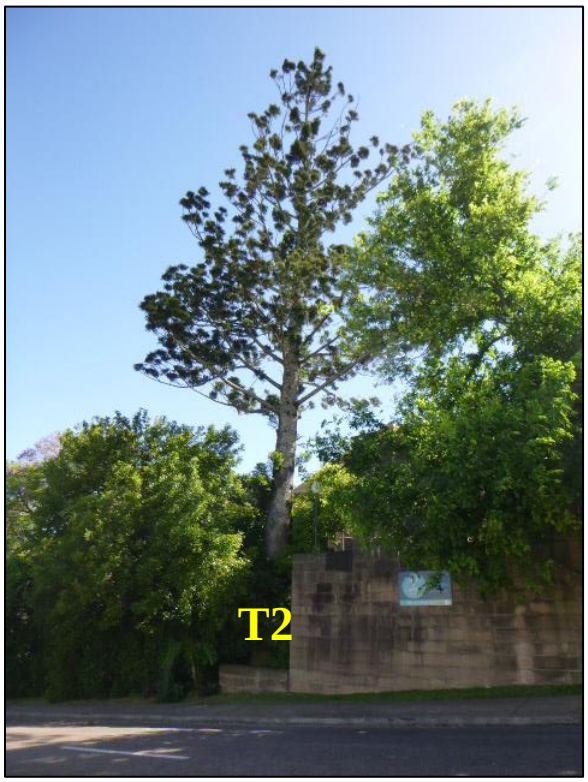


Photo 3 – Tree has an historical association with the building

Photo 4 - Existing footings of adjacent wall to be retained to minimize impacts to roots

7.3 Tree Nos. 5 & 7

Based on the Basement and Demolition plans it is proposed to demolish the adjacent building and construct a new Café building in its place.

As demolition / construction is within the TPZ / SZR of the trees the main area of concern is severance / damage to roots within the SRZ and excessive damage to roots within the TPZ during both the demolition and construction stages of the development (See Appendix 6 Basement Plan).

To minimize the impacts to roots it is proposed to demolish the existing wall to ground level. This will enable the foundation footings to be retained and minimize the impacts to roots.

At this stage it is envisaged foundation footings are likely to have acted as a form of root barrier preventing radial spread of roots. Roots are forced to grow down and/ or linearly along the wall (Photo 5).

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 and the limitations on the depth of root growth it is possible that roots are not likely to have penetrated deep into the soil and come back up towards the surface on the other side of the wall however this is largely dependent on the depth of foundation footing (Photo 6 & 7).

If foundation footings are relatively shallow it may also be possible that have extended under the foundation footings and as such any excavation with TPZ should be undertaken with care to avoid potential damage / severance to roots.

Damage to roots within the SRZ will increase the risk of failure, especially during high winds however 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 damage to secondary and minor roots within the TPZ can initiate a decline in tree health & vigour.

This does not mean that excavation can take place without regard to the damage that might be caused to the root system. Extreme care must be taken regardless not to damage the bark, rip or tear wood of any roots.

Prior to excavation machine operators are to be instructed in the requirements for the prevention of damage to tree roots and instructed to proceed with extreme care

It is recommended that a suitably qualified arborist (AQF level 5 or equivalent) is on site to supervise excavation works within the TPZ of these trees to assess impacts in relation to retention / removal during excavation works.

Alternatively, upon excavation if roots are encountered within the TPZ / SRZ beyond the wall works should cease and a qualified arborist should be consulted to determine the amount of roots that can removed or whether re-assessment is necessary.

If only a few over 25mm or less in diameter are found, the tree will probably tolerate the impact. However if larger roots are encountered evaluation of the impact of damage or cutting of these roots should be assessed.

The arborist can determine the amount of roots that can removed and still retain the tree or whether re-assessment is necessary.

Upon excavation:

- No roots greater than 25mm in diameter within the calculated SRZ, including on the inside of the footings, shall be cut without consulting a suitably qualified arborist.
- Roots between 25 – 50mm in diameter outside the SRZ should only be cut if absolutely necessary.
- Roots over 50mm in diameter outside the SRZ but within the TPZ should only be cut after consultation with a suitably qualified arborist.
- Roots to be removed should have the soil removed and cut cleanly with a sharp saw or secateurs flush with the edge of excavation.

If it is determined that cutting of roots will be detrimental to tree stability and / or health and alternative measures to reduce the impact within the root zone of the tree would need to be considered.

In assessing the potential impacts, it is considered that provided excavation is undertaken with extreme care to any damage to roots is minimal that the works can be undertaken as proposed and tolerated by the tree.

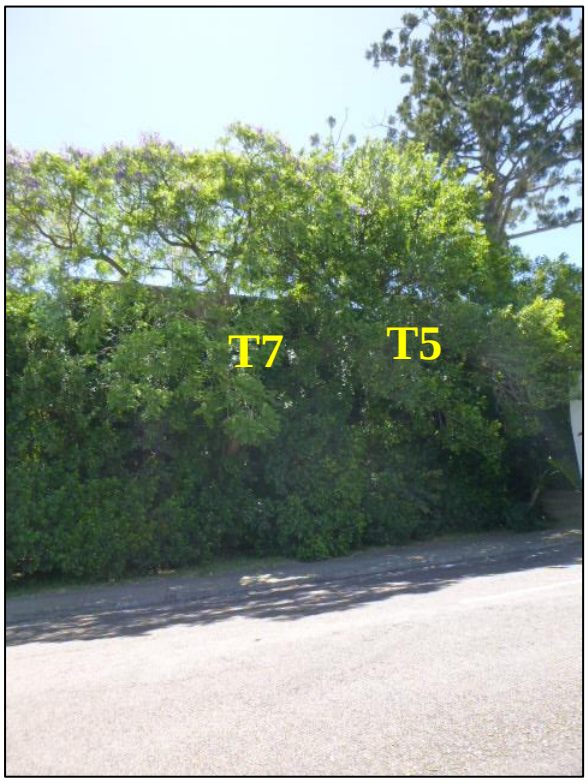


Photo 5
Trees to be retained
Existing footings of adjacent wall to be retained to minimize impacts to roots

7.4 Tree Nos. 3, 4, 6, 8, 9 & 10

Based on the Basement and Demolition plans it is proposed to demolish the existing adjacent building and construct a new Café building in its place.

Whilst it is proposed to demolish the existing wall to ground level and the impacts to roots may be minimal enabling the tree to be retained due to their close proximity to each other branch and foliage orientation of individual trees form asymmetrical crowns resulting in their relatively poor overall habit & form.

Whilst it is possible that they could be retained their removal is preferred and will provide space for replacement planting to be undertaken as required in accordance with the landscape design (Photo 6).

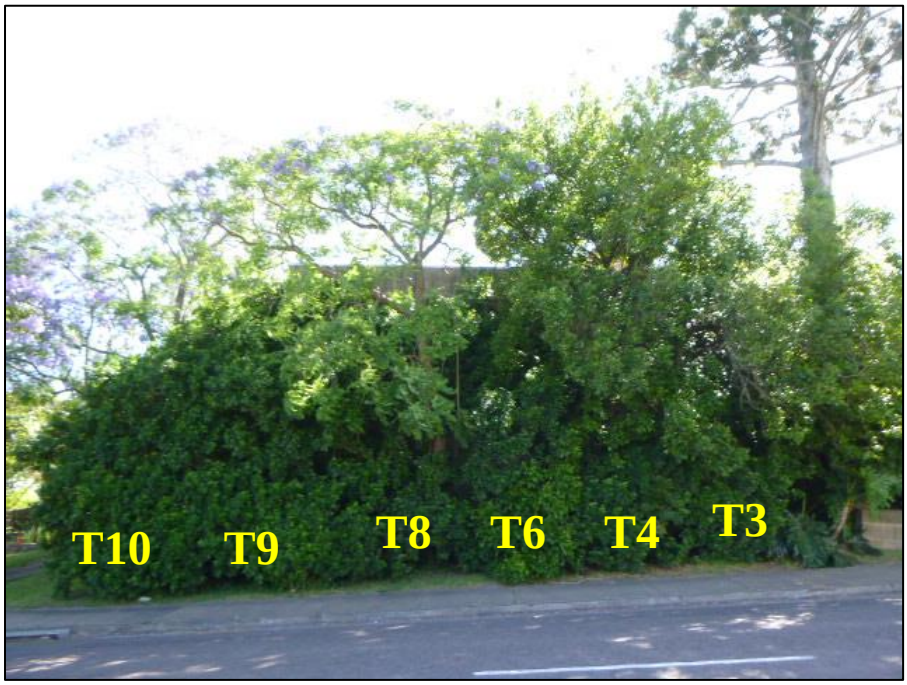


Photo 6 – Removal of small trees (shrubs) will provide space for new plantings

7.5 Tree No. 11

Based on the Basement Plan construction of the new path will encroach well into the TPZ and SRZ of the tree. The main area of concern is severance / damage to roots within the SRZ and excessive damage to roots within the TPZ.

Encroachment is considered to be major where construction will encroach into the SRZ or encroach more than 10% into the calculated TPZ of a tree (See Appendix 6 - Basement Plan).

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.

Damage or severance to roots within the SRZ 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 within the TPZ is also likely to initiate a 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.

Due to the close proximity of construction and extent of encroachment into its TPZ and SRZ it is considered that the tree will be adversely impacted upon that will be detrimental to both stability and health & vigour and as such would need to be removed to facilitate the development as proposed (Photo 7 & 8).

Due to its medium live crown size and visual presence tree has been assessed as having a moderate retention value.

The retention of the tree would require significant changes to the design / development footprint and / or alternative construction methods to be utilized that would enable it to be retained and survive the impacts of construction.

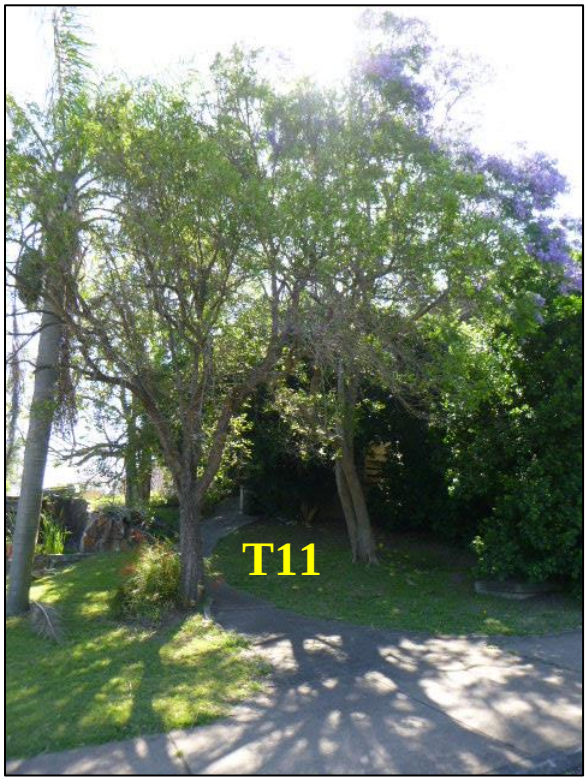


Photo 7- New Path within TPZ / SRZ

Photo 8 - Construction of new path with TPZ & SRZ of T11 & 12

7.6 Tree No. 12

Based on the Basement Plan construction of the new path will encroach well into the TPZ and SRZ of the tree.

Demolition of existing structures (stairs & wall) around Tree No. 12 will also encroach into the TPZ & SRZ of the tree. Encroachment is considered to be major where construction will encroach into the SRZ or encroach more than 10% into the calculated TPZ of a tree (See Appendix 6 - Basement Plan).

The main area of concern is damage to roots within the SRZ and excessive damage to roots within the TPZ during the demolition process. 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.

Damage or severance to roots within the SRZ 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.

Excessive damage to secondary and minor roots within the TPZ is also likely to initiate a 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.

Due to the close proximity of demolition and extent of encroachment into its TPZ and SRZ it is considered that the tree is likely to be adversely impacted upon and as such would be removed to facilitate the development as proposed (Photo 8 & 9).

Its removal would not significantly diminish the visual character and amenity of the area and will provide space for replacement planting to be undertaken as required in accordance with the landscape design.

Photo 9 - Demolition of existing structures within TPZ / SRZ

7.7 Tree No. 13

Although demolition and construction of the new path is within the SRZ of Tree No. 13 it is possible that the path can be replaced without adversely impacting on the condition of the tree provided damage or severance to root within the SRZ and excessive damage to secondary and minor roots within the TPZ is avoided (See Appendix 6 Basement Plan).

Pavement can be removed without significantly impacting on the trees however must be removed in a manner that will not cause damage to roots (Photo 10).

This can be achieved by carefully placing an excavation bucket or by carefully placing hand tools just under the concrete just and lifting smaller size sections out and away from the tree.

Removal of the concrete or bitumen 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.

Note: If it is determined that damage/ or severance to roots within the SRZ and/ or excessive damage to roots within the TPZ cannot be avoided and no alternative options are available its removal would then become necessary as the tree is likely to be adversely impacted upon in a manner that will be detrimental to stability and / or health and vitality.

Whilst it is possible that the tree can be retained upon inspection some dead small size branches dieback of other small branches, twigs & thinning of crown foliage particularly to the northwest was noticeable indicating the tree may be in an initial stage of decline (Photo 11).

Trees that are already in decline and / or stressed are less likely to tolerate impacts of changes to the surrounding conditions due to lower energy reserves. The tree must increase energy use to cope with stresses associated with it declining condition. This takes away from the maintenance of chlorophyll in the leaves and rejuvenation of fine roots.

With some remedial action to improve health & vigour and some pruning to remove dead branches it is possible the tree may eventually recover.

Alternatively if its removal is preferred it could be replaced with a better quality tree that will be more sustainable for long term retention and will provide space for replacement planting to be undertaken as required in accordance with the landscape design.

Photo 10 – Path close to tree

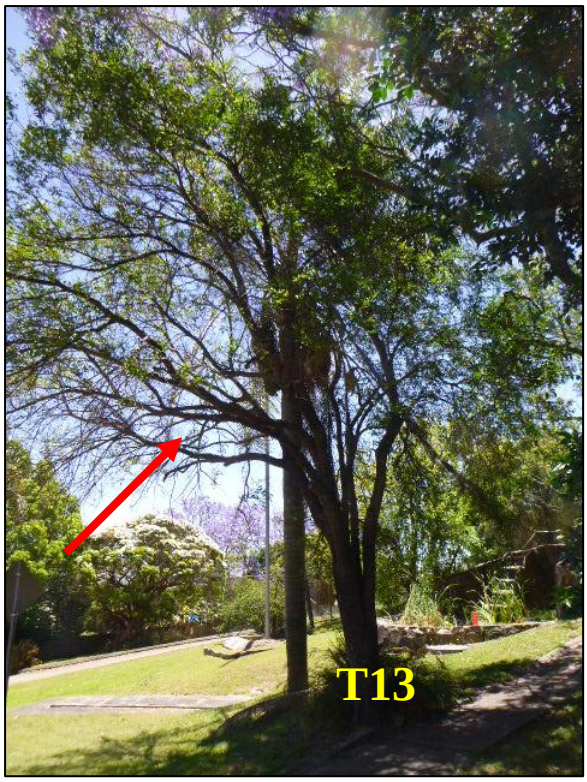


Photo 11 – Dead branches particularly on western side

7.8 Tree No. 14

Whilst the tree is not expected to be significantly impacted upon by the proposed development due to its state of decline and split / crack at the branch collar of large lower branch to the east the tree is no considered suitable for long term retention and as such its removal and replacement is preferred

Trees that are already in decline and / or stressed are less likely to tolerate impacts of changes to the surrounding conditions due to lower energy reserves. The tree must increase energy use to cope with stresses associated with it declining condition. This takes away from the maintenance of chlorophyll in the leaves and rejuvenation of fine roots.

In general, if a tree has more than 35% to 50% crown dieback from a decline disorder it is not likely to survive. A decrease in the amount of live foliage affects the trees ability to photosynthesis, which is vital for trees to survive.

It is considered that due to its state of decline and other structural defects that over the short term (less than 5-15 years) the tree would eventually be removed regardless of the impacts of the development

Whilst its removal would be noticeable from the street due to its state of decline its retention value is considered to be low. As such its removal would not significantly diminish the visual character and amenity of the area and will provide space for replacement panting in accordance with the landscape design with a better quality tree that will be more suitable and sustainable for long term retention (Photo 12).

Photo 12 – Tree in decline & split at branch union

7.9 Tree No. 15

The removal of the existing generator and associated electrical cables around Tree No. 15 will encroach into the TPZ & SRZ of the tree.

Encroachment is considered to be major where construction will encroach into the SRZ or encroach more than 10% into the calculated TPZ of a tree (See Appendix 6- Basement Plan).

The main area of concern is damage to roots within the SRZ and excessive damage to roots within the TPZ during the demolition / removal process.

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.

Damage or severance to roots within the SRZ 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 within the TPZ is also likely to initiate a 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.

Due to the close proximity of demolition and extent of encroachment into its TPZ and SRZ it is considered that the tree is likely to be adversely impacted upon and as such would be removed to facilitate the development as proposed (Photo's 13 & 14).

Its removal would not significantly diminish the visual character and amenity of the area and will provide space for replacement planting to be undertaken as required in accordance with the landscape design.

Photo 13 – Tree proposed to be removed

Photo 14 - Removal of generator and associated cables within SRZ

7.10 Tree No. 16

Based on the Site and Demolition plans the tree is not expected to be impacted upon by the proposed development and as such could be retained

However, the tree has had numerous pruning events to remove branches that were overhanging the driveway and previous failure of large branches to north and the previous failure of the co-dominant trunk to northwest indicate that over time, the tree has developed a history of branch failures over time.

Whilst it is possible that they could be retained their removal is preferred and will provide space for replacement planting to be undertaken as required in accordance with the landscape design (Photo 15 & 16).

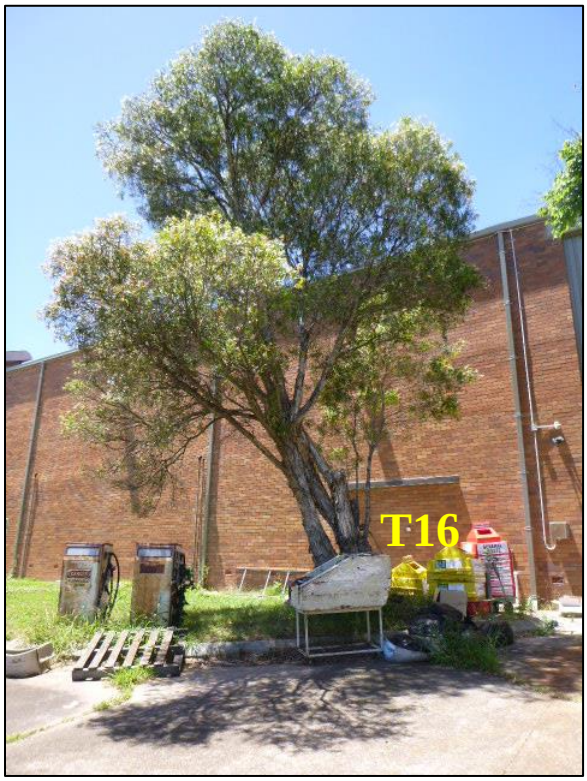


Photo 15 – Tree proposed to be removed & replaced

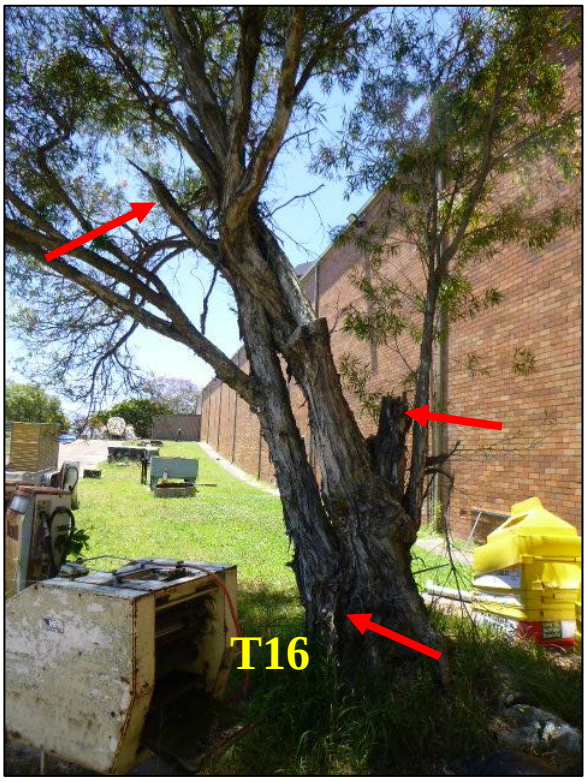


Photo 16 – Previous failures

8. RECOMMENDATIONS

Based on the proposed Plan and after an assessment of the potential impacts of the proposed development the following outcomes are recommended:

1. **Removal of Tree No. 1**
   Reason:
   Due to the close proximity of construction and extent of encroachment into its TPZ / SRZ's it is considered that the tree will be adversely impacted upon by the development that may be detrimental to both stability and health & vigour

   Re-design options and/ or alternative construction methods will be difficult to achieve and always likely to result in conflict between tree roots and construction that will have a detrimental impact on the tree reducing its retention value

2. **Retention of Tree No. 2**
   Reason:
   The tree has a close historical association with the heritage significance of the building and as such is to be retained.

   Retention of exiting foundation footings will minimize the impacts to roots and provided excavation is undertaken with extreme care and any damage to roots is minimal the works can be undertaken as proposed and should be tolerated by the tree.

3. **Retention of Tree Nos. 5 & 7**
   Reason:
   Retention of exiting foundation footings will minimize the impacts to roots and provided excavation is undertaken with extreme care and any damage to roots is minimal the works can be undertaken as proposed and should be tolerated by the tree.

4. **Removal of Tree Nos. 3, 4, 6, 8, 9 & 10**
   Reason:
   Whilst it is possible that the trees could be retained their removal is preferred and will provide space for replacement planting to be undertaken as required in accordance with the landscape design.

5. **Removal of Tree No. 11**
   Reason:
   Due to the close proximity of construction and extent of encroachment into its TPZ / SRZ's by construction of the new path it is considered that the tree will be adversely impacted upon by the development that may be detrimental to both stability and health & vigour.

6. **Removal of Tree No. 12**
   Reason:
   - Construction of new path and demolition of existing structures (stairs & wall) will encroach into the TPZ & SRZ of the tree and due to the close proximity and extent of encroachment into its TPZ and SRZ it is considered that the tree is not likely to tolerate the impacts and as such would be removed to facilitate the development as proposed.

     Its removal will provide space for replacement planting to be undertaken as required in accordance with the landscape design.

7. **Retention / Removal Option for Tree No. 13**
   Reason:
   - Provided damage or severance to root within the SRZ and excessive damage to secondary and minor roots within the TPZ is avoided it is possible that the path can be removed and replaced without adversely impacting on the condition of the tree.

   - With some remedial action to improve health & vigour and some pruning to remove dead branches it is possible the tree may eventually recover.

   - If it is determined that damage/ or severance to roots within the SRZ and/ or excessive damage to roots within the TPZ cannot be avoided and no alternative options are available, its removal would then become necessary as the tree is likely to be adversely impacted upon in a manner that will be detrimental to stability and / or health and vitality.

     Alternatively, if its removal is preferred it could be replaced with a better quality tree that will be more sustainable for long term retention and will provide space for replacement planting to be undertaken as required in accordance with the landscape design.

8. **Removal of Tree No. 14**
   Reason:
   Whilst the tree is not expected to be significantly impacted upon by the proposed development due to its state of decline and split / crack at the branch collar of large lower branch to the east the tree is not considered suitable for long term retention and as such its removal is preferred and will provide space for replacement planting to be undertaken as required in accordance with the landscape design.

9. **Removal of Tree No. 15**
   Reason:
   Demolition / removal the existing generator and associated electrical cables around will encroach into the TPZ & SRZ of these trees.

   Due to the close proximity of demolition and extent of encroachment into its TPZ and SRZ it is considered that the tree is not likely to tolerate the impacts and as such would be removed to facilitate the development as proposed.

10. **Removal of Tree No. 16**
    Reason:
    Whilst the tree is not expected to be impacted upon by the proposed development and could be retained its removal is preferred and will provide space for new plantings with a better quality tree that will be more suitable and sustainable for long term retention and will provide space for replacement planting to be undertaken as required in accordance with the landscape design.

11. **Replant as required in accordance with the landscape design.**
    Reason:
    To compensate for the removal of trees with new plantings.

12. **Implementation of Tree Protection Measures**
    Reason:
    - To provide the developers with a guide so that the trees to be retained during the development of this site can be protected whilst construction is undertaken

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

13. **Suitably qualified arborist (AQF level 5 or equivalent) should be on site to supervise excavation works within TPZ or alternatively excavation is to cease, and advice obtained from a suitably qualified arborist if roots are encountered within the SRZ of Tree Nos. 2, 5 & 7**
    Reason:
    To avoid damage or severance to structural roots and to determine the most appropriate course of action.

14. **Tree work to be carried out by a qualified tree contractor**
    Reason:
    To ensure works are undertaken in accordance to Australian Standard 4373 –2007 and in accordance with the Code of Practice Amenity Tree Industry August 2007

15. **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

9. REFERENCES

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

www.treetec.net.au/TPZ_SRZ_DBH_calculator.php

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.

E. Thomas Smiley,PhD . Assessing The Failure Potential of Tree Roots - Bartlett Tree Research Laboratories

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

Bartlett Tee Research Laboratories Charlotte, NC, Plant Health Care, Declining Trees

John Roberts, Nick Jackson, Mark Smith – Tree Roots in Built Environments. Research for Amenity Trees No. 8. 2006. Published by TSO PO Box 29, Norwich, NR3 1GN

Barrell, J., (1993) 'Pre-planning Tree Surveys: Safe Useful Life Expectancy (SULE) is the Natural Progression' Arboricultural Journal Vol. 17, pp 33-46, AB Academic Publishers, Great Britain.

The City of Newcastle - Urban Forest Technical Manual, Part B Public Trees February 2018

10. DISCLAIMER

The conclusions and recommendations contained in this report refer to the tree's condition on the day of inspection only. The report is to 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 and as such not all defects may have been detected. 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

Report by

Diploma of Arboriculture

APPENDIX 1

SULE - Safe Useful Life Expectancy

1. Long SULE

a. Structurally sound and can accommodated 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 group of trees has 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 - TREE PROTECTION PLAN

Tree Protection Measures

The purpose of the Tree Protection Measures (TPM) is to provide the developers with a guide so that trees to be retained can be protected during the development process.

Based on the Site Plans it is likely that encroachment by machinery and other associated construction activity will occur within the TPZ of some trees and as such optimal TPZ's that would comply with Australian Standard 4970 – 2009 Protection of Trees on Development Sites may not be achievable for all trees.

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

A Tree Protection Plan Specification has also been prepared to give trees the best possible chance to survive the impacts of construction so that they can be retained in their current condition during construction

Tree Protection Measures in conjunction with the Tree Protection Zone Specification must be adhered to before any construction activity occurs within the nominated TPZ of trees to be retained.

Table 1 - Trees to be Protected

Tree No.	**Specific Protection Measures**
2, 5 & 7	As optimal Tree Protection Zones cannot be achieved due to site constraints preferably 1800mm high chain link temporary fencing should be erected around the trunks to protect the trees from unintentional damage**,** however due to the close proximity of the tree if fencing is not appropriate the tree should be protected with boards and padding on the trunk Boards must be strapped to the tree not nailed and spaced a maximum of 50mm apart (Figure 3)
13	As optimal Tree Protection Zones cannot be achieved due to site constraints 1800mm high chain link temporary fencing should be erected shall encompass an area as close as possible to the edge of construction then incorporate remaining TPZ radius where possible (Figure 2) 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 Boards must be strapped to trees not nailed. (Figure 3)
General Protection Measures • Tree Protection Zone Specification to be adhered to	

Tree Protection Zone Figures

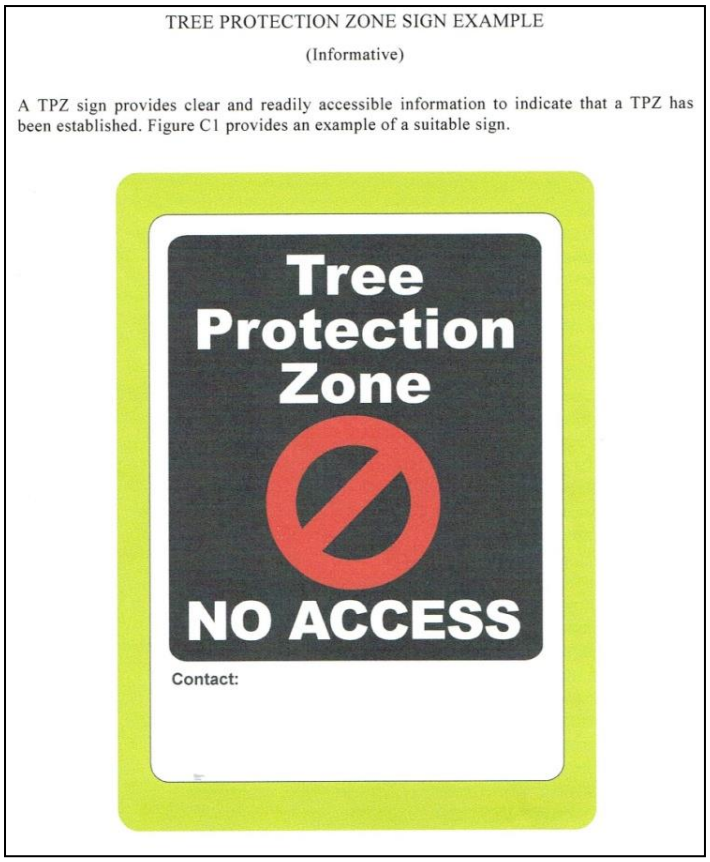


Figure 1 - Example of TPZ signage

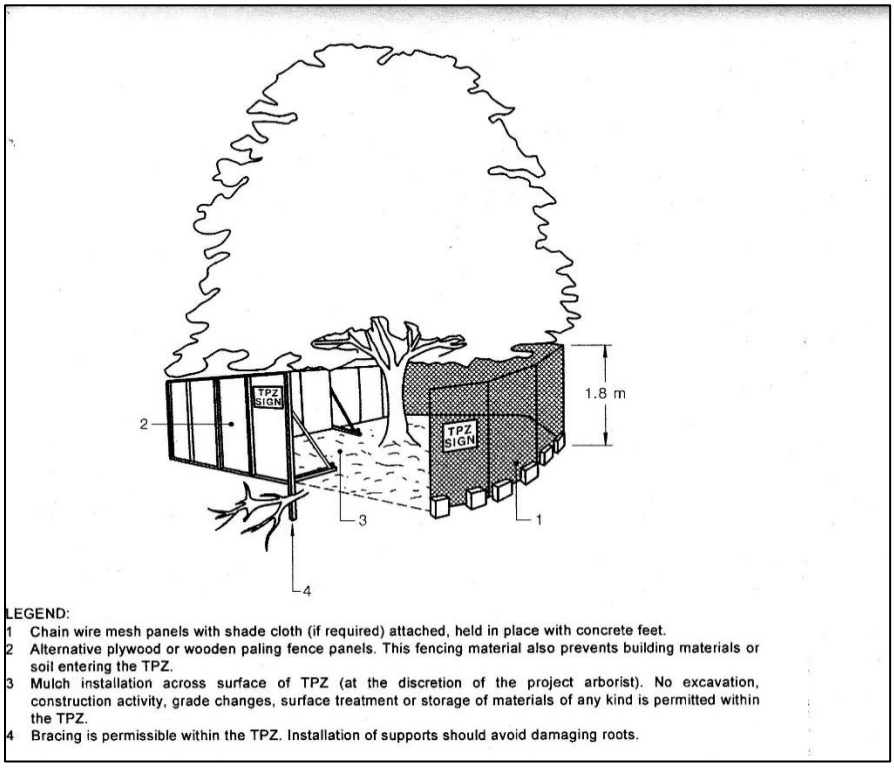
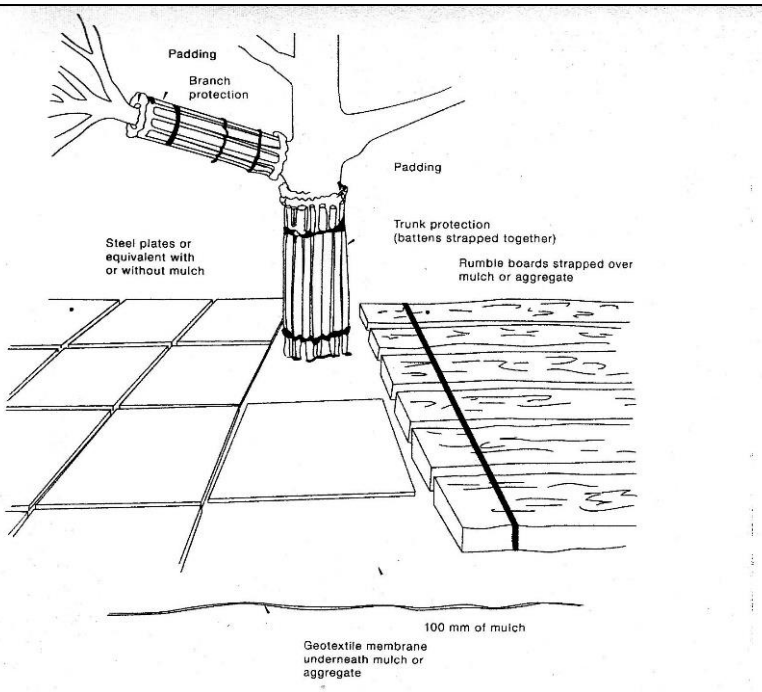


Figure 2 - Example of TPZ fencing



NOTES:

1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.

2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

Figure 3 – trunk & branch protection

APPENDIX 4
TREE PROTECTION ZONE SPECIFICATION

The following specification must be adhered to before any site activity occurs within established Protection Zones of trees to be retained.

1. All works within nominated Tree Protection Zones must comply with Australian Standard 4970 – 2009 Protection of Trees on Development Sites.

2. Tree Protection Measures to be established as outlined in Table 1 prior to the commencement of any construction works and must comply with Australian Standard 4970 – 2009 Protection of Trees on Development Sites, Section 4 - Tree Protection Measures.

3. Protection areas are to be clearly marked as Tree Protection Zone - NO GO AREA (figure 1)

4. The limits of Tree Protection Zones shall be staked and 1800mm high chain link temporary fencing installed (figure 2).

5. Preferably 1800mm high chain link temporary fencing should be erected around the trunks to protect the trees from unintentional damage**,** however due to the close proximity of the tree if fencing is not appropriate the tree should be protected with boards and padding on the trunk

   Boards must be strapped to the tree not nailed and spaced a maximum of 50mm apart (Figure 3)

6. No construction activity allowed within an established TPZ's without first consulting the project manager or project arborist

7. No roots shall be cut within the calculated SRZ of the tree unless confirmed by a suitably qualified arborist.

8. No materials, equipment, spoils, waste water or chemicals of any description may be disposed of or stored within the a Tree Protection Zones.

9. No parking of vehicles, trailers or machinery is allowed within the Tree Protection Zones.

10. Any electrical cables, gas pipes, sewer pipes or other plumbing services to be routed outside the Tree Protection Zones.

11. Trees to be removed that have branches extending into trees of tree to remain must be removed by a qualified arborist and not by demolition or construction contractors. A qualified arborist shall remove the tree in a manner that causes no damage to the trees and understory to remain.

12. Trees to be removed from within the Tree Protection Zones shall be removed by a qualified arborist.

13. Trees removed within the TPZ of trees to be retained shall be cut near ground level and the stump ground out.

14. A consulting arborist should be on site where any excavation works are to be carried out within an established Tree Protection Zone.

15. If injury to the tree should occur during construction it should be evaluated as soon as possible so that appropriate treatments can be applied.

16. Any roots damaged during construction shall be exposed to sound tissue and cut cleanly with as saw.

17. Erosion control devises such as silt fencing shall be installed to prevent siltation and or erosion within the Tree Protection Zones.

18. Surface drainage is not to be altered so as to direct water into or out of the Tree Protection Zones.

19. Any herbicides placed under paving material must be safe for use around trees and labeled for that use. Any pesticides used on site must be tree safe and not easily transported by water.

20. Any pruning work is to be carried out by a qualified arborist working to Australian Standard 4373 –2007 and in accordance with the Code of Practice Amenity Tree Industry August 1998.

21. Protection measures are to remain in place until all site work has been completed. Fencing may not be relocated or removed without written permission from the project manager or consulting arborist.

APPENDIX 5 – TREE EVALUATION SHEETS

Legend
DBH – Diameter at Breast Height (1.4m) DARF - Diameter Above Root Flare
TPZ – Tree Protection Zone SRZ – Structural Root Zone

Tree No	Botanical Name Common Name	Age	HGT (m)	Canopy Spread(m) N S E W	DBH (mm)	DARF (mm)	TPZ Radius (m)	SRZ Radius (m)	Structure	Health	Condition	SULE	Comments	Impacts	Sustainability	Landscape Significance	Retention Value
1	*Celtis australis* Nettle Berry	M	14	5987	520 480	840	8.5	3.08	Good	Good	5	1b	No significant signs of dieback or decline No significant structural defects (Photo 1)	Potential damage to roots within the TPZ & SRZ	Greater than 40 years	3	High
2	*Araucaria cunninghamii* Hoop Pine	M	30	5555	1070	1160	12.8	3.52	Good	Good	5	1c	No significant signs of dieback or decline No significant structural defects (Photo 3)	Potential damage to roots within the TPZ & SRZ	Greater than 40 years	2	High
3	*Murraya paniculata* Murraya	M	5	1423	180 160 80	300	3.0	2.00	Good	Good	5	2d/ 3c	No significant signs of dieback or decline No significant structural defects Fair habit & form canopy spread partially suppressed by other surrounding trees & building - orientated to the south (Photo 6)	Potential damage to roots within the TPZ & SRZ	5– 15 years	5	Low
4	*Murraya paniculata* Murraya	M	7	1311	150	220	2.0	1.75	Good	Good	5	2d/ 3c	No significant signs of dieback or decline No significant structural defects Fair habit & form canopy spread partially suppressed by other surrounding trees (Photo 6)	Potential damage to roots within the TPZ & SRZ	5– 15 years	5	Low
5	*Glochidion ferdinandii* Cheese Tree	M	12	2545	420	520	5.0	2.51	Good	Good	5	2d	No significant signs of dieback or decline No significant structural defects (Photo 3)	Potential damage to roots within the TPZ	15– 40 Years	4	Moderate
6	*Murraya paniculata* Murraya	M	6	2113	100x3	250	2.0	1.85	Good	Good	5	2d/ 3c	No significant signs of dieback or decline No significant structural defects Fair habit & form – Canopy spread partially suppressed by other adjacent trees & building - orientated to the west (Photo 6)	Potential damage to roots within the TPZ & SRZ	5– 15 years	5	Low
7	*Jacaranda mimosifolia* Jacaranda	M	12	5244	320	360	3.8	2.15	Good	Good	5	1b	No significant signs of dieback or decline No significant structural defects (Photo 5)	Potential damage to roots within the TPZ	15– 40 Years	4	Moderate
8	*Murraya paniculata* Murraya	M	5	2524	Multi Avg. 6x100	350	2.9	2.13	Good	Good	5	2d/ 3c	No significant signs of dieback or decline No significant structural defects Fair habit & form canopy spread partially suppressed by other surrounding trees & building - orientated to the west (Photo 6)	Potential damage to roots within the TPZ & SRZ	5– 15 years	5	Low

Tree No	Botanical Name Common Name	Age	HGT (m)	Canopy Spread(m) N S E W	DBH (mm)	DARF (mm)	TPZ Radius (m)	SRZ Radius (m)	Structure	Health	Condition	SULE	Comments	Impacts	Sustainability	Landscape Significance	Retention Value
9	*Murraya paniculata* Murraya	M	6	5144	150 130 180	350	3.2	2.13	Good	Good	5	2d/ 3c	No significant signs of dieback or decline No significant structural defects Fair habit & form canopy spread partially suppressed by other surrounding trees & building orientated to the northwest (Photo 6)	Potential damage to roots within the TPZ & SRZ	5– 15 years	5	Low
10	*Murraya paniculata* Murraya	S/M	5	3112	Multi Avg. .80x5	250	2.0	1.85	Good	Good		2d/ 3c	No significant signs of dieback or decline No significant structural defects (Photo 6)	Potential damage to roots within the TPZ & SRZ	5– 15 years	5	Low
11	*Jacaranda mimosifolia* Jacaranda	M	15	6566	450 270	600	6.2	2.67	Good / Fair	Good	5	1b	No significant signs of dieback or decline Weak Branch Union = Co-dominant trunks minor bark inclusion No cracking or splitting could be seen at the co-dominant union that would indicate failure was imminent or probable (Photo 7)	Potential damage to roots within the TPZ & SRZ	15– 40 Years	4	Moderate
12	*Murraya paniculata* Murraya	M	5	4444	Multi Avg. 180	500	4.0	2.47	Good	Good	5	2d/ 3c	No significant signs of dieback or decline No significant structural defects (Photo 9)	Potential damage to roots within the TPZ & SRZ	15– 40 Years	5	Low
13	*Glochidion ferdinandii* Cheese Tree	M	10	5235	410	420	4.9	2.30	Good / Fair	Fair	4	3d	Initial stage of decline. Some dead small size branches dieback of small branches, twigs & thinning of crown foliage particularly to the northwest Crown density approx. 50% Weak Branch Union = Co-dominant trunks moderate bark inclusion No cracking or splitting could be seen at the co-dominant union that would indicate failure was imminent or probable (Photo 11)	Potential damage to roots within the TPZ & SRZ	5– 15 years	4	Low
14	Unidentified	M	15	4352	440 340	700	6.7	2.85	Good / Fair	Fair	4	3d	Initial stage of decline. Some dead small size branches dieback of small branches, twigs & thinning of crown foliage Crown density < 50% Weak Branch Union = Co-dominant trunks minor bark inclusion No cracking or splitting could be seen at the co-dominant union that would indicate failure was imminent or probable Split forming at lower branch collar to east indicating high risk of branch failure (Photo 12)	Potential damage to roots within the TPZ	5– 15 years	5	Low

Tree No	Botanical Name Common Name	Age	HGT (m)	Canopy Spread(m) N S E W	DBH (mm)	DARF (mm)	TPZ Radius (m)	SRZ Radius (m)	Structure	Health	Condition	SULE	Comments	Impacts	Sustainability	Landscape Significance	Retention Value
15	*Koelreuteria paniculata* Golden Rain Tree	M	12	5354	370	450	4.4	2.37	Good	Good	5	2d	No significant signs of dieback or decline No significant structural defects (Photo 13)	Potential damage to roots within the TPZ & SRZ	15– 40 Years	4	
16	*Callistemon salignus* White Bottlebrush	M	10	3232	400 300	600	6.0	2.67	Fair	Good	5	3c	No significant signs of dieback or decline Weak Branch Union = Co-dominant trunks moderate bark inclusion No cracking or splitting could be seen at the co-dominant union that would indicate failure was imminent or probable Previous failure of large branches to north indicative of failure associated with excessive end weight and breakage due to strong winds Previous failure of co-dominant trunk to northwest indicative of co-dominant union and included bark Fungal brackets on some decaying stem stubs of previously failed branches (Photo 15)	Potential damage to roots within the TPZ & SRZ	5– 15 years	5	

APPENDIX 6 – BASEMENT PLAN (PART PLAN)