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23 October 2017

NEW ULTIMO PYRMONT PUBLIC SCHOOL

QUARRY STREET - ULTIMO, NSW

ARBORICULTURAL ASSESSMENT & DEVELOPMENT IMPACT REPORT

Report ref No: RTC-13917

Prepared for
School Infrastructure NSW
C/- DesignInc Sydney Pty Limited
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INTRODUCTION

This report has been commissioned by School Infrastructure NSW C/- DesignInc Sydney Pty Limited to assess the remaining Useful Life Expectancy (ULE) and potential impacts that may occur to significant trees in relation to a new development proposal. The new development proposal consists of demolishing the existing school to make way for the redevelopment of the Ultimo & Pyrmont Public School located at Quarry Street, ULTIMO NSW.

Recommendations for retention or removal of trees is based on their accorded ULE category, the current design proposal and potential impacts to trees under this development application.

This report forms Stage 2 of works proposed within the site where Stage 1 consists of exempt development works (demolition of existing structures & services) as identified within Demolition Plan Dwg No: DA-1003 rev E. Those trees identified for removal have been addressed within Raintree Consulting's Demolition Plan Report ref No: RTC-13817 dated 10 October 2017. Additional trees requiring removal under Stage 2 have been referenced within this report and the Post Demolition Plan Dwg No: DA-1005 rev A, see Appendix- E p24.

To retain specific trees and ensure their viability development must take into consideration protection of the Tree Protection Zone (TPZ) radiuses as referred to within Notes of Attachment- A and as shown within the AS4970 TPZ diagram. The Structural Root Zone (SRZ) & Tree Protection Zone (TPZ) distance for each tree has been provided within Appendix- C the SRZ & TPZ distance column.

Each tree has been accorded a temporary identification number and is referred to by number throughout this report. For additional trees not plotted on provided documentation their location has been estimated by taking offsets from existing trees and structures. The assessed trees may be referenced within the Tree Assessment Schedule and Tree Location Plan Appendices C and D.

Care has been taken to obtain information from reliable sources. All data has been verified as far as possible, however, I can neither guarantee nor be responsible for the accuracy of information provided by others.

METHODOLOGY

i In preparation for this report a limited site and ground level Visual Tree Assessment (VTA) was conducted on Thursday 22nd June 2017 by the author of this report. The principles of VTA were primarily adopted from components of Mattheck *& Breloer* 1994 '*The Body Language of Trees*' & the ISA TRAQ manual 2013. The inspection included assessment of the overall health and vigour of the trees, tree form, structure and structural condition commencing from near the lower trunk to the upper first order branch division as best as site conditions would allow. On completion of the VTA the retention value of the tree was summarised utilizing the Tree Assessment Checklist provided within Appendix- B.

ii The inspection was limited to a visual assessment from within the subject site where the retention value, condition and diameters of neighbouring trees was estimated. No aerial (climbing) inspections, woody tissue testing or tree root investigation was undertaken as part of this tree assessment. Tree height and canopy spread was estimated and expressed in metres with trunk diameters measured at approximately 1.4 metres above ground level, rounded off to the nearest 50mm and expressed as DBH (Diameter at Breast Height).

iii This report utilises the current Australian Standards 'Protection of Trees on Development Sites' AS 4970 – 2009 as explained within Notes of Appendix- A.

Unless specified otherwise all distances and development offsets within this report are taken from the centre of the tree.

iv Plans and/or documentation received to assist in preparation of this assessment include:

DesignInc Sydney design drawings

- Grounds – Lower Playground Dwg No DA-2300 rev 14 dated 4.10.2017
- Level 1 – Library Dwg No DA-2301 rev 14 dated 4.10.2017
- Level 2 – Middle Playground Dwg No DA-2302 rev 14 dated 4.10.2017
- Level 3 – Upper Playground Dwg No DA-2303 rev 14 dated 4.10.2017
- Level 4 – COLA Dwg No DA-2304 rev 14 dated 4.10.2017
- Roof Level Dwg No DA-2305 rev 14 dated 4.10.2017
- North Elevations Dwg No DA-3001 rev 7 dated 4.10.2017
- East Elevations Dwg No DA-3002 rev 7 dated 4.10.2017
- Building Sections Dwg No DA-4001 rev 8 & 4002 rev 7 dated 4.10.2017
- Demolition Plan Dwg No: DA-1003 rev E dated 10.10.2017
- Post Demolition Plan Dwg No: DA-1005 rev A dated 10.10.2017

Survey & Spatial Information Service

- Survey Plan No. 57345 Sheet 1 dated 7.9.2015

Raintree Consulting

- Demolition Plan Arboricultural Assessment & Impact Report Ref No: RTC-13817 dated 5.10.2017

1. SUMMARY OF ASSESSMENT

1.1 Twenty eight (28) trees have been assessed under this current development proposal which include fifteen (15) Council verge street trees. The development proposal requires the removal of following fourteen (14) trees to accommodate design.

- 12a, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28 & 29

Of the above trees, T12a is a Council verge street tree located within the footprint of a proposed new school driveway entry.

1.2 Council verge street trees 12 & 14 will require considerable canopy reduction pruning to accommodate the Wattle Street elevation with minor pruning of tree 8 due to the new Quarry Street building elevation. The extent of pruning is to be approved by Council where a pruning plan is recommended to ensure no over pruning occurs.

Tree 8. Where deep excavation >0.5m (500mm) is required along the boundary contiguous piling is recommended to minimize the risk of whole tree failure occurring from soil collapse. Given that the trees have restricted and likely lineal root zones running in line with the pedestrian pathway, tree height and gravitational forces may leaver the tree from its anchorage should the soil profile be weakened on one side.

1.3 For the purpose of protecting Council verge street trees the principles outlined within Australian Standard AS 4970 – 2009 Protection of Trees on Development Sites are to be adopted prior to and during construction activities. In accordance with AS4970 Section 1.4.4 a Project Arborist is to be engaged to oversee tree protection methodology outlined within this report. Should there be an uncertainty in the content of this report the project arborist is to be consulted before activities commence within Tree Protection Zone (TPZ) radiuses with no works permitted within the Structural Root Zone (SRZ), see Appendix- C the SRZ & TPZ distance column.

1.4 Attachment- A the generic Tree Management Plan provides a general guide for the management of trees on or adjacent to development sites where Tree Protection Zones (Z) and Fencing (F) is to be detailed and certified prior to works commencing.

Yours sincerely

Mark A. Kokot
AQF Level 5 consulting arborist

2. DISCUSSIONS OF OBSERVATIONS

2.1 General tree assessment

2.1.1 Twenty eight (28) trees have been assessed for the purpose of this development application. Of the twenty eight trees fifteen (15) trees are located within Council verges and one (1) tree has been assessed as containing a low retention value.

Council verge trees are identified as trees 1 to 14. Of these trees small Poplar tree T13 displays likely poor root anchorage, and trees 12 & 14 have canopy extensions well within the site.

Trees identified with low retention values. Tree 15 is considered as containing somewhat of a low retention value being environmentally stressed and showing decline within the upper canopy. The tree is considered a tree which should not restrict the development proposal due to containing an estimated short remaining safe life expectancy.

2.1.2 Remaining trees on site are considered trees viable for retention in the existing environment and without change in site conditions and/or their Tree Protection Zone (TPZ) radiuses.

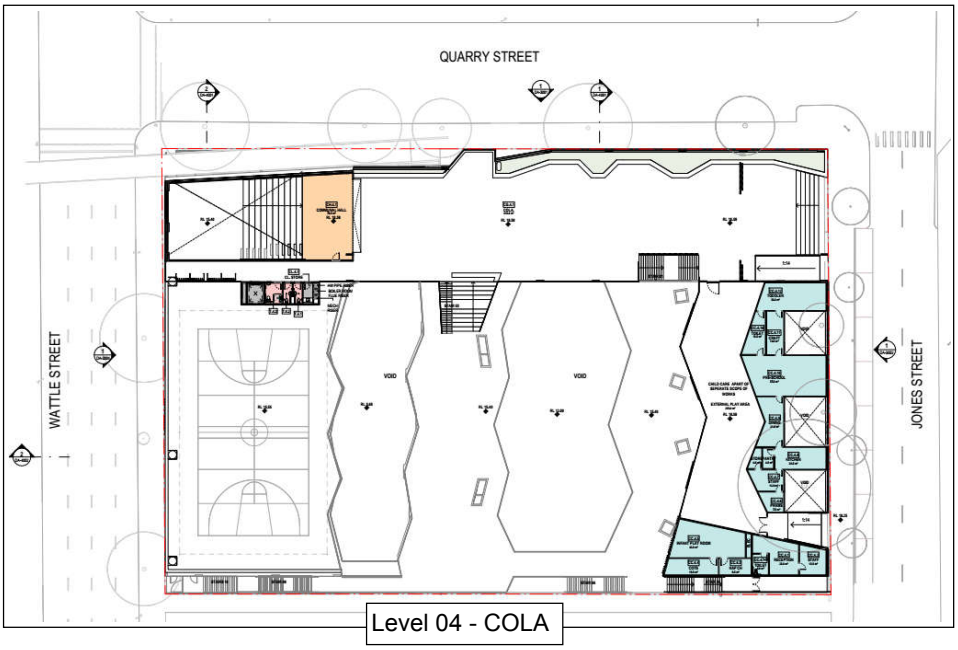
2.2 Tree removal due to demolition proposal

2.2.1 Provided within RTC-13817 Stage 1 Demolition Report those trees identified as recommended for removal for the purpose of demolition are trees 14a, 21, 23, 30 & 31. These trees have been excluded from discussions relating to development impacts within this report.

2.3 The development proposal

2.3.1 The new development proposal consists of demolishing the existing school infrastructure and constructing a new school facility with additional buildings and associated landscaping. Development requires deep excavation of the moderately sloping site where the majority of trees will be affected by works.

Figure 1, showing proposed development footprint



2.4 Proposed tree removal to accommodate design

2.4.1 Of the trees assessed fourteen (14) trees require or are recommended for removal to accommodate the new development proposal. The fourteen (14) trees are identified as tree:

- 12a, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28 & 29

Of these trees T15 displays decline within the overall canopy unit and is considered a low retention value tree that may become problematic in the near future.

Discussion of development impacts and tree removal by design has been outlined within the following sections

2.5 Discussion of development impacts

Wattle Street frontage

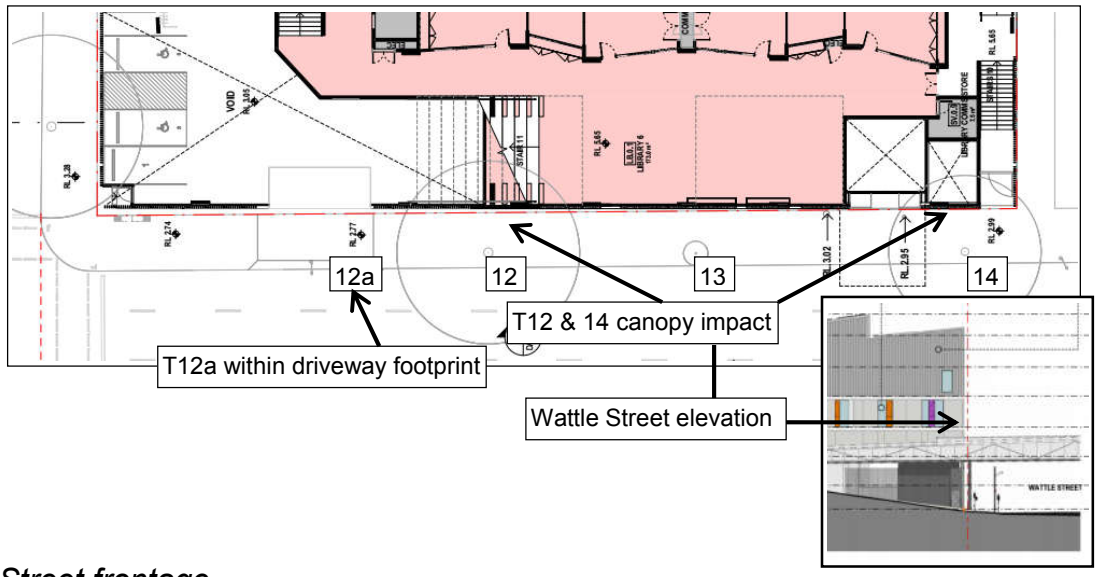
2.5.1 Trees requiring removal to accommodate design are trees 15 & 16 and Council verge tree 12a. Trees 15 & 16 are located within the building footprint where lower level carpark and above Library is proposed. Council verge tree T12a will be affected by the new driveway entrance and requires removal to accommodate design.

2.5.2 Council verge trees are trees 12, 13 & 14. The new building footprint is located on the boundary where canopy impacts by design occur to trees 12 & 14. Both trees contain canopy extension over the boundary to near 6m where pruning to AS-4373 standards would require greater reduction pruning back to main stem or branch collars. Given the species type the extent of pruning is unlikely to affect the trees vitality with pruning compensating for loss of their notional Tree Protection Zone (TPZ) radius. Development incursion within TPZ setbacks are considered minor and manageable <15% encroachments, however, radial root development may be restricted by roadside kerb & guttering where higher concentration of root activity may be lineal or located within the site. It may also be possible that the existing low boundary retaining wall has restricted root activity within the site minimising overall impacts, refer to Figure 2 p8 impact areas.

To ensure development impacts are minimised the following recommendations are provided:

- Prior to works the trunk of Council verge trees are to be protected with timber beam trunk protection in accordance with Attachment- A the generic Tree Management Plan (TMP) section 1 Figure B
- The extent of canopy reduction pruning is to be made clear by providing a detailed Pruning Plan clearly showing those limbs to be removed to accommodate building and public access clearances. Both project arborist and designers are recommended to detail building elevations and discuss conflicts that may occur by the propose substation adjacent T14
- Footing excavations within TPZ setbacks are be supervised by a site Project Arborist to treat and protect any encountered tree roots
- Where deep excavation is required >0.5m (500mm) contagious piling along the boundary is recommended to minimise risk of disrupting horizontal soil strength which could result in whole tree failure

Figure 2, showing Wattle Street Impact area



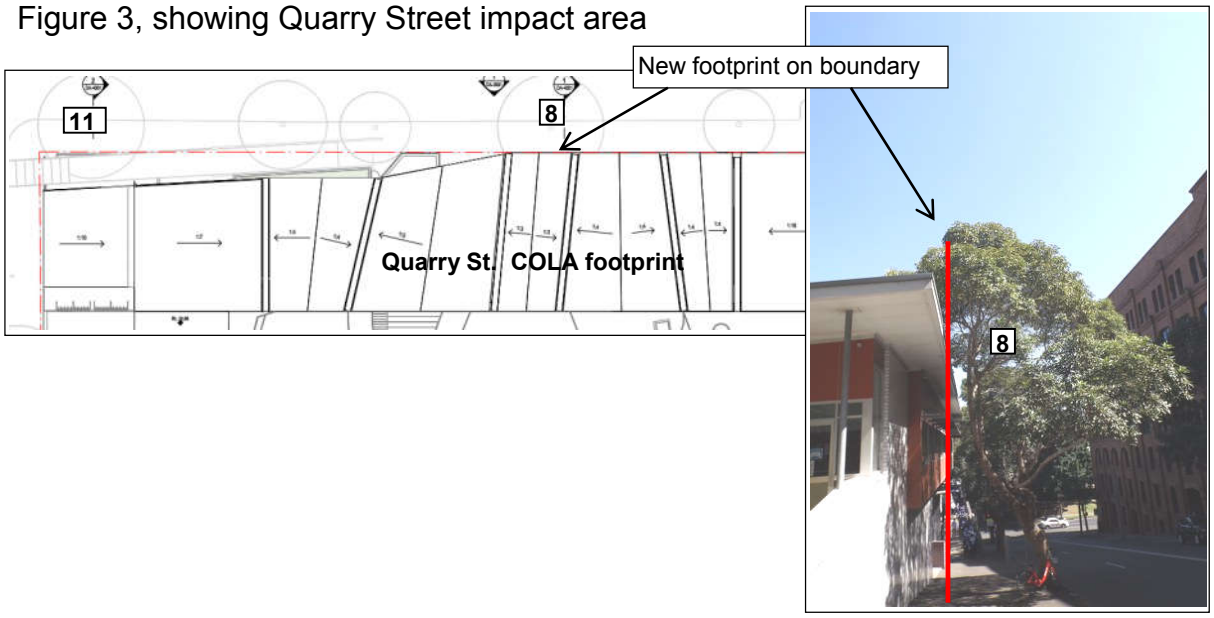
Quarry Street frontage

2.5.3 Trees requiring removal to accommodate proposed access and COLA footprint are identified as trees 28 & 29.

2.5.4 Council verge trees 7, 8, 9, 10 & 11. Of these trees T8 is likely to require canopy reduction pruning to accommodate roofline clearances. Tree 8 may receive substantial limb conflict due to the new building footprint at the boundary, and may likely receive potential root zone interference due to new excavations for footings adjacent the tree. Trees 7, 9, 10 & 11 are unlikely to be affected by ground works where the existing building footprint or existing brick wall foundations may have restricted root activity within the site.

2.5.5 Where deep excavation >0.5m (500mm) is required along the boundary adjacent T8 contiguous piling is recommended to minimize the risk of soil collapse which may result in whole tree failure. The tree has likely narrow restricted root zones within a lineal public pathway, is a tall tree which contributes to levering pressures on narrow anchoring root plates.

Figure 3, showing Quarry Street impact area



Jones Street frontage

2.5.6 Trees requiring removal to accommodate the proposed Jones Street frontage which includes structures to accommodate staff areas and pre-school facilities are trees 22 & 27.

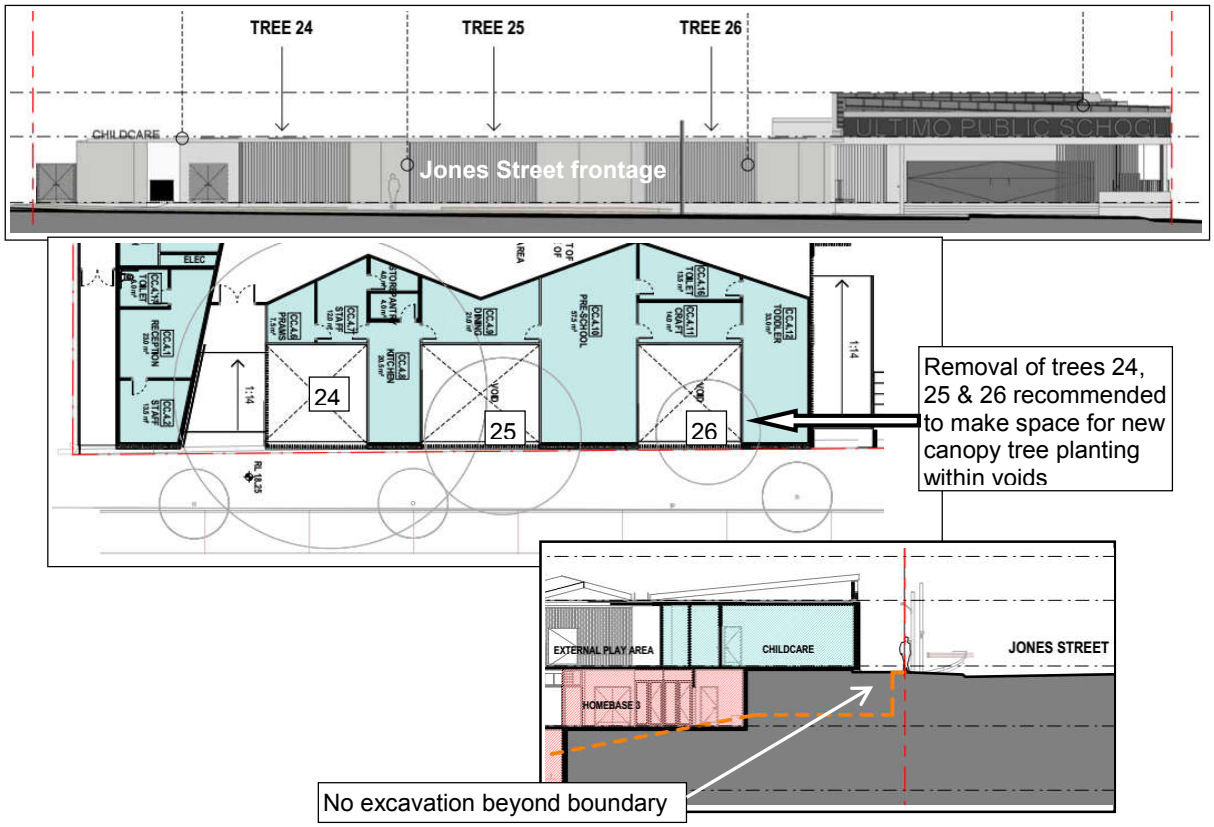
2.5.7 Trees 24, 25 & 26 have been identified for retention, however, retention under the current proposal would be difficult to ensure the trees remain a long term viable asset. Incursion within TPZ setbacks is considered somewhat minor within a 5m Jones Street setback. Problematic issues arise for the building footprint where a continuous courtyard garden bed along Jones Street is unable to be incorporated into the design to ensure the trees remain viable. Based on the likely construction impacts received both below and above ground tree removal and replacement should be considered.

To retain the trees would require design to provide a continuous courtyard garden bed extending 6m from T24 and 5m from T26, with the designated area considered a development exclusion zone.

Under the current design tree removal and replacement with tall canopy trees within the provided void / courtyard space is recommended.

2.5.8 Council verge trees 1, 2, 3, 4, 5 & 6. The trees are unlikely to be affected by the proposal as their canopies extend mostly to the east. The trees are young developing trees containing small structural root zones where boundary works are unlikely to affect the trees. Prior to works timber beam trunk protection is recommended to be installed to minimize tree damages occurring during construction activities.

Figure 4, showing Jones Street impact area



Level 2 to 4 central impact area

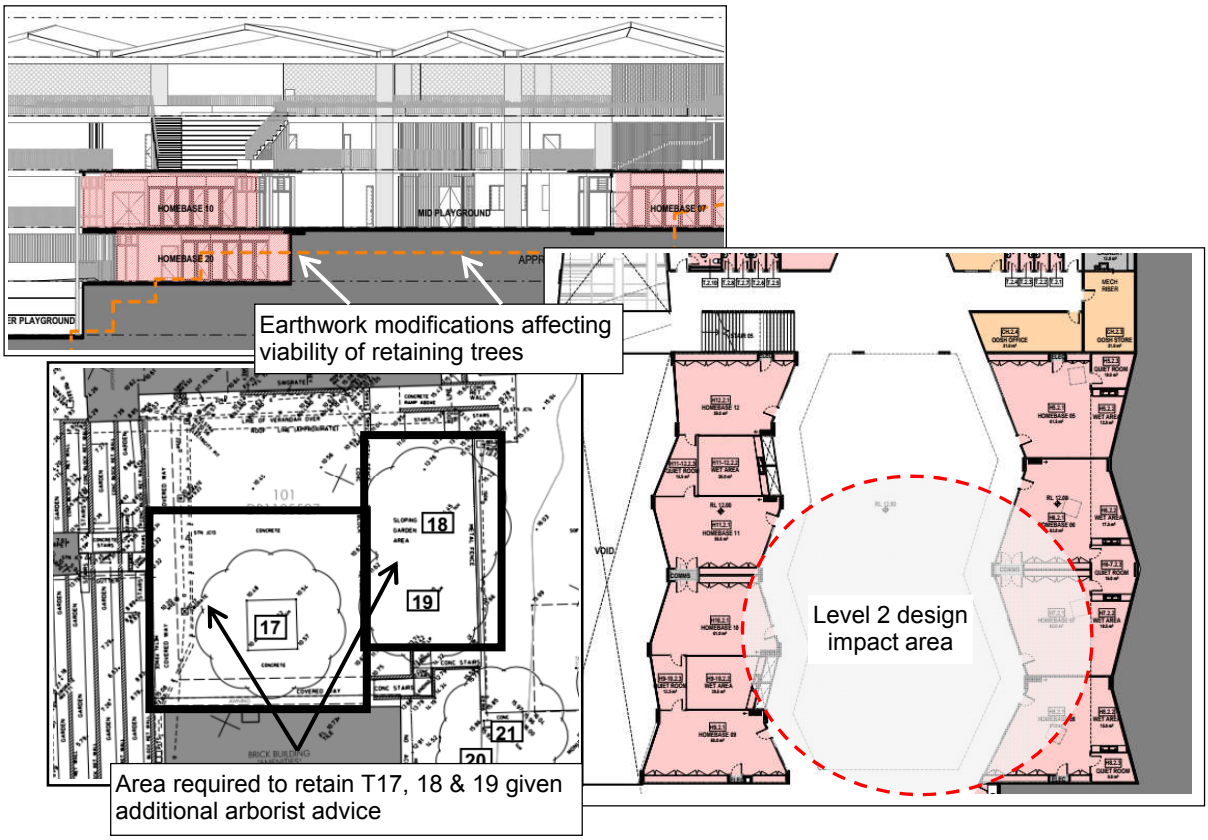
2.5.9 Trees requiring removal to accommodate new design works are trees 17, 18, 19 & 20. It is likely that T18 & 19 will be removed during the demolition stage due to safety reason.

Based on Level 2 design plans trees which fall within Homebase (H) building footprints or are significantly affected by earthwork modifications (cut & fill) are trees 18, 19 & 20.

Tree 17 receives a significant impact by required site modifications to accommodate Homebase H9, H10 & H14.

To sufficiently retain trees 17, 18 & 19 retention of surrounding features and natural ground level as indicated within Figure 5 below is required.

Figure 5, showing central impact area



3. CONCLUSIONS & RECOMMENDATIONS

3.1 Tree removal

3.1.1 With the consent of Council the following fourteen (14) trees have been identified for removal to accommodate the Ultimo Pyrmont Public School Redevelopment proposal. The fourteen trees are identified as trees:

- 12a, 15, 16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28 & 29

3.2 Recommended tree management & protection principles

3.2.1 Street trees to be retained require the construction of Tree Protection Zones (TPZ), fences (F) or specific protection methodology as explained within section 3.2.3 and Attachment- A the generic Tree Management Plan (TMP).

TPZ's are to be considered a development exclusion zone to ensure the tree remains viable where prior arborist advice is required prior to undertaking works within TPZ setbacks.

To retain trees requires protection of the TPZ radius as indicated within Appendix- C the SRZ & TPZ distance column. Design is cable of encroachment within the TPZ given prior arborist advice, refer Appendix- A, diagram showing acceptable incursions within the TPZ (AS4970).

3.2.2 Prior to works commencing and at a pre commencement site meeting the development site superintendent is to be advised of all tree protection requirements as outlined within this report or specific to AS4970 tree protection principles.

3.2.3 In addition to recommendations provided throughout this report the following summary of recommendations are provided as a guide to tree protection during works

1. All street trees are to be protected by timber beam trunk protection installed as directed by DA conditions, or as specified by an appointed Project Arborist, refer TMP section 1 Figure B.
2. Canopy pruning. The extent of canopy reduction pruning is to be approved by Council. Given that trees 12 & 14 will require significant reduction pruning a detailed pruning report identifying those limbs to be removed is recommended to ensure no over pruning occurs outside of development consent conditions.
3. Where excavations for footings along Quarry Street exceed 0.5m (500mm) contiguous piling or similar is recommended to ensure the soil profile does not collapse, and street tree anchorage is not compromised.
4. *General*. In accordance with AS4970 - 2009 (1.4.4) a Project Arborist is to be engaged to monitor, supervise excavation within TPZ setbacks and provide certification of protection works conducted (AS4970 S/5.5.2 *Final certification*). The final certification is to outline tree protection methodology conducted with photographic evidence of ongoing works adjacent council verges retained for final certification.
5. There shall be no excavation or soil disturbance within SRZ setbacks (the area required for tree stability AS4970) without prior project arborist advice.
6. The project arborist is to be familiar with all protection measures as specified within AS4970 – 2009 and ensure tree protection is compliant to AS4970 Section 4.5 *Other Tree Protection Measures*
7. Should there be any uncertainty in tree protection requirements the appointed arborist is to be consulted prior to activities occurring.
8. The TPZ is to be maintained as specified within AS4970 Section 4.6 *Maintaining the TPZ*, which includes no storage of builders material

within designated TPZ setbacks or as directed by the project arborist prior to works commencing.

9. During approved excavation activities root pruning is to be conducted by the an appointed arborist in accordance with AS4970 – 2009 Section 4.5.4 and AS4373 - 2007 Section 9 'Root pruning' to ensure tree roots are not damaged or ripped beyond the point of excavation. All exposed roots at the cut face are to be protected with jute mesh, geotextile fabric or similar and be pegged in in place.
10. *Additional inground services within TPZ's* which may include sewer, stormwater, water and electrical services, final design and impact to trees shall be reviewed and endorsed by the project arborist prior to such works commencing.
11. Attachment- A, the generic Tree Management Plan (TMP) outlines general tree protection methodology which is to be adopted with any tree specific recommendation provided within this report.
12. The development site superintendent is responsible for ensuring that all tree protection measures are conducted accordingly and all site contractors are aware of tree protection requirements prior to their engagement of services.
13. For the purpose of protecting trees on development sites the development site superintendent is responsible for providing arborist certifications to the Principal Certifying Authority (PCA) prior to obtaining an Occupation Certificate (OC).

    In addition to Attachment- A, Section 12 & 13 of the Tree Management Plan arborist certifications are to consist of timing of events, protection methodology undertaken and photographic evidence of site and Tree Protection Fence (TPF) condition.

Should you require further liaisons in this matter please contact me direct on 0419 250 248

Yours sincerely

Mark A Kokot

AQF Level 5 consulting arborist

Diploma of Hort/Arboriculture (AQF5), Associate Diploma Parks Management (AQF4), Certified Arborist / Tree Surgeon (AQF3), ISA Tree Risk Assessment Qualified 6/2014, Builders Contract Licence No. 43850C, Member: Arboriculture Australia No.1292, Working With Children No: WWC0144637E

ATTACHMENT- A: *Generic* Tree Management Plan

1. **Tree Protection Fencing (TPF)** unless specified otherwise TPF is to be constructed prior to any works commencing to ensure no impact occurs to trees requiring retention. If required TPZ fencing is to consist of 1.8m high chain link fencing secured to the ground by 50 x 50mm steel posts. Generally the location of the TPZ is to be constructed outside of the canopy drip line or extent of the TPZ, refer Appendix- C, SRZ & TPZ distance column.

   Should development site constraints exist the location of the TPZ fence may be reduced or altered to timber beam trunk protection, see TMP Figure B.

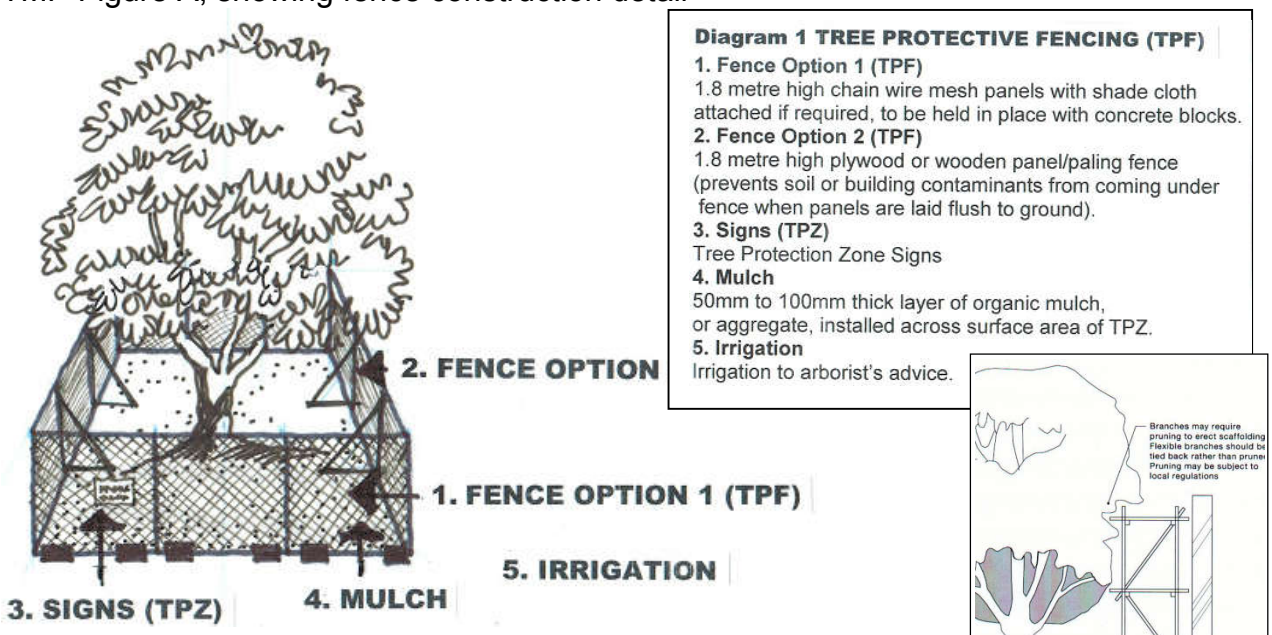
   If reduced TPZ fencing or timber bean protection is required the arborist may request that the extent of the TPZ / root zone be protected by ground mats and native leaf mulch during site works.

   The location of the TPZ is to be constructed as to allow for best tree management practices while providing adequate development work access to finalise the development proposal.

1.2 The TPZ is a development exclusion zone, it is an area isolated from construction disturbance so that the tree remains viable. No works or storage of materials are permitted within the TPZ without prior consultation and written approval from the appointed site arborist.

Appropriate signage shall be erected on TPZ fencing identifying the prevention of any unauthorised activity and/or access. Certification of TPZ modifications are to be provided by the site arborist to the development site superintendent for Principal Certifying Authority (PCA) compliance matters.

TMP Figure A, showing fence construction detail



1.3 Scaffolding within TPZ areas requires to be constructed in accordance with AS4970 Section 4.5.6.

TMP Figure B, showing trunk & root protection detail

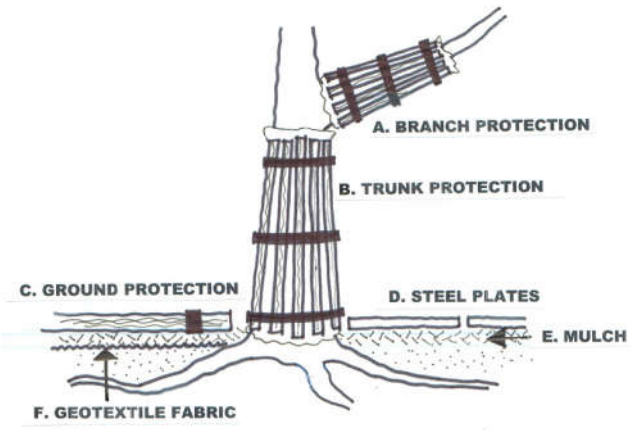


Diagram 2 TYPES OF BRANCH, TRUNK AND GROUND PROTECTION

A. Branch Protection
Prevent bark damage by use of timber boards and padding strapped to branch. (Do not use nails or screws).

B. Trunk Protection
Prevent bark damage by use of timber boards and padding for at least 2 metres above ground level. (Do not use nails or screws).
Also refer to Detail Diagram 3.

C. Ground Protection
Install a suitable device eg timber rumble boards strapped together, above mulch or aggregate. The device shall be thick enough to prevent soil compaction and also to prevent compression or damage to roots.

D. Steel Plates
Steel plates (or similar, as approved by arborist) may be laid with, or without, mulch or aggregate under.

E. Mulch
Minimum 50mm thick, maximum 100mm thick, organic mulch or aggregate.

F. Geotextile fabric
Geotextile fabric laid under mulch or aggregate layer.

2. **Appointing a Site Arborist**. Prior to works commencing a qualified arborist with a minimum AQF Level 5 qualification is to be appointed as the Site Arborist to address any development impacts that may occur to trees that require retention including any neighbouring tree.

   The development site superintendent is responsible for enforcing all tree protection methodology, contacting and liaising with the appoint site arborist. The appointed site arborist must be consulted at all times when working within the TPZ and specifically be on site if development activities are required within the SRZ to discuss root impact management techniques, refer Appendix C for SRZ & TPZ setbacks. The appointed Site Arborist is to certify to the Principal Certifying Authority (PCA) that all tree protection methodology has been conducted accordingly as specified within this report.

3. **Hold Points**, unless specified otherwise no works are permitted within the SRZ radius of any tree without prior onsite arborist consultation or direct site involvement. The SRZ setback is a development exclusion zone. Where works are proposed within the SRZ an air spade or water jetting root investigation is required to identify the potential impact which is to be assessed by the site arborist.

   Hand tools are to be used when working within both the SRZ & TPZ with cantilevering or bridging over the SRZ under pier & beam construction recommended.

4. **Demolition within the Tree Protection Zone (TPZ)** is to be supervised by the site arborist. Rubber tracked excavators are recommended to work within the footprint of any hard surface such as pathways and pavements to minimise the radial impact to the TPZ and/or SRZ. No tree roots at or exceeding 30mm(Ø) are to be damaged during works. Where larger woody roots are located the appointed site arborist is to be notified.

5. **Excavation within the TPZ,** is to be avoided where possible. Any excavation for footings, foundations or grading (site leveling) is to be approved and supervised by the appointed arborist.

5.2 To appropriately protect the root zone air spade or water jetting excavation is recommended to locate and expose any tree roots which may be affected and to avoid ripping by site machinery. Tree roots <30mm(Ø) in diameter shall be clean cut with sharp clean root pruning tools. Further advice from the site arborist is required where larger woody tree roots have been located.

6. **Landscaping or development within the TPZ** is to complement the long term needs to retain the subject trees. Pervious paving materials are recommended within the TPZ to maintain soil moisture availability. Unless approved within this report no grade changes being cut or fill is to occur within 10% of the TPZ radius. Greater than ten (10%) percent of the TPZ may be affected by development encroachment given prior arborist consultation and appropriate tree management. Maintaining the existing soil levels, moisture and aeration is the key to significant tree preservation. All efforts are to be made in maintaining the TPZ, soil moisture content and soil microorganism activity essential for maintaining good tree vigour.

7. **Fill material within the Tree Protection Zone**, fill material within the Tree Protection Zone shall be avoided.

8. **Site machinery**, demolition, excavations and site construction machinery must ensure that no direct conflicts occur to protected trees which may include canopy overhang towards development areas.

8.2 In the event of tree damage the appointed site arborist is to be notified immediately. The site arborist is to immediately undertake action to minimise any impact.

9. **Underground services**, no trenching for underground services is permitted within the radial SRZ setback without prior arborist approval. Where underground services are required within the SRZ or in line cutting through the TPZ, underboring or directional drilling is recommended.

10. **Root pruning**, tree roots are to be correctly treated, clean cut by the appointed arborist abiding to the Australian Standards Pruning of Amenity Trees AS 4373 2007 section 9 *Root pruning* at all times.

At no stage are tree roots greater than 30mm(Ø) (in diameter) allowed to be cut by site contractors without prior arborist consultation. Where significant woody tree roots are located they are to be referred to the arborist for advice. Bridging over or tunneling beneath the root system may be required to ensure the vigour of the tree is not adversely affected by proposed works.

11. **Canopy pruning / tree removal**, where required tree removal and canopy reductions are to be approved by the Local Government Authority and conducted by a suitably qualified AQF Level 3 arborist to AS4373 Pruning Standards, and specifically be conducted in accordance with Safe Work Australia – Guide to managing risks of tree trimming and removal works 2016 (www.swa.gov.au)

12. **Regular site inspections**, the appointed site arborist shall undertake regular site inspections of Tree Protection Zones (TPZ) & Tree Protection Fencing

(TPF). Unless specified otherwise within this report site inspections are recommended at the following stages.

- Inspection of installed Tree Protection Fencing (TPF) / timber beam trunk protection prior to commencement of works
- At eight (8) week intervals to ensure TPF remains in place and is without alteration
- In accordance with any approved DA conditions specified for the protection of trees on development sites
- At completion of works prior at handover - Occupation Certificate (OC) to ensure no detrimental impact to trees has occurred

NOTE: Liaising with the Project Arborist and organizing of ongoing site inspections in accordance with DA conditions is the responsibility of the development site superintendent.

13. **Certifications**, obtaining relevant arborist certifications is the responsibility of the development site superintendent. Certifications are to be provided to the Principal Certifying Authority (PCA) stating that all tree protection fencing and/or methodology has been installed to adequately protect any tree requiring retention which includes neighbouring trees.

Arborist Certification is to consist of timing of events, discussions of attendance, tree roots encountered and mitigation works conducted to minimise development impacts on protected trees during the course of development activities.

Yours sincerely

Mark A Kokot - 0419 250 248

Level 5 consulting arborist

APPENDICES

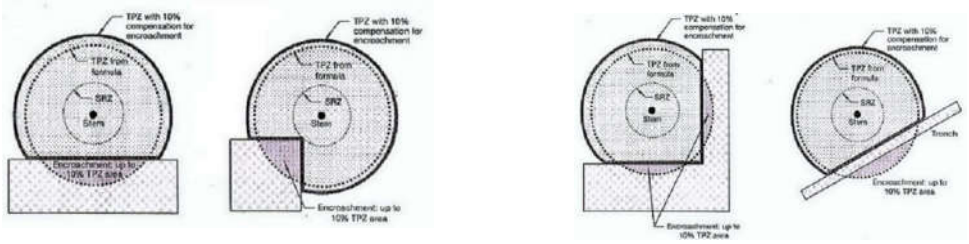
APPENDIX- A: Terminology & references

Acceptable Risk: Exposure to or reject risk of varying degrees. The acceptable risk is defined as '*The person who accepts some degree of risk in return for a benefit being exposed to some risk of varying degree*.
Age classes: (I) Immature refers to a well established but juvenile tree. (ESM) refers to an early semi mature tree not of juvenile appearance. (SM) Semi-mature refers to a tree at growth stages advancing into maturity and full size. (LSM) Late Semi- Mature, refers to a tree between semi-mature and close to mature. (EM) refers to a tree at the first stages of maturity. (M) Mature refers to a full size tree with some capacity for future growth. **Health:** Refers to a trees vigor exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion and the degree of dieback.
Condition: Refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (i.e. Trunk and major branches), including structural defects such as cavities, crooked trunks or week trunk / branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.
Decay: (*N*) – an area of wood that is undergoing decomposition. (*V*) – decomposition of an area of wood by fungi or bacteria.
Decline: Is the response of a tree to a reduction of energy levels resulting from stress. Recovery from decline is difficult and slow; is usually irreversible. **Defect:** A identifiable fault in a tree. **Epicormic Shoots**: Shoots that arise from latent or adventitious buds that occur on stems and branches and on suckers produced from the base of the tree. A symptom / result of stress related factors.
Footprint: The area occupied by site structures, including the dwelling driveways and hard surfaces. **Included Bark**: (Inclusion) a genetic weak fault, pattern of development at branch junctions where the bark is turned inwards rather than pushed out, can pose a potential hazard. **Order of branches:** First order being those that are the first to extend from the main trunk or codominant limbs, second order branches extend from the first order and third order branches extend from the second order. **Probability:** The likelihood of some event happening. **Risk:** Is the probability of something adverse happening. **Suppression:** Restrained growth pattern from competition of other trees or structures. **Wound:** Damage inflicted upon a tree through injury to its living cells, may continue to develop further weakening of the structure compromising structural integrity.

NOTES: No aerial (climbing) inspections, woody tissue testing or tree root investigation was undertaken as part of this tree assessment. This report acknowledges the current **Australian Standards 'Protection of Trees on Development Sites'** AS 4970 – 2009 with reference to the Tree Protection Zone (TPZ): being a combination of the root and crown area requiring protection. The TPZ takes into consideration the Structural Root Zone (SRZ): The area required for tree stability. Determined by AS4970 - 2009 Figure 1, Table of determining the SRZ, section 3.3.5 of the standards. The standard states where a greater than 10% encroachment occurs the arborist is to take into consideration the schedule of determining impacts as set within AS4970 s. 3.3.4. Encroachments are referred to within this report as major or minor encroachments (AS4970 s. 3.3.2 & 3.3.3). Below is the terminology used for estimated percentage of development incursion used within this report. To retain specific trees and ensure their viability development must take into consideration protection of the TPZ radius.

The extent of inclusion within the TPZ radius has been categorised within this report as follows:
<10% - negligible incursion >10 - <15% - low to moderate level of incursion / >15 - <20% - moderate level of incursion / >20 - <25% - moderate to high level of incursion / >25 - <35% - high level of incursion / >35% - significant inclusion within the TPZ

Showing acceptable incursion within the TPZ (AS4970)



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NSW Legislation. State Environmental Planning Policy SEPP/494 (Educational Establishments & Child Care Facilities) https://www.legislation.nsw.gov.au/#/view/EPI/2017/494

APPENDIX- B: Tree Retention Value *Checklist* ©rainTree consulting

VTA i) Landscape Significance (LS): The significance of a tree in the landscape is a combination of its amenity, environmental and heritage values.

Values may be subjective however, offer a visual understanding of the relative importance of the tree to the environment. The Landscape Significance of a tree is described in seven categories to assist in determining the retention value of trees.

1	Significant	2	Very High	3	High	4	Moderate	5	Low	6	Very Low	7	Insignificant

ii) Visual Tree Assessment (VTA)

0	If appropriate to VTA - **exempt* trees - Dep of Education SEPP and/or Local Government Authority (LGA) Tree Management or Preservation Orders (TPO)	2E	Trees location likely to be affected by infrastructure restricting root growth potential, or tree has potential to cause infrastructure damage where risk mitigation or rectification works may likely compromise tree anchorage
0A	Noxious or invasive species located within heritage conservation area		
1	Trees that are dead, significantly declining >75% volume or obviously hazardous	3	This rating incorporates trees that may require further investigation of defects such as cavities or symptoms indicating internal decay to an extent that cannot be quantified under visual examination. Further inspections may be in the way of arborist climbing inspection within the canopy, root crown investigation and/or drill penetrating or Picus Sonic Tomograph ultrasound testing procedures to determine percentage of internal decay.
2	Trees that are structurally damaged. Have poor structure or weak & detrimental large stem inclusions capable or failure opposed to 2B. Tree also may be affected by extensive borer damage, fungal pathogens (wood rot) or viruses. Some symptoms may be reversible, remediated or controlled give appropriate management.		
2A	Tree damage specific to basal and/or root plate damage, very shallow soils or steep topography resulting in poor anchorage where condition may become problematic in near future / may include trees with included bark splits to ground level	4	Trees which appear specifically environmentally stressed by drought, poor soil or site conditions. Symptoms may be reversible given appropriate management
2B	Defect specific to stem inclusions development (weak branch attachments) where the condition may not be immediately detrimental however, requires annual to biannual monitoring with control to prevent stem failure by installing slings, cable or bracing. Tree may also contain multi stems or codominant twin stems	5	Trees that would benefit from crown maintenance pruning as identified within the Australian Standards AS 4373 – 2007 Pruning of Amenity Trees
		5A	Trees that require little or no maintenance at time of inspection other than close monitoring
2C	Tree may contain minor wounds, pest or minor pathogen activity, altered from storm damaged to an extent that is not considered immediately detrimental - may also display average form. Likely to require close annual monitoring or minor corrective pruning	6	Trees may be typical for species type, of good form and visual condition for age class May have suppressed one sided canopies or are low risk trees
2D	Trees significantly altered by recent storm or over pruning events which may reduce retention values due to average form- or tree extensively pruned for power line clearance	7	VTA restricted by canopy or plant material vine or ivy covering tree parts, or site conditions which do not allow access- fences to neighbouring sites

iii) Retention Value (RV): Determined by [1] Low risk - tree fee of visual defects and viable for retention, [2] Medium – low risk - viable for retention with minor faults which may reduce ULE, [3] Medium risk - trees which contain faults that are likely to become problematic in the near future, [4] M/High risk - trees to be considered for removal due to poor condition.

1	High retention	2	Medium retention	3	Low retention	4	Consider removal

iv) U.L.E. categories Useful Life Expectancy (after *Barrell* 1996, modified by the author)

A trees U.L.E. category is the life expectancy of the tree modified first by its age, health, condition, safety and location. U.L.E. assessments are not static but may be modified as dictated by changes in trees health and environment. The five categories of U.L.E. are as follows:

1. Long U.L.E. - Appear retainable at the time of assessment for over 40 years with an acceptable degree of risk assuming reasonable maintenance.
2. Medium U.L.E. - Appear to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk assuming reasonable maintenance.
3. Short U.L.E. - Trees appear to be retainable at the time of assessment for 5 to15 years with an acceptable degree of risk assuming reasonable maintenance.
4. Very short - Removal- Trees which should be scheduled for removal within the very short term or as specified within this report.
5. Small, young or regularly pruned – Trees under 5m in height that can be easily moved or replaced, includes screen plantings or hedge lines.

APPENDIX- C: Tree Assessment Schedule

	Trees requiring removal due to hazardous or dead condition - subject to Local Government Authority notification		Trees with low retention values: senescence, developing defects or being *exempt trees <5m tall located within a heritage conservation area

Tree No	*Botanical Name* COMMON NAME	Height x spread (m)	DBH (mm)	SRZ / TPZ	Age	Health	Condition	Signifi-cance	VTA	RV	ULE	Comments CV = Council verge tree NT = Neighbouring trees
1 CV	*Lophostemon confertus* Qld Brush Box	9 x 5	250	2 / 3	ESM	Good	Good	2	6	1	2	Tree with no significant defects noted
2 CV	*Lophostemon confertus* Qld Brush Box	7 x 5	200	1.8 / 2.4	ESM	Good	Good	2	6	1	2	Tree with no significant defects noted
3 CV	*Lophostemon confertus* Qld Brush Box	7 x 5	200	1.8 / 2.4	ESM	Good	Good	2	6	1	2	Tree with no significant defects noted
4 CV	*Lophostemon confertus* Qld Brush Box	7 x 5	150	1.5 / 2	I	Good	Fair / Good	2	2B	2	2	Bowing lean NTH/EST, minor stem inclusion development at 2.2m
5 CV	*Lophostemon confertus* Qld Brush Box	7 x 6	200	1.8 / 2.4	ESM	Good	Good	2	6	1	2	Tree with no significant defects noted
6 CV	*Lophostemon confertus* Qld Brush Box	6 x 7	250	2 / 3	ESM	Good	Good	2	6	1	2	Tree with no significant defects noted
7 CV	*Lophostemon confertus* Qld Brush Box	16 x 12	650	2.8 / 7.8	ESM	Good	Fair	2	2A/C	2	2	Minor wound at 2.1m EST, potential poor anchoring root development due to kerb
8 CV	*Lophostemon confertus* Qld Brush Box	12 x 13	550	2.7 / 6.6	ESM	Good	Fair / Good	2	6	1	2	Tree with no significant defects noted
9 CV	*Lophostemon confertus* Qld Brush Box	15 x 9	400	2.4 / 4.8	ESM	ESM	Good	2	6	1	2	Tree with no significant defects noted
10 CV	*Lophostemon confertus* Qld Brush Box	15 x 10	550	2.7 / 6.6	ESM	ESM	Good	2	6	1	2	Tree with no significant defects noted

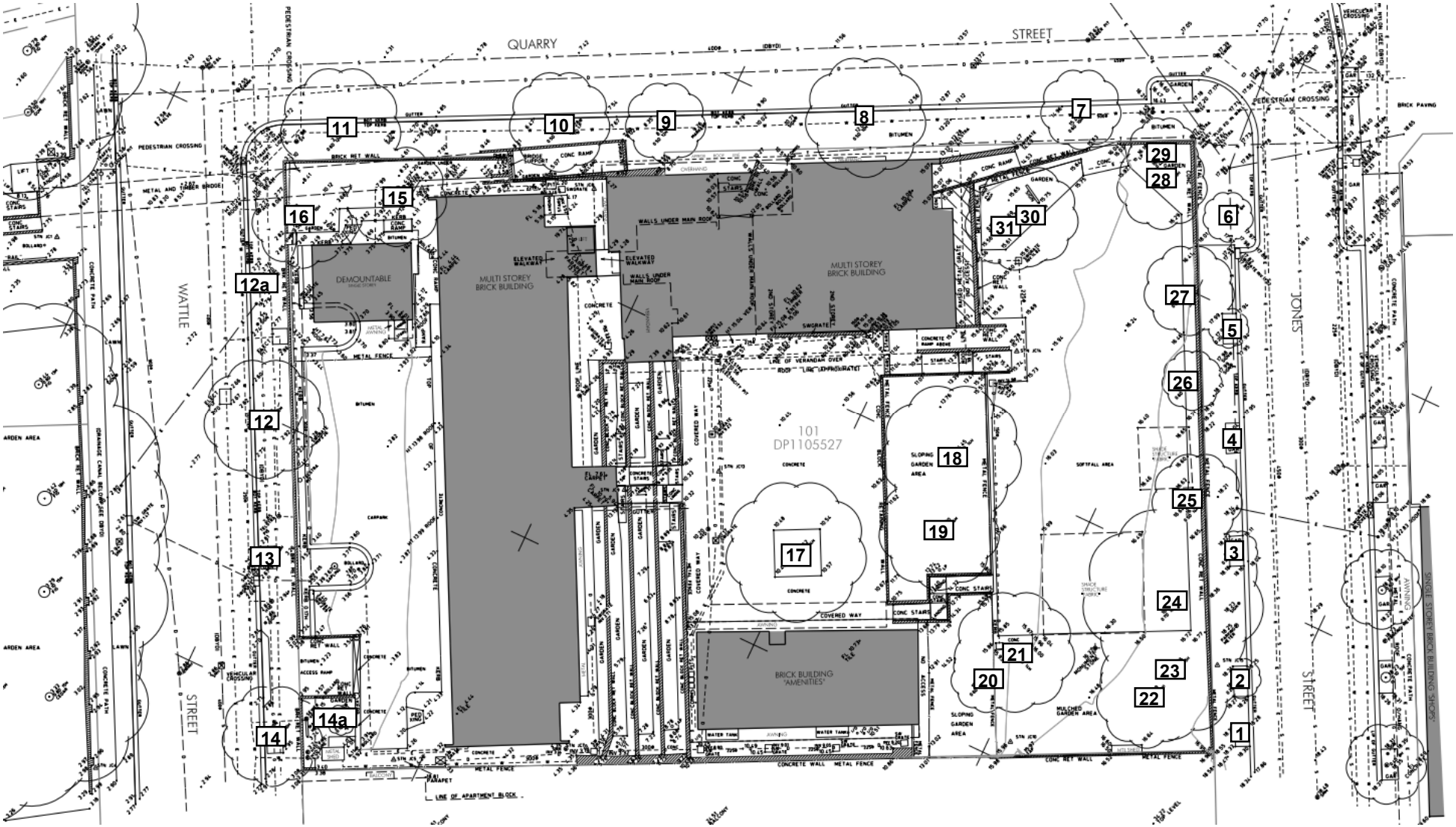
	Trees requiring removal due to hazardous or dead condition - subject to Local Government Authority notification		Trees with low retention values: senescence, developing defects or being *exempt trees <5m tall located within a heritage conservation area

Tree No	*Botanical Name* COMMON NAME	Height x spread (m)	DBH (mm)	SRZ / TPZ	Age	Health	Condition	Signifi-cance	VTA	RV	ULE	Comments CV = Council verge tree NT = Neighbouring trees
11 CV	*Lophostemon confertus* Qld Brush Box	16 x 14	700	2.8 / 8.4	SM	Good	Good	2	6	1	2	Tree with no significant defects noted
12 CV	*Ficus microcarpa var hillii* Hills Figs	12 x 14	450	2.5 / 5.4	ESM	Fair / Good	Fair / Good	2	2B/C	2	2	Slight lean NTH, root girdled WST side, lower branch scaffolds with minor stem inclusion development, canopy extension 6m within site
12a CV	*Populus nigra 'Italica'* Lombardy Poplar?	7 x 2	100at base	1.5 / 2	I	Good	Good	2	6	1	2	Deciduous tree. Young sapling tree with no significant defects noted
13 CV	*Populus nigra 'Italica'* Lombardy Poplar?	8 x 2.5	150at base	1.5 / 2	ESM	Good	Fair	2	2A	2	3	Deciduous tree. Average to potentially poor anchoring root development, slight lean EST with exposed surface root to kerb
14 CV	*Ficus microcarpa var hillii* Hills Figs	15 x 14	500	2.6 / 6	ESM	Fair / Good	Fair / Good	2	2B/C	2	2	Sooty mold covering canopy foliage, lower NTH stem with minor stem inclusion, canopy extension 5m within site
*14a	*Lagerstromia indica* Crepe Myrtle	5 x 2.5	100at base	1.5 / 2	ESM	Good	Good	4	6	1	2/5	Exempt tree species <8m in height SEPP Clause 20 part (C)
15	*Eucalyptus elata* River Peppermint	22 x 14	600	2.7 / 7.2	ESM	Fair	Fair / Good	3	2C/4	2	3	Environmentally stressed, Slight decline in canopy + low foliage volume, minor lower trunk wounds STH to 1.5m, trunk indent & wound NTH/WST at base
16	*Melaleuca bracteata* Tea tree	10 x 11	250, 300	2.6 / 6.6	M	Good	Fair / Good	3	2A	2	2	Main twin stems at ground level with stem inclusion development, suppressed canopy form biomass EST
17	*Platanus x acerfolia* London Plane Tree	22 x 15	750	3 / 9	SM	Good	Good	3	6	1	2	Tree with no significant defects noted. May pose allergy health risk during spring.
18	*Platanus x acerfolia* London Plane Tree	20 x 17	1100at base	3.5 / 13.2	SM	Good	Good	3	6/7	1	2	Tree with no significant defects noted, multi stemmed at ground level, may have issues at ground level - base Ivey covered restricting VTA
19	*Platanus x acerfolia* London Plane Tree	22 x 16	1100at base	3.5 / 13.2	SM	Good	Good	3	6/7	1	2	Tree with no significant defects noted, multi stemmed at ground level, may have issues at ground level - base Ivey covered restricting VTA

	Trees requiring removal due to hazardous or dead condition - subject to Local Government Authority notification		Trees with low retention values: senescence, developing defects or being *exempt trees <5m tall located within a heritage conservation area

Tree No	*Botanical Name* COMMON NAME	Height x spread (m)	DBH (mm)	SRZ / TPZ	Age	Health	Condition	Signifi-cance	VTA	RV	ULE	Comments CV = Council verge tree
20	*Araucaria columnaris* Cooks Pine	21 x 5	550	2.7 / 6.6	ESM	Good	Good	3	6	1	2	Tree with no significant defects noted
21	*Eucalyptus sideroxylon* Red Ironbark	20 x 14	550	2.7 / 6.6	ESM	Good	Fair	3	2C	2	<3	Slight lean NTH, lower trunk fold indents & seam wounds to 1.8m WST / 1.4m STH, wound at 4m EST stem = condition likely to become problematic in future
22	*Eucalyptus sideroxylon* Red Ironbark	20 x 11	450	2.5 / 5.4	ESM	Good	Good	3	6	1	2	Tree with no significant defects noted
23	*Eucalyptus sideroxylon* Red Ironbark	22 x 17	450. 400	3 / 10.2	ESM	Good	Fair / Good	3	2C	3	3	Bowing form EST, twin stems at ground level, NTH stem reaction wood due to lean + minor wound at 1.2m EST – increasing wound seam above to 2.2m
24	*Eucalyptus sideroxylon* Red Ironbark	20 x 17	600	2.7 / 7.2	ESM	Good	Good	3	6	1	2	Slight lean EST with no significant defects noted
25	*Casuarina glauca* She Oak	21 x 7	400	2.4 / 4.8	ESM	Good	Good	3	6	1	2	Restricted root zone by retaining wall – with no significant defects noted
26	*Casuarina glauca* She Oak	21 x 11	450	2.5 / 5.4	ESM	Good	Good	3	6	1	2	Restricted root zone by retaining wall, slight lean WST – no significant defects noted
27	*Eucalyptus sideroxylon* Red Ironbark	14 x 10	550	2.7 / 6.6	ESM	Fair / Good	Fair / Good	3	2C/4	2	2	Restricted root zone by retaining wall Environmentally stressed slightly low foliage volume
28	*Eucalyptus camaldulensis* River Red Gum	15 x 13	500	2.6 / 6	ESM	Fair / Good	Good	3	4	2	2	Slightly low foliage volume with no significant defects noted
29	*Melaleuca quinquenervia* Paperbark	11 x 7	300	2.1 / 3.6	ESM	Good	Good	3	6	1	2	Suppressed canopy form biomass NTH
30	*Melaleuca quinquenervia* Paperbark	17 x 10	700at base	2.8 / 8.4	ESM	Good	Fair	3	2	3	3	Suppressed canopy form biomass EST, twin stems at 1m with stem inclusion fault / seam increasing EST side
31	*Melaleuca quinquenervia* Paperbark	17 x 8	350	2.3 / 4.2	ESM	Good	Good	3	6	1	2	Suppressed canopy form biomass – STH with no significant defects noted

APPENDIX- D: Tree Location Plan



APPENDIX- E: Tree Removal Plan, *post demolition*