

ARBORICULTURAL IMPACT REPORT

PROPOSED LIBRARY BUILDING ON PRECINT 1 AND UNDERGROUND CARPARK

AUSTRALIAN CATHOLIC UNIVERSITY MASTERPLAN STRATHFIELD CAMPUS - BARKER ROAD STRATHFELD

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PREPARED FOR AUSTRALIAN CATHOLIC UNIVERSITY



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1. BACKGROUND

Landscape Matrix Pty Ltd has been engaged by the Australian Catholic University to prepare an Arboricultural Impact Report in respect to 27 trees at its Strathfield Campus that are potentially affected by a proposed new library building in precinct 1 of its proposed Masterplan. This report has been prepared by Guy Paroissien, a Director of Landscape Matrix.

Landscape Matrix has prepared an earlier report which assessed arboricultural impacts of other proposals at the site, including proposed underground carparking in the vicinity of the western boundary of the campus. This earlier report was dated 27 February 2012 and a summary of the potential impacts of the proposed underground carpark is attached at Appendix D.

The site was inspected on 15 and 20 February 2012 to collect data for 57 trees for preparation of the earlier report and re-inspected on 7 June 2012 to collect data for the additional trees considered in this report.

The assessment of the trees was based upon a visual inspection of the trees from ground level using the Visual Tree Assessment (VTA) approach developed by Mattheck & Breloer (1994). The visual inspection included examination of the trees' dimensions, foliage density and foliage health, form, structure, structural condition, overall health and vigour and landscape significance.

The inspection was limited to visual inspection of the trees without dissection, probing or coring. No aerial inspection of the trees was carried out and the assessment did not include any woody tissue testing or root investigation.

The tree heights and canopy spreads were estimated and expressed in metres and the tree diameters at breast height (DBH) were measured with a standard metal tape at approximately 1.4 metres above ground level and expressed in millimetres.

Measurements from the trees referred to in this report are to be taken as if measured from the centre of the trees' trunks.

2. TREES ON SITE

27 trees within the site have been assessed in preparing this report. A summary of these trees, their dimensions, condition, Safe Use and Life Expectancy (SULE) and landscape significance is attached in Appendix B. The SULE categories identified in Appendix B follow those of Barrell (1996).

The tree numbers in Appendix B correspond with the tree numbers marked on the attached Survey Plan prepared by Danny Linker and Co Pty Ltd dated 15/05/2010 and identified as Drawing Number 100402, Sheet 2, Issue D.

The site has been developed in the past and currently supports a number of educational buildings, associated infrastructure including access roads, parking areas, pathways, playing fields and landscaped gardens with a mix of exotic and planted Australian trees together with a number of trees that are considered likely to be remnants of the original vegetation of the site and locality.

The trees that have been assessed for this report are summarised in table 1 as follows:

Table 1: Summary of species assessed, number and height range.

SPECIES	COMMON NAME	NUMBER PRESENT	HEIGHT RANGE (metres)
<i>Araucaria bidwillii</i>	Bunya Bunya Pine	2	26
<i>Callistemon viminalis</i>	Weeping Bottlebrush	2	4 to 5
<i>Lophostemon confertus</i>	Brush Box	8	7 to 14
<i>Phoenix canariensis</i>	Canary Island Date Palm	13	7 to 12
<i>Syncarpia glomulifera</i>	Turpentine	2	13 to 16
	Total	27	4 to 26

None of the species is individually listed as a threatened species under the NSW *Threatened Species Conservation Act 1995* and the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.

However, it is also noted that *Syncarpia glomulifera* (Turpentine) is a component species of the vegetation community identified as Turpentine Ironbark Forest in the Sydney Basin Bioregion. This vegetation community is listed as an endangered ecological community under the NSW *Threatened Species Conservation Act 1995* and as a critically endangered ecological community under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.

3. TREES IDENTIFIED AS BEING OF HIGH LANDSCAPE SIGNIFICANCE.

The landscape significance of trees is based upon a number of factors including; species, dimensions, health, maturity, Safe Use and Life Expectancy (SULE) and landscape significance. Following assessment of the trees it is considered the following 9 trees are of high landscape value and medium to long SULE.

Table 2: Trees identified as being of high landscape significance.

TREE NO.	SCIENTIFIC AND COMMON NAME	TPZ	SRZ	COMMENTS
1	<i>Lophostemon confertus</i> (Brush Box)	5.5 metres	2.4 metres	A mature, single trunked specimen approximately 14 metres in height with a canopy spread of 12 metres and a DBH of 420mm at 1 metre. In good health and of high landscape significance. Slight canopy bias to the north. Slight canopy bias to the north. Codominant leaders from 1.4 metres with minor fibre buckling under SE leader below junction - not considered at risk of failure - monitoring recommended.
2	<i>Lophostemon confertus</i> (Brush Box)	5.5 metres	2.6 metres	A mature, single trunked specimen approximately 14 metres in height with a canopy spread of 11 metres and a DBH of 460mm. In good health and of high landscape significance. At the time of inspection the tree exhibited low levels of dieback/dead wood.
4	<i>Lophostemon confertus</i> (Brush Box)	6.1 metres	2.6 metres	A mature, single trunked specimen approximately 15 metres in height with a canopy spread of 9 metres and a DBH of 510mm. In good health and of high landscape significance. Slight canopy bias to the north. Codominant leaders from 1.3 metres - junction appears sound. At the time of inspection the tree exhibited low levels of dieback/dead wood.
5	<i>Syncarpia glomulifera</i> (Turpentine)	8.3 metres	3.2 metres	A mature, single trunked specimen approximately 13 metres in height with a canopy spread of 14 metres and a DBH of 690mm. In good health and of high landscape significance. The tree displays fair branch attachment with multiple leaders from 4 metres following past loss or removal of the main leader at this point. There is some evidence of poor attachment and high levels of striations in the bark on the underside of the western leader indicative of subsidence - further investigation required.

6	<i>Lophostemon confertus</i> (Brush Box)	6.5 metres	2.6 metres	A mature, single trunked specimen approximately 12 metres in height with a canopy spread of 10 metres and a DBH of 540mm. In good health and of high landscape significance. The tree displays fair branch attachment with codominant leaders from 1.6 metres with some evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure.
7	<i>Araucaria bidwillii</i> (Bunya Bunya Pine)	8.5 metres	3.2 metres	A mature, single trunked specimen approximately 26 metres in height with a canopy spread of 9 metres and a DBH of 710mm. In good health and of significant landscape value. Cone remnants under canopy (cone scales and nuts) - cone shedding is a high risk that requires active management given the high levels of target activity in the vicinity of the tree.
8	<i>Araucaria bidwillii</i> (Bunya Bunya Pine)	11.9 metres	3.5 metres	A mature, single trunked specimen approximately 26 metres in height with a canopy spread of 10 metres and a DBH of 990mm. In good health and of significant landscape value. Evidence of past wounding (and associated reaction wood) in lower trunk at 1.4 metres. Fair branch attachment with evidence of recent failure of 2 branches of 40 and 50mm diameter. Electricity substation, Pit and stormwater pipe at 800mm depth and of ca. 300mm diameter in close proximity to tree - past damage to roots from these facilities is not known. Cone remnants under canopy (cone scales and nuts) - cone shedding is a high risk that requires active management given the high levels of target activity in the vicinity of the tree.
10	<i>Lophostemon confertus</i> (Brush Box)	7.3 metres	3 metres	A mature, single trunked specimen approximately 11 metres in height with a canopy spread of 11 metres and a DBH of 610mm. In good health and of high landscape significance. The tree displays fair branch attachment with multiple leaders from 4 metres following past loss or removal of the main leader at this point. There is some evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure.
13	<i>Lophostemon confertus</i> (Brush Box)	6.7 metres	2.8 metres	A mature, single trunked specimen approximately 11 metres in height with a canopy spread of 10 metres and a DBH of 560mm. In good health and of high landscape significance. The tree displays fair branch attachment with multiple leaders from 4 metres following past loss or removal of the main leader at this point. There is evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure.

TPZ = Tree Protection Zone under AS4970-2009, SRZ = Structural Root Zone under AS4970-2009. Both TPZ and SRZ are radial offsets measured from the centre of the tree's trunk.

While identified as being of high landscape significance tree number 26 (Turpentine) was not identified as a priority for retention due to its short SULE - At the time of inspection the tree was of moderate health and poor vigour as evidenced by reduced foliage density, moderate to high levels of dieback and epicormic growth.

A number of methods to determine the likely extent of root zones and appropriate setbacks for tree root protection zones for trees on development sites have been developed in the past. The key criteria used in determining setbacks is the tree's trunk diameter at breast height (DBH) in conjunction with other factors including the sensitivity of the species in question to environmental disturbance/change, the age of the tree and the tree's health and vigour at the time.

Harris et al (2004) provide formulae for calculating tree protection zones based on the above criteria and modified from the 1991 British Standard for protection of trees on construction sites (BS 5837:1991). The 2005 version of the British Standard (BS 5837:2005) recommends a radius of 12 times the tree's DBH. For multi trunked trees BS 5837:2005 recommends a setback of 10 times the basal trunk diameter.

The Australian Standard AS 4970-2009 Protection of Trees on Construction Sites also identifies a 'Tree Protection Zone' (TPZ) of 12 times the tree's DBH. AS 4970-2009 also provides a formula for calculating the "Structural Root Zone" of trees on development sites. This is the area required for stability. In regard to palms, other monocots, cycads and tree ferns the Standard identifies the Tree Protection Zone should not be less than 1 metre outside the crown projection. (Australian Standards Association 2009)

The tree protection zones (TPZ) identified above have been calculated using the Australian Standard AS 4970 Protection of Trees on Construction Sites and are the optimum setback from the trees where disturbance (e.g. soil level changes, compaction, excavation etc) should be minimised to reduce potential impacts on the long term health of the trees.

Preferably, no more than 10% of the TPZ should be disturbed with compensation made by extension of other areas of the TPZ to compensate for the area(s) disturbed. Where greater than 10% of the TPZ is potentially disturbed the tree's viability needs to be investigated and demonstrated by the project arborist.

The structural root zone is the area required for stability and where disturbance of any sort should be avoided.

4. TREES IDENTIFIED AS MODERATE OR MODERATE TO HIGH LANDSCAPE SIGNIFICANCE

The landscape significance of trees is based upon a number of factors (species, dimensions, health, maturity, Safe Use and Life Expectancy (SULE) and landscape significance).

Following assessment of the trees it is considered the following 13 trees are of moderate or moderate to high landscape significance and medium to long SULE:

Table 3: Trees identified as moderate or moderate to high landscape significance.

TREE NO.	SCIENTIFIC AND COMMON NAME	TPZ	SRZ	COMMENTS
9	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	A mature, single trunked palm approximately 9 metres in height with a canopy spread of 6 metres and a diameter at breast height (DBH) of 620mm. In good health and of moderate to high landscape significance.
11	<i>Phoenix canariensis</i> (Canary Island Date Palm)	3.5 metres	N/A	A mature, single trunked palm approximately 8 metres in height with a canopy spread of 5 metres and a DBH of 540mm. In good health and of moderate to high landscape significance.
12	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	A mature, single trunked palm approximately 8 metres in height with a canopy spread of 6 metres and a DBH of 570mm. In good health and of moderate to high landscape significance.
15	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	A mature, single trunked palm approximately 10 metres in height with a canopy spread of 6 metres and a DBH of 580mm. In good health and of moderate to high landscape significance.
18	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	A mature, single trunked palm approximately 8 metres in height with a canopy spread of 6 metres and a DBH of 620mm. In good health and of moderate to high landscape significance.
19	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	A mature, single trunked palm approximately 8 metres in height with a canopy spread of 6 metres and a DBH of 640mm. In good health and of moderate to high landscape significance.
20	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	A mature, single trunked palm approximately 10 metres in height with a canopy spread of 5 metres and a DBH of 540mm. In good health and of moderate to high landscape significance.

21	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	A mature, single trunked palm approximately 10 metres in height with a canopy spread of 6 metres and a DBH of 640mm. In good health and of moderate to high landscape significance. Slight yellowing of one side of lower fronds possibly indicative of the fungal disease referred to as Fusarium wilt of palms (<i>Fusarium oxysporum</i>) - if infected the tree's SULE will be significantly reduced and no treatment is available. Further investigation/testing recommended.
22	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	A mature, single trunked palm approximately 9 metres in height with a canopy spread of 6 metres and a DBH of 670mm. In good health and of moderate to high landscape significance. Slight yellowing of one side of lower fronds possibly indicative of the fungal disease referred to as Fusarium wilt of palms (<i>Fusarium oxysporum</i>) - if infected the tree's SULE will be significantly reduced and no treatment is available. Further investigation/testing recommended.
23	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	A mature, single trunked palm approximately 12 metres in height with a canopy spread of 6 metres and a DBH of 620mm. In good health and of moderate to high landscape significance. Slight yellowing of one side of lower fronds possibly indicative of the fungal disease referred to as Fusarium wilt of palms (<i>Fusarium oxysporum</i>) - if infected the tree's SULE will be significantly reduced and no treatment is available. Further investigation/testing recommended.
24	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	A mature, single trunked palm approximately 10 metres in height with a canopy spread of 6 metres and a DBH of 630mm. In good health and of moderate to high landscape significance. Slight yellowing of one side of lower fronds possibly indicative of the fungal disease referred to as Fusarium wilt of palms (<i>Fusarium oxysporum</i>) - if infected the tree's SULE will be significantly reduced and no treatment is available. Further investigation/testing recommended.
25	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	A mature, single trunked palm approximately 8 metres in height with a canopy spread of 6 metres and a DBH of 590mm. In good health and of moderate to high landscape significance. Slight yellowing of one side of lower fronds possibly indicative of the fungal disease referred to as Fusarium wilt of palms (<i>Fusarium oxysporum</i>) - if infected the tree's SULE will be significantly reduced and no treatment is available. Further investigation/testing recommended.
27	<i>Phoenix canariensis</i> (Canary Island Date Palm)	3.5 metres	N/A	A mature, single trunked palm approximately 7 metres in height with a canopy spread of 5 metres and a DBH of 540mm. In good health and of moderate to high landscape significance.

TPZ = Tree Protection Zone under AS4970-2009, SRZ = Structural Root Zone under AS4970-2009. Both TPZ and SRZ are radial offsets measured from the centre of the tree's trunk.

The tree protection zones (TPZ) identified above have been calculated using the Australian Standard AS 4970 Protection of Trees on Construction Sites and are the optimum setback from the trees where disturbance (e.g. soil level changes, compaction, excavation etc) should be minimised to reduce potential impacts on the long term health of the trees.

Preferably, no more than 10% of the TPZ should be disturbed with compensation made by extension of other areas of the TPZ to compensate for the area(s) disturbed. Where greater than 10% of the TPZ is potentially disturbed the tree's viability needs to be investigated and demonstrated by the project arborist.

The structural root zone is the area required for stability and where disturbance of any sort should be avoided.

5. TREES THAT SHOULD BE CONSIDERED FOR REMOVAL

Following assessment of the trees on the site it is considered that none of the trees assessed for this report should be considered for immediate removal and replacement due to declining health, structural issues and/or unsuitability to the site.

6. TREES NOT IDENTIFIED FOR REMOVAL OR RETENTION

The following 5 trees have not been identified as being of moderate to high landscape value, medium to long SULE and worthy of retention/protection, or as priority for removal due to low landscape value, structural condition or declining health:

- Tree numbers 3, 14, 16, 17 and 26.

These trees are currently in moderate to good health and do perform some landscape function of low to moderate significance. However these trees are not considered significant enough to warrant specific design consideration due to their low landscape significance or short predicted life expectancy.

7. POTENTIAL IMPACTS ON TREES

The potential impacts of the proposal have been assessed using the Survey Plan prepared by Danny Linker and Co Pty Ltd dated 15/05/2010 and identified as Drawing Number 100402, Sheet 2, Issue D and upon which the footprint of the proposed library building has been superimposed.

7.1 Trees requiring removal or proposed to be removed or transplanted to facilitate the proposed Library Building

It is proposed to remove or transplant the following 8 trees to facilitate construction of the proposed Library Building.

Table 4: Trees proposed for removal or transplanting to facilitate construction of the proposed Library Building.

TREE NUMBER(S)	SCIENTIFIC AND COMMON NAME	COMMENTS*
20	<i>Phoenix canariensis</i> (Canary Island Date Palm)	Located within the footprint of the proposed library building and will require removal.
21	<i>Phoenix canariensis</i> (Canary Island Date Palm)	Located within the footprint of the proposed library building and will require removal.
22	<i>Phoenix canariensis</i> (Canary Island Date Palm)	Located within the footprint of the proposed library building and will require removal.
23	<i>Phoenix canariensis</i> (Canary Island Date Palm)	Located within the footprint of the proposed library building and will require removal.
24	<i>Phoenix canariensis</i> (Canary Island Date Palm)	Located within the footprint of the proposed library building and will require removal.
25	<i>Phoenix canariensis</i> (Canary Island Date Palm)	Located within the footprint of the proposed library building and will require removal.
26	<i>Syncarpia glomulifera</i> (Turpentine)	Located within the footprint of the proposed library building and will require removal.
27	<i>Phoenix canariensis</i> (Canary Island Date Palm)	Located within the footprint of the proposed library building and will require removal.

The Canary Island dated Palms identified as tree numbers 20 to 25 and 27 could be transplanted and retained on site as part of the works.

7.2 Trees potentially impacted by the proposed Library Building

To facilitate construction of the proposed Library Building 19 trees are proposed for retention on or adjacent to the site and may be potentially impacted. The potential impacts are summarised in table 6.

The root zone calculations referred to in this report were made using scale drawings of the trees' identified tree protection zones (TPZ) in a CAD program (TurboCAD®) with potentially affected areas added to the drawing. The area of potential impact was converted to a percentage of TPZ using a spreadsheet (Microsoft Excel®).

In calculating the potential impacts to the trees it has been assumed the excavation for the basement levels of the library building will extend for 1 metre beyond the proposed footprint of the building.

The extent of impacts to the trees in table 5 has been rated using the following guideline:

0% of root zone impacted – no impact of significance

0 to 10% of TPZ impacted – low level of impact

10 to 15% of TPZ impacted – low to moderate level of impact

15 to 20% of TPZ impacted – moderate level of impact

20 to 25% of TPZ impacted – moderate to high level of impact

25 to 35% of TPZ impacted – high level of impact

>35% of TPZ impacted – significant level of impact

Table 5: Trees potentially affected by the proposed Library Building.

TREE NO	SCIENTIFIC AND COMMON NAME	TPZ	SRZ	COMMENTS
1	<i>Lophostemon confertus</i> (Brush Box)	5.5 metres	2.4 metres	The proposed excavation is located 2.56 metres from the tree at the closest point and is calculated to potentially impact on 18.39m ² or 19.22% of the tree's identified tree protection zone (TPZ) – this is a moderate level of impact and within an acceptable threshold for the tree.
2	<i>Lophostemon confertus</i> (Brush Box)	5.5 metres	2.6 metres	The proposed excavation is located 2.49 metres from the tree at the closest point and is calculated to potentially impact on 20.11m ² or 21.02% of the tree's identified TPZ – this is a moderate to high level of impact with potential to affect the tree's long term health and reduce its SULE. Whilst this species is resilient to disturbance the extent of impact combined with excavation in the structural root zone and canopy pruning is considered high.

3	<i>Lophostemon confertus</i> (Brush Box)	5.4 metres	2.5 metres	The proposed excavation is located 6.92 metres from the tree at the closest point and is outside the tree's identified TPZ – no impact of substance.
4	<i>Lophostemon confertus</i> (Brush Box)	6.1 metres	2.6 metres	The proposed excavation is located 2.46 metres from the tree at the closest point and is calculated to potentially impact on 29.04m ² or 24.69% of the tree's identified TPZ – this is a moderate to high level of impact with potential to affect the tree's long term health and reduce its SULE. Whilst this species is resilient to disturbance the extent of impact combined with excavation in the structural root zone and canopy pruning is considered high.
5	<i>Syncarpia glomulifera</i> (Turpentine)	8.3 metres	3.2 metres	The proposed excavation is located 2.9 metres from the tree at the closest point and is calculated to potentially impact on 61.32m ² or 28.48% of the tree's identified TPZ – this is a high level of impact and likely to affect the tree's long term health and reduce its SULE. In addition, excavation in the structural root zone will be required.
6	<i>Lophostemon confertus</i> (Brush Box)	6.5 metres	2.6 metres	The proposed excavation is located 3.22 metres from the tree at the closest point and is calculated to potentially impact on 26.78m ² or 20.31% of the tree's identified TPZ – this is a moderate to high level of impact with potential to affect the tree's long term health and reduce its SULE. Whilst this species is resilient to disturbance the extent of impact combined with canopy pruning is considered high.
7	<i>Araucaria bidwillii</i> (Bunya Bunya Pine)	8.5 metres	3.2 metres	The proposed excavation is located 7.5 metres from the tree at the closest point and is calculated to potentially impact on 1.12m ² or 0.49% of the tree's identified TPZ – this is a low level of impact and within an acceptable threshold.
8	<i>Araucaria bidwillii</i> (Bunya Bunya Pine)	11.9 metres	3.5 metres	The proposed excavation is located 3.75 and 4.09 metres from the tree at the closest points and is calculated to potentially impact on 125.16m ² or 28.24% of the tree's identified TPZ – this is a high level of impact and likely to affect the tree's long term health and reduce its SULE. In addition, the excavation is adjacent to the structural root zone and impacts on woody roots (and the tree's stability) are possible.
9	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	The proposed excavation is located 5.06 metres from the tree at the closest point and is outside the tree's identified TPZ – no impact of substance.
10	<i>Lophostemon confertus</i> (Brush Box)	7.3 metres	3 metres	The proposed excavation is located 4.95 metres from the tree at the closest point and is calculated to potentially impact on 17.38m ² or 10.33% of the tree's identified TPZ – this is a low to moderate level of impact and within an acceptable threshold.

11	<i>Phoenix canariensis</i> (Canary Island Date Palm)	3.5 metres	N/A	The proposed excavation is located 4.92 metres from the tree at the closest point and is outside the tree's identified TPZ – no impact of substance.
12	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	The proposed excavation is located 4.56 metres from the tree at the closest point and is outside the tree's identified TPZ – no impact of substance.
13	<i>Lophostemon confertus</i> (Brush Box)	6.7 metres	2.8	The proposed excavation is located 4.42 metres from the tree at the closest point and is calculated to potentially impact on 15.75m ² or 11.11% of the tree's identified TPZ – this is a low to moderate level of impact and within an acceptable threshold.
14	<i>Lophostemon confertus</i> (Brush Box)	2* metres	1.8	The proposed excavation is located 1.34 metres from the tree at the closest point and is calculated to potentially impact on 1.36m ² or 10.83% of the tree's identified TPZ – this is a low to moderate level of impact and within an acceptable threshold. However, given the proximity of proposed works and the building the short and long term retention of this tree is considered unsustainable.
15	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	The proposed excavation is located 4.44 metres from the tree at the closest point and is outside the tree's identified TPZ – no impact of substance.
16	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	2 metres	1.6 metres	The proposed excavation is located 4.62 metres from the tree at the closest point and is outside the tree's identified TPZ – no impact of substance.
17	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	3 metres	1.8 metres	The proposed excavation is located 2.56 metres from the tree at the closest point and is calculated to potentially impact on 0.95m ² or 3.36% of the tree's identified TPZ – this is a low level of impact and within an acceptable threshold.
18	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	The proposed excavation is located 4.45 metres from the tree at the closest point and is outside the tree's identified TPZ – no impact of substance.

19	<i>Phoenix canariensis</i> (Canary Island Date Palm)	4 metres	N/A	The proposed excavation is located 4.05 metres from the tree at the closest point and is at the outer edge of the tree's identified TPZ – no impact of substance.
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The impacts to the trees proposed to be retained in the vicinity of the proposed works can be summarised as follows:

The proposed works are outside the identified tree protection zone of tree numbers 3, 9, 11, 12, 15, 16, 18 and 19 and no impact of substance is predicted for these trees.

The proposed works will impact on less than 10% the identified tree protection zone of tree numbers 7 and 17 - this is a low level of impact and within an acceptable threshold for these trees.

The proposed works will impact on 10 to 15% of the identified tree protection zones of tree numbers 10, 13 and 14 - this is a low to moderate level of impact and within an acceptable threshold for these trees.

The proposed works will impact on 15 to 20% of the identified tree protection zones of tree number 1- this is a moderate level of impact and within an acceptable threshold for this tree.

The proposed works will impact on 20 to 25% of the identified tree protection zones of tree number 2, 4 and 6 - this is a moderate to high level of impact with potential to affect the trees' long term health and reduce their SULE.

The proposed works will impact on 25-35% of the identified TPZ of tree numbers 5 and 8 - this is a high level of encroachment that is likely to affect the tree's long term health and reduce their SULE. In addition, as works are within or adjacent to the trees' identified structural root zones, the potential for damage to structural roots (and impacts on the trees' stability) is considered probable due to the depth of excavation.

7.3 Trees potentially impacted – Carpark near western boundary

The potential impacts of the proposed carpark on trees adjacent to the western boundary of the campus were considered in the Arboricultural Impact Report prepared by Landscape Matrix dated 27 February 2012.

These trees were identified as tree numbers 8 to 19 in that report (and are not the trees referred to by those numbers in this report).

That report summarised the impact as follows:

The proposed works will impact on less than 10% the identified tree protection zone of tree numbers 13, 14, 16 and 18 - this is a low level of impact and within an acceptable threshold for these trees.

The proposed works will impact on 10 to 15% of the identified tree protection zones of tree numbers 8, 10, 15 and 17 - this is a low to moderate level of impact and within an acceptable threshold for these trees.

The proposed works will impact on 15 to 20% of the identified tree protection zones of tree numbers 9 and 12 - this is a moderate level of impact and within an acceptable threshold for these trees.

The proposed works will impact on 20 to 25% of the identified tree protection zones of tree number 11 - this is a moderate to high level of impact with potential to affect the tree's long term health and reduce their SULE.

Extracts from the report dated 27 February 2012 including a summary of those trees and the impact analysis is attached as Appendix D.

8. TREE PROTECTION MEASURES

The following generic tree protection measures are recommended to assist in minimising potential impacts that may arise during the demolition and construction phases if the precinct is to undergo redevelopment (including the implementation of landscape works on the site).

A. Measures to be implemented prior to the commencement of any works on the site.

1. Tree to be retained are to be clearly identified by signage as protected trees.
2. The tree protection zones of trees to be retained are to be protected by fencing during the entire construction period except for specific areas directly required to achieve construction works.
3. The tree protection fence shall be constructed of galvanised pipe at 2.4 metre spacing and connected by securely attached chain mesh fencing to a minimum height of 1.8 metres and shall be installed prior to work commencing.

4. The tree protection fencing shall be installed as closely as possible to the alignment of the identified tree protection zone and shall be approved and certified by the site arborist prior to commencement of any construction or demolition works on the site.

B. Measures to be implemented and maintained during the life of construction works on the site.

5. Any excavation within the identified root protection zones of trees to be retained shall be carried out by hand to minimize disturbance to tree roots. Roots greater than 25mm are not to be damaged or severed without prior assessment by an arborist to determine likely level of impact and the restorative actions required to minimise the impacts of root damage.

6. Tree roots between 10mm and 25mm diameter, severed during excavation, shall be cut cleanly by hand by an experienced Arborist/Horticulturist with a minimum qualification of the Horticulture Certificate or Tree Surgery Certificate.

7. The following activities/actions are prohibited from the tree protection zones:

- Soil cut or fill including excavation and trenching
- Soil cultivation, disturbance or compaction
- Stockpiling storage or mixing of materials
- The parking, storing, washing and repairing of tools, equipment and machinery
- The disposal of liquids and refueling
- The disposal of building materials
- The sitting of offices or sheds
- Any action leading to the impact on tree health or structure

8. Canopy pruning of trees identified for protection which is necessary to accommodate approved building works shall be undertaken by an experienced Horticulturist/ Arborist, with a minimum qualification of the Horticulture Certificate or Tree Surgery Certificate and in accordance with Australian Standard 4373-2007 'Pruning of Amenity Trees'.

9. USE OF TREES BY WILDLIFE

During the site inspections on 15 and 20 February 2012 and 7 June the trees on the site were checked for signs of use by wildlife.

A number of the trees exhibited signs of usage by wildlife such as scratch marks on their trunks or scats under their canopies that were most likely made by a Common Brushtail Possum (*Trichosurus vulpecula*) or Common Ringtail Possum (*Pseudocheirus peregrinus*).

It is probable that many of the trees would be used by native fauna at various times for food, shelter and roosting purposes and the retention and/or replacement of trees on the site will retain this opportunity.

The following bird species was noted on the site (or heard calling in the vicinity of the site) during the inspection on 15 and 20 February 2012 and 7 June 2012: Noisy Miner (*Manorina melanocephala*), Australian Magpie (*Gymnorhina tibicen*), Australian Raven (*Corvus coronoides*), White Ibis (*Threskiornis molucca*) and Rainbow Lorikeet (*Trichoglossus haematodus*).

10. CONCLUSION

Of the 27 trees on or adjoining the site that have been assessed 9 of the trees has been identified as having high or significant landscape value. An additional 13 trees have been identified as being of moderate or moderate to high landscape value.

None of the trees assessed for the report have been identified as recommended for immediate removal, regardless of the proposal, due o their health and condition. The remaining 5 trees are identified in section 6 of the report as not requiring specific design consideration.

To facilitate construction of the proposed Library Building the following 8 trees are proposed for removal or transplanting within the site:

- Tree # 20 *Phoenix canariensis* (Canary Island Date Palm)
- Tree # 21 *Phoenix canariensis* (Canary Island Date Palm)
- Tree # 22 *Phoenix canariensis* (Canary Island Date Palm)
- Tree # 23 *Phoenix canariensis* (Canary Island Date Palm)
- Tree # 24 *Phoenix canariensis* (Canary Island Date Palm)
- Tree # 25 *Phoenix canariensis* (Canary Island Date Palm)
- Tree # 26 *Syncarpia glomulifera* (Turpentine)
- Tree # 27 *Phoenix canariensis* (Canary Island Date Palm)

The Canary Island dated Palms identified as tree numbers 20 to 25 and 27 could be transplanted and retained on site as part of the works.

To facilitate construction of the proposed Library Building the following 19 trees are proposed to be retained and may be potentially affected:

- Tree # 1 *Lophostemon confertus* (Brush Box)
- Tree # 2 *Lophostemon confertus* (Brush Box)
- Tree # 3 *Lophostemon confertus* (Brush Box)
- Tree # 4 *Lophostemon confertus* (Brush Box)
- Tree # 5 *Syncarpia glomulifera* (Turpentine)
- Tree # 6 *Lophostemon confertus* (Brush Box)
- Tree # 7 *Araucaria bidwillii* (Bunya Bunya Pine)
- Tree # 8 *Araucaria bidwillii* (Bunya Bunya Pine)
- Tree # 9 *Phoenix canariensis* (Canary Island Date Palm)
- Tree # 10 *Lophostemon confertus* (Brush Box)
- Tree # 11 *Phoenix canariensis* (Canary Island Date Palm)
- Tree # 12 *Phoenix canariensis* (Canary Island Date Palm)
- Tree # 13 *Lophostemon confertus* (Brush Box)
- Tree # 14 *Lophostemon confertus* (Brush Box)

Tree # 15 *Phoenix canariensis* (Canary Island Date Palm)
Tree # 16 *Callistemon viminalis* (Weeping Bottlebrush)
Tree # 17 *Callistemon viminalis* (Weeping Bottlebrush)
Tree # 18 *Phoenix canariensis* (Canary Island Date Palm)
Tree # 19 *Phoenix canariensis* (Canary Island Date Palm)

The levels of potential impact are discussed in Section 7 (Table 6) of this report.

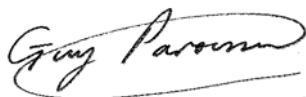
The impacts to the trees proposed to be retained in the vicinity of the proposed works can be summarised as follows:

- The proposed works are outside the identified tree protection zone of tree numbers 3, 9, 11, 12, 15, 16, 18 and 19 and no impact of substance is predicted for these trees.
- The proposed works will impact on less than 10% the identified tree protection zone of tree numbers 7 and 17 - this is a low level of impact and within an acceptable threshold for these trees.
- The proposed works will impact on 10 to 15% of the identified tree protection zones of tree numbers 10, 13 and 14 - this is a low to moderate level of impact and within an acceptable threshold for these trees.
- The proposed works will impact on 15 to 20% of the identified tree protection zones of tree number 1- this is a moderate level of impact and within an acceptable threshold for this tree.
- The proposed works will impact on 20 to 25% of the identified tree protection zones of tree number 2, 4 and 6 - this is a moderate to high level of impact with potential to affect the trees' long term health and reduce their SULE.
- The proposed works will impact on 25-35% of the identified TPZ of tree numbers 5 and 8 - this is a high level of encroachment that is likely to affect the tree's long term health and reduce their SULE. In addition, as works are within or adjacent to the trees' identified structural root zones, the potential for damage to structural roots (and impacts on the trees' stability) is considered probable due to the depth of excavation.

In addition to the above the potential impacts of the proposed carpark on trees adjacent to the western boundary of the campus were considered in detail in the Arboricultural Impact Report prepared by Landscape Matrix dated 27 February 2012 and are summarised at section 7.3 of this report.

Extracts from the report dated 27 February 2012 including a summary of those trees and the impact analysis is attached as Appendix D.

Generic tree protection measures are recommended in section 8 of this report to minimise potential impacts to the trees to be retained.



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9 June 2012

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APPENDIX A



Photograph 1: Tree # 5 - Illustrating the high levels of striations in the bark on the underside of the western leader indicative of subsidence.



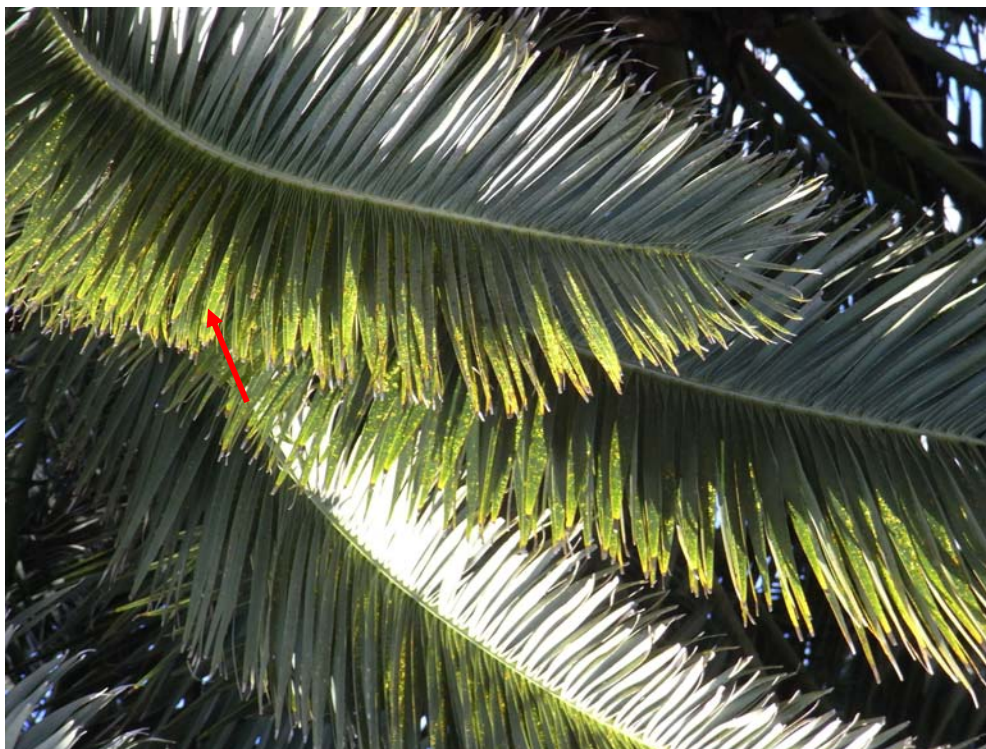
Photograph 2: Illustrating the row of trees referred to a tree numbers 9 to 19.



Photograph 3: Tree # 8 - Illustrating the electricity substation, Pit and stormwater pipe at 800mm depth and of ca. 300mm diameter in close proximity to tree (trunk arrowed) – the direction of the pipeline is depicted by tape measure - past damage to roots from installation of these facilities is not known to Landscape Matrix.



Photograph 4: Illustrating the row of trees referred to a tree numbers 20 to 26.



Photograph 5: Illustrating the slight yellowing of one side of lower fronds of tree numbers 21 to 25 and possibly indicative of the fungal disease referred to as Fusarium wilt of palms (*Fusarium oxysporum*).



Photograph 6: Tree # 26 - Illustrating the reduced foliage density, moderate to high levels of dieback and epicormic growth in upper canopy.

APPENDIX B - TREE DATA SUMMARY - AUSTRALIAN CATHOLIC UNIVERSITY MASTERPLAN - LIBRARY BUILDING

Tree No.	Genus, Species (Common Name)	Height (m)	Canopy (m)	DBH (mm)	DBH for TPZ	DGL for SRZ	Foliage Condition	Age Class	Trunk	Trunk Lean	Crown balance	Past Pruning	Stability	Branch Attachment	Health	Vigour	Dead Wood	Pest or disease	SULE	Landscape Significance	Retention Value*	Comments
1	<i>Lophostemon confertus</i> (Brush Box)	14	12	420 at 1 metre	460	460	Good foliage condition	Mature	Single trunk	Upright trunk	Majority of canopy to the North	Lower limbs pruned to 3 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	5%	No evidence of significant pest nor disease	1 Long (> 40 years)	High landscape significance	1	Slight canopy bias to the north. Codominant leaders from 1.4 metres with minor fibre buckling under SE leader below junction - not considered at risk of failure - monitoring recommended.
2	<i>Lophostemon confertus</i> (Brush Box)	14	11	420 x 500	460	570	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 3 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	5%	No evidence of significant pest nor disease	1 Long (> 40 years)	High landscape significance	1	At the time of inspection the tree exhibited low levels of dieback/dead wood.
3	<i>Lophostemon confertus</i> (Brush Box)	14	8	450	450	525	Good foliage condition	Mature	Single trunk	Slight trunk lean to NE	Majority or canopy to the NE	Lower limbs pruned to 5 metres in past	Appears stable	Sound branch attachment	Good health	Fair vigour	10%	Tissue dysfunction possibly indicative of fungal canker in lower trunk on NE	3 Short (5 to 15 years)	Moderate to high landscape significance	3	The tree's past canopy development has been suppressed. At the time of inspection the tree was of fair vigour and exhibited moderate levels of dieback. Evidence of past tissue damage/dysfunction and exposed heartwood in lower trunk on NE - monitoring recommended.
4	<i>Lophostemon confertus</i> (Brush Box)	13	9	510	510	570	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 4 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	5%	No evidence of significant pest nor disease	1 Long (> 40 years)	High landscape significance	1	Slight canopy bias to the north. Codominant leaders from 1.3 metres - junction appears sound. At the time of inspection the tree exhibited low levels of dieback/dead wood.
5	<i>Syncarpia glomulifera</i> (Turpentine)	13	14	660 x 720	690	905	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 4 metres in past, appears central leader removed at 4 metres in past	Appears stable	Fair branch attachment	Good health	Fair vigour	5%	Reaction wood in basal trunk possibly indicative if internal decay - monitor	2 Medium (15 to 40 years)	High landscape significance	1	The tree displays fair branch attachment with multiple leaders from 4 metres following past loss or removal of the main leader at this point. There is some evidence of poor attachment and high levels of striations in the bark on the underside of the western leader indicative of subsidence - further investigation required.
6	<i>Lophostemon confertus</i> (Brush Box)	12	10	510 x 570	540	560	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 4 metres in past	Appears stable	Fair branch attachment	Good health	Good vigour	5%	No evidence of significant pest nor disease	2 Medium (15 to 40 years)	High landscape significance	1	The tree displays fair branch attachment with codominant leaders from 1.6 metres with some evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure.
7	<i>Araucaria bidwillii</i> (Bunya Bunya Pine)	26	9	680 x 740	710	900	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 2 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Significant landscape value	1	Cone remnants under canopy (cone scales and nuts) - cone shedding is a high risk that requires active management given the high levels of target activity in the vicinity of the tree.
8	<i>Araucaria bidwillii</i> (Bunya Bunya Pine)	26	10	960 x 1020	990	1145	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 2 metres in past	Appears stable	Fair branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Significant landscape value	1	Evidence of past wounding (and associated reaction wood) in lower trunk at 1.4 metres. Fair branch attachment with evidence of recent failure of 2 branches of 40 and 50mm diameter. Electricity substation. Pit and stormwater pipe at 800mm depth and of ca. 300mm diameter in close proximity to tree - past damage to roots from these facilities is not known. Cone remnants under canopy (cone scales and nuts) - cone shedding is a high risk that requires active management given the high levels of target activity in the vicinity of the tree.
9	<i>Phoenix canariensis</i> (Canary Island Date Palm)	9	6	620	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	
10	<i>Lophostemon confertus</i> (Brush Box)	11	11	580 x 640	610	780	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 3.5 metres in past, appears central leader removed at 4 metres in past	Appears stable	Fair branch attachment	Good health	Good vigour	5%	No evidence of significant pest nor disease	2 Medium (15 to 40 years)	High landscape significance	1	The tree displays fair branch attachment with multiple leaders from 4 metres following past loss or removal of the main leader at this point. There is some evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure.
11	<i>Phoenix canariensis</i> (Canary Island Date Palm)	8	5	540	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	

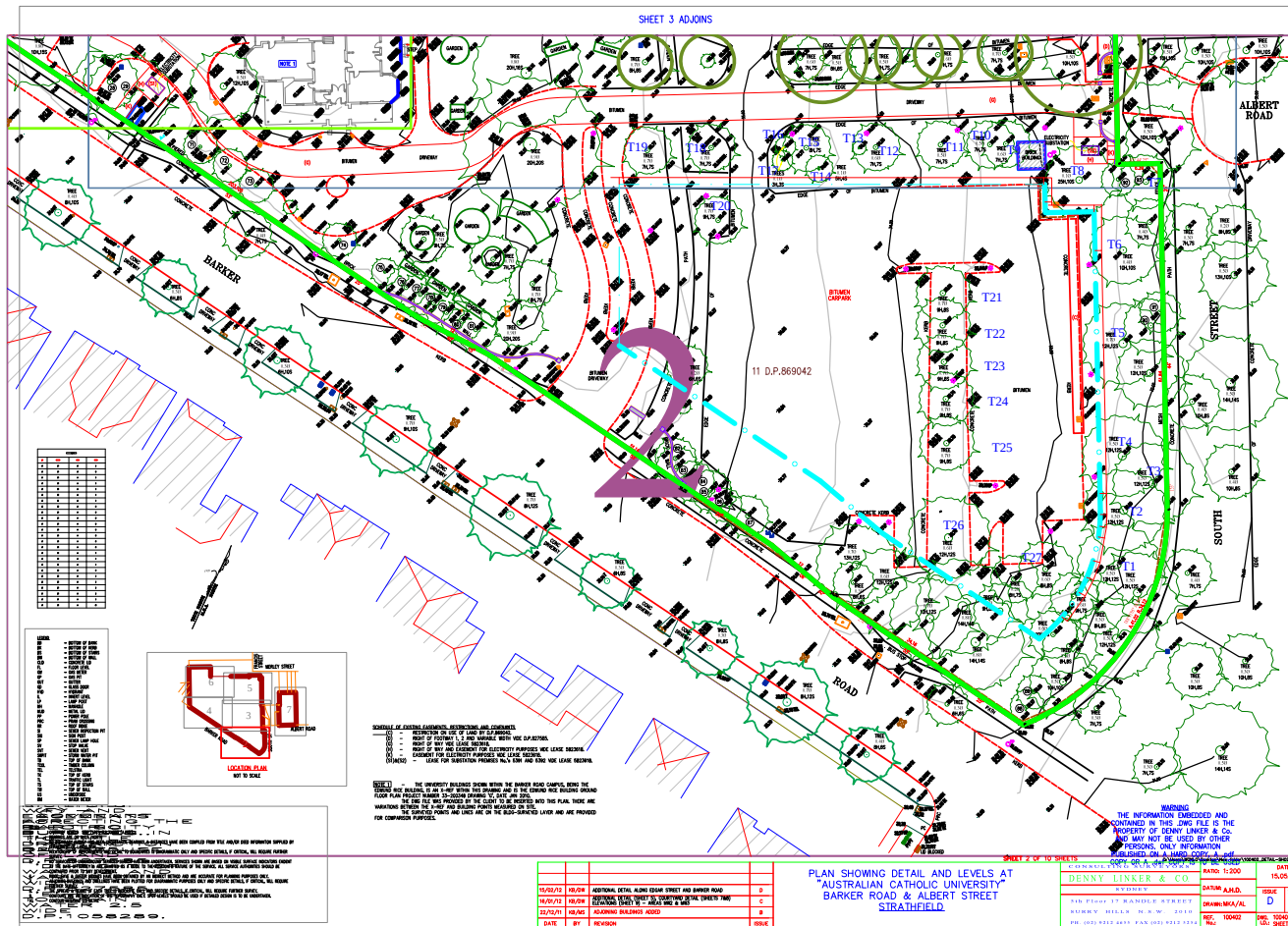
Tree No.	Genus, Species (Common Name)	Height (m)	Canopy (m)	DBH (mm)	DBH for TPZ	DGL for SRZ	Foliage Condition	Age Class	Trunk	Trunk Lean	Crown balance	Past Pruning	Stability	Branch Attachment	Health	Vigour	Dead Wood	Pest or disease	SULE	Landscape Significance	Retention Value*	Comments
12	<i>Phoenix canariensis</i> (Canary Island Date Palm)	8	6	570	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	
13	<i>Lophostemon confertus</i> (Brush Box)	11	10	560	560	660	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 4 metres in past, appears central leader removed at 4 metres in past	Appears stable	Fair branch attachment	Good health	Good vigour	5%	No evidence of significant pest nor disease	2 Medium (15 to 40 years)	High landscape significance	1	The tree displays fair branch attachment with multiple leaders from 4 metres following past loss or removal of the main leader at this point. There is evidence of poor attachment at the junction - the junction is a weak point in the tree's structure with increased risk of failure.
14	<i>Lophostemon confertus</i> (Brush Box)	7	4	160	160	220	Good foliage condition	Semi Mature	Single trunk	Upright trunk	Balanced canopy area	Lower limbs pruned to 1.4 metres in past	Appears stable	Sound branch attachment	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Low to moderate landscape significance	3	Semi mature specimen.
15	<i>Phoenix canariensis</i> (Canary Island Date Palm)	10	6	580	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	
16	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	4	3 x 4	up to 110	170	170	Good foliage condition	Mature	Multi trunked	Upright trunk	Majority of canopy to the North	Lower limbs pruned to 1.4 metres in past	Appears stable	Sound branch attachment	Good health	Fair vigour	5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Low landscape significance	3	The tree's past canopy development has been suppressed.
17	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	5	5	up to 120	250	250	Good foliage condition	Mature	Multi trunked	Upright trunk	Balanced canopy area	Lower limbs pruned to 1.7 metres in past	Appears stable	Fair branch attachment	Good health	Fair vigour	5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Low to moderate landscape significance	3	Slight canopy bias to west.
18	<i>Phoenix canariensis</i> (Canary Island Date Palm)	8	6	620	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	
19	<i>Phoenix canariensis</i> (Canary Island Date Palm)	8	6	670	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	
20	<i>Phoenix canariensis</i> (Canary Island Date Palm)	10	6	640	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	
21	<i>Phoenix canariensis</i> (Canary Island Date Palm)	10	6	640	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	Slight yellowing of one side of lower fronds possibly indicative of the fungal disease referred to as Fusarium wilt of palms (<i>Fusarium oxysporum</i>) - if infected the tree's SULE will be significantly reduced and no treatment is available. Further investigation/testing recommended.
22	<i>Phoenix canariensis</i> (Canary Island Date Palm)	9	6	670	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	Slight yellowing of one side of lower fronds possibly indicative of the fungal disease referred to as Fusarium wilt of palms (<i>Fusarium oxysporum</i>) - if infected the tree's SULE will be significantly reduced and no treatment is available. Further investigation/testing recommended.
23	<i>Phoenix canariensis</i> (Canary Island Date Palm)	12	6	620	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	Slight yellowing of one side of lower fronds possibly indicative of the fungal disease referred to as Fusarium wilt of palms (<i>Fusarium oxysporum</i>) - if infected the tree's SULE will be significantly reduced and no treatment is available. Further investigation/testing recommended.
24	<i>Phoenix canariensis</i> (Canary Island Date Palm)	10	6	630	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	Slight yellowing of one side of lower fronds possibly indicative of the fungal disease referred to as Fusarium wilt of palms (<i>Fusarium oxysporum</i>) - if infected the tree's SULE will be significantly reduced and no treatment is available. Further investigation/testing recommended.

Tree No.	Genus, Species (Common Name)	Height (m)	Canopy (m)	DBH (mm)	DBH for TPZ	DGL for SRZ	Foliage Condition	Age Class	Trunk	Trunk Lean	Crown balance	Past Pruning	Stability	Branch Attachment	Health	Vigour	Dead Wood	Pest or disease	SULE	Landscape Significance	Retention Value*	Comments
25	<i>Phoenix canariensis</i> (Canary Island Date Palm)	8	6	590	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	Slight yellowing of one side of lower fronds possibly indicative of the fungal disease referred to as <i>Fusarium</i> wilt of palms (<i>Fusarium oxysporum</i>) - if infected the tree's SULE will be significantly reduced and no treatment is available. Further investigation/testing recommended.
26	<i>Syncarpia glomulifera</i> (Turpentine)	16	16	490, 540	775	870	Fair foliage condition	Mature	Twin trunked	Upright trunk	Balanced canopy area	Lower limbs pruned to 5 metres in past	Appears stable	Fair branch attachment	Moderate health	Poor vigour	10%	No evidence of significant pest nor disease	3 Short (5 to 15 years)	High landscape significance	3	The tree displays fair branch attachment with codominant leaders from 1.2 metres with some evidence of poor attachment at the junction - while not considered at immediate risk of failure the junction is a weak point in the tree's structure with increased risk of failure. At the time of inspection the tree was of moderate health and poor vigour as evidenced by reduced foliage density, moderate to high levels of dieback and epicormic growth. Short SULE.
27	<i>Phoenix canariensis</i> (Canary Island Date Palm)	7	5	540	N/A	N/A	Good foliage condition	Mature	Single trunk	Upright trunk	Balanced canopy area	No evidence of significant past pruning	Appears stable	N/A	Good health	Good vigour	<5%	No evidence of significant pest nor disease	1 Long (> 40 years)	Moderate to high landscape significance	2	

ca = approximate diameter at breast height (DBH) estimated from nearest property boundary or fence where trees were located on adjoining properties

* Retention Values: 1 - High (Priority for retention); 2 - Moderate (Consider for retention); 3 - Low or short SULE (Not warranting specific design consideration) and 4 - Remove (very short SULE, structurally unsound, weed species etc.)

APPENDIX C - SITE PLAN WITH TREE NUMBERS



APPENDIX D: TREES NEAR THE WESTERN BOUNDARY AND POTENTIALLY IMPACTED BY THE PROPOSED CARPARK

The potential impacts of the proposed underground carpark on trees adjacent to the western boundary of the campus were considered in the Arboricultural Impact Report prepared by Landscape Matrix dated 27 February 2012.

These trees were identified as tree numbers 8 to 18 in that report and are assessed in some detail in that report (and are not the trees referred to by the equivalent numbers in this report).

These trees can be summarised as follows:

Tree No.	Genus, Species (Common Name)	Height (m)	Canopy (m)	DBH (mm)	Retention Value*
8	<i>Cinnamomum camphora</i> (Camphor Laurel)	12	9 x 14	Ca 400, 400, 400	4
9	<i>Cinnamomum camphora</i> (Camphor Laurel)	16	13	900	4
10	<i>Lophostemon confertus</i> (Brush Box)	12	9 x 12	700	2
11	<i>Eucalyptus paniculata</i> (Grey Ironbark)	19	16	800 x 1100	3
12	<i>Cinnamomum camphora</i> (Camphor Laurel)	9	11	Up to 320	4
13	<i>Eucalyptus nicholii</i> (Narrow Leaved Black Peppermint)	10	9	500	2
14	<i>Lophostemon confertus</i> (Brush Box)	10	11	460	2
15	<i>Cinnamomum camphora</i> (Camphor Laurel)	10	9	260, 370, 370	4
16	<i>Eucalyptus microcorys</i> (Tallowwood)	12	8 x 10	390	2
17	<i>Cinnamomum camphora</i> (Camphor Laurel)	10	10	Up to 340	4
18	<i>Brachychiton acerifolius</i> (Illawarra Flame Tree)	7	5	250, 330	2

* Retention Values: 1 - High (Priority for retention); 2 - Moderate (Consider for retention); 3 - Low or short Sule (Not warranting specific design consideration) and 4 - Remove (very short SULE, structurally unsound, weed species etc)

The following pages include an extract of the impact assessment and a site plan showing the tree numbers, both from the 27 February 2012 report.

That report dated 27 February 2012 summarised the impacts as follows (extract from Table 6 of that report):

Table 6: Trees potentially affected by the proposed access roads and carparking. (Extract from Report dated 27 February 2012)

TREE NO	SCIENTIFIC AND COMMON NAME	TPZ	SRZ	COMMENTS
8	<i>Cinnamomum camphora</i> (Camphor Laurel)	10.8 metres	3.2 metres	The proposed access road from Barker Road is located 6.96 metres from the tree at the closest point and the underground carpark 8.4 metres from the tree. These structures combined are calculated to potentially impact on 48.02m ² or 13.11% of the tree's identified TPZ - this is a low to moderate level of encroachment and within an acceptable threshold for the tree.
9	<i>Cinnamomum camphora</i> (Camphor Laurel)	10.8 metres	3.3 metres	The proposed access road from Barker Road is located 8.37 metres from the tree at the closest point and the underground carpark 5.99 metres from the tree. Allowing for a 500mm over-excavation for the carpark area these structures combined are calculated to potentially impact on 64.3m ² or 17.56% of the tree's identified TPZ - this is a moderate level of encroachment and within an acceptable threshold for the tree.
10	<i>Lophostemon confertus</i> (Brush Box)	8.4 metres	2.9 metres	The proposed underground carpark is located 5.74 metres from the tree at the closest point and, allowing for a 500mm over-excavation, is calculated to potentially impact on 28.72m ² or 12.96% of the tree's identified TPZ - this is a low to moderate level of encroachment and within an acceptable threshold for the tree.
11	<i>Eucalyptus paniculata</i> (Grey Ironbark)	11.4 metres	3.3 metres	The proposed underground carpark is located 5.23 metres from the tree at the closest point and, allowing for a 500mm over-excavation, is calculated to potentially impact on 99.13m ² or 24.29% of the tree's identified TPZ - this is a moderate to high level of encroachment with potential to impact on the tree's long term health and reduce its SULE.
12	<i>Cinnamomum camphora</i> (Camphor Laurel)	9.5 metres	3 metres	The proposed underground carpark is located 5.98 metres from the tree at the closest point and, allowing for a 500mm over-excavation, is calculated to potentially impact on 43.63m ² or 15.46% of the tree's identified TPZ - this is a moderate level of encroachment and within an acceptable threshold for the tree.
13	<i>Eucalyptus nicholii</i> (Narrow Leaved Black Peppermint)	6 metres	2.6 metres	The proposed underground carpark is located 5.88 metres from the tree at the closest point and, allowing for a 500mm over-excavation, is calculated to potentially impact on 2.22m ² or 1.96% of the tree's identified TPZ - this is a low level of encroachment and within an acceptable threshold for the tree.

14	<i>Lophostemon confertus</i> (Brush Box)	5.5 metres	2.5 metres	The proposed underground carpark is located 5.68 metres from the tree at the closest point and, allowing for a 500mm over-excavation, is calculated to potentially impact on 0.81m ² or 0.85% of the tree's identified TPZ - this is a low level of encroachment and within an acceptable threshold for the tree.
15	<i>Cinnamomum camphora</i> (Camphor Laurel)	9 metres	2.8 metres	The proposed underground carpark is located 6.2 metres from the tree at the closest point and, allowing for a 500mm over-excavation, is calculated to potentially impact on 31.66m ² or 12.45% of the tree's identified TPZ - this is a low to moderate level of encroachment and within an acceptable threshold for the tree.
16	<i>Eucalyptus microcorys</i> (Tallowwood)	4.7 metres	2.3 metres	The proposed underground carpark is located 4.66 metres from the tree at the closest point and, allowing for a 500mm over-excavation, is calculated to potentially impact on 1.51m ² or 2.2% of the tree's identified TPZ - this is a low level of encroachment and within an acceptable threshold for the tree.
17	<i>Cinnamomum camphora</i> (Camphor Laurel)	9.6 metres	3 metres	The proposed underground carpark is located 6.37 metres from the tree at the closest point and, allowing for a 500mm over-excavation, is calculated to potentially impact on 39.44m ² or 13.63% of the tree's identified TPZ - this is a low to moderate level of encroachment and within an acceptable threshold for the tree.
18	<i>Brachychiton acerifolius</i> (Illawarra Flame Tree)	5.3 metres	2.2 metres	The proposed underground carpark is located 4.58 metres from the tree at the closest point and, allowing for a 500mm over-excavation, is calculated to potentially impact on 5.45m ² or 6.23% of the tree's identified TPZ - this is a low level of encroachment and within an acceptable threshold for the tree.

In Summary:

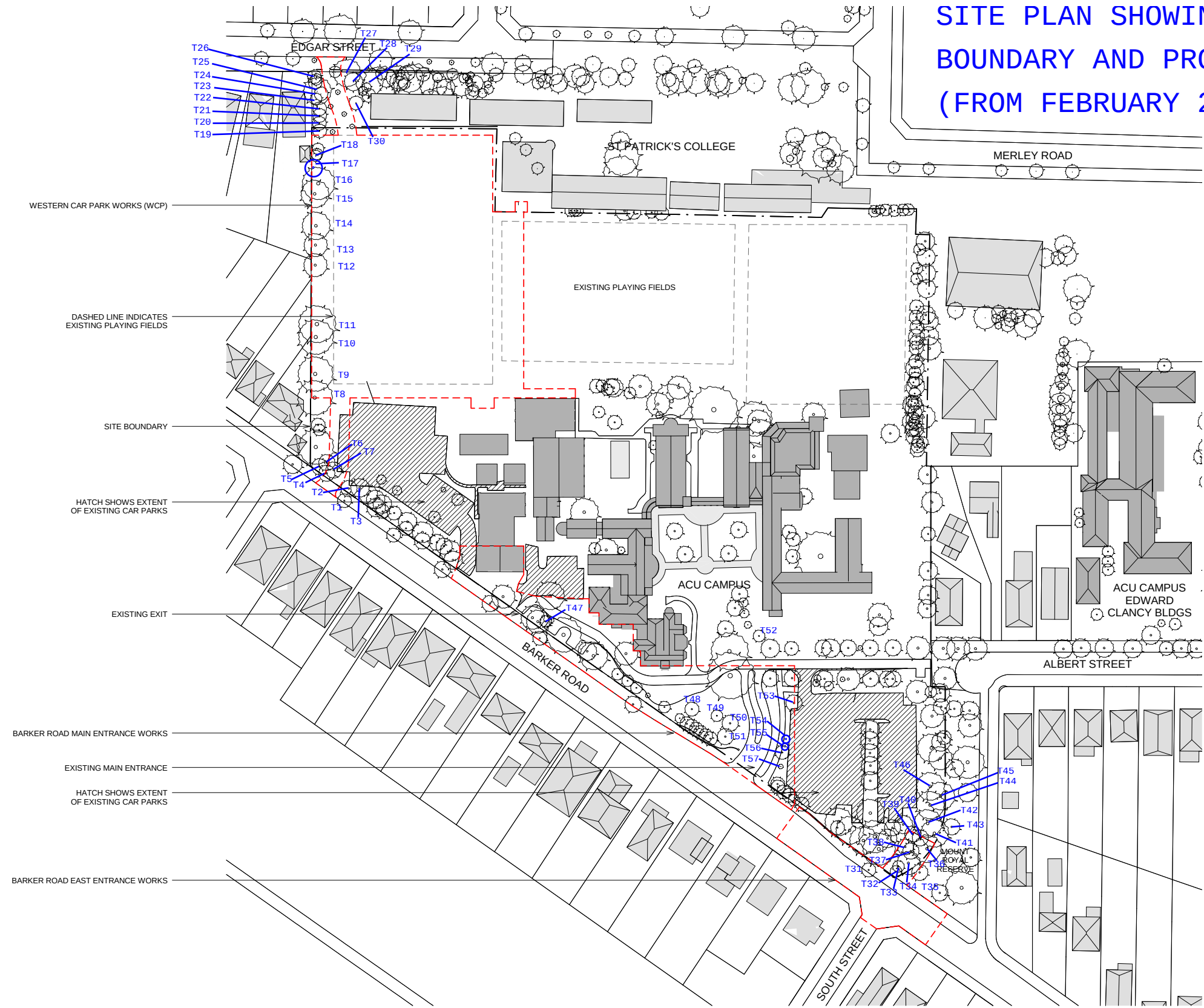
The proposed works will impact on less than 10% the identified tree protection zone of tree numbers 13, 14, 16 and 18 - this is a low level of impact and within an acceptable threshold for these trees.

The proposed works will impact on 10 to 15% of the identified tree protection zones of tree numbers 8, 10, 15 and 17 - this is a low to moderate level of impact and within an acceptable threshold for these trees.

The proposed works will impact on 15 to 20% of the identified tree protection zones of tree numbers 9 and 12 - this is a moderate level of impact and within an acceptable threshold for these trees.

The proposed works will impact on 20 to 25% of the identified tree protection zones of tree number 11 - this is a moderate to high level of impact with potential to affect the tree's long term health and reduce their SULE.

SITE PLAN SHOWING TREES ADJACENT TO WESTERN
BOUNDARY AND PROPOSED UNDERGROUND CARPARK
(FROM FEBRUARY 2012 REPORT)



1 SITE PLAN - EXISTING
1:1000

Status
DA SUBMISSION

Date
20.02.2012

Drawn by
SM/CW

Scale
As indicated @ A1

Client
Australian Catholic
University

Project Name
ACU CAR PARK &
BARKER ROAD UPGRADE
WORKS DA

Drawing
DA-A003
SITE PLAN - EXISTING

Revision
A

Approved by
ML



Project Ref
HSL-AX003796

HASSELL

