URBAN FORESTRY AUSTRALIA

TREE MANAGEMENT CONSULTING ARBORICULTURISTS

PRELIMINARY ARBORICULTURAL ASSESSMENT

for

University of Technology Sydney
Facilities Management Unit
Building1, Level 19, 15 Broadway
BROADWAY NSW 2007

SITE ADDRESS

STAGE ONE—PRELIMINARY REPORT
UTS CAMPUS
BUCKLAND STREET
CHIPPENDALE NSW

AUGUST 2015

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EXECUTIVE SUMMARY

This Preliminary Arboricultural Assessment is an inventory of the existing trees on the site and also includes the existing street trees on Buckland Street. The primary aim of this assessment was to present an analysis of the projected tree retention and removal relating to the proposed, future Blackfriars Precinct Research Building.

A total of thirty-two (32) trees were assessed and accorded retention values based on their current health and condition (i.e. their *Useful Life Expectancy*) and their significance in the landscape (Appendix E).

Four (4) trees were identified as being of high retention value, although one of these is a comparatively small tree of only medium significance in the landscape, and the other is on the adjoining property to the east.

Seven (7) trees are attributed with a medium retention value.

Eighteen (18) trees were identified as being of low retention value.

Three (3) trees were identified as having no retention value, and would inevitably be removed regardless of any future development of the site.

A tree location plan and schedule of all assessed trees, which included their landscape significance and tree retention values, was provided to the project team members to assist in guiding the Stage 1 phase of the proposed development. During meetings and discussions, tree retention was considered in the context of the needs of the research facility and the required consideration of the existing agreed building envelope and the conservation of the existing archaeological and built heritage.

The greatest concentration of moderate to high retention value trees that also make a substantial contribution to the existing streetscape are at, or close to the site frontage facing Buckland Street. These trees, because of the large volume of ground and air space occupied by their canopies and roots, place the greatest constraints on developing the research building footprint within the limitations posed by surrounding heritage items.
The agreed footprint, including consideration of open space and landscaping, requires the removal of these trees, as well as several others of lesser retention value.

A total of twenty-three (23) trees are likely to be removed to facilitate the proposal (noting one is already approved for removal under a separate application), including three (3) small street trees where the main site access is proposed.

It is expected that a replacement landscape will eventually provide a complimentary tree planting commensurate with, and sympathetic to, the form and function of the new research facilities.

CONTENTS

1 INTRODUCTION

1.1 This Preliminary Arboricultural Assessment (PAA) was commissioned by Mr Sarkis Aznavoorian for, and on behalf of, the Facilities Management Unit of the University of Technology Sydney.

1.2 This report is to accompany a submission to the City of Sydney for the Stage 1 Development 'Envelope" Application for the proposed Blackfriars Research Building on the north part of the site. "The site" is identified as the University of Technology Sydney Blackfriars Campus, 4 – 12 Buckland Street, Chippendale, New South Wales.

1.3 The purpose of this report is to assess the *vigour*, *condition* and *retention value* of the surveyed trees in, or in close proximity to the proposed building envelope, and identify the probable removal and retention of trees associated with the proposed building envelope.

1.4 This report gives recommendations for tree retention or removal, and provides guidelines for planning and designing built elements in proximity to existing trees to be retained.

1.5 Care has been taken to obtain all 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.

1.6 This PAA is not intended as an assessment of any impacts on trees by any future construction within the Stage 1 building envelope of the site, other than the current development application for the building envelope.

1.7 This report is not intended to be a comprehensive tree *hazard* or *risk* assessment, nor is it intended as a development or construction impact assessment or tree protection specification; however the report may make recommendations, where appropriate, for further assessment, treatment or testing of trees where potential structural problems have been identified, or where below ground investigation may be required.

2 METHODOLOGY

2.1 In preparation for this report, Catriona Mackenzie, Australian Qualification Framework Level 5 arboriculturist and principal of Urban Forestry Australia ("UFA") carried out ground level *visual tree assessments*[1] of thirty-two (32) trees in, or in close proximity to the site, on 1st July, 2015. Inspection details of these trees are provided in Appendix E – *Schedule of Assessed Trees.*

2.2 Tree heights and canopy spreads were visually estimated. Unless otherwise noted in the Schedule of Assessed Trees (Appendix E), trunk diameters were measured at 1.4 metres above ground level using a diameter tape.

2.3 Trees surrounded by construction/exclusion fencing were subject to limited inspections as UFA did not have permission to enter those areas. Where relevant, this is noted in Appendix E.

2.4 Field observations were written down and photographs of the site and trees taken using a Canon EOS1000D digital SLR camera.

2.5 No *aerial inspections*, *root mapping* or woody tissue testing were undertaken as part of the tree assessments. Information contained in this tree report covers only the trees that were examined and reflects the condition of those trees at the time of inspection.

2.6 Plans and documents referenced for the preparation of this report include:

- Details and Levels Plan, Sheet 1, Ref. No. 72875, dated 26/09/2007, prepared by Rygate & Company Pty Limited.
- Concept Stage 1 Building Envelope (8 pages, undated), prepared by H2o Architects.
- Schematic Design Draft Ground Plan, Dwg.LAN-D-001, Rev. A, dated 12/08/2015, prepared by Aspect Studios.
- SEARS, Application No. SSD 6746, dated 18 November, 2014.
- City of Sydney Council Development Control Plan 2012 (DCP) Section 3 *General Provisions*, Schedule 8 *Tree Management.*
- City of Sydney Council Local Environment Plan 2012 (LEP) Clauses 5.9 and 5.9AA.
- Conservation Management Plan: Blackfriars Campus (CMP), August 2015 by Paul Davies Pty Ltd.
- Arboricultural Development Impact Assessment for Proposed Childcare Centre, dated September 2012, prepared by Urban Forestry Australia.

2.7 The trees are shown on a marked up copy of the site survey. This plan is attached as Appendix F – Tree Location Plan.

[1] Visual Tree Assessment (VTA) is a procedure of defect analysis developed by Mattheck and Breloer (1994) that uses the growth response and form of trees to detect defects.

3 OBSERVATIONS AND DISCUSSION

3.1 Assessed Trees

3.1.1 Thirty-two (32) trees or palms were assessed and included in this report. Details of these are included in the Schedule of Assessed Trees – Appendix E.

3.1.2 Of the 32 assessed trees:

- One tree is located on the adjoining St. Benedict's property (T49)
- Ten (10) are street trees located in the road reserve of Buckland Street (Trees 24–29, 29a, 30, 31 and 32).
- Twenty-one (21) are in the site (Trees 33–48, 50–54).

3.1.3 Based on the Useful Life Expectancy and Landscape significance of the trees, the following Retention Values are accorded.

- High Retention Value trees
  - 33—*Jacaranda mimosifolia* (Jacaranda),
  - 35—*Casuarina cunninghamiana* (River She-oak)
  - 41—*Casuarina glauca* (Swamp She-oak)
  - 49—*Phoenix canariensis* (Canary Island Date Palm)
- Medium Retention Value trees
  - 27—*Lophostemon confertus (Brush Box)*
  - 31—Brush Box
  - 34—*Cinnamomum camphora* (Camphor Laurel)
  - 36—Brush Box
  - 45—*Sapium sebiferum* (Chinese Tallow)
  - 51—Brush Box
  - 52—River She-oak
- Low Retention Value trees
  - 24, 25, 26, 28, 29, 30—*Tristaniopsis laurina* (Water Gum)
  - 29a—*Fraxinus excelsior* (Common Ash)
  - 32—*Liriodendron tulipifera* (Tulip Tree)
  - 38, 46, 54—*Olea europea* var. *africana* (African Olive)
  - 39, 40, 47—Jacaranda
  - 42—*Celtis sinensis* (Common Hackberry)
  - 43—Chinese Tallow
  - 50—Brush Box
  - 53—*Morus nigra* (Mulberry)
- Nil (remove) Retention Value trees
  - 37, 44—Common Hackberry
  - 48—*Acacia* sp (Wattle).

3.1.4 No site or street trees are identified in any of the City of Sydney Registers of Significant Trees 2005.

3.1.5 Not one of the 21 site trees is identified in the CMP as having heritage or cultural significance. However, the CMP does refer to the existing Olive trees (Tree 46—row of six [6] immediately north of Building 5), suggesting their Heritage Value is low, or potentially high subject to *"…assessment by a horticulturalist",* and to *"Retain where possible".*

These 6 trees are considered to be a grouping of trees, but are collectively assessed as a single tree (i.e. due to their size and proximity to each other, the growth habit of each tree is strongly influenced by its relative position to its neighbour—major pruning or removal of individual trees will have an impact on the 'tree'). Under arboricultural assessment, this 'tree' is considered to have a low retention value due to a number of negative influences on its visual amenity and structural condition through the processes of natural ageing, pruning, poor growing conditions and proximity of built structures.

3.2 Projected Tree Removal

3.2.1 Of the 32 assessed trees, it is expected that twenty-two (22), including three (3) street trees, will be removed to accommodate the research building footprint, associated landscaping and vehicle access.

3.2.2 Trees removed would include all High and Medium Retention Value trees in the site, and three low retention value street trees.

3.3 Potential Impacts on Trees Proposed for Retention

3.3.1 Under the Australian Standard 4970-2009 *Protection of trees on development sites* (AS4970), encroachments less than 10% of the *Tree Protection Zone* (TPZ) are considered to be minor. There are no specifications provided in AS4970 for potential impacts of 10% or greater. The 10% figure is taken to be a threshold and trigger where arboricultural investigations into TPZ encroachments beyond this figure need to be considered.

3.3.2 Provision for the TPZ offsets of trees to be retained will be required at planning and design stage. Refer to Appendix E for those Tree Protection Zone (TPZ) offsets.

4 PRELIMINARY GUIDELINES FOR PLANNING AND DESIGN

4.1 Minimising Impacts on Trees to be Retained

4.1.1 Generally, potential impacts from site development can be summarised as follows;

- Incursions (i.e. excavation or filling over existing ground, grading and removing of topsoils) into the root zones of trees resulting in loss of fine feeder roots, or severing of structural woody roots.
- Structural branch loss through close proximity of structures to trees.
- Significant changes to surrounding soil levels which can affect soil hydrology and tree root health.

4.1.2 Where tree retention is desired, the *Tree Protection Zone* (TPZ) of an individual tree is estimated at 12 times the stem diameter, or the outer extent of the *canopy dripline* (whichever is the greater). It is prudent to add, where possible, an additional 1–2 m to this TPZ setback to ensure construction scaffolding can be accommodated without excessive removal of foliage and branches from the tree. Where trees have high crowns this additional setback may be reduced following further arboricultural assessment of impacts on individual trees near proposed development.

4.1.3 To facilitate adequate protection of tree root zones and tree crowns, separate appraisal of each development area (proposed site access and construction areas in proximity to trees to be retained) should be carried out. A suitably qualified arboriculturist (i.e. a minimum Australian Qualification Framework Level 5 [Diploma] in arboriculture) must be advised prior to any development proposed to occur within the TPZ offset of those trees, to enable assessment and protection recommendations. Refer to Appendix E for the TPZ offset for each tree.

4.1.4 Without any specific root zone investigation the entire TPZ is to be kept entirely free of any development works, e.g. changes to existing ground levels, use of machinery, stockpiling, etc.

4.1.5 On no account are any works approved within the *Structural Root Zone* (SRZ) of a tree without prior root investigation and the approval of the site arboriculturist or Council.

4.1.6 Wherever possible all major utilities and service corridors are to be located away from trees, and preferably outside the TPZ of trees to be retained.

5 CONCLUSIONS

- Thirty-two (32) trees in the site and adjoining road reserve or properties, were assessed to provide base arboricultural data to assist in the layout of the research building footprint.
- No trees have identified conservation status under the Council's Significant Tree Register, and the likely significance of mature Olive trees on the site is low given their age and condition.
- Twenty-two (22) trees would likely be removed based on the current building footprint and likely landscape scheme. This includes three (3) small street trees of low retention value.
- The seven (7) remaining street trees (T24–28, 31 and 32), a palm (T49) on the adjoining St Benedict's site, and an Olive tree (T38) in the site are not expected to impacted by future development.
- Liaising with an arboriculturist during development design and review will improve the retention success of trees to be retained.

Report prepared by Catriona Mackenzie

August, 2015

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APPENDIX A

TERMS AND DEFINITIONS

TERMS AND DEFINITIONS

The following relates to terms or abbreviations that may have been used in this report and provides the reader with a detailed explanation of those terms.

Aerial inspection Where the subject tree is climbed by a professional tree worker or arborist specifically to inspect and assess the upper stem and crown of the tree for signs or symptoms of defects, disease, etc.

Age classes
Y *Young* refers to a well-established but juvenile tree
SM *Semi-mature* refers to a tree at growth stages between immaturity and full size
EM *Early-mature* refers to a tree that is more or less full sized and vigourously growing.
M *Mature* refers to a full sized tree with some capacity for further growth
LM *Late Mature* refers to a full sized tree with little capacity for growth that is not yet about to enter decline
OM *Over-mature* refers to a tree about to enter decline or already declining
LS *Live Stag* refers to a tree in a significant state of decline. This is the last life stage of a tree prior to death.

Cluster describes a group of branches or stems arising from the same point on a larger branch or stem.

Co-dominant refers to stems or branches equal in size and relative importance.

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 weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.

Crook An abrupt bend in the branch or trunk (stem).

Crown All the parts of a tree arising above the trunk where it terminates by its division forming branches, e.g. the branches, leaves, flowers and fruit: or the total amount of foliage supported by branches.

Deadwood refers to any whole limb that no longer contains living tissues (e.g. live leaves and/or bark). Some dead wood is common in a number of tree species.

Defect Any structural weakness or deformity.

Diameter at Breast Height (DBH) refers to the tree trunk diameter at breast height, i.e. measured at 1.4 m above ground level.

Dieback Death of growth tips/shoots and partial limbs, generally from tip to base. Dieback is often an indicator of stress and tree health.

Growth crack / split Longitudinal crack/split that may develop as a rupture in the bark from normal growth. Longitudinal crack/split that may develop in the trunk of some fast growing palms.

Health (syn. vigour) refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

Inclusion - the pattern of development at branch or stem junctions where bark is turned inward rather than pushed out. This fault is located at the point where the stems/branches meet. This is normally a genetic fault and potentially a weak point of attachment as the bark obstructs healthy tissue from joining together to strengthen the joint.

Lopping Cutting between branch unions (not to branch collars), or at internodes on a tree, with the final cut leaving a stub. Lopping may result in dieback of the stub and can create infection courts for disease or pest attack.

Root Mapping The exploratory process of recording the location of roots usually in reference to a datum point where depth, root diameter, root orientation and distance from trunk to existing or proposed structures are measured. It may be slightly invasive (disturbs or displaces soil to locate but not damage roots, e.g. hand excavation, or use of air or water knife), or non-invasive (does not disturb soil, e.g. ground penetrating radar).

Sooty Mould An unsightly black fungus covering the branches and/or leaves, preventing sunlight from reaching the leaf surface. A sticky substance, known as 'Honey dew', is a waste product of scale insects and provides an excellent substrate for the growth & development of sooty mould.

Structural Root Zone (SRZ) Refers to the radial distance in metres, measured from the centre of the tree stem, which defines the critical area required to maintain stability of the tree. Only thorough investigation into the location of structural roots within this area can identify whether any minor incursions into this protection zone are feasible. Note: The SRZ is calculated on the diameter measured immediately above the root/stem buttress (DAB). Where this measurement is not taken in the field, it is calculated by adding 12.5% to the stem diameter at breast height (DBH).(Based on averages calculated from DBH and DAB measurements taken from 20 mature Brush Box and Camphor Laurel). Note: The SRZ may not be symmetrical in shape/area where there is existing obstruction or confinement to lateral root growth, e.g. structures such as walls, rocky outcrops, etc).

Suppressed In crown class, trees which have been overtopped and whose crown development is restricted from above.

Sweep A curve in the trunk, generally near the ground. This usually occurs when a tree is partially wind thrown when young, but then stabilises itself and straightens due to reaction wood. Stem sweep can also be a naturally developed feature of some tree species. E.g. *Araucaria columnaris* (Cook Pine), that has no relationship to a defect or partial windthrow.

Topping or heading is a pruning practice that results in removal of terminal growth leaving a cut stub end. Topping causes serious damage to the tree.

Tree Protection Zone (TPZ). Refers to the radial distance in metres, measured from the centre of the tree stem which defines the *tree protection zone* for a tree to be retained. This is generally the minimum distance from the center of the tree trunk where protective fencing or barriers are to be installed to create an exclusion zone. The **TPZ** surrounding a tree aids the tree's ability to cope with disturbances associated with construction works. Tree protection involves minimising root damage that is caused by activities such as construction. Tree protection also reduces the chance of a tree's decline in health or death and the possibly damage to structural stability of the tree from root damage.
To limit damage to the tree, protection within a specified distance of the tree's trunk must be maintained throughout the proposed development works. No excavation, stockpiling of building materials or the use of machinery is permitted within the TPZ.Note: In many circumstances the tree root zone does not occupy a symmetrically radial area from the trunk, but may be an irregular area due to the presence of obstructions to root spread or inhospitable growing conditions.

USEFUL LIFE EXPECTANCY (ULE)
In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. ULE i.e. a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner. ULE categories are easily verifiable by experienced personnel without great disparity. A tree's ULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give the life expectancy); then by economics (i.e. cost of maintenance - retaining trees at an excessive management cost is not normally acceptable); and finally, effects on better trees, and sustained amenity (i.e. establishing a range of age classes in a local population). ULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short ULE may at present be making a contribution to the landscape, but their value to the local amenity will decrease rapidly towards the end of this period, prior to them being removed for safety or aesthetic reasons. For details of ULE categories see Appendix B, modified from Barrell 2001.

Vigour (syn. health) refers to the tree's health as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

APPENDIX B

ULE CATEGORIES

Useful Life Expectancy (ULE) CATEGORIES (after Barrell 1996, updated 01/04/01)

The five categories and their sub-groups are as follows:

1. Long ULE - tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:

A. structurally sound trees located in positions that can accommodate future growth
B. trees which could be made suitable for long term retention by remedial care
C. trees of special significance which would warrant extraordinary efforts to secure their long term retention

2. Medium ULE - tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:

A. trees which may only live from 15 to 40 years
B. trees which may live for more than 40 years but would be removed for safety or nuisance reasons
C. trees which may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
D. trees which could be made suitable for retention in the medium term by remedial care

3. Short ULE - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:

A. trees which may only live from 5 to 15 years
B. trees which may live for more than 15 years but would be removed for safety or nuisance reasons
C. trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
D. trees which require substantial remediation and are only suitable for retention in the short term

4. Removal - trees which should be removed within the next 5 years

A. dead, dying, suppressed or declining trees
B. dangerous trees through instability or recent loss of adjacent trees
C. dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
D. damaged trees that are clearly not safe to retain.
E. trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.
F. trees which are damaging or may cause damage to existing structures within the next 5 years.
G. trees that will become dangerous after removal of other trees for the reasons given in (a) to (f).
H. trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.

5. Small, young or regularly pruned - Trees that can be reliably moved or replaced.

A. small trees less than 5m in height.
B. young trees less than 15 years old but over 5m in height.
C. formal hedges and trees intended for regular pruning to artificially control growth.

APPENDIX C

SIGNIFICANCE OF A TREE ASSESSMENT RATING

IACA Significance of a Tree, Assessment Rating System (STARS)© (IACA 2010)©

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001.

The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process all definitions for terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined. An example of its use in an Arboricultural report is shown as Appendix A.

Tree Significance - Assessment Criteria

1. High Significance in landscape

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

2. Medium Significance in landscape

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

3. Low Significance in landscape

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions,
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species

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

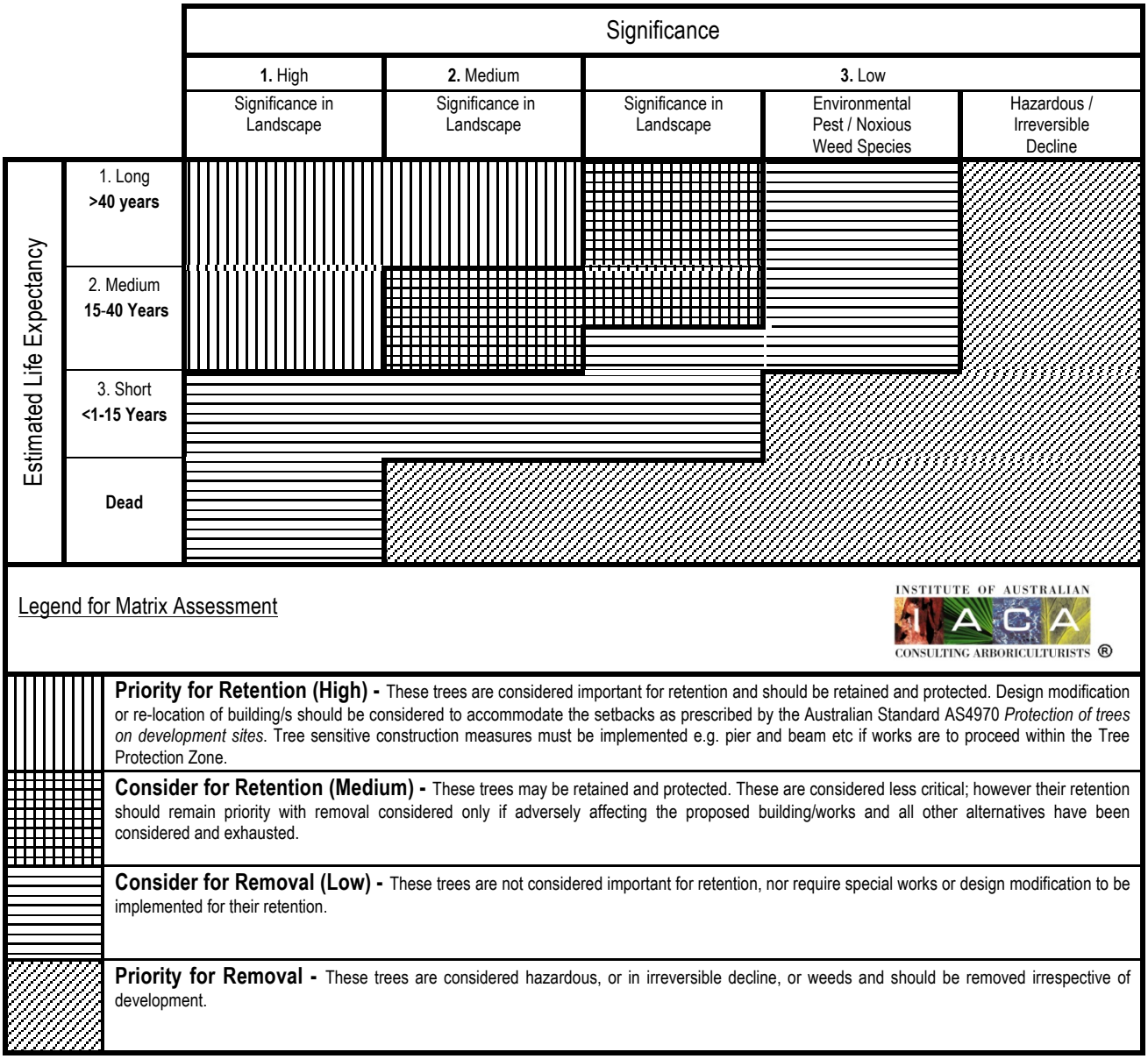
Hazardous/Irreversible Decline

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

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

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

Table 1 - Tree Retention Value - Priority Matrix.



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APPENDIX D

SITE PHOTOGRAPHS

Plate 1
Looking southeast towards the site from Buckland Street. Smaller street trees are evident. The large high retention value River she-oak (Tree 35) clearly dominates the street view.
C. Mackenzie

Plate 2
Looking northeast towards the site from Buckland Street. The large, mature Camphor Laurel (Tree 34) has notable decline of the upper crown, indicating possible onset of senescence. The large Jacaranda (Tree 33) is left of the tree, the River She-oak to its right.
C. Mackenzie

Plate 3
Looking east from within the site. Part of the row of Olives (Tree 46) in front (north) of building 5. Tree 47 (Jacaranda) is in the background, and just beyond that is the ailing wattle (Tree 48)

Plate 4
Looking northwest from within the site. The crown of the large Jacaranda (Tree 33) is evident above the existing childcare building (left). Trees 54 (Olive), 53 (Mulberry) in background, and 51 (Brush Box) and 52 (River She-oak) can be seen on the left.
C. Mackenzie

Plate 5
Looking more or less west, from within the site. The larger trees facing Buckland Street can be seen (i.e. River She-oak, Jacaranda and Camphor Laurel).
C. Mackenzie

Plate 6
Looking north from within the site, towards the area the research building would occupy. Part of Tree 46 (row of Olives), can be seen in the right foreground. In the distance, Tree 52 (River She-oak- arrowed) is located at the far north end of the site boundary.
C. Mackenzie

APPENDIX E

SCHEDULE OF ASSESSED TREES

SCHEDULE OF ASSESSED TREES

UTS Blackfriars Campus (north half of site), Buckland Street, Chippendale. July, 2015.

NOTE: Trees 1–23 are subject of an earlier Arboricultural Impact Assessment by Urban Forestry Australia, dated September 2012, for approved child-care facility on the southern part of the Blackfriars site.

Tree No.	*Genus* and *species* Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments and Recommendations	ULE	TSR	RV	SRZ† (m)	TPZ† (m)	TPZ (area)	ILR
24	*Tristaniopsis laurina* **Water Gum**	5	3	100	SM	G	F	Street tree. Indigenous species. Spindly. Planted approximately 300mm from kerb. Basal shoots.	Med 2A	L	L	1.6	2	7	
25	*Tristaniopsis laurina* **Water Gum**	4.5	3	100	SM	G	F	Street tree. Indigenous species. ***Co-dominant*** stems @ 1100mm AGL.	Med 2A	L	L	1.6	2	7	
26	*Tristaniopsis laurina* **Water Gum**	5	3	125	SM	F	F—P	Street tree. Indigenous species. Basal shoots. Bark anomalies (borers/damage, etc). Heavily ***lopped*** w/poor crown volume.	Short 3C	L	L	1.6	2	8	
27	*Lophostemon confertus* **Brush Box**	14	11	500	EM	G	F—P	Street tree. Introduced native species. ***Topped*** and lopped @4m AGL, w/resulting ***branch crooks***, vigorous vertical shoots and poor branch architecture.	Med 2D	H	M	2.7	6	113	
28	*Tristaniopsis laurina* **Water Gum**	5.5	4	150	SM	G	F—G	Street tree. Indigenous species. Co-dominant stems @ 1.6m. Tip/small branches cut between nodes for power lines.	Med 2D	L	L	1.6	2	10	
29	*Tristaniopsis laurina* **Water Gum**	5	5	175	SM	G	F—G	Street tree. Indigenous species. Co-dominant stems @ 1.6m. Crown ***suppressed*** w/bias to W.	Med 2B	L	L	1.7	2.2	15	
29a	*Fraxinus excelsior* **Common Ash**	3.5	1.5	40	J	F	P	Street tree. Introduced exotic species. Very suppressed.	Short 3C	L	L	1.5	2	7	
30	*Tristaniopsis laurina* **Water Gum**	5	6	175	SM	G	F	Street tree. Indigenous species. Co-dominant stems @ 0.5m. Old stem removed at base.	Med 2A	L	L	1.7	2.2	15	
31	*Lophostemon confertus* **Brush Box**	10	9	400	EM	G	F	Street tree. Introduced native species. Heavy crown bias to W (suppression). Heavily lopped for power lines. High number of impact injuries to trunk and underside branches on road side.	Med 2C	M	M	2.5	4.8	72	
32	*Liriodendron tulipifera* **Tulip Tree**	4	2	50	J	G	G	Street tree. Introduced, deciduous, exotic species. Vulnerable to opening car doors. In mixed planted bed.	Med 2D	L	L	1.5	2	7	
33	*Jacaranda mimosifolia* **Jacaranda**	15	15	875	M	G	F	Introduced exotic species. Significant stem **sweep** to NE. Branches just clearing building roof peak (around 8m+), extending about 6-7m beyond. Protected by buildings from majority of winds. ***Deadwood*** noted—needs crown clean if retained.	Med 2D	H	H	3.4	10.6	350	

Tree No.	*Genus* and *species* Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments and Recommendations	ULE	TSR	RV	SRZ† (m)	TPZ† (m)	TPZ (area)	ILR
34	*Cinnamomum camphora* **Camphor Laurel**	15	18	350+ 600+ 900 (1140)	LM	F—P	F—G	Introduced exotic species. Environmental weed/pest species. Co-dominant stems @ 1.4m. Some decay noted to old wound face N side. N stem also co-dominant @ 1.6m. Cracking/upheaval of pavement entry to child care building. Confined to W by boundary wall. Upper crown very poor, 'droughty' looking, with substantial tip ***dieback*** noted. High volume of deadwood up to and >100mm Ø, especially over public path.	Short 3B	H	M	3.7	13.6	581	
35	*Casuarina cunninghamiana* **River She-oak**	17	17	725	M	G	G	Introduced indigenous species. Conflicting with existing timber deck. ***Tree Protection Zone*** covered with artificial turf. Confined by boundary wall to W. Deadwood >100mm Ø and >4m long noted over playground. Needs deadwooding of branches >30mm Ø.	Med 2B	H	H	3.1	8.8	241	
36	*Lophostemon confertus* **Brush Box**	10	6	275	SM	G	F	Introduced native species. Heavily suppressed on 2 sides, bias to W. Twiggy dieback, lopped for power lines.	Med 2D	M	M	2.1	3.3	35	
37	*Celtis sinensis* **Common Hackberry**	13	11	*525	EM	G	F—P	Introduced exotic, deciduous species. Environmental weed/pest species. Co-dominant, ***included*** stems @ 2m. Limited access to tree, although clearly damaging existing built structures. Very confined area for trunk and root growth. No major deadwood noted. NOTE: Tree identified as Tree 24 in Condition 10 of DA Consent D/2012/1398—this tree approved for removal with child care centre application.	Short 3B	M	R	2.7	6.4	129	
38	*Olea europaea* var. *africana* **African Olive**	8	9	325+ 350 (475)	EM	G	F	Introduced exotic, evergreen species. Environmental weed/pest species. Very confined growing area (3m x 3m). Large stone walls, edges and building surrounding most of root zone. Basal shoots from old, pruned stem. Co-dominant stems @ 0.4m. Crown bias to W/SW.	Short 3C	M	L	2.6	5.8	104	
39	*Jacaranda mimosifolia* **Jacaranda**	4.5	5	175	J	G	G	Introduced exotic species. Small tree in garden bed. No special problems visibly apparent at time of inspection.	Med 2A	L	M	1.7	2.2	15	
40	*Jacaranda mimosifolia* **Jacaranda**	6.5	5	2 x 100 (175)	J	G	P	Introduced exotic species. Middle tree of 3 in garden bed. Previously lopped at base.	Med 2C	L	L	1.7	2.2	15	
41	*Casuarina glauca* **Swamp She-oak**	12	4	200	SM	G	G	Introduced indigenous species. Small tree in garden bed. No special problems visibly apparent at time of inspection.	Med 2A	M	H	1.8	2.4	18	
42	*Celtis sinensis* **Common Hackberry**	6	5	125	SM	F	F	Introduced exotic, deciduous species. Environmental weed/pest species. Very close to fence. No other special problems visibly apparent at time of inspection.	Short 3C	L	L	1.6	2	8	

Tree No.	*Genus* and *species* Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments and Recommendations	ULE	TSR	RV	SRZ† (m)	TPZ† (m)	TPZ (area)	ILR
43	*Sapium sebiferum* **Chinese Tallow Tree**	7.5	8	225+ 375 (450)	EM	G	F	Introduced exotic, deciduous species. Confined growing area. Stems grow up through 'cubby-house'. Possibly has had crown reduced in height (or past branch dieback pruned). Slight stem sweep to N/NE.	Med 2C	M	L	2.5	5.4	92	
44	*Celtis sinensis* **Common Hackberry**	8.5	5.5	75+ 100+ 150 (200)	SM	F	P	Introduced exotic, deciduous species. Environmental weed/pest species. Very tightly welded and included stems near base. Infestation of ***sooty mould*** affecting fence and paths.	4A	L	R	1.8	2.4	18	
45	*Sapium sebiferum* **Chinese Tallow Tree**	10	15	400	M	G	F—G	Introduced exotic, deciduous species. Crown slightly biased to W/NW. Suppressed to S by crown spread of row of African Olives.	Med 2A	M	M	2.5	4.8	72	
46	*Olea europaea* var. *africana* x 6 **African Olive**	8–10	10–12	300–650	LM	F—G	F	Introduced exotic, evergreen species. Environmental weed/pest species. Crowns almost entirely biased to N due to building close behind and clearance pruning. Some stems lean to N. Tip dieback, rubbing branches, fig seedlings growing in branch/stem crotches, rocks wedged in stems, etc. Basal suckers. Poorly pruned.	Short 3C	H	L	2.9	7.2	163	
47	*Jacaranda mimosifolia* **Jacaranda**	12	7	2 x 150 (210)	SM	G	F	Introduced exotic species. Co-dominant stems @ base. Generally ok condition, but slightly suppressed to W/NW by Olives.	Med 2D	M	L	1.8	2.5	20	
48	*Acacia* sp. **Wattle**	12	10	375	OM	P	P	Introduced, short-lived indigenous species. Splitting bark, exudates, <5% live crown volume—all typical features of Wattle tree in significant and irreversible decline.	4A	L	R	2.4	4.5	64	
49	*Phoenix canariensis* **Canary Island Date Palm**	*9–10	*5–6	*600–800	M	G	G?	Within neighbouring, adjoining property. Introduced exotic palm species. Limited inspection - all observations made from site only.	Long 1A?	M	H?	NA	4	50	
50	*Lophostemon confertus* **Brush Box**	14	10	475	EM	G	F—P	Introduced native species. Lopped/damaged @ 3mAGL, w/***cluster*** of 5 branches arising from similar location. Minor dieback and deadwood to <40mm Ø. Active ***growth splits*** on trunk.	Short 3B	M	L	2.6	5.8	104	
51	*Lophostemon confertus* **Brush Box**	14	10	375	SM	G	F—G	Introduced native species. Affected by competition for crown space. Slight lean to N/NW.	Med 2A	M	M	2.4	4.5	64	
52	*Casuarina cunninghamiana* **River She-oak**	15	8	425	EM	G	G?	Introduced indigenous species. Crown somewhat obscured for ground visual inspection. Possible deadwood up to 60mm Ø.	Med 2A?	M	M?	2.5	5.1	84	
53	*Morus nigra.* **Mulberry**	9	10	325	M	G	F—P	Introduced exotic, evergreen species. Environmental weed/pest species. Decay and poor form, particularly at base of branches to N. Interesting gnarly trunk.	Short 3C	L	L	2.2	3.9	48	

Tree No.	*Genus* and *species* Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments and Recommendations	ULE	TSR	RV	SRZ† (m)	TPZ† (m)	TPZ (area)	ILR
54	*Olea europaea* var. *africana* **African Olive**	7	8	275	EM	G	F	Introduced exotic, evergreen species. Environmental weed/pest species. Significant lean to N/NE. Badly pruned.	Short 3D	L	L	2.1	3.3	35	

KEY

Trees to be retained.

Tree approved for removal under separate application.

Trees proposed to be removed.

TREE RETENTION VALUE

HIGH (Priority for Retention) —These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 *Protection of trees on development sites*. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.

MEDIUM (Consider for Retention) —These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.

LOW (Consider for Removal) — These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.

REMOVE (Priority for Removal)—These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.

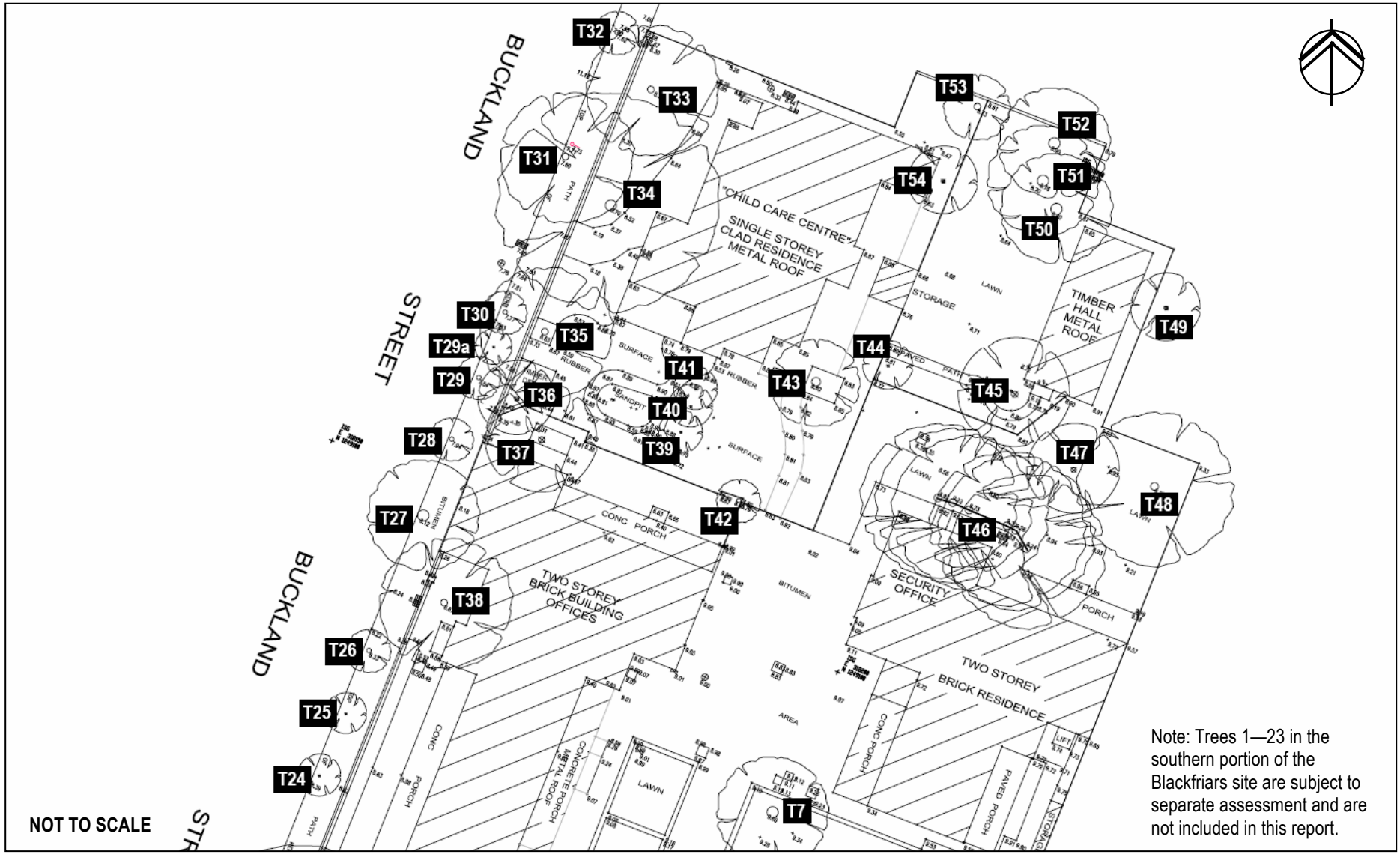
† Notional radial offset of a symmetrical, unrestricted root system – subject to change depending on site conditions affecting tree root growth.
* Visually estimated. **GL** at ground level. **AGL** above ground level.

LEGEND

H refers to the approximate height of a tree in metres, from base of stem to top of tree crown.
Sp refers to the approximate and average spread in metres of branches/canopy (the 'crown') of a tree.
DBH refers to the approximate diameter of tree stem at breast height i.e. 1.4 metres above ground (unless otherwise noted), and expressed in millimetres.
Age refer to Appendix A -Terms and Definitions for more detail.
V refers to the tree's vigour (health). L – Low vigour, N – normal vigour, P = poor vigour. Refer to Appendix A -Terms and Definitions for more detail.
C refers to the tree's structural condition. F = fair condition, G = good condition, P = poor condition. Refer to Appendix A -Terms and Definitions for more detail.
ULE refers to the estimated *Useful Life Expectancy* of a tree. Refer to Appendices A and B for details. Where further investigation or testing of trees is required, a ULE can't be accorded until investigations have taken place.
TSR The *Tree Significance Rating* considers the importance of the tree as a result of its prominence in the landscape and its amenity value, from the point of public benefit. Refer to Appendix C –for more detail.
RV Refers to the retention value of a tree, based on the tree's ULE *and* Tree Significance. Refer to Appendix C –for more detail. Note: a RV cannot be accorded to a tree where the ULE is not provided.
SRZ Structural Root Zone (SRZ) refers to the critical radial offset in metres from the centre of the tree's stem required to maintain stability of the tree. The SRZ is calculated on the diameter measured immediately above the root buttress or flare (DAB). Where this measurement is not taken in the field, it is calculated by adding 12.5% to the stem diameter at breast height (DBH). Refer to Appendix A -Terms and Definitions for more detail.
TPZ Tree Protection Zone (TPZ) refers to the *tree protection zones* for trees to be retained. The measurement given is a radial offset in metres from the centre of the tree's stem. Refer to Appendix A -Terms and Definitions for more detail.
ILR Impact Level rating: **0** = Nil (0%); **L** = Low (0.25–10%); **L–M** = Low to Moderate (11–15%); **M** = Moderate (16–20%); **M–H** = Moderate to High (21–25%); **H** = High (26 – 35%); **S** = Significant (>35%). Refer to Appendix A for more details.

APPENDIX F

TREE LOCATION PLAN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BUCKLAND STREET
BUCKLAND
"CHILD CARE CENTRE"
SINGLE STOREY CLAD RESIDENCE METAL ROOF
STORAGE
LAWN
TIMBER HALL METAL ROOF
SURFACE
RUBBER
SANDPIT
PAVED PATH
CONC PORCH
TWO STOREY BRICK BUILDING OFFICES
BITUMEN
SECURITY OFFICE
PORCH
TWO STOREY BRICK RESIDENCE
AREA
CONCRETE PORCH
PAVED PORCH
LIFT
STORAGE
PATH
NOT TO SCALE
Note: Trees 1—23 in the southern portion of the Blackfriars site are subject to separate assessment and are not included in this report.