

## Arboricultural Impact Assessment



### **Darlington Road Terraces Mixed Use Building Additions and Alterations to the Darlington Road Terraces and Public Domain Improvements**

**19<sup>th</sup> November, 2016**

C90746

**ASSESSMENT & REPORT COMMISSIONED BY:**

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19<sup>th</sup> November, 2016

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**Covering Letter**

**RE: The Arboricultural Impact Assessment of Ninety five (95) trees within proximity of the project; Darlington Road Terraces Mixed Use Building Additions and Alterations to the Darlington Road Terraces and Public Domain Improvements, at Darlington Lane, Darlington, New South Wales.**

Dear Lena,

As per your request under Consultancy Agreement C90390V2 Darlington Road Terraces Student Accommodation, Arborist Report. We are pleased to provide you with the following Arboricultural Impact Assessment of ninety five (95) trees within proximity of Darlington Road Terraces Mixed Use Building Additions and Alterations to the Darlington Road Terraces and Public Domain Improvements at Darlington Lane, Darlington, New South Wales.

Complete use of this report is authorised under the conditions limiting its use as stated in Appendix A Item 7 of "*Arboricultural Reporting Assumptions and Limiting Conditions*".

Should you have any queries relating to this report, its recommendations, or the options considered please do not hesitate to contact us on 1300-272-671.

Regards,



Alex Austin  
*Dip. Hort. Arb, Grad. Cert. Arb, AQF Level 8.*  
Consulting Arborist

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## 1 Executive Summary

- 1.1.1 The following Arboricultural Impact Assessment regards details the current condition, retention Value and impacts to ninety five (95) trees within proximity of the proposed development of student accommodation buildings at Darlington Lane, Darlington, New South Wales.
- 1.1.2 The subject trees were assessed in the landscape and retention values were assigned as follows,
- Two (2) Trees were assigned High Retention Values
  - Eleven (11) Tree were assigned Moderate Retention Values
  - Seventy Nine (79) Trees were assigned Low Retention Values
  - Three (3) Trees were assigned Remove Retention Values
- 1.1.3 Fifty seven (57) trees can be retained if the current proposal is to proceed and include;
- One (1) High Retention Value tree (Tree number 11)
  - Nine (9) Moderate Retention Value trees (Tree numbers 1, 2, 33, 35, 36, 47, 50, 55 & 57)
  - Forty six (46) Low Retention Value trees ( Tree numbers 3, 4, 880, 880a – 880i, 879, 879a – 879h, 34, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 49, 51, 52, 53, 54, 56, 58, 59, 60, 62, 63, 64 & 65).
  - One (61) Remove Retention Value tree. (Tree number 61). However, this tree should be removed irrespective of the development.
- 1.1.4 Thirty Eight (38) trees will require removal if the current proposal is to proceed and include;
- One (1) High Retention Value tree (Tree number 25).
  - Two (2) Moderate Retention Value trees (Tree numbers 7 & 20).
  - Thirty three (33) Low Retention Value trees ( Tree numbers 5,6, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 182, 181, 180, 177, 176, 174, 173, 172 & 171.
  - Two (2) Remove Retention Value trees (Tree numbers 183 & 179).
- 1.1.5 All site trees to be retained will require tree protection measures in the form of protective fencing and restriction of activities with their TPZs.
- 1.1.6 Proposed design within the TPZ of Tree 11 *Eucalyptus saligna* (Sydney Blue Gum) has been altered multiple times throughout the design process in order to minimise encroachments and impacts to Tree 11. The required encroachment to the TPZ has been finalised at 8%, which is a minor and acceptable encroachment under the Australian standard 4970:2009. Therefore there is no requirement to demonstrate that the tree will remain viable though root mapping or exploratory excavation. The deck over the TPZ will be supported by steel beams running from Building B and C, which will also support the light weight boundary fence running through the TPZ. The majority of the encroachment into the TPZ (Outside the SRZ) has occurred through the placement of disabled access ramps. Canopy lifting through the pruning of seven (7) branches is required to allow for clearance for pedestrians on the proposed deck. Minor branch tip pruning is required to accommodate the edge of Building B.

- 1.1.7 The future landscape design within and adjacent to the development includes replacement tree planting to aid in offsetting the removal of existing site trees. Specifically, the pocket park proposes the planting of three semi-mature trees.
- 1.1.8 Guidance on arboricultural inspection and reporting requirements for all trees nominated for retention has been provided.

## 2 Introduction

- 2.1.1 ArborSafe Australia Pty Ltd was engaged by Lena Louangkoth of Sydney University to complete a Arboricultural Impact Assessment of Ninety five (95) trees within proximity of the proposed development of student accommodation at Darlington Lane, Darlington, New South Wales.
- 2.1.2 This project forms part the University's Campus Improvement programme which was previously approved by the Department of Planning.
- 2.1.3 This report follows on from a Pre Development Arboricultural Assessment of a smaller area within the site, which was completed by ArborSafe in 2014.
- 2.1.4 The trees contained within the report are located within the vicinity of the proposed development at Darlington Lane, Darlington, New South Wales.
- 2.1.5 Tree data and photographs were collected on the 27th of May 2016 and/or the 18<sup>th</sup> of June 2014 by Alex Austin (The Author).
- 2.1.6 Trees likely to be impacted by the proposal have been assessed and documented within this report.

## 3 Scope.

- 3.1.1 Carry out a visual examination of the nominated trees located within and adjacent to the proposed development area.
- 3.1.2 Inspect the nominated trees and their growing environment.
- 3.1.3 Provide an objective appraisal of the subject trees in relation to its species, estimated age, health, structural condition and viability within the landscape.
- 3.1.4 Based on the findings of this investigation, provide independent recommendations on the retention value of the trees.
- 3.1.5 Determine the impact of the proposal on the nominated trees.
- 3.1.6 Identify and reduce potential conflicts between tree protection and site development prior to construction by providing accurate information on the area required for tree protection and the restricted activities within the area for each tree prior to construction.



## 4 Methodology

- 4.1.1 The subject trees have been partly numbered from 1 – 65. The trees are not tagged, however their physical location is described in column B of Appendix D. Tree Assessment Data.
- 4.1.2 The site's tree numbers also include some numbers between 171 and 880 in line with the existing ArborPlan tree inventory system for the University of Sydney Darlington Campus. Trees managed under the ArborPlan system can be identified on site using white numbered tags located at approximately 2.0m from ground level on the southern side of each tree's trunk. As these tree numbers form a sub-set of a larger inventory undertaken for the University of Sydney Darlington Campus, tree numbers are not in sequential order and range between 171 to 880(a to i).
- 4.1.3 Alex Austin of ArborSafe Australia Pty Ltd carried out an initial site inspection of the thirty-two subject trees detailed in the previous Pre-Development Report on the 18<sup>th</sup> of June 2014.
- 4.1.4 A subsequent site inspection was completed on the 27th of May 2016 to collect data on the trees within the expanded development area.
- 4.1.5 The subject trees were inspected from the ground. No foliage or soil samples were taken. No aerial or internal investigations were undertaken.
- 4.1.6 Tree height and canopy width were estimated while trunk diameter was measured with a diameter tape.
- 4.1.7 Data collected on site was analysed by Alex Austin, collated into report format, and relevant recommendations were formulated.
- 4.1.8 The Tree Protection Zone method has been derived from the Australian Standard 4970–2009: *Protection of trees on development sites*.
- 4.1.9 The Tree Protection Zone (TPZ) is defined as a specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown. It is the area required to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development. The radius of the TPZ is calculated for each tree by multiplying its Diameter at Breast Height (DBH) by 12. TPZ radius = DBH × 12. (Note "Breast Height" is nominally measured as 1.3m from ground).
- 4.1.10 4.3.3 The Structural Root Zone (SRZ) is the area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. SRZ radius =  $(D \times 50)^{0.42} \times 0.64$
- 4.1.11 Retention Values have been determined based upon the assessment of the tree's health, structure, dimensions, age class, life expectancy, location and its environmental amenity and environmental significance.
- 4.1.12 All photographs were taken at the time of the site inspection by the author. Photographs have not been altered except for brightness and/or 'cropping' purposes.

## 5 Reviewed Plans

5.1.1 Plans reviewed as part of this Arboricultural Impact assessment Report include;

- Detail survey of Sydney University student accommodation, Revision 8, by Monteath & Powys. Drawing Number 13/0196, Dated 22/09/2014
- Darlington Road Terraces mixed use building additions and alterations to the Darlington Road Terraces and Public Domain Improvements, Complete DA Set, Revision B, by AJ+C Architects, Project 14051, Dated 15/06/2016.
- Darlington Road Terraces mixed use building additions and alterations to the Darlington Road Terraces and Public Domain Improvements, Complete DA Draft Set, Revision 2, by AJ+C Architects, Project 14051, Dated 17/10/2016
- Darlington Road Terraces mixed use building additions and alterations to the Darlington Road Terraces and Public Domain Improvements, Complete DA Draft Set, Revision 3, by AJ+C Architects, Project 14051, Dated 18/11/2016
- Darlington Road Terraces Mixed Use Development, Building C&D- Level 1, by AJ+C Architects, Project 14051, Drawing number A1 Dated 10/05/2016.
- Darlington Road Terraces Mixed Use Development, Building C&D- Level 1, by AJ+C Architects, Project 14051, Drawing number SK1 Dated 10/05/2016
- Darlington Road Terraces Mixed Use Development, Building C&D- Level 1, by AJ+C Architects, Project 14051, Drawing number SK.1\_B, Dated 6/09/2016
- Darlington Road Terraces Mixed Use Development, Building C&D- Level 1, by AJ+C Architects, Project 14051, Drawing number SK.1\_C, Dated 19/10/2016
- Darlington Road Terraces Mixed Use Development, Building C&D- Level 1, by AJ+C Architects, Project 14051, Drawing number SK.1\_D, Dated 17/11/2016
- University of Sydney Darlington Terraces Landscape Design Report, Development Application, by OCULUS, Landscape architecture, Dated October 2016



## 6 Observations

### 6.1 Aerial Image



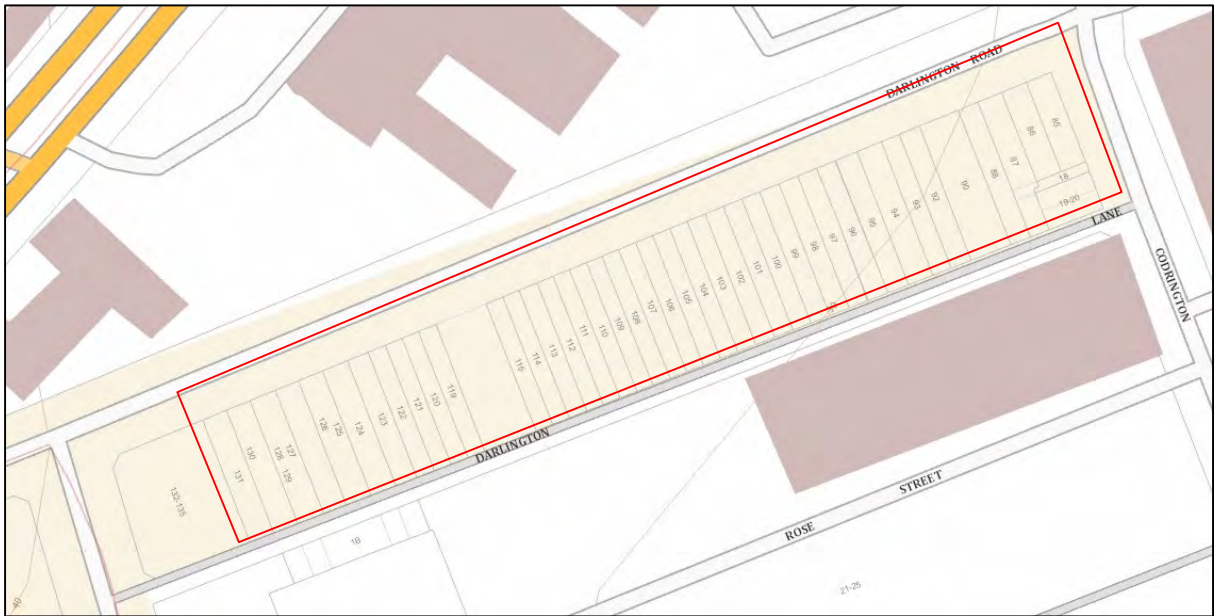
**Figure 1:** The red line indicates the area containing the trees surveyed in this report. Source: SixMaps 2016.

### 6.2 Site details

- 6.2.1 The site includes forty-six (46) terrace houses thirty eight (38) of which are owned by Sydney University between Darlington Lane and Darlington Road.
- 6.2.2 The terraces are numbered from 86 to 131.
- 6.2.3 A service or street light power line runs along the back boundary of the terraces.
- 6.2.4 The site has a slight south easterly slope.
- 6.2.5 Apart from service/power line clearance pruning, the trees have not been pruned.
- 6.2.6 Several trees are lifting deteriorating pavements.
- 6.2.7 Trees are located in the front and the rear of the properties.

### 6.3 City of Sydney Site Details

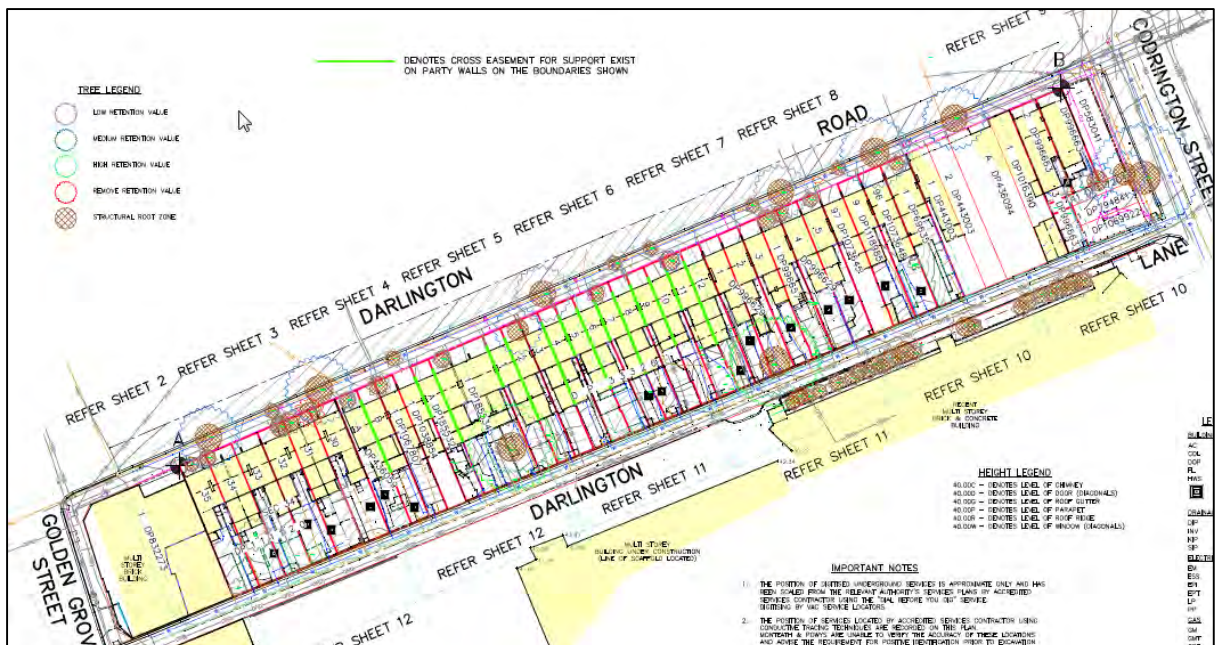
- 6.3.1 18 trees are located in the foot path surrounding the site, with the majority located on Darlington Road.
- 6.3.2 An Aerial Bundle Low Voltage cable (ABC) runs outside 85 Darlington Road to outside number 97 Darlington Road,
- 6.3.3 Exposed low voltage wires run up the remainder of Darlington Road.
- 6.3.4 The pavement consists of a Tarmac Surface with tree planter pits cut into the surface at regular intervals.



**Figure 2:** Site map showing property boundaries. The red line indicates the area containing the trees surveyed in this report.  
Source: SixMaps 2016

## 7 Site trees

- 7.1.1 A total of 95 trees were surveyed in this report. Complete attributes can be found in Appendix D.
- 7.1.2 None of the site trees form part of the City of Sydney's Significant tree register.



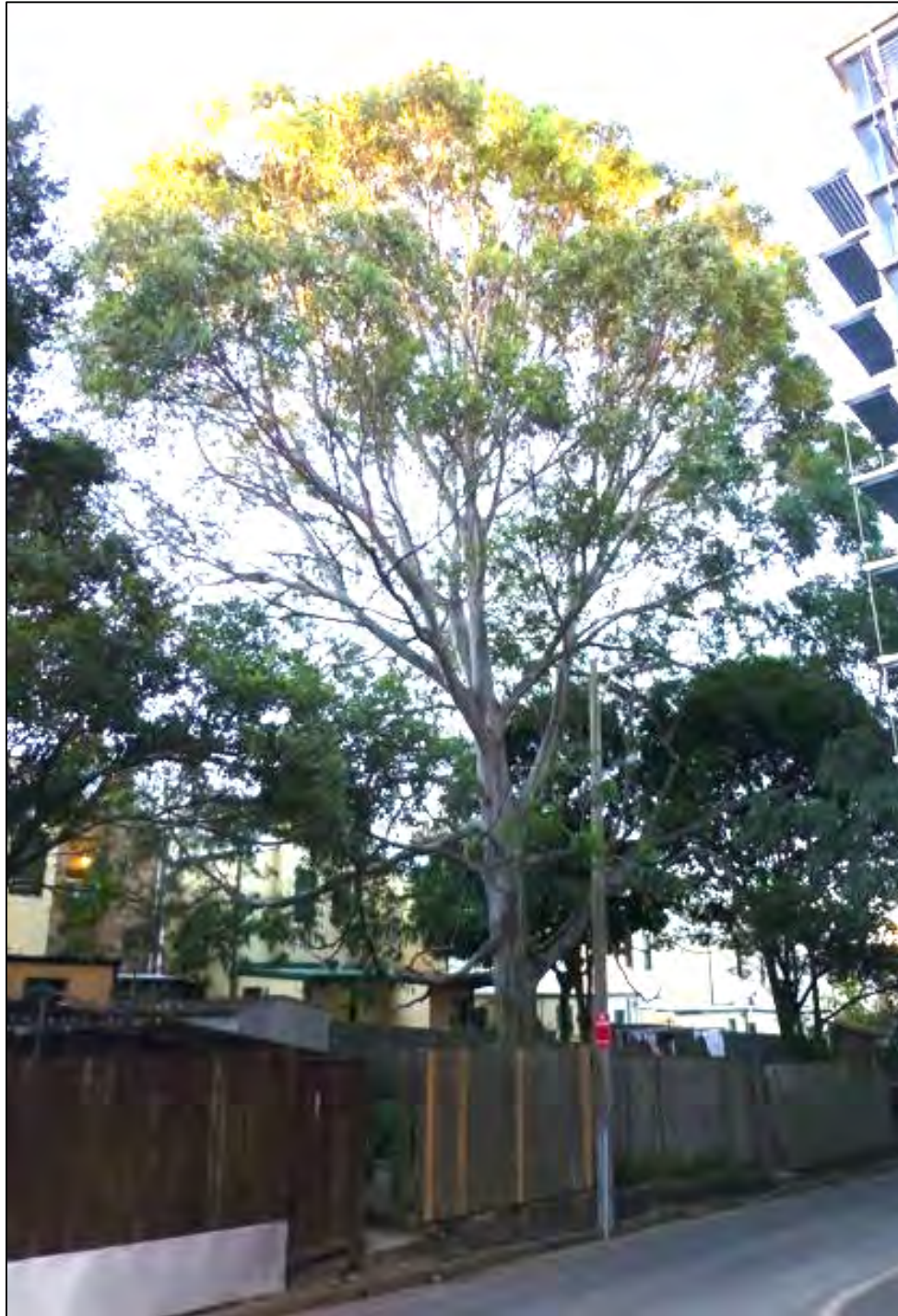
**Figure 3:** Site map showing tree surveyed. TPZ and SRZ distances are to be obtained from the tree data in Appendix D. Source: Detail survey of Sydney University student accommodation Revision 7, by Monteath & Powys. Drawing Number 13/0196 dated 22/09/2014



## 7.2 Trees within the Terrace backyards.

7.2.1 Two (2) trees were considered to have High Retention Values.

7.2.2 Tree 11, *Eucalyptus saligna* (Sydney Blue Gum) has a High Retention Value This tree makes a significant contribution to the landscape character of the area and has a life expectancy of more than 50 years. The Tree Protection Zone (TPZ) required for the successful retention of this tree is 9.1m radius measured from the trunk. The Structural Root Zone (SRZ) is 3.3m.



**Figure 4:** Tree 11 in its growing environment. Source Austin 18/06/2014

- 7.2.3 Tree 25, *Quercus ilex* (Evergreen Oak) has a High Retention Value. This tree makes a significant contribution to the landscape character of the area and has a life expectancy of 30 – 50 years. The Tree Protection Zone (TPZ) required for the successful retention of this tree is 9.2m radius measured from the trunk. The Structural Root Zone (SRZ) is 3.1m.



**Figure 5:** Tree 25 in its growing environment. Source Austin 18/06/2014



- 7.2.4 Four (4) trees were considered to have Moderate Retention Values.
- 7.2.5 Tree 1, *Grevillia robusta* (Silky Oak) has a Moderate Retention Value. The TPZ required for the successful retention of this tree is 4.2m radius measured from the trunk.
- 7.2.6 Tree 2, *Allocasurina toralosa* (Forest She Oak) has a Moderate Retention Value. The TPZ required for the successful retention of this tree is 3.6m radius measured from the trunk.



**Figure 6:** Tree 1 (left) and 2 (right) in their growing environments. Source Austin 18/06/2014

- 7.2.7 Tree 7, *Mangifera indica* (Mango) has a Moderate Retention Value. The TPZ required for the successful retention of this tree is 5.9 radius measured from the trunk.



**Figure 7:** Tree 7 in its growing environment. Source Austin 18/06/2014

- 7.2.8 Tree 20, *Brachychiton acerifolius* (Illawarra Flame tree) has a Moderate Retention Value. The TPZ required for the successful retention of this tree is 4.3m radius measured from the trunk.



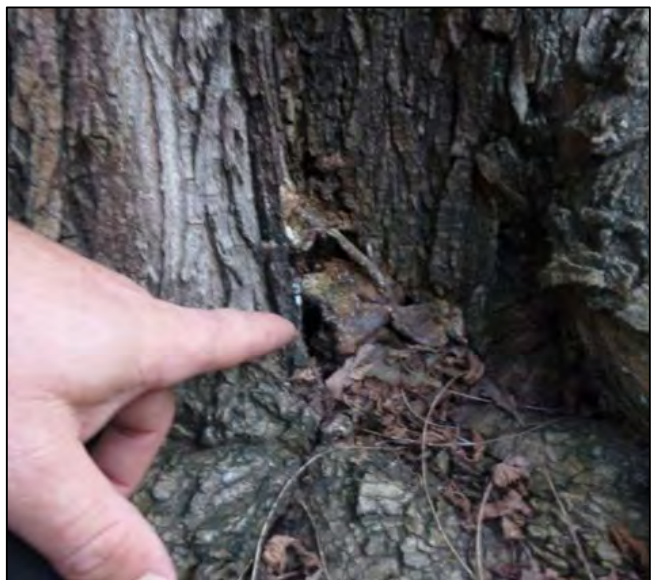
**Figure 8:** Tree 20 in its growing environment. Source Austin 18/06/2014



- 7.2.9 Twenty-six (26) trees in the Terrace Backyards were found to have Low Retention Values. Trees in this category are of low significance in the landscape.
- 7.2.10 Certain Low Retention Value trees (Tree numbers 3 4, 5, 8, 9, 14, 18, 19, 28, 29, & 32) were found to be small and replacement would attain the same significance within the landscape within 5 years.
- 7.2.11 Other Low Retention Value trees (Tree numbers 12, 13, 22 & 26) have been either poorly pruned or lopped for power line service line clearance. These poor pruning practices have misshapen the canopies and resulted in shorter life expectancies for these trees.
- 7.2.12 Some Low Retention Value trees (Tree numbers 6, 10, 15, 16, 17, 21, 23, 24, 27, 30 & 31) have significant structural defects that have an increased probability of branch or whole tree failure which greatly reduces the useful life expectancy of these trees.



**Figure 9:** Tree 17 has co dominant stems with a severe bark inclusion resulting in a likely probability of failure. Source Austin 18/06/2014



**Figure 10:** Tree 27 has been pruned for power line clearance, has a confined and swollen root crown with fungal fruiting bodies observed at ground level. Source Austin 18/06/2014



**Figure 11:** Tree 3 has been poorly pruned. Source Austin 18/06/2014



**Figure 12:** Tree 4 is easily replaceable and is insignificant in the landscape. Source Austin 18/06/2014



**Figure 13:** Tree 12 has been pruned for power line clearance and has a misshapen canopy. Source Austin 18/06/2014



### 7.3 University trees along Darlington Lane

- 7.3.1 Thirty trees (30) are located along the eastern side of Darlington Lane.
- 7.3.2 The trees are located in a garden bed running alongside Darlington Lane.
- 7.3.3 The avenue planting comprises of 11 *Populus deltoides* (Poplars) under planted with 19 *Plumeria sp* (Frangipanis).
- 7.3.4 The 11 *Populus deltoides* (Poplars) have Low Retention Values with the exception of Tree numbers 179 and 183 which have Remove Retention Values. The avenue planting of 11 *Populus deltoides* are suppressed form the building shade and have significant lean and skewed canopies towards the northwest.
- 7.3.5 The entire planting of *Populus deltoides* (Poplars) has a short useful life expectancy of 5-10 years due to their structural form.
- 7.3.6 The 19 *Plumeria sp* (Frangipanis) have a long live expectancy of 25 – 50 years, however, still have a Low Retention Value due to their small size.



**Figure 14:** Depicts Trees 179 and 180 which have skewed canopies overhanging Darlington Lane.  
Source: Austin 27/05/2016



**Figure 15:** Depicts Trees 880, 880a, and 880b which are located beneath the *Populus deltoides* growing in the garden bed adjacent to Darlington Lane. Source: Austin 27/05/2016

## 7.1 University trees situated in the front of the terrace houses.

- 7.1.1 Fifteen (15) trees are located in the front gardens of the Terrace houses.
- 7.1.2 Tree numbers 55, *Syzygium paniculatum* (Brush Cherry) and Tree number 57 *Plumeria sp* (Frangipani) are of Moderate Retention Value.
- 7.1.3 Tree number 61, *Plumeria sp* (Frangipani) has a Remove Retention Value as it is damaging the front fence and has a severe basal wound.
- 7.1.4 The remaining trees located in the front gardens of the Terrace houses numbered between 51 and 65 (excluding 55, 57 & 65) have a Low Retention Value, primarily due to their small size.



**Figure 16:** Tree 55 (*Syzygium paniculatum*) is located in the front garden of 105 Darlington Road has a Moderate Retention Value. . Source Austin 27/05/2016



**Figure 17:** Tree 57 (*Pumeria sp*) is located in the front garden of 114 Darlington Road has a Moderate Retention Value. .Source Austin 27/05/2016



**Figure 18:** Tree 61 (*Pumeria sp*) is located in the front garden of 125 Darlington Road has a Remove Retention Value. Source Austin 27/05/2016



## 7.2 City of Sydney Trees located in the footpaths.

- 7.2.1 Eighteen (18) trees are owned by the city of Sydney and are located in the footpaths surrounding the development area.
- 7.2.2 Tree numbers 33, *Liquidambar styraciflua* (Sweet Gum), 35, 36, 47 and 50 (all *Populus deltoides*, Poplars) are of Moderate Retention Value.
- 7.2.3 Tree numbers 34, 37, 39, 40 41, 42, 43, 45, 46, 48 & 49 which are all young *Liriodendron tulipifera*, are of Low Retention Value as they are new plantings and are considered to be easily replaceable.
- 7.2.4 Tree numbers 38 & 44 both *Populus deltoides*, are of Low Retention Value due to their poor structure which has resulted from years of powerline clearance pruning.



**Figure 19:** Tree 33 (*Liquidambar styraciflua*) is located on the footpath on the southern side of Codrington St and has a Moderate Retention Value. Source Austin 27/05/2016



**Figure 20:** Tree 36 (*Populus deltoides*) is located on the footpath outside 95 Darlington Road and has a Moderate Retention Value. Source Austin 27/05/2016



**Figure 21:** Tree 34 (*Liriodendron tulipifera*) is located on the footpath outside 90 Darlington Road and has a Low Retention Value as it is easily replaceable. . Source Austin 27/05/2016

## 8 Impacts of the Proposed Design

### 8.1 Trees requiring Removal

8.1.1 Thirty Eight (38) trees will require removal if the current proposal is to proceed. The reasons for removal include that the tree(s) is/are situated within the building footprint and/or have an unacceptable encroachment into the subject tree's TPZ that will occur if the project is to proceed and/or the subject trees will no longer have their required growing space or they are of "Removal" Retention Value as they require removal irrespective of development. For details on each subject tree please see Appendix D Tree Assessment Data.

8.1.2 The Thirty Eight (38) trees requiring removal include;

- One (1) High Retention Value tree (Tree number 25)
- Two (2) Moderate Retention Value trees (Tree numbers 7 & 20)
- Thirty three (33) Low Retention Value trees (Tree numbers 5,6, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 182, 181, 180, 177, 176, 174, 173, 172 & 171.
- Two (2) Remove Retention Value trees (Tree numbers 183 & 179).

8.1.3 Tree numbers 182, 181, 180, 177, 176, 174, 173, 172, 171, 183 & 179 are the *Populus deltoides*'s located on the eastern side of Darlington Lane. Due to the skewed nature of their canopies, the trees would not be retainable through construction as the only access for construction materials would be lifting from this laneway. Additionally, the lean of the trees due to shading limits the life expectancy of the trees. When then proposed building is constructed on the opposite side of Darlington Lane, the canopies of these trees will conflict with the building façade.

8.1.4 The remainder of the trees requiring removal are within the building footprint.

8.1.5 Retention of the High Retention Value tree (Tree number 25) tree was explored at length however, according to the design team, the removal of Tree number 25 is necessary for the development viability due to the location and volume of site area (TPZ Radius of 9.2m) its retention requires. Additionally, the low and spreading canopy does not present pruning options to accommodate structures beneath without diminishing the tree's significance.

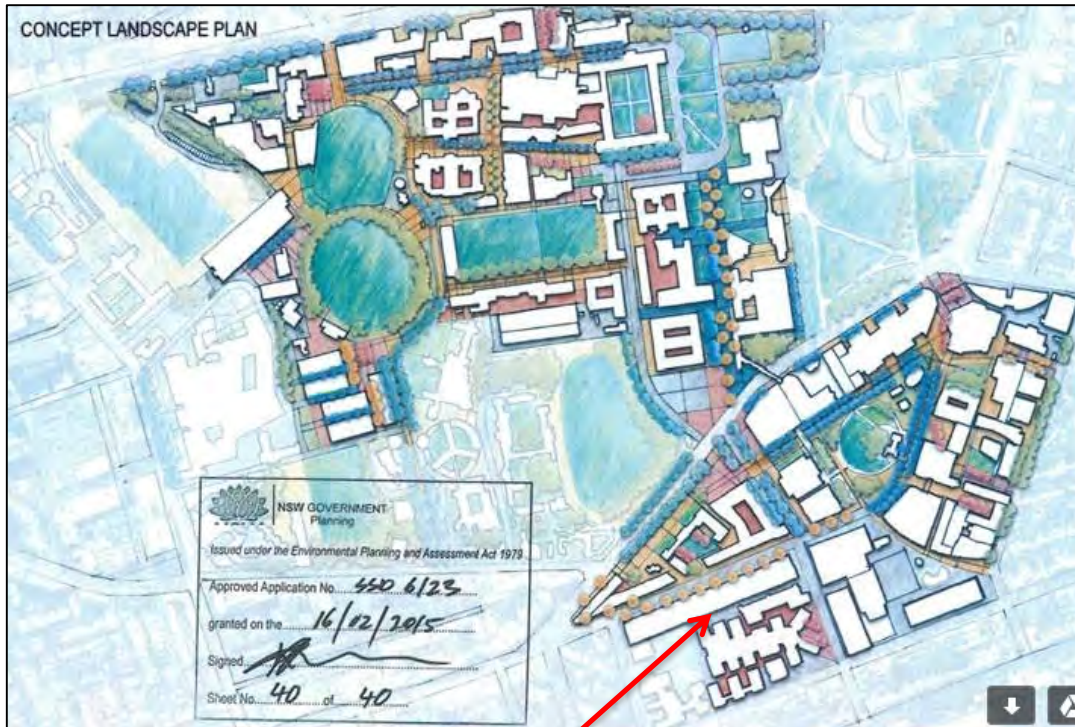
8.1.6 Transplanting of Tree number 25 is not possible due to its size and the spatial constraints the site presents.

### 8.2 Planning approval

8.2.1 Previous planning approval through NSW Government Planning was obtained by the University for the Campus Improvement Plan, to which this development forms a part thereof. The planning approval included the Concept Landscape Plan (figure 22) which notably does not show the retention of any trees subject to this report, except for the City of Sydney trees along Darlington Lane.

8.2.2 The removal of the High Retention Value tree number 25 is required in order for this development to proceed. The removal of this tree does not impact upon the Concept Landscape Plan found within the approved, Campus Improvement Plan.





**Figure 22:** The previously approved Concept Landscape Plan that forms part of the Campus Improvement Plan show the absence of mature trees around the proposed development. And an absence of the improvement of the pocket park tree numbers.  
Source L. Louangkoth, (USYD) 8/09/2016

- 8.2.3 The Pocket Park landscape concept plan proposes the planting of three semi-mature trees as shown in the Landscape Plan by Oculus. This landscape improvement also does not form part of the Campus Improvement Plan. The proposed semi mature plantings are planned to be 400 litre in root ball size to enable amenity benefits to be obtained immediately.
- 8.2.4 This report also notes that the pocket park site, as proposed for replanting (Darlington Lane/Codrington Street/Darlington Road junction) is a park setting that will offer continued accessibility to the University population and local residential community.



**Figure 23:** Extract from Landscape Design Report by Oculus, October 2016 which forms part of the Development Application showing the three (3) new 400 litre trees proposed and improved park amenity.  
Source : University of Sydney Darlington Terraces Landscape Design Report, Development Application, by OCULUS, Landscape architecture, Dated October 2016



## 9 Trees for retention

### 9.1 Total trees for retention.

9.1.1 Fifty seven (57) trees can be retained if the current proposal is to proceed.

9.1.2 Fifty seven (57) trees able to be retained include;

- One (1) High Retention Value tree (Tree number 11)
- Nine (9) Moderate Retention Value trees (Tree numbers 1, 2, 33, 35, 36, 47, 50, 55 & 57)
- Forty six (46) Low Retention Value trees ( Tree numbers 3, 4, 880, 880a – 880i, 879, 879a – 879h, 34, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 49, 51, 52, 53, 54, 56, 58, 59, 60, 62, 63, 64 & 65).
- One (1) Remove Retention Value tree. (Tree number 61). However, this tree should be removed irrespective of the development.

### 9.2 Tree 11 *Eucalyptus saligna* (Sydney Blue Gum)

9.2.1 Tree 11 *Eucalyptus saligna* (Sydney Blue Gum) is a High Retention Value tree able to be retained with the current proposal. The requirements for successful retention of this tree were established at the concept stage and have been known to all parties involved in the design.

9.2.2 Tree 11 is the largest, most significant tree on the subject site.

9.2.3 Tree 11 is in good health and has good structure. It is anticipated that tree 11 will tolerate moderate impacts to its growing environment without declining in health or life expectancy.

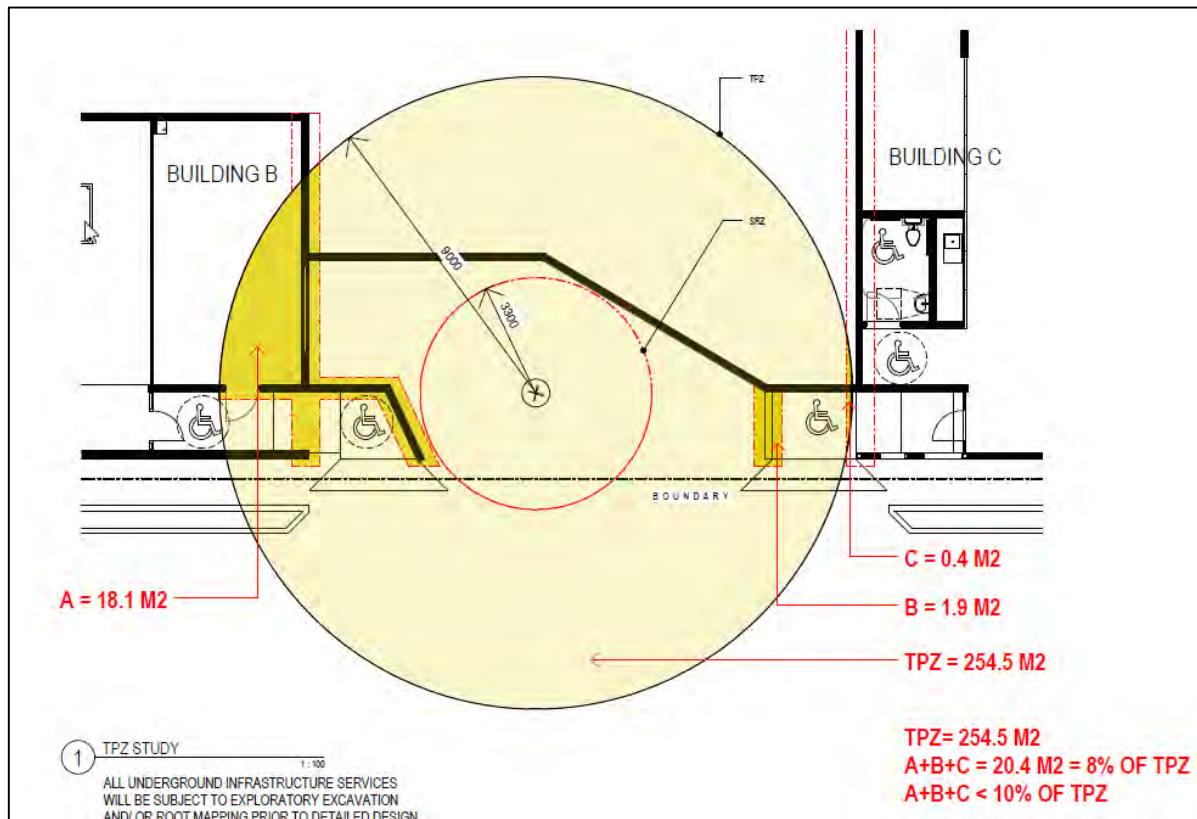
9.2.4 A minor encroachment is anticipated into the root zone. Building B's edge and disabled access ramp creates a 7% encroachment into the TPZ of Tree 11 and the encroachments are outside the Structural Root Zone (SRZ). In addition, Building C's edge creates further incursion into the TPZ of 1% area resulting in an 8% total encroachment. It is imperative that the encroachment to this TPZ is minimized and remains below 10% of the TPZ area.

9.2.5 An encroachment of up to 10% of the TPZ area is deemed a minor encroachment by the Australian Standard AS 4970:2009 *Protection of Trees on Development Sites*. As the proposed encroachment is less than 10% of the area of the TPZ and is outside the (SRZ), detailed root investigations should not be required for the construction of the major structures on the edge to the TPZ. (See figure 24).

9.2.6 All further works within the TPZ of Tree 11 will need to be flexible in their locations in order to avoid contact with significant roots larger than 40mm diameter. All works within the root zone will require Arborist supervision and approval.

9.2.7 The design of the decking support is primarily constructed from steel beams that are incorporated into building walls to eliminate piers from the design in/over the TPZ of Tree 11.

- 9.2.8 The revised boundary fence running through the TPZ on the northern side of Tree 11 is of light weight construction supported by the steel structure supporting the deck and the deck itself.
- 9.2.9 Any required piers that have not been anticipated within the TPZ of Tree 11 must be dug by hand or with an air-spade or water-lance with a vacuum truck subject to arborist approval. All project piers must be able to be positioned with flexibility in the case of major roots (>40mm diameter) being uncovered. Pier holes are to be lined with builders' plastic prior to concrete application.
- 9.2.10 Strip footings associated with the disabled access ramps should be altered to minimize impacts if multiple roots greater than 40mm diameter are encountered during excavation. Pier and beam footings should be utilized and consideration to the weight of the supported structure which requires these footings should be made.
- 9.2.11 Open space within the TPZ will be used for planting and the area beneath the deck remain mulched.
- 9.2.12 Surfaces used within the TPZ must be porous.



**Figure 24:** Details the encroachments into the TPZ of Tree 11. Source: Darlington Road Terraces Mixed Use Development, Building C&D- Level 1, by AJ+C Architects, Project 14051, Drawing number SK.1\_D, Dated 17/11/2016.

- 9.2.13 Minor branch tip pruning will be required to accommodate the 12m high edge of Building B depicted in Figure 24. It is anticipated that this involves the pruning of 3 branches of 75mm diameter to ascending sub branches, 6m from the trunk.



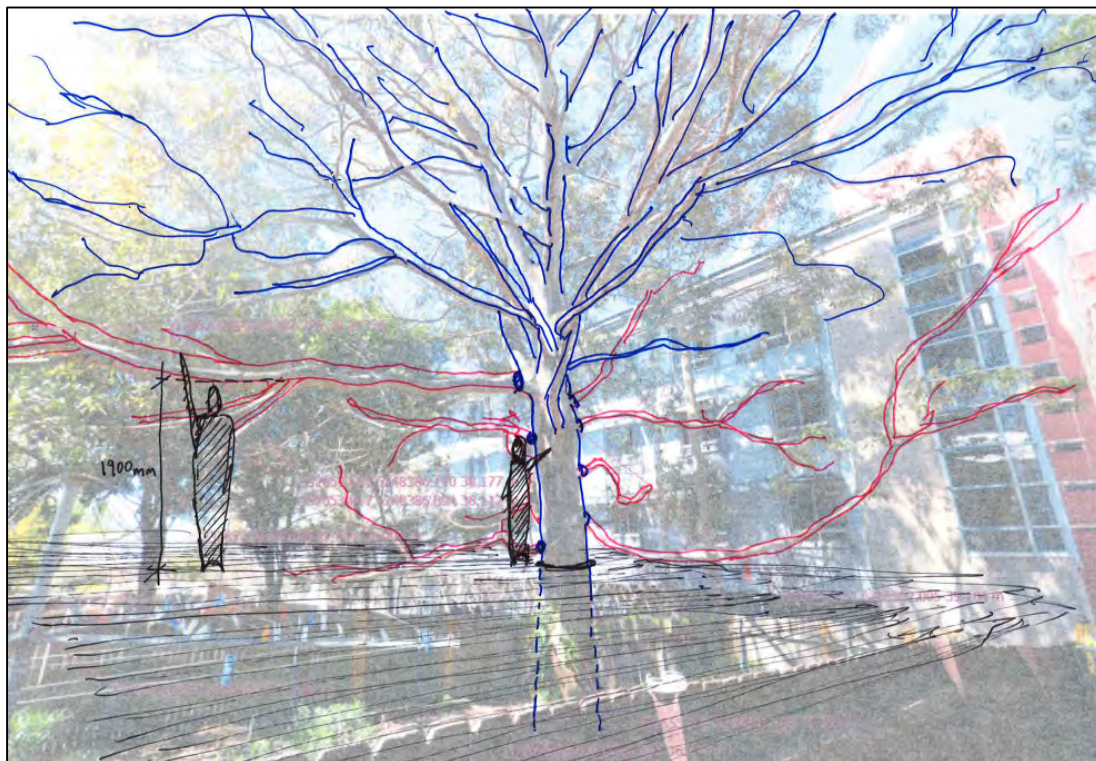
- 9.2.14 Seven (7) branches will require pruning in order to raise the canopy of Tree 11 sufficiently to incorporate the decking area beneath the canopy. The tree has minimal pruning in the past, hence the low canopy. The branches are elongated and shaded out with minimal pruning options. It has been determined that the pruning would total around 15% of the total canopy and will not have a detrimental effect on tree health. The pruning requires the removal of branches to 5m height including seven branches with diameters of 110, 250, 250, 100 and 3 branches of 80 mm. The removal of a significant quantity of deadwood is also required at this stage.



**Figure 25:** Indicates the pruning required for tree 11.  
Source Austin 27/05/2106



**Figure 26:** Indicates the pruning required for tree 11.  
Source Austin 27/05/2106



**Figure 27:** Hand drawn overlay which indicates the pruning required for tree 11. Red branches will require removal while blue branches remain. Source Josh Wrathall, AJ+C Architects 31/10/2014.

- 9.2.15 Crown protection will be required to avoid damage from tower or mobile cranes slinging loads. The canopy are needs to be incorporated in all lift plans and on the induction form for lifting personnel (Diver and Dogman) provided when they arrive onsite.
- 9.2.16 Trunk Protection must be installed as per Australian Standard 4970:2009 (see Appendix C). Trunk Protection must extend 4m up the trunk using 100mm x 20mm pine boards strapped to the trunk on top of hessian wrapped around the trunk. The timber must not be nailed to the trunk.
- 9.2.17 All services should be routed outside the TPZ. If underground services must be routed within the TPZ, they should be installed by directional drilling The directional drilling bore (under boring) and should be at least 1m deep.
- 9.2.18 Demolition within the root zone will be required as old concrete pathways are present. Demolition must occur by hand or with a small (<3tonne) rubber tracked excavator working with arborist supervision. Old footing located in the root zone should remain if there is likely to be root damage from their removal.



**Figure 28:** The old concrete paths located with the TPZ of tree 11 that require hand removal or machine removal with Arborist supervision. . Source Austin 27/05/2016

- 9.2.19 Any proposed works Darlington Lane involving the water, storm water, sewer or lighting must not involve machine excavation within the TPZ. Exploratory excavation along the required service line with the air-spade or water-lance method is to be used to reveal the location and size of the roots in this section of the TPZ and will also allow for the sensitive installation of services between roots. If significant roots are identified, alternative locations for service installation will need to be considered
- 9.2.20 Directional drilling at 1m depth through the root zone is an alternative method or installing these services and will not impact on the TPZ.
- 9.2.21 Resurfacing of Darlington lane must not involve a reduction of road level into existing soil.
- 9.2.22 Service installation must be coordinated and be sufficient in size to ensure only one trenching operation occurs.



### 9.3 City of Sydney trees

- 9.3.1 No TPZ fencing or Trunk Protection is required for the City of Sydney trees located along the footpaths. This is due to the lack of works in proximity to the trees.
- 9.3.2 Crown protection is required due to the possibility of lifting works occurring in proximity to the trees. The canopies of the City of Sydney trees must be incorporated in all lift plans and on the induction form for lifting personnel (Crane/Lift Operators and Dogmen) provided when they arrive onsite.

### 9.4 Terrace front yard trees

- 9.4.1 It is anticipated that minimal works are proposed in proximity to trees in the front yards of the terrace houses. Therefore, tree protection fencing and trunk protection is not required.
- 9.4.2 If excavation for services is required, Arborist supervision will be required.

### 9.5 University Trees along Darlington Lane.

- 9.5.1 The nineteen (19) *Plumeria sp* (Frangipanis) numbered 880, 880a – 880i, 879, 879a – 879h require Tree protection fencing along the garden bed edge on the eastern side of Darlington Lane.



**Figure 29:** The nineteen *Plumeria sp* (Frangipanis) that require tree protection fencing along the edge of Darlington Lane.  
Source Austin 27/05/2106

## 10 Replacement trees

### 10.1 *Populus nigra Italica* (Lombardy Poplar)

- 10.1.1 The eleven (11) existing *Populus deltoides* (Poplar) numbered between 171 and 183 recommended for removal should be replaced with *Populus nigra Italica* (Lombardy Poplar) which has a fastigate form which will fit the growing environment and continue current character of the lane and provide the benefits of the deciduous species. See Appendix F for species profile and data sheet.
- 10.1.2 The location of the new plantings should be situated in the same location as the existing Poplars.

### 10.2 Pocket Park

- 10.2.1 There is a planting opportunity within the development proposal at the grass area on the corner of Codrington Street and Darlington Road. The Universities Tree selection committee has proposed planting of *Stenocarpus sinuatus* (Queensland Firewheel Tree) for this location. See Appendix F for species profile and data sheet.
- 10.2.2 The following is a list of trees proposed for inclusion by the development Landscape Architect:
- *Elaeocarpus reticulatus* (Blueberry Ash)
  - *Eucalyptus gummifera* (Red Bloodwood)
  - *Plumeria rubra* (Frangipani)
  - *Stenocarpus sinuatus* (Firewheel Tree)
  - *Sycarpia glomulifera* (Turpentine Tree)

## 11 Tree Protection during construction

### 11.1 Project Arborist

- 11.1.1 An official “Project Arborist” should be commissioned to oversee the tree protection, any works within the TPZ and to complete regular monitoring compliance certification.
- 11.1.2 The Project Arborist should have minimum five (5) years industry experience in the field of arboriculture, horticulture with relevant demonstrated experience in tree management on construction sites; and Diploma level qualifications in arboriculture - AQF Level 5.
- 11.1.3 Inspections should be conducted by the Project Arborist at several key points during the construction in order to ensure that protection measures are being adhered to during construction stages and decline in tree health or additional remediation measures can be identified.

### 11.2 Installation of Tree Protection Fencing.

- 11.2.1 Trees 1, 2, 3, 4, 11, 880a – 880i, 879, 879a – 879h will need to be fenced off and protected from construction activities as per the method described in Appendix C.
- 11.2.2 No works of any kind are permitted within any TPZ of a tree marked for retention without direct arborist supervision or approval.
- 11.2.3 The tree protection fencing around Tree 11 should be locked. The Key for this zone should be held by the Project Arborist.

### 11.3 Mulching

- 11.3.1 The area within the TPZ’s should be mulched. The mulch must be maintained to a depth of 50–100 mm using material that complies with AS 4454.
- 11.3.2 Where the existing landscape within the TPZ is to remain unaltered (e.g. garden beds or turf) mulch may not be required.

### 11.4 Tree Protection Signage

- 11.4.1 Tree protection signage (Appendix C) should be installed at 10m intervals along the Tree Protection Fence.

### 11.5 Crown Protection

- 11.5.1 The canopies of trees marked for retention must be incorporated onto all plans as no lift zones. Crane drivers must be made aware of this requirement during induction.

### 11.6 Works within TPZ’s

- 11.6.1 All works within TPZ’s of trees to be retained must be approved and overseen by the Project Arborist.



11.6.2 Any works with a listed TPZ must incorporate “sensitive construction methods” in order to leave the majority of the root system and soil within the TPZ unaltered. Common sensitive construction methods include;

- Suspended slabs
- Pier and beam construction
- Hand excavation
- Air-spade or Water-lance excavation with vacuum truck

11.6.3 The designs within the listed TPZ’s should remain flexible in order to be able to avoid any roots of significance (40mm diameter or greater).

11.6.4 All services should be routed outside the TPZ. If underground services must be routed within the TPZ, they should be installed by directional drilling or in manually excavated trenches overseen by the project arborist. The directional drilling bore should be at least 600 mm deep.

### **11.7 Activities Restricted within the TPZ**

The following activities are not permitted within the listed TPZ distances of any tree to be retained unless Site Arborist Approval is obtained.

- Machine excavation, including trenching for services
- Excavation for silt fencing
- Storage of materials
- Preparation of chemicals, including preparation of cement products
- Dumping of waste
- Wash down and cleaning of equipment
- Placement of fill
- Soil level changes
- Temporary or permanent installation of utilities and signs
- Physical damage to the tree.

### **11.8 Project Milestones requiring Arborist Inspection.**

The following actions or project milestones are recommended as when on-site tree inspection should be required:

- 11.8.1 On completion of the Tree Removal and Pruning Works
- 11.8.2 Following the installation of the TPZ fencing.
- 11.8.3 During the demolition within the TPZ of Tree 11.
- 11.8.4 During the exploratory excavations in the TPZ of Tree 11.
- 11.8.5 At least once every three (3) months during the construction phase.
- 11.8.6 During any earthworks/excavation within the TPZ of trees marked for retention.
- 11.8.7 At the completion of building works and prior to commencement of landscape works.
- 11.8.8 At practical completion of the project.

### **11.9 Compliance Reporting**

- 11.9.1 Following each inspection, the Project Arborist shall prepare a report detailing the condition of the trees. These reports should certify whether or not the works have been completed in compliance with the consent relating to tree protection.
- 11.9.2 These reports should contain photographic evidence where required to demonstrate that the work has been carried out as specified.
- 11.9.3 Matters to be monitored and included in these reports should include; tree condition, tree protection measures and impact of site works which may arise from changes to the approved plans.
- 11.9.4 The reports and Compliance Statements shall be submitted to the Project Manager (as well as University's nominated representative) following each inspection.
- 11.9.5 The reports and any Non-Compliance Statements shall be submitted to the Project Manager (as well as University's nominated representative) if tree protection conditions have been breached. Reports should contain clear remedial action specification to minimise any adverse impact on the subject tree.

## 12 References

Standards Australia, 2009, *AS:4970-2009 Protection of Trees on Development Sites*, Standards Australia, G.P.O. Box 476, Sydney, New South Wales, 2001.

## 13 Appendices

### 13.1 Appendix A – Arboricultural Reporting Assumptions and Limiting Conditions

1. Any legal description provided to the consultant is assumed to be correct. Any titles and ownership of any property are assumed to be good. No responsibility is assumed for matters legal in character.
2. It is assumed that any property/project is not in violation of any applicable codes, ordinances, statutes or other government regulations.
3. Care has been taken to obtain all information from reliable sources. All data has been verified in so far as possible, however, the consultant can neither guarantee nor be responsible for the accuracy of the information provided by others.
4. The consultant shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services.
5. Loss or alteration of any part of this report invalidates the entire report.
6. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by anyone but the person to whom it is addressed, without the prior written consent of the consultant.
7. Neither all nor any part of the contents of this report, nor any copy thereof, shall be used for any purpose by anyone but the person to whom it is addressed, without the written consent of the consultant. Nor shall it be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales or other media, without the written consent of the consultant.
8. This report and any values expressed herein represent the opinion of the consultant and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
9. Sketches, diagrams, graphs and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys unless expressed otherwise.
10. Information contained in this report covers only those items that were examined and reflect the condition of those items at the time of inspection.
11. Inspection is limited to visual examination of accessible components without dissection, excavation or probing. There is no warranty or guarantee expressed or implied that the problems or deficiencies of the plants or property in question may not arise in the future.

## 13.2 Appendix B – Explanation of Tree Assessment Terms

**Tree name:** Provides the botanic name, (genus, species, sub-species, variety and cultivar where applicable) in accordance with the International Code of Botanical Nomenclature (ICBN), and an accepted common name.

**Age:** Refers to the life cycle of the tree.

Category	Description
Young	Tree is small in terms of its potential physical size and has not reached its full reproductive ability, may have been recently planted.
Semi-mature	Tree in active growth phase of life cycle and not yet attained an expected maximum physical size for its species and/or its location.
Mature	Tree has reached an expected maximum physical size for the species and/or location and is showing a reduction in the rate of seasonal extension growth.
Senescent	Tree is approaching the end of its life cycle and is exhibiting a reduction in vigour often evidenced by natural deterioration in health and structure.

**Health:** Summarises the health and vigour of the tree.

Category	Description
Excellent	Canopy full with even foliage density throughout, leaves are entire and are of an excellent size and colour for the species with no visible pathogen damage. Excellent growth indicators, e.g. seasonal extension growth. Exceptional specimen.
Good	Canopy full with minor variations in foliage density throughout, leaves are entire and are of good size and colour for the species with minimal or no visible pathogen damage. Good growth indicators, none or minimal deadwood.
Fair	Canopy with moderate variations in foliage density throughout, leaves not entire with reduced size and/or atypical in colour, moderate pathogen damage. Reduced growth indicators, visible amounts of deadwood, may contain epicormic growth.
Poor	Canopy density significantly reduced throughout, leaves are not entire, are significantly reduced in size and/or are discoloured, significant pathogen damage. Significant amounts of deadwood and/or epicormic growth, noticeable dieback of branch tips, possibly extensive.
Dead	No live plant material observed throughout the canopy, bark may be visibly delaminating from the trunk and/or branches.

**Structure:** Summarises the structure of the tree from root to crown.

Category	Description
Good	Sound branch attachments with no visible structural defects e.g. included bark or acute angled unions. No visible wounds to the trunk and/or root plate. No fungal pathogens present.
Fair	Minor structural defects present e.g. apical leaders sharing common union(s). Minor damage to structural roots. Small wounds present where decay could begin. No fungal pathogens present.
Poor	Moderate structural defects present, including bifurcations with included bark with union failure likely within 0-5 years. Wounding evident with cavities and/or decay present Damage to structural roots.
Hazardous	Significant structural defects with failure imminent (3-6 months). Defects may include active splits and/or partial branch or root plate failures. Tree requires immediate arboricultural works to alleviate the associated risk.

**Useful Life Expectancy (ULE):** Useful life expectancy refers to an expected period of time the tree can be retained within the landscape before its amenity value declines to a point where it may detract from the appearance of the landscape and/or becomes potentially hazardous to people and/or property. ULE values consider tree species, current age, health, structure and location. ULE values are based on the tree at the time of assessment and do not consider future changes to the tree's location and environment which may influence the ULE value.

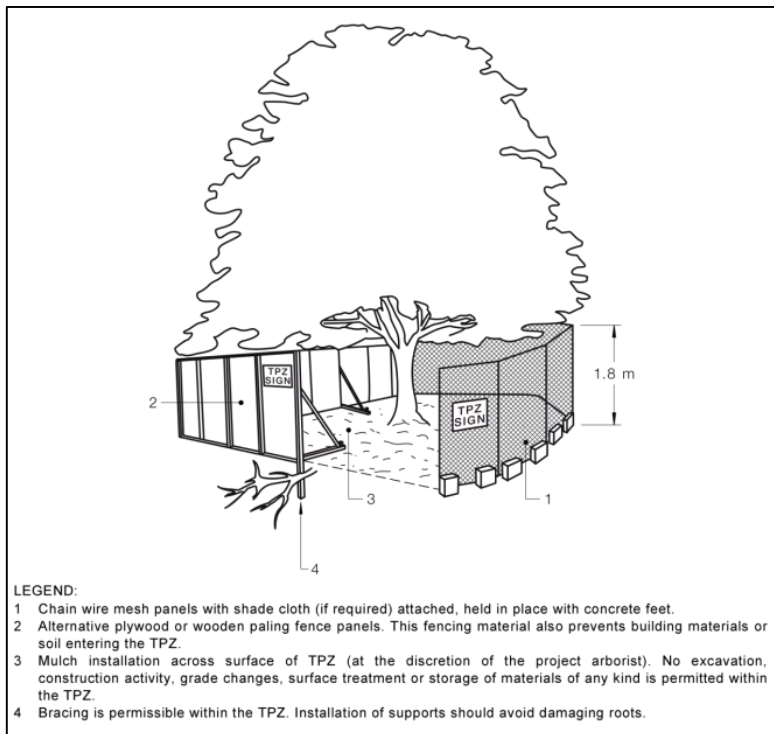
Category:
0-5 Years
5-10 Years
10-20 Years
20-30 Years
30-50 Years
>50 Years

**Retention Value:** Refers to a combination of tree attributes including health, structure and form and also considers suitability of the tree in the context of the landscape.

Category	Description
High	Tree displays good or better health and structure characteristics, is ideally suited to its location, provides a significant level of amenity and has the potential to become a long term component of the landscape. Design modifications will be required to ensure the successful retention of the tree.
Moderate	Tree displays fair or better health and structure characteristics, is well suited to its location, provides a moderate level of amenity and has the potential to become a medium to long term component of the landscape. Reasonable efforts should be made to ensure the successful retention of the tree.
Low	Tree displays poor health and structure characteristics and/or is a young and easily replaceable specimen and/or is inappropriate for its location and/or provides a low level of amenity. Design modifications will not be required.
None	A dead tree and/or a tree with severe structural defects that cannot be corrected through modern arboricultural practices and/or a recognised weed species.

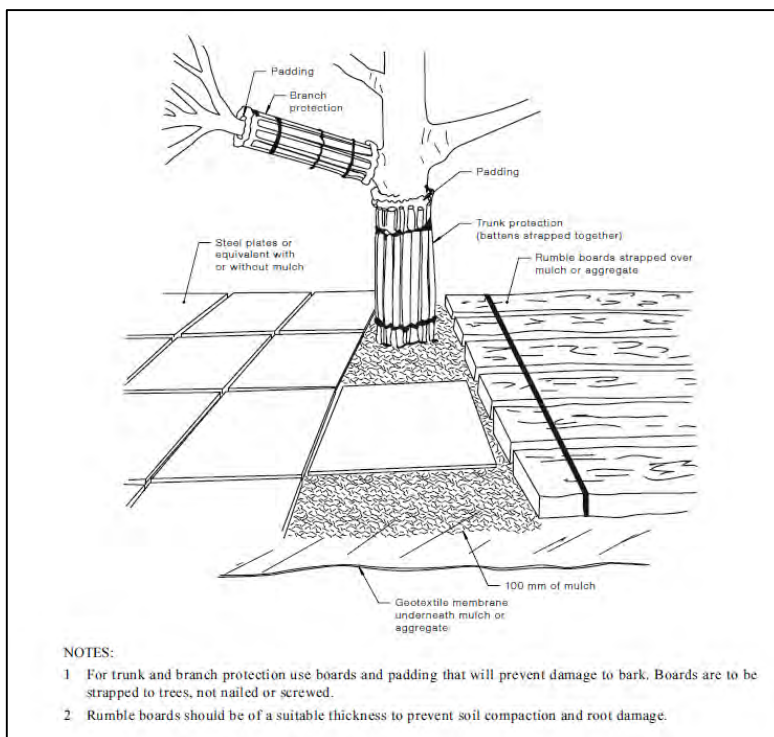
### 13.3 Appendix C – Tree Protection

#### 13.3.1 Tree Protection fencing detail



Source: AS 4970 : 2009

#### 13.3.2 Trunk Protection detail



Source: AS 4970 : 2009

13.3.3 Tree Protection Signage.





#### 13.4 Appendix D Tree Assessment Data



Tree No	Location or property number	Owner	Botanical Name	Common Name	Canopy Diameter	DRC (CM)	DBH (CM)	Height (M)	Health	Structure	Age Class	Life Expectancy (Years)	Defects	Arborist comments	SRZ (M)	TPZ (M)	Retention Value	Outcome	Impact
1	Next to 86 Darlington St	USYD	<i>Grevillia robusta</i>	Silky Oak	5	45	38	12	Fair	Good	Semi - Mature	30 - 50	Confirmed roots and minor root dmage.		2.4	4.6	Moderate	Retain	
2	86 Darlington St	USYD	<i>Allocasurina toralosa</i>	Forest Sheoak	5	35	30	10	Good	Good	Semi - Mature	30 - 50		Rear Corner of site.	2.2	3.6	Moderate	Retain	
3	87 Darlington St	USYD	<i>Banksia serrata</i>	Saw-toothed Banksia	<5		25	<5	Good	Fair	Semi - Mature	10 - 15	Poor pruning, wounds	Previosly hacked.		3	Low	Retain	
4	95 Darlington St	USYD	<i>Banksia serrata</i>	Saw-toothed Banksia	<5		10	6	Fair	Good	Semi - Mature	30 - 50				1.2	Low	Retain	
5	99 Darlington St	USYD	<i>Callistemon citrinus</i>	Crimson Bottlebrush	<5		10	5	Fair	Poor	Semi - Mature	<5	Suppressed, dieback			1.2	Low	Remove	Within Footprint
6	99 Darlington St	USYD	<i>Syzygium paniculatum</i>	Magenta Brush Cherry	8		35	10	Good	Fair	Semi - Mature	30 - 50	Co dominant with bark inclusions, lifting asphalt	Limited pruning options to reduce the probability of branch failure.		4.2	Low	Remove	Within Footprint
7	99 Darlington St	USYD	<i>Mangifera indica</i>	Mango	8	80	34,34	8	Good	Fair	Mature	30 - 50	Co dominant, Western stem rubbing severely on structure, lifting pavements.		3.1	5.9	Moderate	Remove	Within Footprint
8	100 Darlington St	USYD	<i>Elaeocarpus reticulatus</i>	Blueberry Ash	4		18	10	Fair	Fair	Mature	10 - 15	Poor pruning for service line clearance, suppressed, dieback	Limited pruning options to reduce the probability of branch failure.		2.16	Low	Remove	Within Footprint
9	100 Darlington St	USYD	<i>Elaeocarpus reticulatus</i>	Blueberry Ash			19		Fair	Fair	Mature	10 - 15	Poor pruning for service line clearance, suppressed, dieback			2.28	Low	Remove	Within Footprint
10	100 Darlington St	USYD	<i>Syzygium paniculatum</i>	Magenta Brush Cherry	6		28	10	Good	Fair	Semi - Mature	15 - 30	Co dominant with bark inclusions			3.36	Low	Remove	Within Footprint
11	102 Darlington St	USYD	<i>Eucalyptus saligna</i>	Sydney Blue gum	18	96	78	25	Good	Good	Mature	50	Deadwood.	Signifianct tree in the landscape.Lsignifcant quantity requires removal removal. Lifting of branches to 5m height will be required.This includes 110, 250, 250, 100, 3x 80mm diamater branches.	3.3	9.4	High	Retain	Minor Encroachment
12	105 Darlington St	USYD	<i>Syzygium paniculatum</i>	Magenta Brush Cherry	5		35	10	Good	Poor	Semi - Mature	15 - 30	Poor pruning for service line clearance			4.2	Low	Remove	Within Footprint
13	105 Darlington St	USYD	<i>Elaeocarpus reticulatus</i>	Blueberry Ash	6		15	5	Fair	Poor	Semi - Mature	<5	Poor pruning for service line clearance, suppressed,			1.8	Low	Remove	Within Footprint
14	105 Darlington St	USYD	<i>Elaeocarpus reticulatus</i>	Blueberry Ash	4		16	8	Good	Fair	Semi - Mature	10 - 15	Suppressed,			1.92	Low	Remove	Within Footprint
15	105 Darlington St	USYD	<i>Syzygium paniculatum</i>	Magenta Brush Cherry	3		26	10	Fair	Fair	Semi - Mature	10 - 15	Co dominant			3.12	Low	Remove	Within Footprint
16	105 Darlington St	USYD	<i>Syzygium paniculatum</i>	Magenta Brush Cherry	3	25	10, 10 8	8	Good	Fair	Semi - Mature	10 - 15	Co dominant			2	Low	Remove	Within Footprint
17	105 Darlington St	USYD	<i>Celtis australis</i>	European Nettle Tree	10		42	10	Fair	Poor	Semi - Mature	10 - 15	Co dominant with severe bark inclusions			5.04	Low	Remove	Within Footprint
18	105 Darlington St	USYD	<i>Murraya paniculta</i>	Orange Jessamine	4	25	Multi	4	Good	Fair	Semi - Mature	30 - 50				2.2	Low	Remove	Within Footprint
19	105 Darlington St	USYD	<i>Elaeocarpus reticulatus</i>	Blueberry Ash	2		10 10	4	Fair	Poor	Semi - Mature	<5	Poor speciem, trunk against building			1.8	Low	Remove	Within Footprint
20	109 Darlington St	USYD	<i>Brachychiton acerifolius</i>	Illawarra Flame Tree	10		36	10	Good	Fair	Mature	10 - 15	Misshapen canopy due to service line clearance pruning. Ivy		2.3	4.3	Moderate	Remove	Within Footprint
21	109 Darlington St	USYD	<i>Tibouchina laurina</i>	Tibochina	8	47	28 20	6	Fair	Fair	Mature	5 - 10	Co dominant with bark inclusions, die back, ivy, major rubbing union			4.2	Low	Remove	Within Footprint
22	114 Darlington St	USYD	<i>Leptospermum petersonii</i>	Lemon Scented Tea Tree	<5		26	<5	Poor	Poor	Mature	<5	Lopped for service line clearance.			3.12	Low	Remove	Within Footprint
23	114 Darlington St	USYD	<i>Leptospermum petersonii</i>	Lemon Scented Tea Tree	5		21	8	Good	Fair	Mature	10 - 15	Co dominant with bark inclusions, dieback			2.52	Low	Remove	Within Footprint
24	114 Darlington St	USYD	<i>Leptospermum petersonii</i>	Lemon Scented Tea Tree	5		36	8	Good	Fair	Mature	10 - 15	Co dominant with severe bark inclusions, dieback,			4.32	Low	Remove	Within Footprint
25	116 Darlington St	USYD	<i>Quercus ilex</i>	Evergreen Oak	15	80	77	15	Good	Fair	Mature	30 - 50	Co dominant, wounds, minor cavties associated with previous pruning wounds. Ivy	Signifianct tree in the landscape.	3.1	9.24	High	Remove	Within Footprint
26	117 Darlington St	USYD	<i>Leptospermum petersonii</i>	Lemon Scented Tea Tree	7		26	5	Fair	Poor	Semi - Mature	<5	Lopped for powerline			3.12	Low	Remove	Within Footprint
27	118 Darlington St	USYD	<i>Robinia pseudoacacia "frisa"</i>	Golden Robinia	8	55	44	8	Fair	Poor	Mature	5 - 10	Fruiting bodies at stem based, Confined roots, Power line clearance pruned, Lifting pavements			5.28	Low	Remove	Within Footprint
28	119 Darlington St	USYD	<i>Banksia serrata</i>	Saw-toothed Banksia	2		20	6	Good	Good	Semi - Mature	15 - 30	Growing in small planter			2.4	Low	Remove	Within Footprint
29	119 Darlington St	USYD	<i>Banksia serrata</i>	Saw-toothed Banksia	2		20	6	Good	Good	Semi - Mature	15 - 30	Growing in small planter			2.4	Low	Remove	Within Footprint
30	127 Darlington St	USYD	<i>Tristaniopsislaurina</i>	Kanooka	5		29	6	Good	Fair	Semi - Mature	15 - 30	Service line clearance pruned, co dominant.			3.48	Low	Remove	Within Footprint
31	128 Darlington St	USYD	<i>Callistemon salignus</i>	Willow Bottlebrush.	6		27	7	Fair	Fair	Semi - Mature	10 - 15	Co dominant with bark inclusions,Service line clearance pruned, dieback			3.24	Low	Remove	Within Footprint
32	131 Darlington St	USYD	<i>Banksia serrata</i>	Saw-toothed Banksia	2		10 8	6	Good	Fair	Semi - Mature	10 - 15	Co dominant with bark inclusions			1.6	Low	Remove	Within Footprint
183	Eastern side of Darlington Lane	USYD	<i>Populus deltoides</i>	Poplar	2 (n)	13	11	4	Poor	Poor	Semi - Mature	<5	Basal decay		1.5	1.6	Remove	Remove	Skewed Canopy Overhangs Laneway
182	Eastern side of Darlington Lane	USYD	<i>Populus deltoides</i>	Poplar	2	17	15	7	Fair	Fair	Semi - Mature	5-10		Skewed northwest due to building shade	1.6	1.8	Low	Remove	Skewed Canopy Overhangs Laneway
181	Eastern side of Darlington Lane	USYD	<i>Populus deltoides</i>	Poplar	6w,0 e 2ns	25	22	9	Fair	Fair	Semi - Mature	5-10		Skewed northwest due to building shade	1.9	2.6	Low	Remove	Skewed Canopy Overhangs Laneway
180	Eastern side of Darlington Lane	USYD	<i>Populus deltoides</i>	Poplar	6w,0 e 3ns	33	29	10	Fair	Fair	Semi - Mature	5-10	Epicormics, hangers, deadwood	Skewed northwest due to building shade	2.1	3.5	Low	Remove	Skewed Canopy Overhangs Laneway
179	Eastern side of Darlington Lane	USYD	<i>Populus deltoides</i>	Poplar	1	16	14	5	Poor	Poor	Semi - Mature	0	Almost dead				Remove	Remove	Skewed Canopy Overhangs Laneway
177	Eastern side of Darlington Lane	USYD	<i>Populus deltoides</i>	Poplar	8w,0 e 3ns	31	26	8	Good	Poor	Semi - Mature	5-10	Epicormics, deadwood	Skewed northwest due to building shade.	2.1	3.1	Low	Remove	Skewed Canopy Overhangs Laneway
176	Eastern side of Darlington Lane	USYD	<i>Populus deltoides</i>	Poplar	5w,0 e 2ns	23	20	7	Fair	Fair	Semi - Mature	5-10	Epicormics, deadwood, pevious failures	Skewed northwest due to building shade.	1.8	2.4	Low	Remove	Skewed Canopy Overhangs Laneway

Tree No	Location or property number	Owner	Botanical Name	Common Name	Canopy Diameter	DRC (CM)	DBH (CM)	Height (M)	Health	Structure	Age Class	Life Expectancy (Years)	Defects	Arborist comments	SRZ (M)	TPZ (M)	Retention Value	Outcome	Impact
174	Eastern side of Darlington Lane	USYD	<i>Populus deltoides</i>	Poplar	3w,0 e 1ns	21	17	7	Fair	Fair	Semi - Mature	5-10	Epicormics, deadwood,	Skewed northwest due to building shade.	1.8	2	Low	Remove	Skewed Canopy Overhangs Laneway
173	Eastern side of Darlington Lane	USYD	<i>Populus deltoides</i>	Poplar	3w,0 e 1ns	18	15	7	Fair	Fair	Semi - Mature	5-10	Epicormics, deadwood,	Skewed northwest due to building shade.	1.7	1.8	Low	Remove	Skewed Canopy Overhangs Laneway
172	Eastern side of Darlington Lane	USYD	<i>Populus deltoides</i>	Poplar	5w,0 e 1ns	21	18	7	Fair	Fair	Semi - Mature	5-10	Epicormics, deadwood,	Skewed northwest due to building shade.	1.8	2.2	Low	Remove	Skewed Canopy Overhangs Laneway
171	Eastern side of Darlington Lane	USYD	<i>Populus deltoides</i>	Poplar	6w,0 e 3ns	36	30	12	Good	Fair	Semi - Mature	10-15	Epicormics, deadwood,	Skewed northwest due to building shade.	1.9	3.6	Low	Remove	Skewed Canopy Overhangs Laneway
880	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	15	14	4	Good	Good	Semi -	25-50	Deadwood.	Middle section runing south	1.5	1.7	Low	Retain	
880a	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	15	14	4	Good	Good	Semi -	25-50	Deadwood.		1.5	1.7	Low	Retain	
880b	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,1e	15	14	4	Good	Good	Semi -	25-50	Deadwood.		1.5	1.7	Low	Retain	
880c	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	11	10	3	Good	Good	Semi -	25-50	Deadwood.		1.5	1.5	Low	Retain	
880d	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	11	10	3	Good	Good	Semi -	25-50	Deadwood.		1.5	1.5	Low	Retain	
880e	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	15	14	4	Good	Good	Semi -	25-50	Deadwood.		1.5	1.7	Low	Retain	
880f	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	1	15	14	4	Good	Good	Semi -	25-50	Deadwood.		1.5	1.7	Low	Retain	
880g	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	14	12	4	Good	Good	Semi -	25-50	Deadwood.		1.5	1.5	Low	Retain	
880h	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	14	12	4	Good	Good	Semi -	25-50	Deadwood.		1.5	1.5	Low	Retain	
880i	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	14	12	4	Good	Good	Semi -	25-50	Deadwood.		1.5	1.5	Low	Retain	
879	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wn,0es	15	16	4	Good	Fair	Semi -	25-50	Deadwood.	Northern section, running south	1.5	1.9	Low	Retain	
879a	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	13	11	4	Good	Good	Semi -	25-50	Deadwood.		1.5	1.6	Low	Retain	
879b	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	14	12	3	Good	Good	Semi -	25-50	Deadwood.		1.5	1.5	Low	Retain	
879c	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	14	12	3	Good	Good	Semi -	25-50	Deadwood.		1.5	1.5	Low	Retain	
879d	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	16	16	4	Good	Good	Semi -	25-50	Deadwood.		1.6	1.9	Low	Retain	
879e	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	14	12	4	Good	Good	Semi -	25-50	Deadwood.		1.5	1.5	Low	Retain	
879f	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	14	12	3	Good	Good	Semi -	25-50	Deadwood.		1.5	1.5	Low	Retain	
879g	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	14	12	4	Good	Good	Semi -	25-50	Deadwood.		1.5	1.5	Low	Retain	
879h	Eastern side of Darlington Lane	USYD	<i>Plumeria sp</i>	Frangipani	2wns,0e	14	12	4	Good	Good	Semi -	25-50	Deadwood.		1.5	1.5	Low	Retain	
33	Codrington st	City of Sydney	<i>Liquidambar styraciflua</i>	Liquidamber	8	110	94	10	Good	Fair	Mature	15-25	Co Dominant, previously lopped,		3.5	11.3	Moderate	Retain	
34	os 90 Darlington St	City of Sydney	<i>Liriodendron tulipifera</i>	Tulip tree	1	6	5	2	Good	Good	Young	15-25			1.5	1.5	Low	Retain	
35	os 91 Darlington St	City of Sydney	<i>Populus deltoides</i>	Poplar	4	71	54	15	Fair	Fair	Mature	15-25	Lopped for powerlines, epicormics, Co Dominant, wounds	Innapropriate location for species.	2.9	6.5	Moderate	Retain	
36	os 95 Darlington St	City of Sydney	<i>Populus deltoides</i>	Poplar	6	84	61	18	Fair	Fair	Mature	15-25	Lopped for powerlines, epicormics, Co Dominant, wounds	ABC powerline runs through canopy	3.1	7.3	Moderate	Retain	
37	os 96 Darlington St	City of Sydney	<i>Liriodendron tulipifera</i>	Tulip tree	1	7	6	3	Good	Poor	Young	<5	Previous failures		1.5	1.5	Low	Retain	
38	os 99 Darlington St	City of Sydney	<i>Populus deltoides</i>	Poplar	6w, 444	66	47	12	Fair	poor	Mature	10-15	Lopped for powerlines, epicormics, codom wounds	Powerlines run through canopy	2.8	5.6	Low	Retain	
39	os 100 Darlington St	City of Sydney	<i>Liriodendron tulipifera</i>	Tulip tree	1	10	7	3	Good	Good	Young	15-25	Planted under powerlines	Innapropriate location for species, replacable	1.5	1.5	Low	Retain	
40	os 103 Darlington St	City of Sydney	<i>Liriodendron tulipifera</i>	Tulip tree	1	5	4	3	Good	Good	Young	15-25	Planted under powerlines	Innapropriate location for species, replacable	1.5	1.5	Low	Retain	
41	os 105 Darlington St	City of Sydney	<i>Liriodendron tulipifera</i>	Tulip tree	1	5	4	3	Good	Good	Young	15-25	Planted under powerlines	Innapropriate location for species, replacable	1.5	1.5	Low	Retain	
42	os 106 Darlington St	City of Sydney	<i>Liriodendron tulipifera</i>	Tulip tree	1	11	6	3	Good	Good	Young	15-25	Planted under powerlines	Innapropriate location for species, replacable	1.5	1.5	Low	Retain	
43	os 108 Darlington St	City of Sydney	<i>Liriodendron tulipifera</i>	Tulip tree	1	6	4	3	Good	Good	Young	15-25	Planted under powerlines	Innapropriate location for species, replacable	1.5	1.5	Low	Retain	
44	os 112 Darlington St	City of Sydney	<i>Populus deltoides</i>	Poplar	6w, 444	67	48	12	Fair	poor	Mature	10-15	Lopped for powerlines, epicormics, Co Dominant, wounds	Powerlines run through canopy	2.8	5.8	Low	Retain	
45	os 118 Darlington St	City of Sydney	<i>Liriodendron tulipifera</i>	Tulip tree	1	5	4	3	Good	Good	Young	15-25	Planted under powerlines	Innapropriate location for species, replacable	1.5	1.5	Low	Retain	
46	os 120 Darlington St	City of Sydney	<i>Liriodendron tulipifera</i>	Tulip tree	1	15	9	4	Good	Good	Young	15-25	Planted under powerlines	Innapropriate location for species, replacable	1.5	1.8	Low	Retain	
47	os 124 Darlington St	City of Sydney	<i>Populus deltoides</i>	Poplar	6w, 444	78	59	12	Fair	Fair	Mature	15-25	Epicormics, Co Dominant, wounds, hanger deadwood	Powerlines run through canopy	3	7.1	Moderate	Retain	
48	os 126 Darlington St	City of Sydney	<i>Liriodendron tulipifera</i>	Tulip tree	1	13	8	4	Good	Good	Young	15-25	Planted under powerlines	Innapropriate location for species, replacable	1.5	2.2	Low	Retain	
49	os 128 Darlington St	City of Sydney	<i>Liriodendron tulipifera</i>	Tulip tree	1	3	2	3	Good	Good	Young	15-25	Planted under powerlines	Innapropriate location for species, replacable	1.5	1.5	Low	Retain	
50	os 130 Darlington St	City of Sydney	<i>Populus deltoides</i>	Poplar	6w, 444	69	53	15	Fair	Fair	Mature	15-25	Epicormics, Co Dominant, wounds,	Powerlines run through canopy	2.9	6.4	Moderate	Retain	
51	94 Darlington St	USYD	<i>Plumeria sp</i>	Frangipani	2	13	12,12	3	Good	Fair	Semi -	25-50			1.5	2	Low	Retain	
52	98 Darlington St	USYD	<i>Plumeria sp</i>	Frangipani	2	15	10, 5	3	Good	Fair	Semi -	25-50	Co Dominant		1.5	1.5	Low	Retain	
53	99 Darlington St	USYD	<i>Tibouchina granulosa</i>	Tibouchina	3	20	16	7	Good	Good	Semi -	15-25	Co Dominant, Epicormic		1.7	1.9	Low	Retain	
54	100 Darlington St	USYD	<i>Callistemon citrinus</i>	Bottle Brush	3	30	19, 14	5	Good	Fair	Mature	10-15	Co Dominant		2	2	Low	Retain	
55	105 Darlington St	USYD	<i>Syzygium paniculatum</i>	Brush cherry	2	31	26, 12	8	Good	Fair	Semi -	25-50	Co Dominant		2.1	2.1	Moderate	Retain	
56	109 Darlington St	USYD	<i>Grevillia sp</i>	Grevillia	2, 0s	18	17	5	Good	Fair	Mature	5-10	Co Dominant		1.7	2	Low	Retain	
57	114 Darlington St	USYD	<i>Plumeria sp</i>	Frangipani	5	39	26,27,	6	Good	Fair	Mature	15-25	Co Dominant, wounds		2.3	4.9	Moderate	Retain	
58	118 Darlington St	USYD	<i>Plumeria sp</i>	Frangipani	2	22	19, 14	4	Good	Fair	Semi -	25-50	Co Dominant		1.8	1.8	Low	Retain	
59	121 Darlington St	USYD	<i>Plumeria sp</i>	Frangipani	2	26	20, 18	4	Good	Fair	Semi -	25-50	Co Dominant		1.9	2.2	Low	Retain	
60	123 Darlington St	USYD	<i>Plumeria sp</i>	Frangipani	2	19	9, 9	4	Good	Fair	Semi -	25-50	Co Dominant		1.7	1.7	Low	Retain	
61	125 Darlington St	USYD	<i>Plumeria sp</i>	Frangipani	2	37	19, 21	5	Good	Poor	Semi -	5-10	Co Dominant, wounds	Damaging fence	2.2	2.9	Remove	Retain	
62	126 Darlington St	USYD	<i>Callistemon viminalis</i>	Weeping Bottle	2	29	12,16	9	Good	Good	Semi -	15-25	Co Dominant	Service line through canopy	2	2.4	Low	Retain	
63	126 Darlington St	USYD	<i>Callistemon viminalis</i>	Weeping Bottle	2	24	18	8	Good	Good	Semi -	15-25		Service line through canopy	2.2	1.9	Low	Retain	
64	130 Darlington St	USYD	<i>Plumeria sp</i>	Frangipani	2	19	11, 7	4	Good	Fair	Semi -	25-50	Co Dominant		1.7	1.7	Low	Retain	
65	131 Darlington St	USYD	<i>Plumeria sp</i>	Frangipani	2	12	7,7	3	Good	Fair	Semi -	15-25	Co Dominant		1.5	1.5	Low	Retain	





## 13.6 Appendix F – Species profiles



Photo of a semi-mature tree. (Photo: G.Griffiths)

Botanic Name:  
*Stenocarpus sinuatus*

Common Names:  
**Firewheel Tree**

Family:  
**PROTEACEAE**

Typical Height:  
**8-12 metres**

Typical Width:  
**6 metres**

Typical Growth rate:  
**Moderate.**

Typical Habit:  
**Medium evergreen rainforest tree with smooth grey to brown bark.**

Foliage:  
**Long shiny leathery dark green leaves with a dull green underside.**

Flowers:  
**Deep orange to red flowers in an umbel or wheel like arrangement that gives the tree its name. Summer through to autumn.**

Fruit:  
**The fruit is a long seed pod that contains flat papery seeds.**

Site requirements:  
**Despite its sub-tropical to tropical origin it is adaptable to a range of climates and will even succeed in dry areas. Sunny or partly shaded location. Salt tolerant and drought resistant.**

Source: City of Sydney Tree Policy, Appendices, Part E, Species Data Sheets



***Populus nigra* var. *italica* (Lombardy Poplar)**

<b>Origin</b>	Italy
<b>Characteristics</b>	
Growth Rate	Fast
Habit	Columnar
Height x Width	30-40m x 5-8m
Lifespan	Moderate
<b>Tolerances</b>	
pH	Complete range
Compaction	High to Moderate
Waterlogging	High to Moderate
Drought	Moderate
Frost	High
Aerial Salt	Moderate
<b>Pest &amp; Disease Susceptibility</b>	Susceptible to Poplar rust though resistant selections available.



Left Image: Anon

Right Image: Australian Broadcasting Corporation

**Landscape Notes/ Design Qualities**

A readily distinguished tree having a strong fastigate habit. Bright green foliage turns a golden yellow in Autumn. Being a male clone no fruit ids produced. An extensive root system suckers readily and planting near waterways is best avoided. Prolonged drought will induce early leaf drop. Internal trunk decay in the later stages of life is a common occurrence in Melbourne.

Source : City of Casey, Tree Manual, Appendix 11 - Park Tree Species Data Sheets