



Arboricultural Impact Assessment



Riverlands Development
56 Prescott Parade, Milperra
Shared Cycleway
03/10/2023

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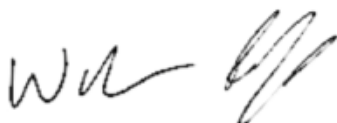


DISCLAIMER and LIMITATIONS

The provision of this report is for *Mirvac Homes (NSW) Pty. Ltd* and the Project Manager (*Calibre Group*) of a proposed shared pathway along the eastern bank of the Georges River, Milperra. The purpose of this report is to provide an Arboricultural Impact Assessment for 141 trees positioned within 10 metres of the proposed pathway. The author of this report is *Temporal Tree Management Pty Ltd*. This report is not designed for any other purpose. The author accepts no responsibility for the use of this report for purposes other than as an Arboricultural Impact Assessment or if used by any other person / party.

This report is not designed for any other purpose. The author accepts no responsibility for the use of this report for purposes other than as an Arboricultural Impact Assessment for this proposed development or if used by any unauthorised person / party.

All observations, recommendations and advice expressed within this report are based on *the Australian Standard for the Protection of Trees on Development Sites (AS 4970 2009)*, the professional experience of the author, information gathered during the site assessments and information provided by the client(s). Trees are dynamically growing organisms that change over time. Recommendations provided in this report reflect the information within the supporting documentation and the condition of the assessed trees on the day of assessment. No guarantee is implied with respect to future tree condition or safety beyond the advice and recommendations within the report.



William Dunlop

Director of *Temporal Tree Management Pty Ltd*.

B. Sc (Adv.), Grad. Dip (Arb) (AQF Level 8), M. UrbHort.

12 June 2023



1. Executive Summary

The purpose of this report is to provide an Arboricultural Impact Assessment for the trees located within 10 metres of a proposed shared pathway along the eastern bank of the George River, Milperra. This pathway will be positioned within the property boundaries of the former Riverlands Golf Course (10/-/DP731859) and a large, undeveloped adjacent allotment (39/-/DP7304). One-hundred and forty-one trees are included in this assessment. This includes forty groups of closely positioned specimens of the same size and species that comprise heavily vegetated areas within the proposed development area.

An assessment of the trees within and adjacent to the subject site was undertaken by William Dunlop of *Temporal Tree Management Pty Ltd* on 23 and 29/03/2023. The trees were located, identified and their retention value assessed using the Tree Retention Values Assessment Methodology (Morton 2011). Tree protection measures are drawn from the *Australian Standard for the Protection of Trees on Development Sites* (AS 4970 2009).

Tree Retention Values

Retention Values for 141 Assessed Trees			
Very Low	Low	Moderate	High
15, 34, 36, 37, 44, 46, 52, 53, 58, 65, 96, 131.	6, 47, 60, 61, 62, 66, 67, 70, 71, 73.	1, 3, 8, 9, 11, 12, 13, 17, 18, 19, 20, 24, 26, 28, 31, 32, 40, 43, 45, 51, 55, 56, 59, 63, 64, 68, 69, 74, 75, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 97, 98, 99, 101, 102, 103, 105, 112, 116, 117, 124, 126, 128, 130, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141.	2, 4, 5, 7, 10, 14, 16, 21, 22, 23, 25, 27, 29, 30, 33, 35, 38, 39, 41, 42, 48, 49, 50, 54, 57, 72, 76, 95, 100, 104, 106, 107, 108, 109, 110, 111, 113, 114, 115, 118, 119, 120, 121, 122, 123, 125, 127, 129.

The retention of forty-eight High Retention value trees is a priority for the proposed development. Seventy-one Moderate retention value trees / tree groups should be retained if reasonably practicable. The retention of ten Low priority trees should not obstruct or require alteration of the proposed design. Twelve Very Low retention value trees should be removed as part of this development.



TPZ Encroachments

Impact of TPZ Encroachments on 141 Assessed Trees				
N/A (0%)	Low (<10%)	Moderate (>10%<20%)	High (>20%<30%)	Severe (>30%)
1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 28, 30, 31, 32, 38, 40, 41, 43, 44, 46, 47, 50, 51, 54, 56, 58, 59, 63, 69, 71, 80, 81, 82, 83, 85, 87, 88, 91, 93, 95, 97, 100, 103, 104, 112, 115, 117, 125, 126, 127, 128, 129.	4, 23, 36, 37, 70, 76, 77, 79, 119, 123, 124.	27, 29, 42, 57, 84, 86, 89, 90, 94, 96, 98, 99, 101, 102, 105, 109, 110, 113, 121, 130, 132, 133, 134, 135, 136, 137, 138, 139, 140.	25, 39, 53, 55, 64, 68, 78, 106, 107, 108, 111, 114, 118, 120, 122.	26, 33, 34, 35, 45, 48, 49, 52, 60, 61, 62, 65, 66, 67, 72, 73, 74, 75, 92, 116, 131, 141.

Twenty-two trees will sustain a major TPZ encroachment that will have a Severe potential impact. Fifteen trees will sustain a major TPZ encroachment that will have a High potential impact. These Severe and High impacts require significant mitigation to allow for the affected trees to be retained. Twenty-nine trees/tree groups will sustain a major TPZ encroachment that will have a Moderate impact. These trees can be retained with mitigation efforts. Eleven trees will sustain minor TPZ encroachments that will have a Minor impact. These encroachments are considered to be acceptable.

A root mapping assessment was undertaken along the closest edge of the pathway that will be within the R_{TPZs} of Trees 33, 35, 39 and 72 to accurately assess the Severe / High impact encroachments they will sustain. Only two minor roots (20mm diameter) were encountered in four survey trenches. Compaction of the topsoil, thick grass ground vegetation cover and access to the water table adjacent to the Georges River are factors that are likely to have encouraged deep root growth for the four assessed trees (Day et al. 2010). It is considered likely these factors have encouraged deeper than expected root growth for all trees across the subject site.

Tree Retention / Removal Schedule

Retain	Remove	Limited Tree Removal from Retained Groups
1-14, 16-33, 35, 38-43, 45, 47-51, 54-57, 59, 63, 64, 68-72, 76-83, 85-88, 91, 93, 95, 97, 100, 103, 104, 106-115, 117-129.	15, 34, 36, 37, 44, 46, 52, 53, 58, 60, 61, 62, 65, 66, 67, 73, 74, 75, 92, 96, 116, 131, 141	84, 89, 90, 94, 98, 99, 101, 102, 105, 130, 132, 133, 134, 135, 136, 137, 138, 139, 140

Trees 34, 52, 58, 60, 61, 62, 65, 66, 67, 73, 74, 75, 92, 96, 116, 131, 141 will require removal to facilitate the proposed development. These seventeen trees are positioned within the footprint of the proposed pathway or will sustain unacceptable major TPZ encroachments. In addition, all remaining



Very Low retention value trees (Trees 15, 36, 37, 44, 46 and 53) should be removed as part of the proposed development. Selective removal will be required for individual specimens in the following retained tree groups: Trees 84, 89, 90, 94, 98, 99, 101, 102, 105, 130, 132, 133, 134, 135, 136, 137, 138, 139, 140. Trees 42, 76, 110 and 114 will require minor uplift pruning to facilitate the construction of the proposed pathway.

Boundary fencing must be established on the eastern side of the proposed pathway and on both sides of the pathway within the south-western portion of the former Riverlands Golf Club. Boundary fencing should be no more than 500mm from the nearest edge of the pathway footprint. It is recommended that all asphalt demolition and excavation within the southern portion of the pathway that is within the RTPZs of Trees 25, 26, 33, 35, 39, 42, 45, 48, 49, 72 and 78 be supervised by the Project Arborist. All excavation within the central portion of the pathway that is within the RTPZs of Trees 106, 108, 111, 113, 114, 118, 119, 120, 121 and 124 must also be undertaken under the supervision of the Project Arborist. Hand tools must be used where required to mitigate the potential impact on any encountered tree roots.



2. Location

2.1. Site Location

The subject site for this Arboricultural Impact Assessment (AIA) is the proposed location of a shared pathway along the eastern bank of the Georges River. This pathway will be positioned within the property boundaries of the former Riverlands Golf Course (10/-/DP731859) and a large, undeveloped allotment (39/-/DP7304) that is adjacent to the former Riverlands Golf Course.

This AIA must be read in combination with the *Riverlands Golf Course Pedestrian and Cyclist Shared Pathway Plans (Revision D)*, as prepared by Calibre (Project Number 19-000908) (13/02/2023).

2.2. Relevant Policy Controls

The subject site is located within the City of Canterbury Bankstown local government area. A portion of the subject site within the former Riverlands Golf Course falls within an RE2 Private Recreation zone. The remaining portion of the subject site falls within an RE1 Public Recreation Zone (Planning NSW 2023). The environmental policy regulations relevant to the trees within the subject site are drawn from the *NSW State Environmental Planning Policy (SEPP) (Biodiversity and Conservation) 2021*.

The policy controls governing the management of the trees are outlined in *Part B11 'Tree Preservation Order' of the Bankstown Development Control Plan (2015)* and the *City of Canterbury-Bankstown Council Tree Management Manual* (City of Canterbury-Bankstown Council 2023). These policy controls draw from the *Australian Standard for the Protection of Trees on Development Sites* (AS4970 2009) and the *Australian Standard for Pruning Amenity Trees* (AS4373 2007).

There are remnant patches of *River-Flat Eucalypt Forest* and *Swamp Oak Floodplain Forest* within the subject site, which are both listed Ecologically Endangered Communities (SEED 2023). This renders the indigenous trees within the subject site of increased Landscape Significance.

2.3. Tree Locations

An assessment of the trees within the subject site was undertaken by William Dunlop of *Temporal Tree Management P/L* on 22 and 29/03/2023. As stipulated in the *Part B11 of the Bankstown DCP (2015)* and the *City of Canterbury-Bankstown Council Tree Management Manual*, woody vegetation was prescribed as a 'tree' if its height exceeded 5 metres (City of Canterbury Bankstown Council 2023).



One-hundred and forty-one trees were included in this assessment (Figure 1). This includes forty groups of closely positioned specimens of the same size and species. Tree tags were installed on all assessed trees / tree groups.

Trees 1-79 are positioned inside the RE2 zoned land within the south-western corner of the former Riverlands Golf Course and the RE1 zoned land adjacent to the south-western boundary. Trees 80-98 are positioned within the RE1 zoned land inside the western boundary of the former Riverlands Golf Course adjacent to the Georges Riverbank. Trees 99-141 are positioned within the RE1 zoned land adjacent to the Georges River within the property of 39/-/DP7304) (*Appendix E and Appendix F*).



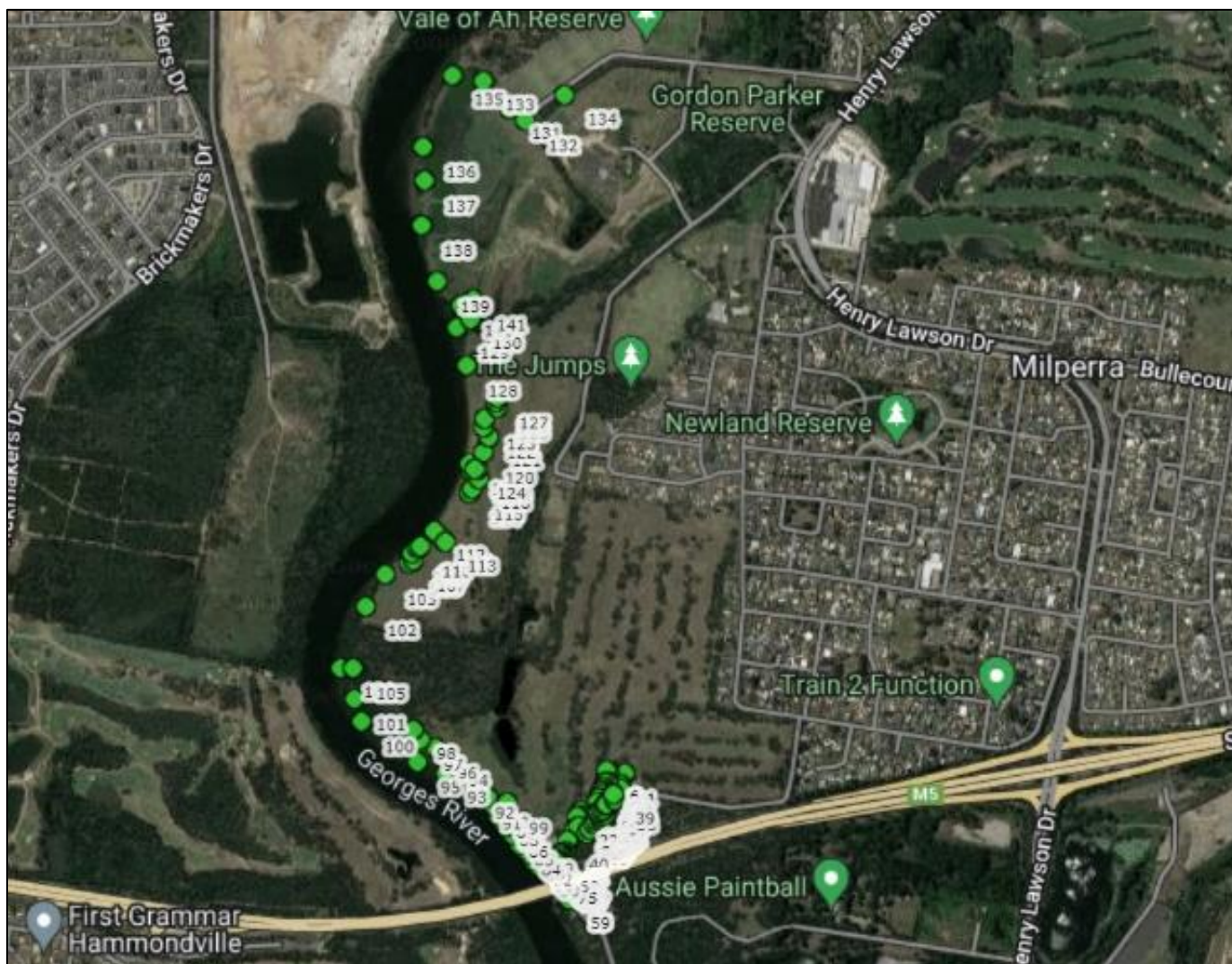


Figure 1. Location of one-hundred and forty-one assessed trees. Detailed Tree Location Maps are provided in Appendix E.



3. Site Development Plans

The proposed shared pathway will extend along the eastern bank of the Georges River from the M5 over-pass to Auld Avenue (Figure 2). Much of the development will be a 3.5-metre-wide concrete pathway. A large portion of the pathway within the former Riverlands Golf Course will replace an existing asphalt roadway. An excavation depth of 450mm will be required for the construction of the concrete pathway within the undeveloped areas. Elevated sections of 3.5-metre-wide pathway will be built over the two heavily vegetated Georges River tributaries. The suspended foundations for the elevated sections will require significantly less excavation.

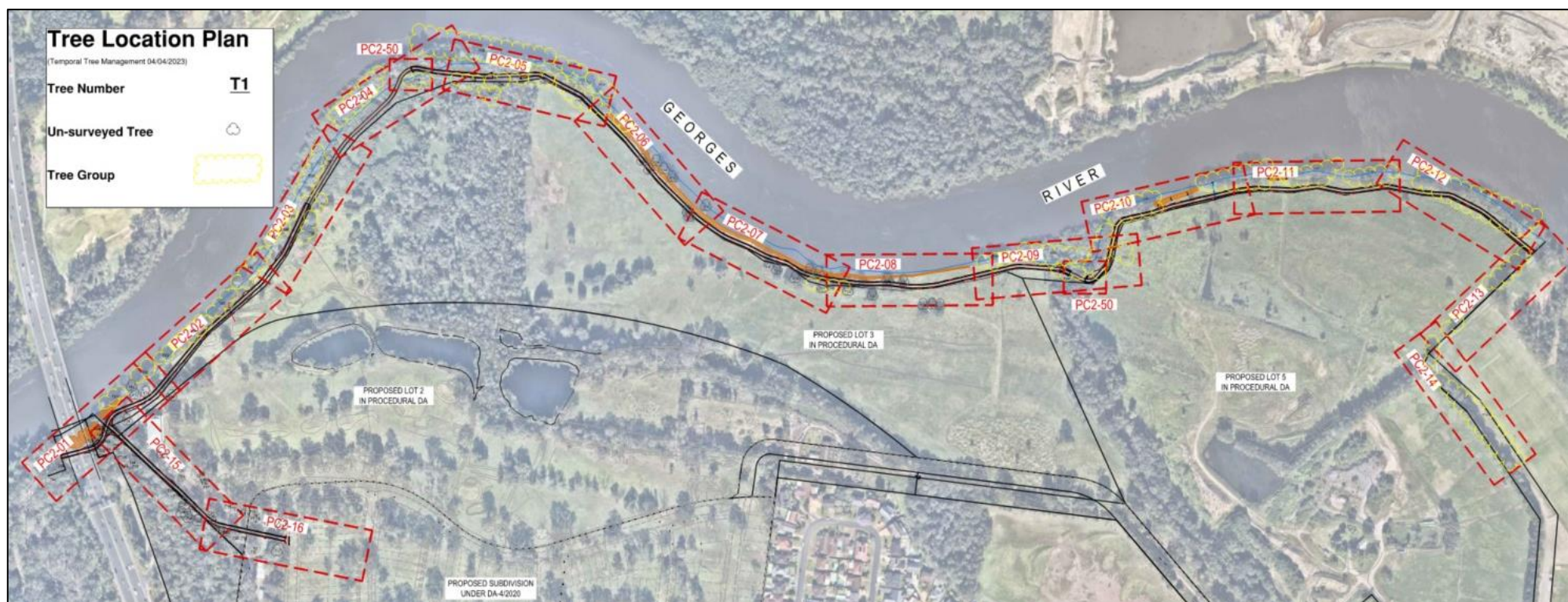


Figure 2. Proposed Georges River Shared Pathway. Site Key Plan (Drawing PC0-01-RevD) drawn by Calibre (02/23), annotated by Temporal Tree Management (12/06/2023). See Appendix F. for detailed Tree Location Plans.



4. Preliminary Assessment

4.1 Assessment Methodology

A ground-based visual assessment of Trees 1-141 was undertaken by William Dunlop of *Temporal Tree Management Pty Ltd* on 23 and 29/03/2023. The data collected includes:

Ø Tree Number: Trees were numbered in order of assessment. A considerable number of the trees included in this report have previously been assessed as part of separate development application. Previously used tree numbers and associated tags are not relevant to this assessment.

Tree groups were formed for closely positioned specimens of the same size and species. Tree tags were installed on all assessed trees / tree groups.

Ø Scientific Name: Vegetation was identified and described using botanical names.

Ø Common Name: One common is provided.

Ø Maturity: **Juvenile, Semi – mature, Mature or Over Mature**. Judgement on these four categories was determined by professional knowledge and research on the species present.

Ø Canopy Radius: Estimated in **metres** as an average in metres from two planes.

Ø Height: Estimated in **metres**.

Ø Diameter at Breast Height (DBH): DBH was measured at 1.4 metres height using a tape measure and is described in **centimetres**. This measurement was used to determine the Tree Protection Zone for each tree. The DBH of the largest specimen in a tree group was applied to all trees in that group.

Ø Diameter at Root Flare (DRF): DRF was measured using a diameter tape at the height of the trees' root flare and is described in **centimetres**. This measurement was used to determine the Structural Root Zone for each tree. The DRF of the largest specimen in a tree group was applied to all trees in that group.



Ø Condition: **Dead, Poor, Fair, Good or Excellent**. Professional experience along with the visual vitality index established by Johnston et al. (2012) was used to underpin this category (*Appendix A*).

Ø Structure: **Failed, Very Poor, Poor, Fair, Good or Excellent**. Professional experience along with Visual Tree Assessment methodology established by Mattheck and Breloar (1994) was used to underpin this category.

Ø Useful Life Expectancy (ULE): This estimate provides an important estimate of a tree's remaining safe life span within a landscape (Barrell 1996). Estimates are based on species knowledge and an individual's structure, health and position within the landscape. ULE estimate categories used were: **Long** (>40 years), **Medium** (between 15 and 40 years), **Short** (between 5 and 15 years), **Transient** (Less than 5 years), **Dead or Hazardous** (less than 12 months). A framework for the ULE determination methodology is provided in *Appendix D* (Barrell 1996).

Ø Landscape Value: **Significant** (1), **Very High** (2), **High** (3), **Moderate** (4), **Low** (5), **Very Low** (6), **Insignificant** (7). These categories account for each tree's size, ecological significance as a food or habitat resource, structural integrity, visual prominence within the landscape and any additional heritage or protection controls that may be relevant to it. A framework for the Landscape Significance determination methodology is provided in *Appendix C* (Morton 2011).

Ø Retention Value: **High, Moderate, Low and Very Low**. ULE and Landscape Significance categories were used for each tree to determine their retention value (Figure 12). A framework for the Retention Value priorities is provided in *Appendix B* (Morton 2011).



	Landscape Significance Reading						
Tree Sustainability	1	2	3	4	5	6	7
Greater than 40 years	High Retention Value						
15 to 40 years				Moderate			
5 to 15 years				Low			
Less than 5 years					Very Low Retention Value		
Dead or hazardous							

Figure 3. Tree retention values assessment methodology. Matrix modified by A. Morton (2011) Tree Retention Values Table Footprint Green Pty Ltd, Sydney Australian. Accessed from the Newcastle Urban Forest Technical Manual (2018). A framework for the Retention Value priorities is provided in *Appendix B* (Morton 2011).

Ø Tree Protection Zone Radius (R_{TPZ}): This measure provides the principle means of protecting trees on construction sites. A TPZ radius (R_{TPZ}) may be calculated using the equation from the Australian Standard for the Protection of Trees on Development Sites (AS 4970 2009):

$$R_{(TPZ)} = DBH \times 12.$$

A minimum R_{TPZ} measure of 2 metres was calculated for this assessment. Once a TPZ is established, all construction activity should be excluded from within its borders. Encroachments may occur under further arboricultural assessment, advice and supervision.

Ø Structural Root Zone Radius (R_{SRZ}): This measure provides an indication of the portion of a tree's root plate that is considered fundamentally important for the maintenance of structural integrity. An SRZ radius (R_{SRZ}) may be calculated using the equation from the *Australian Standard for the Protection of Trees on Development Sites* (AS 4970 2009):

$$R_{(SRZ)} = (DRF \times 50)^{0.42} \times 0.64$$



5. Tree Data Summary

Table 1. Summarised tree retention value data for one-hundred and forty-one trees assessed on 23 and 29/03/2023 within the subject site. Trees determined to be of High retention value are annotated in Green, trees determined to be of Moderate retention value are in Red, trees determined to be of Low retention value are in Yellow and trees of Very Low retention value are annotated in Blue. Detailed Tree Data Sheets are included in *Appendix G*.

Retention Values for 141 Assessed Trees			
Very Low	Low	Moderate	High
15, 34, 36, 37, 44, 46, 52, 53, 58, 65, 96, 131.	6, 47, 60, 61, 62, 66, 67, 70, 71, 73.	1, 3, 8, 9, 11, 12, 13, 17, 18, 19, 20, 24, 26, 28, 31, 32, 40, 43, 45, 51, 55, 56, 59, 63, 64, 68, 69, 74, 75, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 97, 98, 99, 101, 102, 103, 105, 112, 116, 117, 124, 126, 128, 130, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141.	2, 4, 5, 7, 10, 14, 16, 21, 22, 23, 25, 27, 29, 30, 33, 35, 38, 39, 41, 42, 48, 49, 50, 54, 57, 72, 76, 95, 100, 104, 106, 107, 108, 109, 110, 111, 113, 114, 115, 118, 119, 120, 121, 122, 123, 125, 127, 129.



Of the one-hundred and forty-one assessed trees, forty-eight were determined to be of High Retention Value within the surrounding landscape, seventy-one were determined to be of Moderate Retention Value, ten were determined to be of Low Retention Value and twelve were determined to be of Very Low Retention Value.

Trees 2, 4, 5, 7, 10, 14, 16, 21, 22, 23, 25, 27, 29, 30, 33, 35, 38, 39, 41, 42, 48, 49, 50, 54, 57, 72, 76, 95, 100, 104, 106, 107, 108, 109, 110, 111, 113, 114, 115, 118, 119, 120, 121, 122, 123, 125, 127, 129 were determined to be of High Retention Value within the surrounding landscape. The retention of these forty-eight trees is a priority for the proposed development within the subject site. Protection measures compliant with *the Australian Standard for the Protection of Trees on Development Sites (AS4970 2009)* must be established for these trees where necessary.

Trees 1, 3, 8, 9, 11, 12, 13, 17, 18, 19, 20, 24, 26, 28, 31, 32, 40, 43, 45, 51, 55, 56, 59, 63, 64, 68, 69, 74, 75, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 97, 98, 99, 101, 102, 103, 105, 112, 116, 117, 124, 126, 128, 130, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141 were determined to be of Moderate retention value. These seventy-one trees should be retained as part of the planned development works if reasonably practicable. If their retention is not reasonably practicable, these trees are suitable for removal providing they are replaced as part of the development. If retained, protection measures compliant with *the Australian Standard for the Protection of Trees on Development Sites (AS4970 2009)* must be established for these trees where necessary.

Trees 6, 47, 60, 61, 62, 66, 67, 70, 71, 73 were determined to be of Low retention value within the surrounding landscape. Trees 15, 34, 36, 37, 44, 46, 52, 53, 58, 65, 96, 131 have died or are of species exempt from the protection controls outlined in *Part B11 of the Bankstown Development Control Plan (2015)* and were determined to be of Very Low Retention value. The retention of these twenty-two trees should not obstruct or require alteration of the planned development works.



6. Tree Protection Zones (TPZs)

6.1. Tree Protection Zones

Tree Protection Zones are aimed at preventing soil compaction, contamination and physical damage to trees above and below ground (Matheny and Clark 1994). The tree protection zone radius (R_{TPZs}) and structural root zone radius (R_{SRZs}) were calculated for each tree as per *AS4970 (2009)* (Figure 4). TPZ and SRZ radii for Trees 1-141 are provided in *Appendix G* and *Appendix H*.

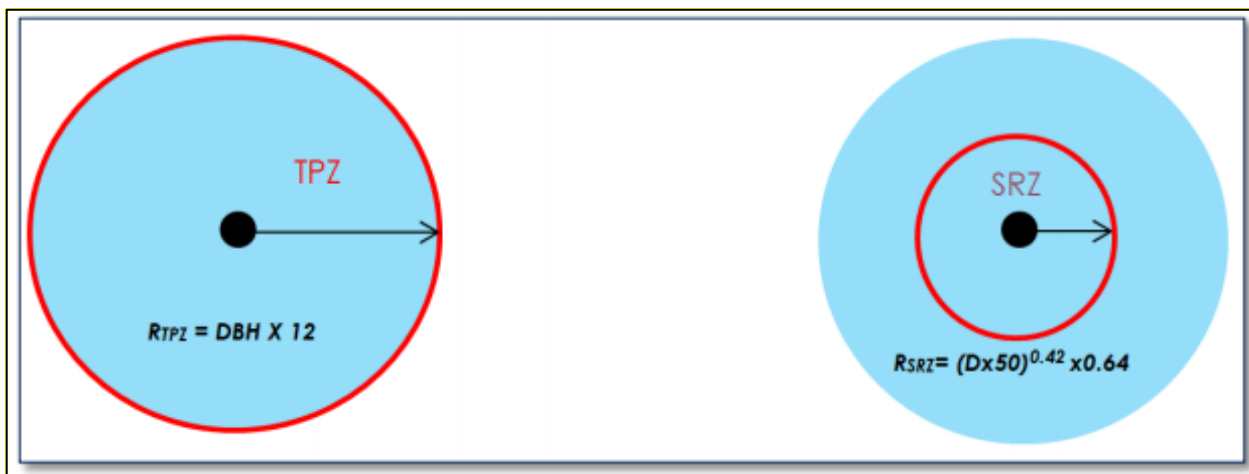


Figure 4. TPZ and SRZ radial measurement equations.

6.2. TPZ Encroachments

A TPZ encroachment is the proportional area of a tree's TPZ that will be absorbed, disturbed or exposed as part of a development. As defined in *Sections 3.3.2 and 3.3.3 of AS4970 (2009)*, minor TPZ encroachments are less than 10% of a tree's TPZ area while major TPZ encroachments exceed 20%.

Encroachments of less than 10% of the total TPZ area may occur without the site presence of the Project Arborist providing there is an equal compensation of area elsewhere within the TPZ. The impact of a TPZ encroachment that is less than 10% is defined as Low in this assessment.

TPZ Encroachments of 10-20% are considered to be acceptable providing the tree's condition is shown to be Good/Fair. Mitigation strategies including tree protection measures and / or design alterations should be utilised to reduce the impact associated with major encroachments within this range. The impact of a TPZ encroachment that is between 10-20% is defined as Moderate in this assessment.



Major encroachments of between 20-30% may negatively impact a tree's health and structure. Retention under such major encroachments will require a root mapping assessment, modified design to the encroaching structure and/or specific consultation from the Project Arborist relating to excavation monitoring and root cutting. The impact of a TPZ encroachment that is between 20-30% is defined as High in this assessment.

Major encroachments of greater than 30%, or any encroachment that breaches a tree's SRZ, are likely to impact a tree's health and the structural integrity of their root plate. Retention under such encroachments is generally unacceptable unless significant mitigation of the impact can be shown. The impact of a TPZ encroachment that is between greater than 30% is defined as Severe in this assessment (Table 2).

6.2.1. Site Specific Encroachments

Table 2. TPZ encroachments associated with the proposed development calculated for Trees 1-141. N/A TPZ encroachments (0%) are annotated in Blue, Low impact encroachments (<10%) are annotated in Green, Moderate impact encroachments (10-20%) are annotated in Yellow, High impact encroachments (20-30%) are annotated in Orange and Severe impact encroachments (>30%) are annotated in Red. Tree Encroachment Data Tables are included in *Appendix H*. TPZ encroachments are shown in *Appendix I*.

Impact of TPZ Encroachments on 141 Assessed Trees				
N/A (0%)	Low (<10%)	Moderate (>10%<20%)	High (>20%<30%)	Severe (>30%)
1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 28, 30, 31, 32, 38, 40, 41, 43, 44, 46, 47, 50, 51, 54, 56, 58, 59, 63, 69, 71, 80, 81, 82, 83, 85, 87, 88, 91, 93, 95, 97, 100, 103, 104, 112, 115, 117, 125, 126, 127, 128, 129.	4, 23, 36, 37, 70, 76, 77, 79, 119, 123, 124.	27, 29, 42, 57, 84, 86, 89, 90, 94, 96, 98, 99, 101, 102, 105, 109, 110, 113, 121, 130, 132, 133, 134, 135, 136, 137, 138, 139, 140.	25, 39, 53, 55, 64, 68, 78, 106, 107, 108, 111, 114, 118, 120, 122.	26, 33, 34, 35, 45, 48, 49, 52, 60, 61, 62, 65, 66, 67, 72, 73, 74, 75, 92, 116, 131, 141.

Trees 26, 33, 34, 35, 45, 48, 49, 52, 60, 61, 62, 65, 66, 67, 72, 73, 74, 75, 92, 116, 131 and 141 will sustain major TPZ encroachments that will have a Severe impact as part of the proposed development works within the subject site. The stems of Trees 60, 61, 62, 65, 66, 67, 73, 74, 75, 92, 116, 131 and 141 are within or immediately adjacent to the footprint of the proposed pathway.

The impact of the major encroachments with Severe / Major impacts that will be sustained by Trees 25, 26, 33, 35, 39, 45, 48, 49 and 72 will be mitigated by the replacement of the existing asphalt roadway that is within their TPZs and SRZs. Reduced additional excavation will be required beneath this existing impermeable surface, which will reduce the likelihood of root disturbance.



Trees 25, 39, 53, 55, 64, 68, 78, 106, 107, 108, 111, 114, 118, 120 and 122 will sustain major TPZ encroachments that will have a High impact as part of the proposed development works within the subject site. Alteration to the pathway design has been made in order to mitigate the impact of the encroachments sustained by 106, 108, 111, 112, 113, 118 and 119-122.

Trees 27, 29, 42, 57, 84, 86, 89, 90, 94, 96, 98, 99, 101, 102, 105, 109, 110, 113, 121, 130, 132, 133, 134, 135, 136, 137, 138, 139 and 140 will sustain TPZ encroachments that will have a Moderate impact as part of the proposed development works within the subject site. The impact of the encroachments sustained by Trees 27, 29 and 42 will be suitably mitigated by the replacement of the existing asphalt surface. The encroachments that will be sustained by Trees 57, 109 and 110 are acceptable providing management strategies are in place that will mitigate the Moderate impacts they will sustain.

Trees 84, 86, 89, 90, 94, 96, 98, 99, 101, 102, 105, 124, 130, 132, 133, 134, 135, 136, 137, 138, 139 and 140 are groups of closely positioned Swamp She-oak (*Casuarina glauca*) specimens. The good health, smaller size and increased species tolerance of root disturbance suggests the trees within these groups will suitably respond to Moderate TPZ encroachments without mitigation measures. Specified distance setbacks are provided in *Appendix G and Appendix H* to maintain these acceptable major encroachments.

Trees 4, 23, 36, 37, 70, 76, 77, 79, 119, 123 and 124 will sustain minor TPZ encroachments that will have a Low impact. The encroachments they will sustain are considered to be acceptable.



7. Root Mapping Assessment

Trees 33, 35, 39 and 72 will sustain major TPZ encroachments within undisturbed portions of their TPZs that are likely to have a Severe / Major impact. A root mapping assessment was undertaken to accurately determine the possible root disturbance associated with the excavation required for the portions of the pathway that will be within their TPZ's.

7.1 Root Mapping Methodology

Four root mapping survey trenches were non-destructively excavated during the site assessment on 29/03/2023 (Figure 5 and Figure 6). The survey trenches were non-destructively excavated using a hydro-vac.

All major tree roots (diameter of or greater than 40mm) were protected and retained during this non-destructive excavation. Only minor tree roots of 15 mm or greater were suitably protected and retained as part of this excavation. Minor roots of less than 15mm diameter that were encountered were preserved where possible. However, due to their small size, their protection and preservation was difficult during the non-destructive excavation.

Encountered tree roots were numbered. The diameter of each encountered tree root and depth within the survey trench were to be measured in mm. Distance from the northern edge of each trench (adjacent to the kerb) was measured in metres.

7.2 Survey Trenches 1-4

The maximum required depth for the pathway construction will be 450mm. An excavation depth of 450mm was therefore used for these four survey trenches. Survey trenches were excavated along all accessible portions of the nearest edge of the proposed pathway that are positioned within the TPZs of Trees 33, 35, 39 and 72 (Figure 5 and Figure 6).



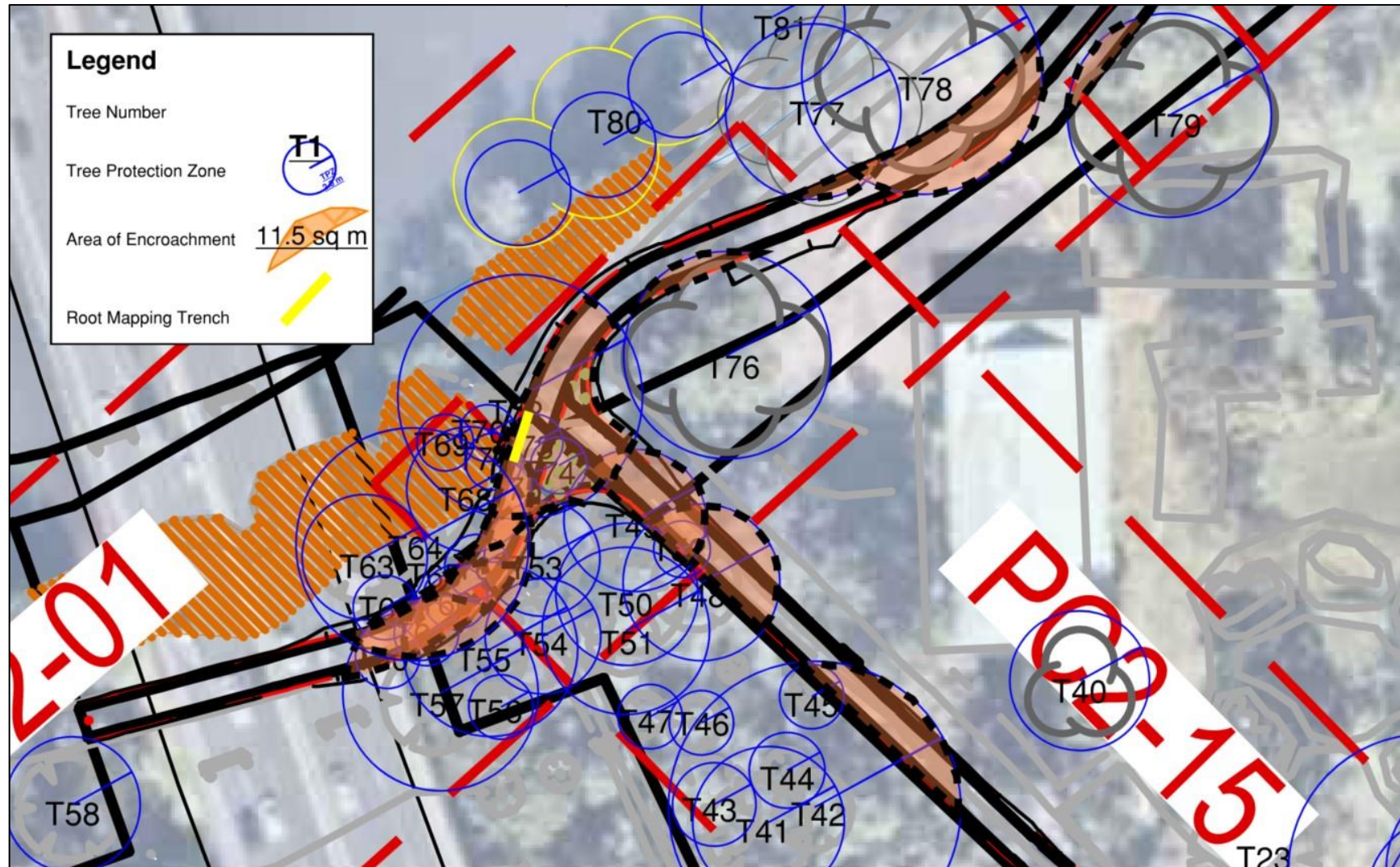


Figure 5. Position of Survey Trench 1. Site Key Plan (Drawing PC0-01-RevD) drawn by Calibre (02/23), annotated by Temporal Tree Management (12/06/2023). See Appendix I for detailed TPZ Encroachment Plans.



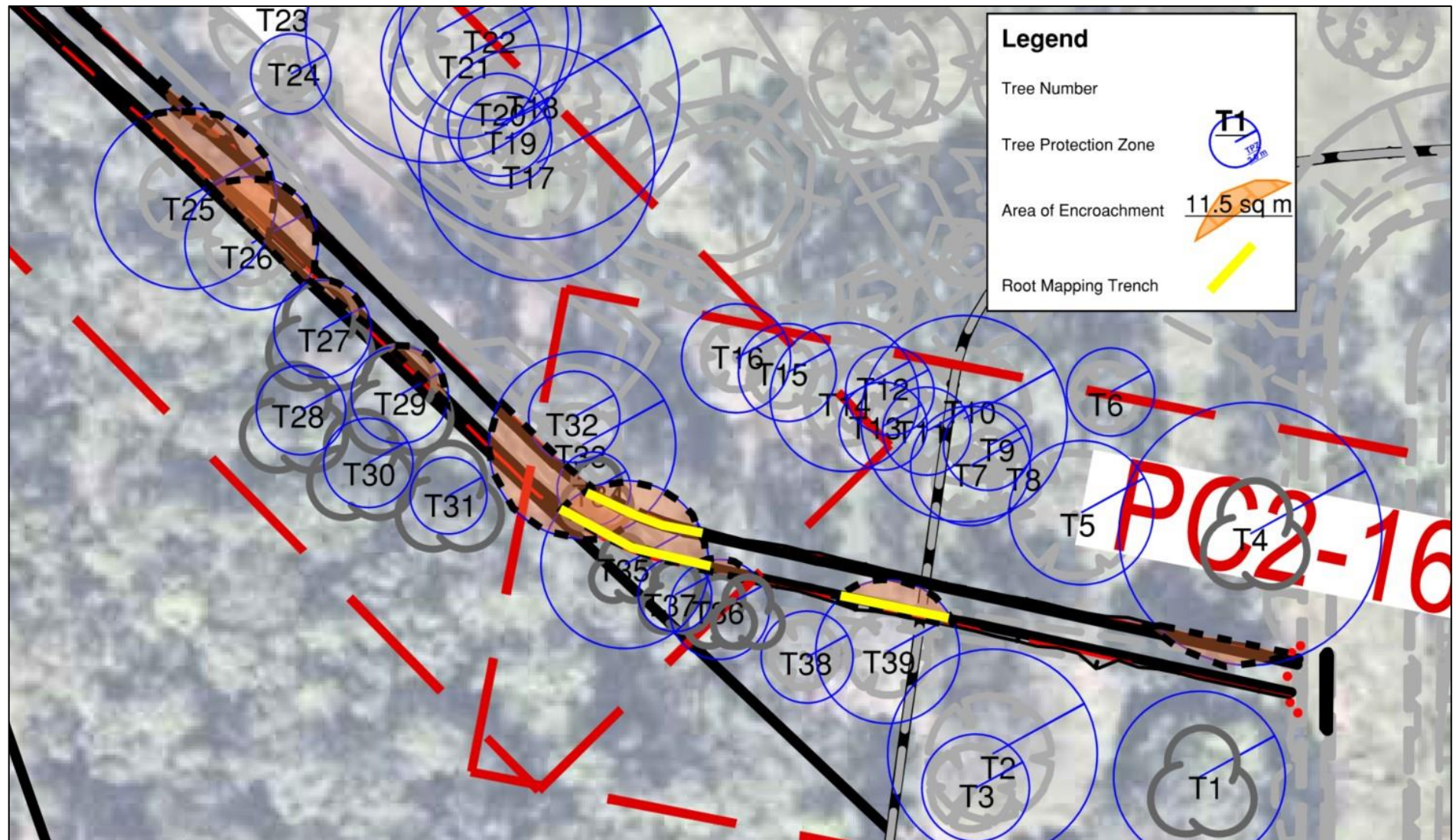


Figure 15. Position of Survey Trenches 2, 3 and 4. Site Key Plan (Drawing PC0-01-RevD) drawn by Calibre (02/23), annotated by Temporal Tree Management (12/06/2023). See Appendix I for detailed TPZ Encroachment Plans.



7.3 Root Mapping results

Negligible tree roots were encountered despite the close proximity of the four survey trenches to the assessed trees. Compaction of the topsoil, thick grass ground vegetation cover and access to the water table adjacent to the Georges River are likely to have encouraged deep root growth for the four assessed trees (Day et al. 2010). These findings confirm that the major encroachments sustained by Trees 33, 35, 39 and 72 will have a tolerable impact. These observations also suggest deep root growth is likely across the subject site.

7.3.1. Survey Trench 1

There were no minor roots of 15mm or greater encountered in Survey Trench 1. There were no major tree roots encountered in this survey trench (Figure 7).



Figure 7. No tree roots were encountered in Survey Trench 1.

7.3.2. Survey Trench 2

One minor root of 15mm diameter was encountered in Survey Trench 2 (Figure 8). There were no major tree roots encountered in this survey trench. The encountered minor root was pruned during the inspection in compliance with *Section 3.3.3 of AS4970 (2009)*.



Figure 8. One minor root was encountered in Survey Trench 2.



7.3.3. Survey Trench 3

One minor root of 15mm diameter was encountered in Survey Trench 2 (Figure 9). There were no major tree roots encountered in this survey trench. The encountered minor root was pruned during the inspection in compliance with *Section 3.3.3 of AS4970 (2009)*.



Figure 9. One minor root was encountered in Survey Trench 3.



7.3.4. Survey Trench 4

There were no minor roots of 15mm or greater encountered in Survey Trench 4. There were no major tree roots encountered in this survey trench (Figure 10).



Figure 10. No tree roots were encountered in Survey Trench 4.



8. Tree Protection / Removal Plan

8.1. Tree Removal / Pruning Schedule

Table 3. Tree removal / retention schedule for proposed Shared Pathway design plans. Detailed Tree Data Tables are provided in Appendix G.

Retain	Remove	Limited Tree Removal from Retained Groups
1-14, 16-33, 35, 38-43, 45, 47-51, 54-57, 59, 63, 64, 68-72, 76-83, 85-88, 91, 93, 95, 97, 100, 103, 104, 106-115, 117-129.	15, 34, 36, 37, 44, 46, 52, 53, 58, 60, 61, 62, 65, 66, 67, 73, 74, 75, 92, 96, 116, 131, 141	84, 89, 90, 94, 98, 99, 101, 102, 105, 130, 132, 133, 134, 135, 136, 137, 138, 139, 140

Trees 34, 52, 58, 60, 61, 62, 65, 66, 67, 73, 74, 75, 92, 96, 116, 131, 141 will require removal to facilitate the proposed development. These seventeen trees are positioned within the footprint of the proposed pathway or will sustain unacceptable major TPZ encroachments. In addition, all remaining Very Low retention value trees (Trees 15, 36, 37, 44, 46 and 53) should be removed as part of the proposed development (Table 3, *Appendix G*).

Efforts to alter the pathway design have been made as part of the *Riverlands Golf Course Pedestrian and Cyclist Shared Pathway Plans (Revision D)*, as prepared by *Calibre (Project Number 19-000908) (13/02/2023)*. The alterations made to the position of the pathway have minimised the encroachment impacts on all affected High retention value trees and as many Moderate retention value trees as is reasonably practicable. As a result, there are no High retention value trees as identified in this assessment that will require removal.

Trees 34, 52, 58, 65, 96 and 131 were determined to be of Very Low retention value. Trees 60, 61, 62, 66, 67 and 73 were determined to be of Low retention value. The removal of these twelve trees to facilitate the proposed pathway is considered to be acceptable.

Trees 74, 75, 92, 116 and 141 were determined to be of Moderate retention value. Alteration of the pathway position cannot be made to allow for the retention of these five trees without requiring the subsequent removal of further Moderate and High retention value trees. As such, the removal of these five trees is considered to be acceptable part of the proposed development.



Large, densely clustered groups of Swamp She-oak (*Casuarina glauca*) are positioned within the subject site along the edge of the Georges River. These groups are predominantly made up of small trees and mature sucker growth. Moderate TPZ encroachments were determined to be suitable for these groups. Selective removal will be required for individual specimens in the following tree groups: Trees 84, 89, 90, 94, 98, 99, 101, 102, 105, 130, 132, 133, 134, 135, 136, 137, 138, 139, 140. Tree removal requirements are provided in the comments for each tree group in *Appendix G and H*. An estimate total of 220 individual tree removals is required from these groups. The removal of approximately 100 specimens from Tree 134 to facilitate the Auld Avenue connection accounts for the majority of the tree removal from retained groups. Confirmation from the Project Arborist is required individual tree removals from retained groups.

Trees 34, 36, 58, 60, 61, 62, 66, 67, 73, 74, 75, 92, 116, 141 are prescribed trees under *Part B11 'Tree Preservation Order' of the Bankstown Development Control Plan (2015)*. Prior approval for the removal of these trees must be obtained as part of the Conditions of Consent for the proposed development. Trees 15, 37, 44, 46, 53 and 65 have died. Trees 52, 96 and 131 are of potentially noxious species that are exempt from the protection controls outlined in *Part B11 'Tree Preservation Order' of the Bankstown Development Control Plan (2015)*. These nine trees may be removed without prior consent from the Bankstown City Council Tree Management Officer.

Trees 42, 76, 110 and 114 will require minor uplift pruning to facilitate the construction of the proposed pathway. Descending second and third-order branches over the proposed pathway location must be pruned to maintain a 4.5 metre ground clearance over the pathway to allow for vehicle use. A maximum pruning cut diameter of 60mm and total live canopy reduction of 5% will not be exceeded during this pruning work.

Tree removal works should be undertaken by a suitably qualified arborist (minimum AQF Level 3) and must be in compliance with the *Work Safe Guide to Managing Risks of Tree Trimming and Removal Work (2016)*. Tree pruning works must be undertaken by a suitably qualified arborist (minimum AQF Level 3) and in compliance with the *Australian Standard for Pruning Amenity Trees (AS4373 2007)*. There were no active hollows or nests observed during this ground-based assessment for the trees recommended for removal. Tree removal or pruning works must be halted, and an ecologist notified, if any arboreal fauna, active hollows or active nests are encountered during the works. An ecologist and the Project Arborist must be engaged to provide guidance in such cases.



8.2. Tree Protection Measures

Fenced protection zones must be established where possible to delineate construction activities from the TPZs and SRZs of retained trees. Fenced protection zones must be enclosed by 1.8 metre steel fencing that is securely fixed to the ground as stated in *Section 4.3 of AS4970 (2009)* (Figure 11). Signage stating the purpose of these exclusion zones should be fixed to the fencing so that it is visible from all points within the site.

As per *Section 4.2 of AS4970 (2009)*, the following activities are not permitted inside delineated protection zones:

- (a) Machine excavation including trenching;*
- (b) Excavation for silt fencing;*
- (c) cultivation;*
- (d) storage;*
- (e) preparation of chemicals, including preparation of cement products;*
- (f) parking of vehicles and plant;*
- (g) refuelling;*
- (h) dumping of waste;*
- (i) wash down and cleaning of equipment;*
- (j) placement of fill*
- (k) lighting of fires;*
- (l) soil level changes;*
- (m) temporary or permanent installation of utilities and signs, and*
- (n) physical damage to the tree."*

Stem protection measures must be installed on retained trees in situations where the establishment of protection fencing is not feasible. Stem protection measures compliant with Section 4.5.2 of *AS4970 (2009)* may be installed using hessian or carpet underlay padding wrapped around the trees' stems and fixed in place using duct tape. Timber battens (20mm x 100mm) must then be spaced no greater than 150 mm around the stems and fixed to one another using steel strapping. Timber battens must not be fixed directly to the trees' stems (Figure 12). Ground protection measures may be required to allow access within retained trees' TPZs (Figure 12).



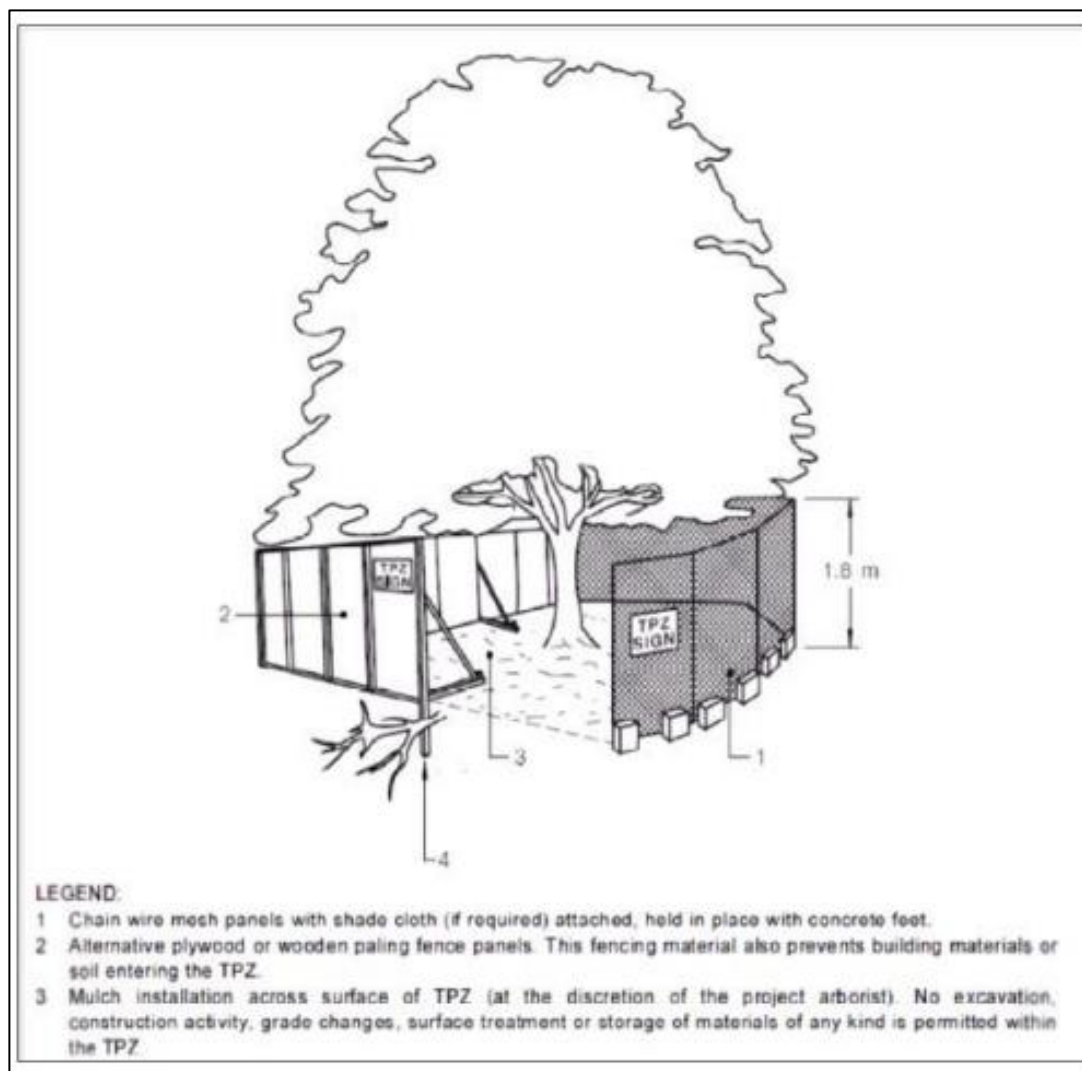


Figure 11. Steel fencing should be erected around the perimeter of TPZs in accordance with *AS4970 (2009)*.



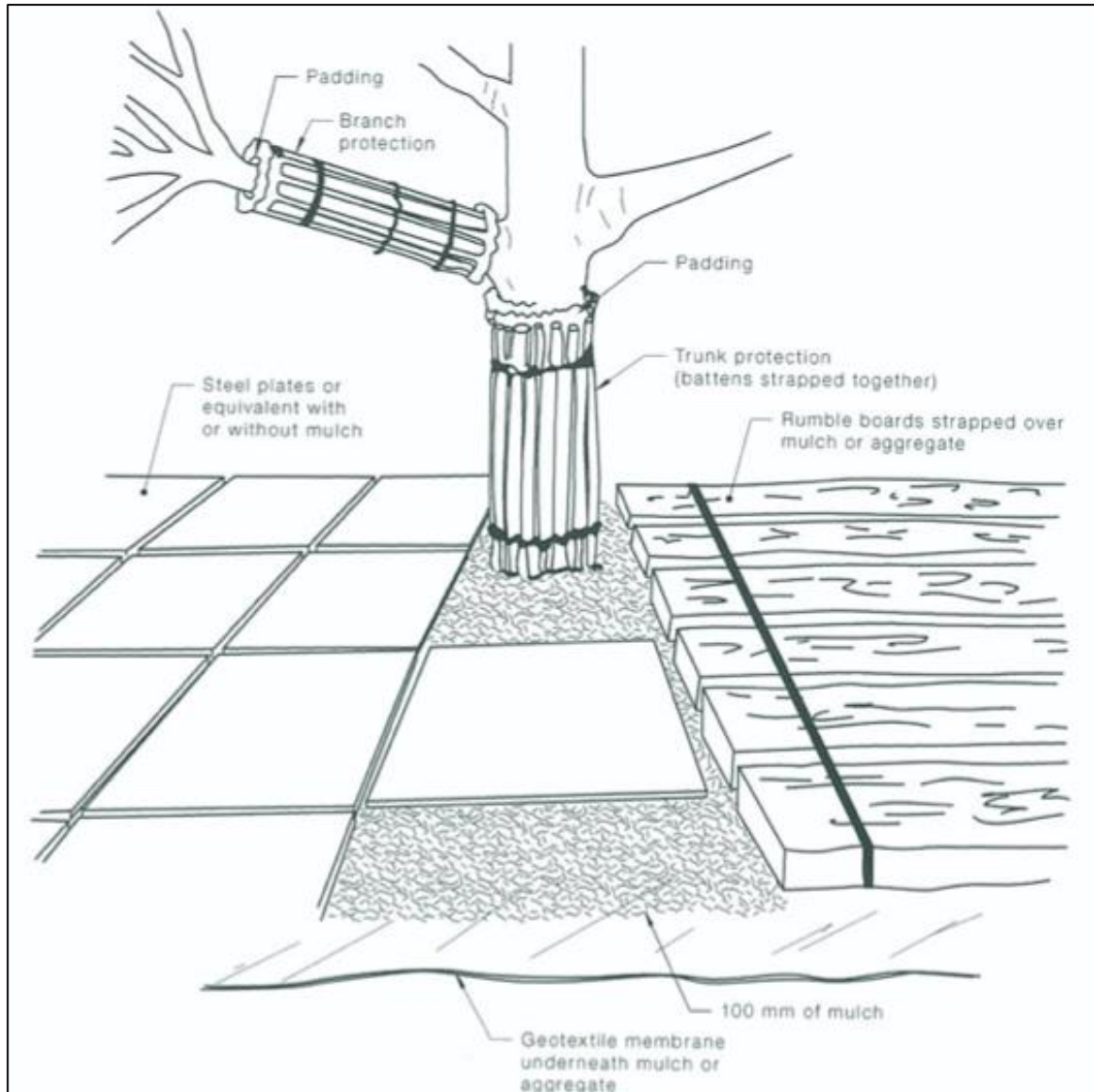


Figure 12. Stem and ground protection measures specified in Section 4.5.3 of *AS4970 (2009)* for temporary access within TPZ.



8.3. Site Specific Tree Protection Measures

Trees 1-14, 16-33, 35, 38-43, 45, 47-51, 54-57, 59, 63, 64, 68-72, 76-115, 117-130, 132-140 will sustain tolerable or negligible impacts under the proposed design plan. The retention of these one-hundred and eighteen trees as part of the development is supported providing the following protection measures are implemented:

- Sediment control fencing will be established on the western side of the pathway along the bank of the Georges River. Boundary fencing must also be established on the eastern side of the proposed pathway and on both sides of the pathway within the south-western portion of the former Riverlands Golf Course. Boundary fencing should be no more than 500mm from the nearest edge of the pathway footprint.
- Boundary fencing along the pathway will provide suitably above-ground protection for all retained trees. Fencing design must be compliant with the specifications outlined in *Section 4.3 of AS4970 (2009)*. Tree protection signage identifying the presence of Tree Protection Zones must be established in front of all portions of the boundary fencing in front of retained trees.
- The impact of the major encroachments with Severe / Major impacts that will be sustained by Trees 25, 26, 33, 35, 39, 42, 45, 48, 49, 72 and 78 will be mitigated by the replacement of the existing asphalt roadway that is within their TPZs and SRZs.
- The High impact these trees may sustain must be mitigated further using sensitive excavation methods. It is recommended that all asphalt demolition and excavation within the R_{TPZs} of Trees 25, 26, 33, 35, 39, 42, 45, 48, 49, 72 and 78 be supervised by the Project Arborist. Hand tools must be used where required to mitigate the potential impact on any encountered tree roots (Figure 13).
- The impact of the major encroachment sustained by Trees 106, 108, 111, 113, 114, 118, 119, 120, 121 and 124 has been mitigated through pathway redesign. The High impact these trees may sustain must be mitigated further using sensitive excavation methods.
- All excavation within the R_{TPZs} of Trees 106, 108, 111, 113, 114, 118, 119, 120, 121 and 124 must be undertaken under the supervision of the Project Arborist. Hand tools must be used where required to mitigate the potential impact on any encountered tree roots (Figure 14).
- Documentation and certification of the specified supervision and hand-excavation of the two portions of the pathway must be provided by the Project Arborist as part of the final compliance for the approved development.



- The suspended portions of the pathway that will be built over the two tributaries will suitably mitigate the potential impact on the individual trees within the groups that comprise Trees 94-102 and Trees 129, 130, and 140 through the use of pier and beam foundations. This will considerably reduce the potential impact on the trees within these groups.
- There must be no major root (diameter of 40mm or greater) damage or disturbance during the hand excavation within the TPZs of retained trees.
- Major root pruning of retained trees is only considered to be suitable if design amendments are not possible. All major root cutting must be undertaken by the Project Arborist using a handsaw in compliance with Section 4.5.2 of *AS4970 (2009)*. Documentation of all major root cutting and an ongoing monitoring schedule for all affected trees must be provided by the Project Arborist as part of the final arboricultural checklist.



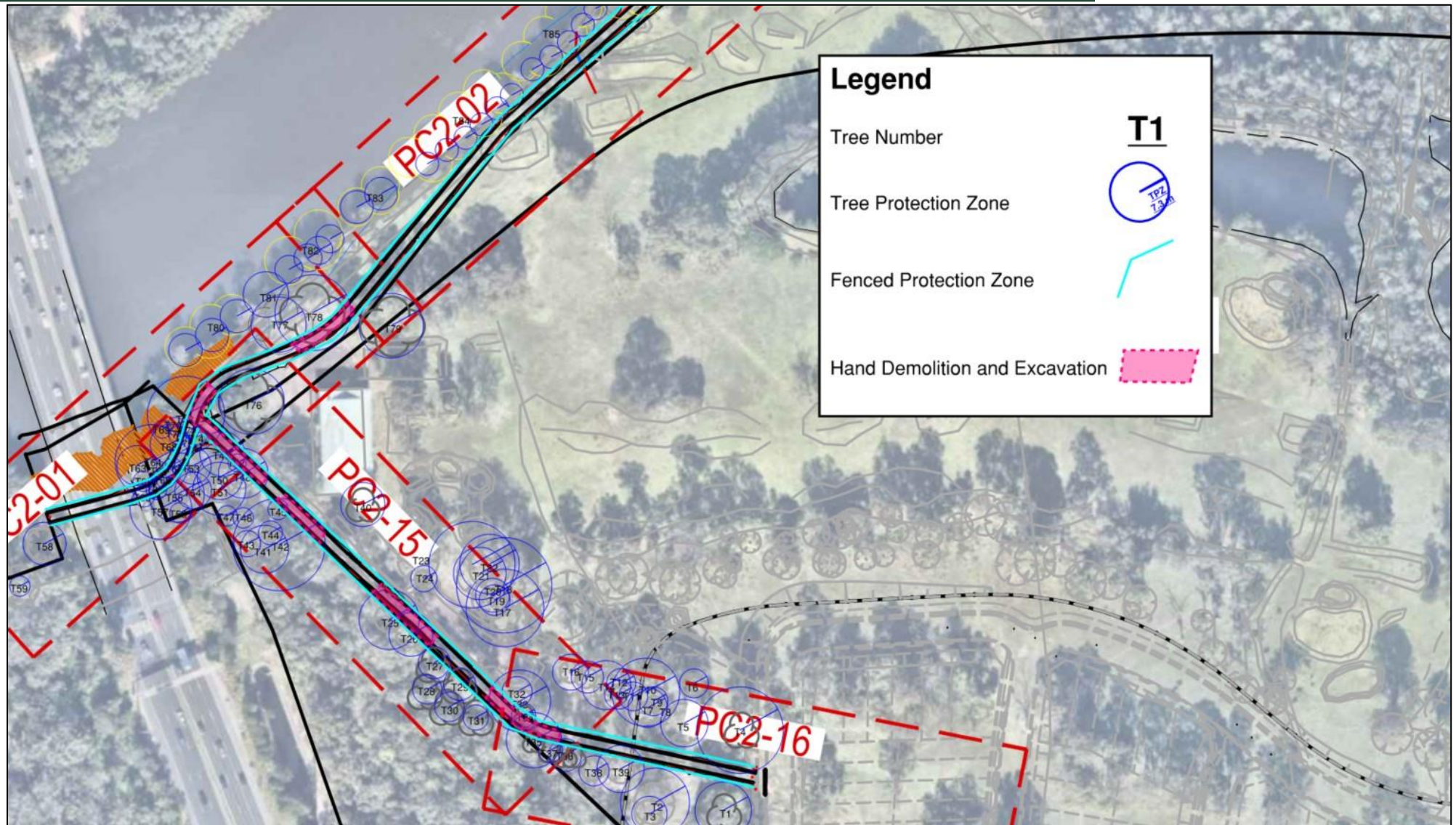


Figure 13. Boundary fencing and supervised excavation requirements within the southern portion of the proposed pathway.





8.4. Certifications

To ensure the proposed development meets the objectives of the Tree Removal/Protection Plan, monitoring and certification process will be undertaken at the following hold points in line with *AS4970 (2009)*. A Project Arborist must be appointed for the duration of this development to ensure compliance with the requirements outlined in Section 7 of this report.

- Tree Removal – If approved, Inspection and certification by the Project Arborist of the removal of Trees 15, 34, 36, 37, 44, 46, 52, 53, 58, 60, 61, 62, 65, 66, 67, 73, 74, 75, 92, 96, 116, 131, 141 and individual trees from the groups that comprise Trees 84, 89, 90, 94, 98, 99, 101, 102, 105, 130, 132, 133, 134, 135, 136, 137, 138, 139, 140 as specified in Section 8.1 of this report. This hold point must be complete prior to the commencement of any demolition or excavation works and prior to the installation of specified tree protection measures.
- Installation Tree Protection Measures – Inspection and certification by the Project Arborist of the protection fencing with affixed ‘Tree Protection Zone’ signage as specified in Section 7.3 of this report. This hold point must be complete prior to the commencement of practical works.
- Supervision and Certification of Excavation within Southern Portion of Pathway – Supervision and certification by the Project Arborist of excavation and use of hand tools where required within the R_{TPZ} of Trees 25, 26, 33, 35, 39, 42, 45, 48, 49 and 72. This inspection must certify that no major tree roots have been damaged or disturbed. This hold point must be carried out prior to the excavation required for the proposed pathway.
- Supervision and Certification of Excavation within Central Portion of Pathway – Supervision and certification by the Project Arborist of excavation and use of hand tools where required within the R_{TPZs} of Trees 106, 108, 111, 113, 114, 118, 119, 120, 121 and 124. This inspection must certify that no major tree roots have been damaged or disturbed. This hold point must be carried out prior to the excavation required for the proposed pathway.
- Certification of Required Root Pruning– Inspection and certification by the Project Arborist of any major roots encountered during excavation work. Any major roots that require pruning



must be severed by the Project Arborist using a hand saw as specified in *Section 3.3.3 of AS4970 (2009)*. This hold point must be carried at any stage during the development as required.

- Final Project Arborist Inspection– Final inspection by Project Arborist and certification of compliance with the Tree Protection Plan as specified in Section 8.3 of this report. All specified protection measures outlined in Section 8.3 must remain in place until this final inspection.



References:

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Australian Standard AS 4373 (2007) Pruning of amenity trees. Standards Australia.

Australian Standard AS 2303 (2015) Tree stock for landscape use. Standards Australia.

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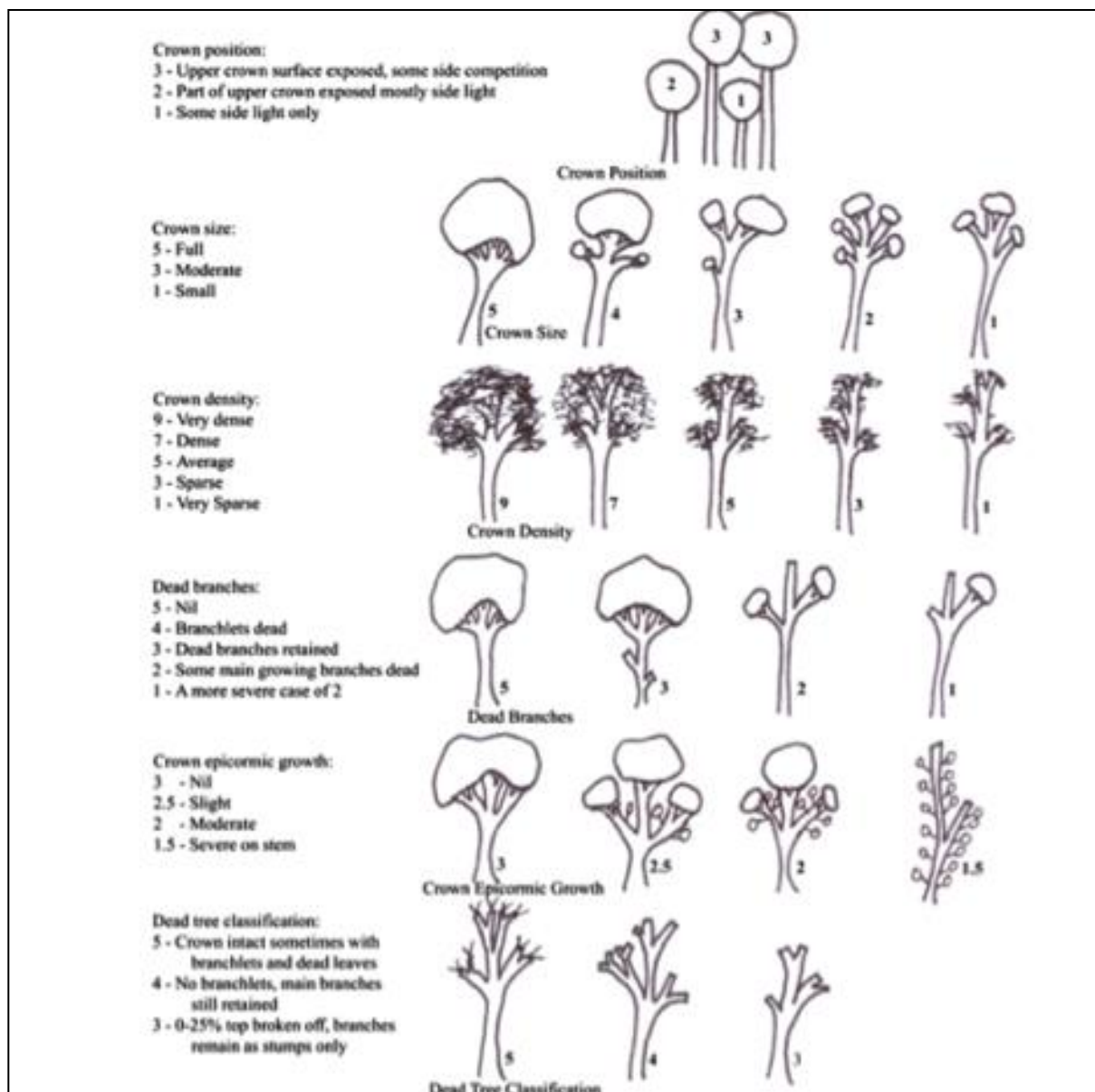
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Appendix A: Vitality using Visual Vitality Index (Johnstone et al. 2012).

VVI = 3/3 (Upper crown exposed) + 5/5 (Good crown size) + 8/9 (Good crown density) + 4/5 (Very little deadwood) + 2/3 (Moderate epicormic growth) + 5/5 (Crown in tact).
=26/30.



Appendix B: Tree Retention Values Priority Requirements

From Morton (2011). Accessed via the Leichardt Council Tree Technical Manual.

Retention value	Recommended action
"High"	<ul style="list-style-type: none"> These trees are considered worthy of preservation; as such careful consideration should be given to their retention as a priority. Proposed site design and placement of buildings and infrastructure should consider the Tree Protection Zones as discussed in the following sections to minimise any adverse impact. In addition to Tree Protection Zones, the extent of the canopy (canopy drip-line) should also be considered, particularly in relation to high rise developments. Significant pruning of the trees to accommodate the building envelope or temporary scaffolding is generally not acceptable.
"Moderate"	<ul style="list-style-type: none"> The retention of these trees is desirable. These trees should be retained as part of any proposed development if possible, however these trees are considered less critical for retention. If these trees must be removed, replacement planting should be considered in accordance with Council's Tree Replacement Policy to compensate for loss of amenity.
"Low"	<ul style="list-style-type: none"> These trees are not considered worthy of any special measures to ensure their preservation, due to current health, condition or suitability. They do not have any special ecological, heritage or amenity value, or these values are substantially
	<p>diminished due to their SULE.</p> <ul style="list-style-type: none"> These trees should not be considered as a constraint to the future development of the site.
"Very Low"	<ul style="list-style-type: none"> These trees are considered potentially hazardous or very poor specimens, or may be environmental or noxious weeds. The removal of these trees is therefore recommended regardless of the implications of any proposed development.



Appendix C: Landscape Significance Definitions

From Morton (2011). Accessed via the Leichardt Council Tree Technical Manual.

Rating	Heritage value	Ecological value	Amenity value
1. SIGNIFICANT	The subject site is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance or is listed as a Significant Tree.	The subject tree is scheduled as a Threatened Species as defined under the <i>Threatened Species Conservation Act 1995 (NSW)</i> or the <i>Environmental Protection and Biodiversity Conservation Act 1999</i> .	The subject tree has a very large live crown size exceeding 100m ² with normal to dense foliage cover, is located in a visually prominent position in the landscape, exhibits very good form and habit typical of the species.
	The subject tree forms part of the curtilage of a Heritage Item (building /structure /artefact as defined under the LEP) and has important association with that item.	The tree is a locally indigenous species, representative of the original vegetation of the area and is known as an important food, shelter or nesting tree for endangered or threatened fauna species.	The subject tree makes a significant contribution to the amenity and visual character of the area by creating a sense of place or creating a sense of identity.
	The subject tree is a Commemorative Planting having been planted by an important historical person (s) or to commemorate an important historical event.	The subject tree is a Remnant Tree, being a tree in existence prior to development of the area.	The tree is visually prominent in view from surrounding areas, being a landmark or visible from a considerable distance.
2. VERY HIGH	The tree has a strong historical association with a Heritage Item (building/structure/artefact/garden etc) within or adjacent the property and/or exemplifies a particular era or style of landscape design associated with the original development of the site.	The tree is a locally-indigenous species, representative of the original vegetation of the area and is a dominant or associated canopy species of an Endangered Ecological Community (EEC) formerly occurring in the area occupied by the site.	The subject tree has a very large live crown size exceeding 60m ² ; a crown density exceeding 70% (normal-dense), is a very good representative of the species in terms of its form and branching habit or is aesthetically distinctive and makes a positive contribution to the visual character and the amenity of the area.



Rating	Heritage value	Ecological value	Amenity value
3. HIGH	The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence.	The tree is a locally-indigenous species and representative of the original vegetation of the area and the tree is located within a defined Vegetation Link / Wildlife Corridor or has known wildlife habitat value.	The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (e.g. crown distortion/suppression) with a crown density of at least 70% (normal); the subject tree is visible from the street and/or surrounding properties and makes a positive contribution to the visual character and the amenity of the area.
4. MODERATE	The tree has no known or suspected historical association, but does not detract or diminish the value of the item and is sympathetic to the original era of planting.	The subject tree is a non-local native or exotic species that is protected under the provisions of this Development Control Plan.	The subject tree has a medium live crown size exceeding 25m ² ; the tree is a fair representative of the species, exhibiting moderate deviations from typical form (distortion/suppression etc) with a crown density of more than 50% (thinning to normal); and
			The tree is visible from surrounding properties, but is not visually prominent – view may be partially obscured by other vegetation or built forms. The tree makes a fair contribution to the visual character and amenity of the area.
5. LOW	The subject tree detracts from heritage values or diminishes the value of a Heritage Item.	The subject tree is scheduled as exempt (not protected) under the provisions of this Development Control Plan due to its species, nuisance or position relative to buildings or other structures.	The subject tree has a small live crown size of less than 25m ² and can be replaced within the short term (5-10 years) with new tree planting.
6. VERY LOW	The subject tree is causing damage to a Heritage Item.	The subject tree is listed as an Environment Weed Species in the Leichhardt Local Government Area, being invasive, or is a known nuisance species.	The subject tree is not visible from surrounding properties (visibility obscured) and makes a negligible contribution or has a negative impact on the amenity and visual character of the area. The tree is a poor representative of the species, showing significant deviations from the typical form and branching habit with a crown density of less than 50% (sparse).



Appendix D: Useful Life Expectancy Definitions

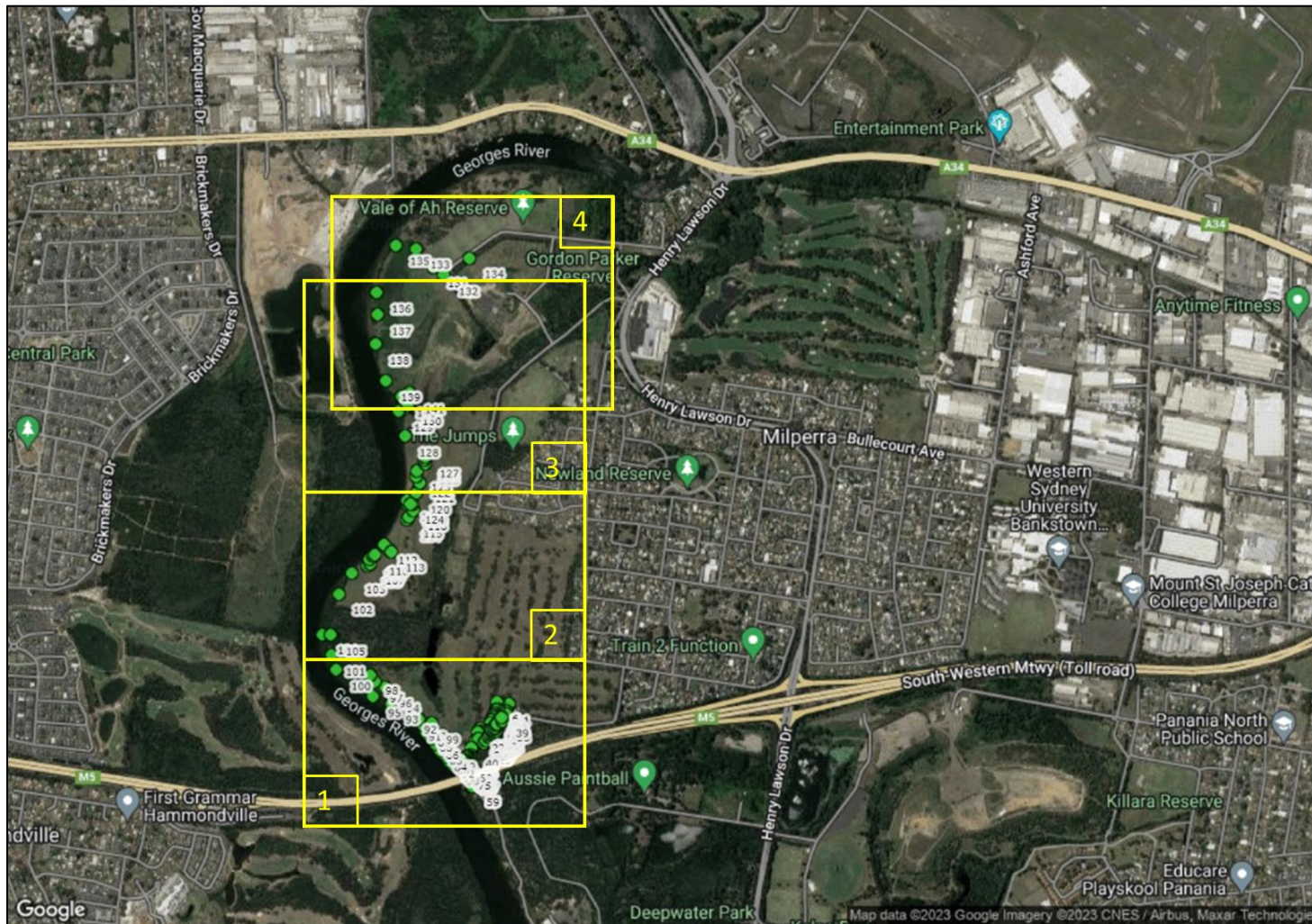
From Barrell (1996). Accessed via the Leichardt Council Tree Technical Manual.

	1. Long	2. Medium	3. Short	4. Removal	5. Moved or replaced
	Trees that appeared to be retainable at the time of assessment for more than 40 years with an acceptable level of risk.	Trees that appeared to be retainable at the time of assessment for 15 - 40 years with an acceptable level of risk.	Trees that appeared to be retainable at the time of assessment for 5 - 15 years with an acceptable level of risk.	Trees that should be removed within the next 5 years	Trees which can be reliably moved or replaced.
A	Structurally sound trees located in positions that can accommodate future growth.	Trees that may only live between 15 and 40 years.	Trees that may only live between 5 and 15 more years.	Dead, dying, suppressed or declining trees through disease or inhospitable conditions.	Small trees less than 5m in height.
B	Trees that could be made suitable for retention in the long term by remedial tree care.	Trees that may live for more than 40 years but would be removed for safety or nuisance reasons.	Trees that may live for more than 15 years but would be removed for safety or nuisance reasons.	Dangerous trees through instability or recent loss of adjacent trees.	Young trees less than 15 years old but over 5m in height.
C	Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.	Trees that may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.	Trees that may live for more than 15 years but should be removed to prevent interference with more suitable individuals or to provide space for new planting.	Damaged trees through structural defects including cavities, decay, included bark, wounds or poor form.	Trees that have been pruned to artificially control growth.
D		Trees that could be made suitable for retention in the medium term by remedial tree care.	Trees that require substantial remedial tree care and are only suitable for retention in the short term.	Damaged trees that are clearly not safe to retain.	
				Trees that may live for more than 5 years but should be	



Appendix E: Detailed Tree Location Maps

From Google Maps 2023.

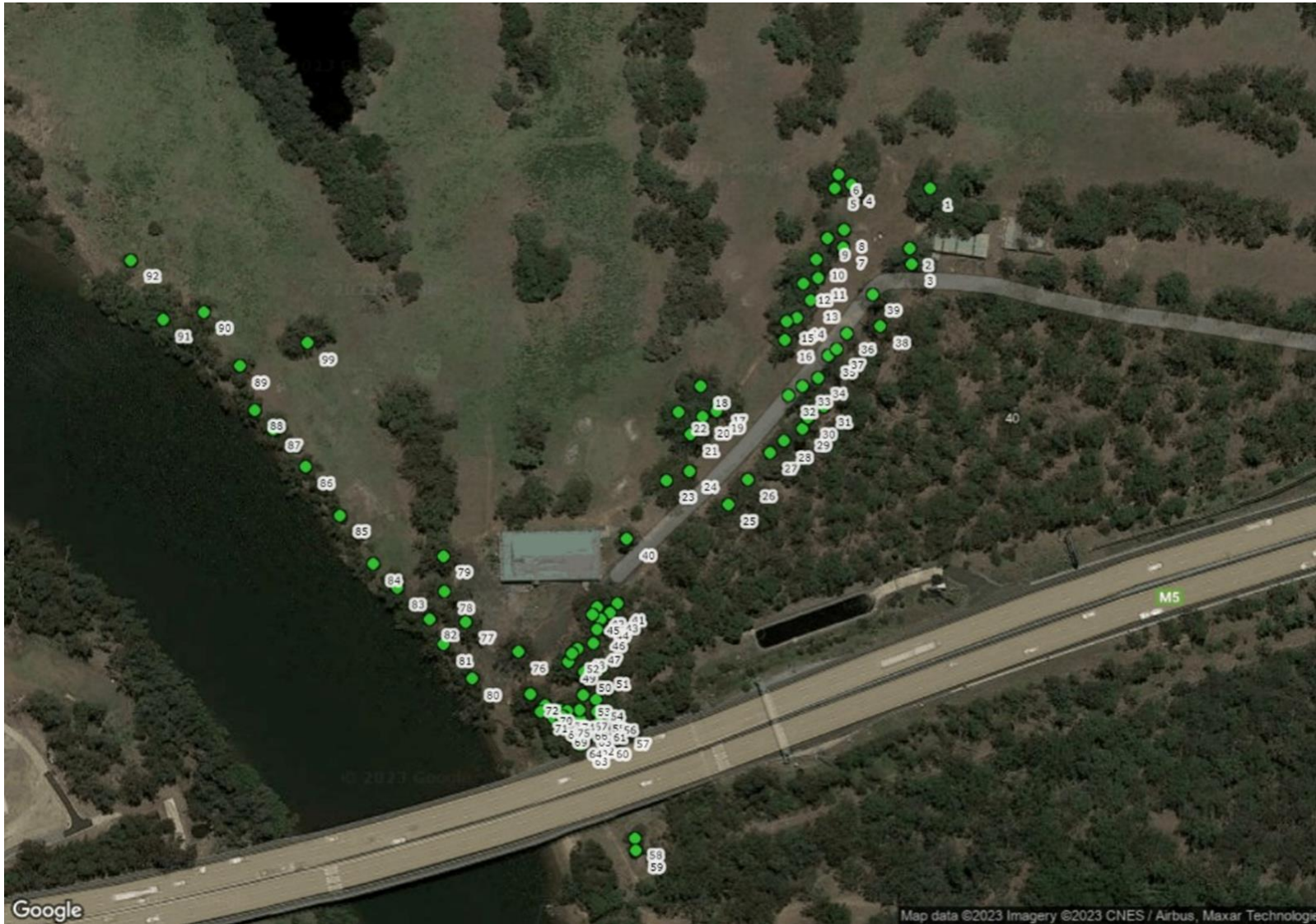


03/10/2023

Temporal Tree Management Pty Ltd.

William Dunlop: Consulting Arborist
(M. UrbHort, Grad. Dip(Arb), B.Sc).





Detailed Tree Location Map 1.

03/10/2023

Temporal Tree Management Pty Ltd.

William Dunlop: Consulting Arborist
(M. UrbHort, Grad. Dip(Arb), B.Sc).





Detailed Tree Location Map 2.

03/10/2023

Temporal Tree Management Pty Ltd.

William Dunlop: Consulting Arborist
(M. UrbHort, Grad. Dip(Arb), B.Sc).





Detailed Tree Location Map 3.



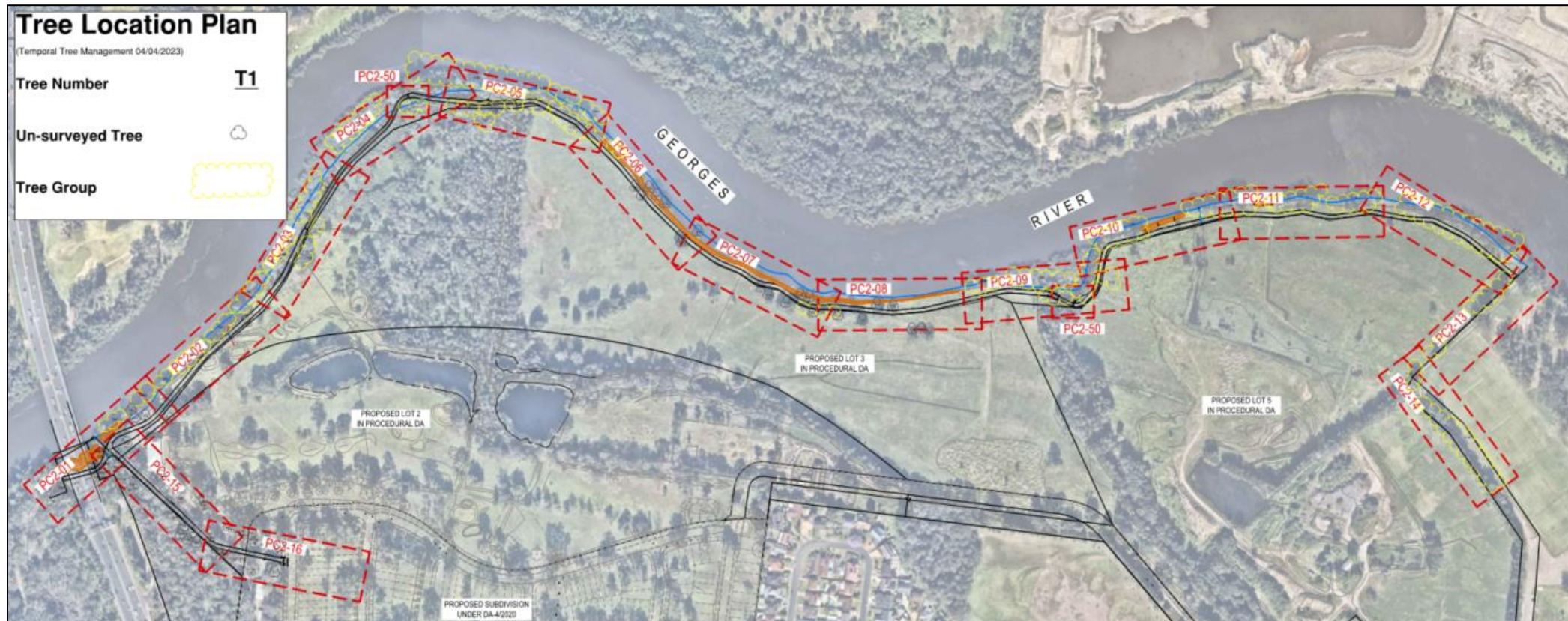


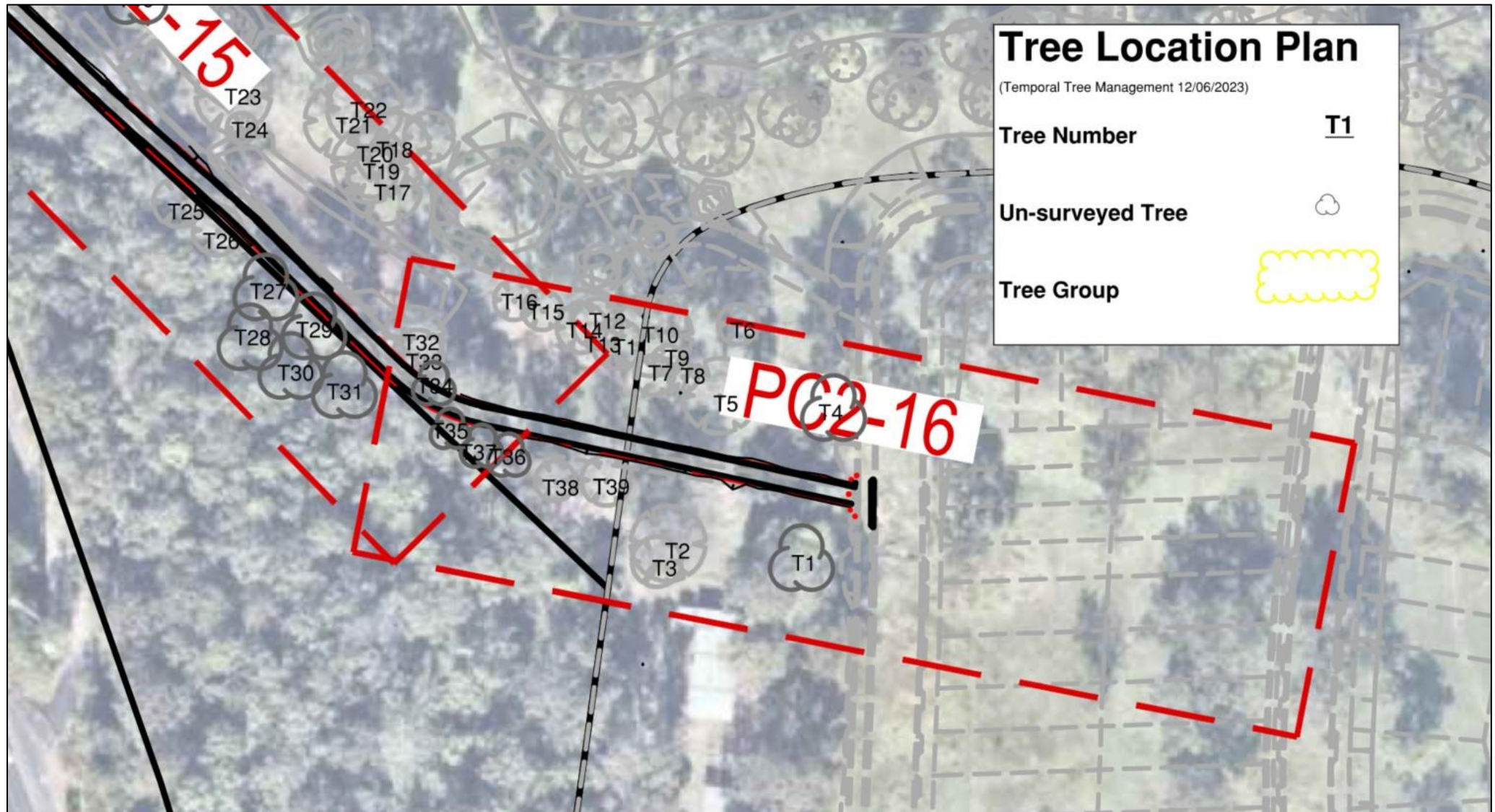
Detailed Tree Location Map 4.

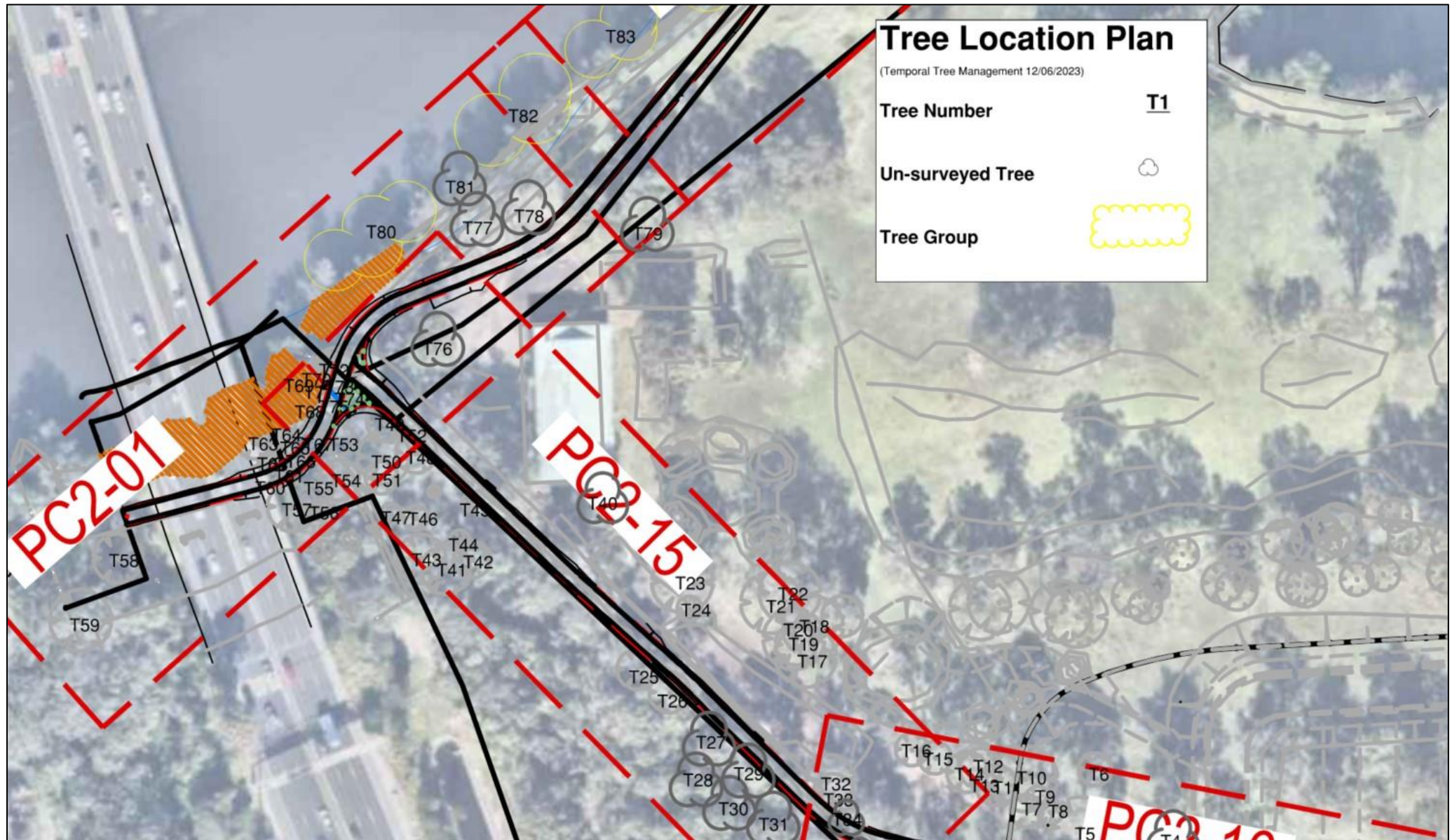


Appendix F: Detailed Tree Location Plans

Site Key Plan (Drawing PC0-01-RevD) drawn by *Calibre* (02/23), annotated by *Temporal Tree Management* (12/06/2023).





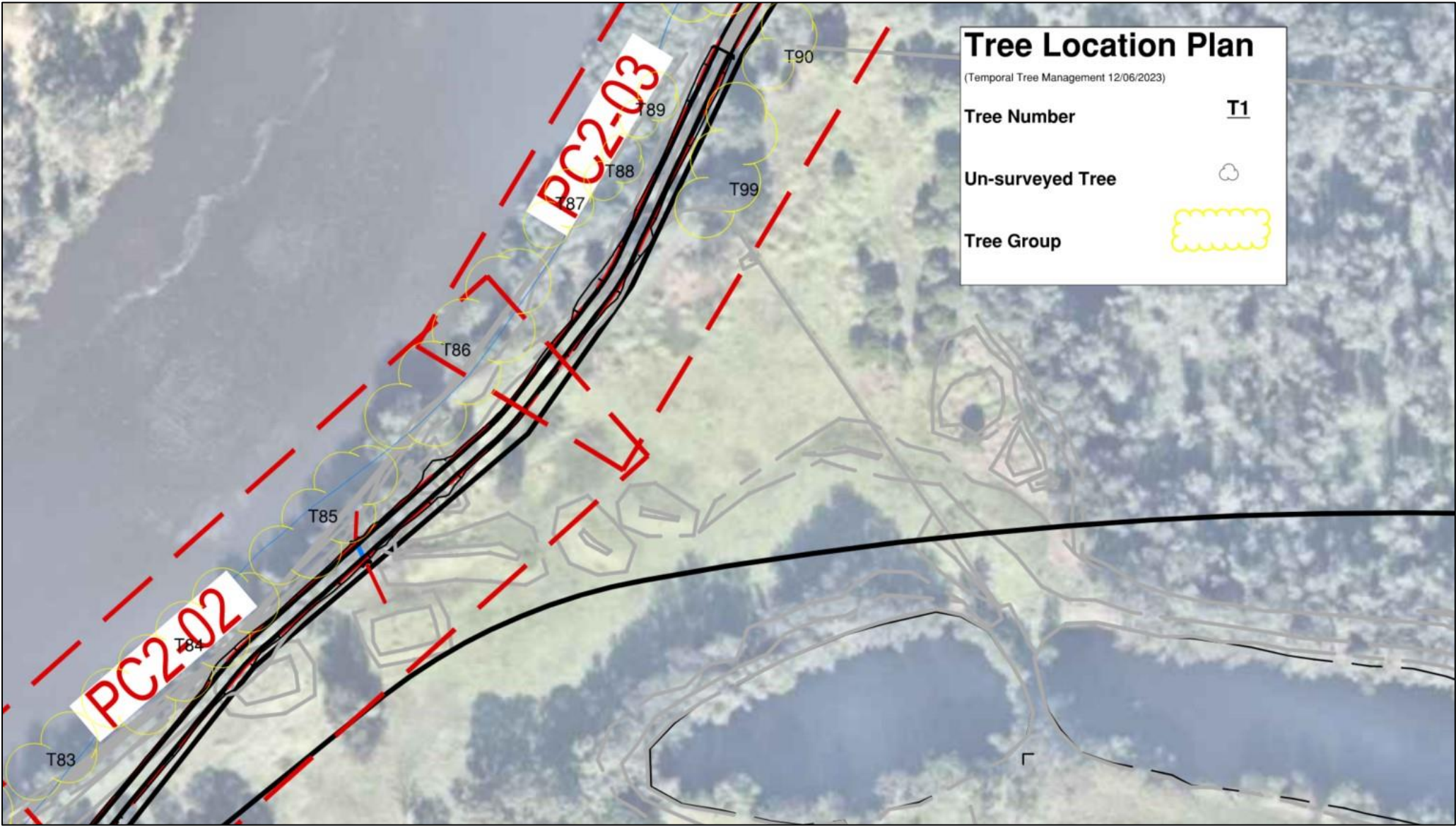


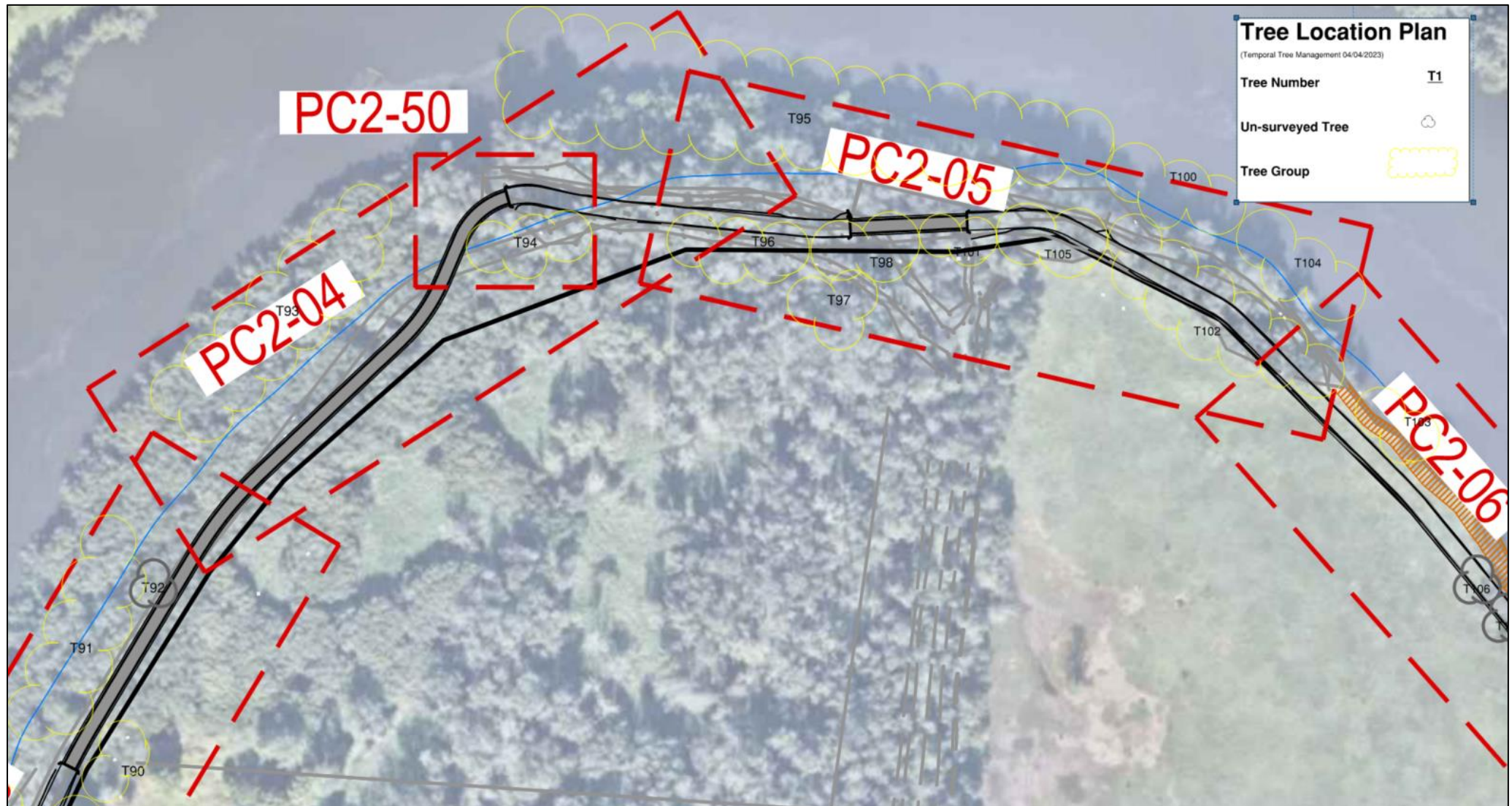
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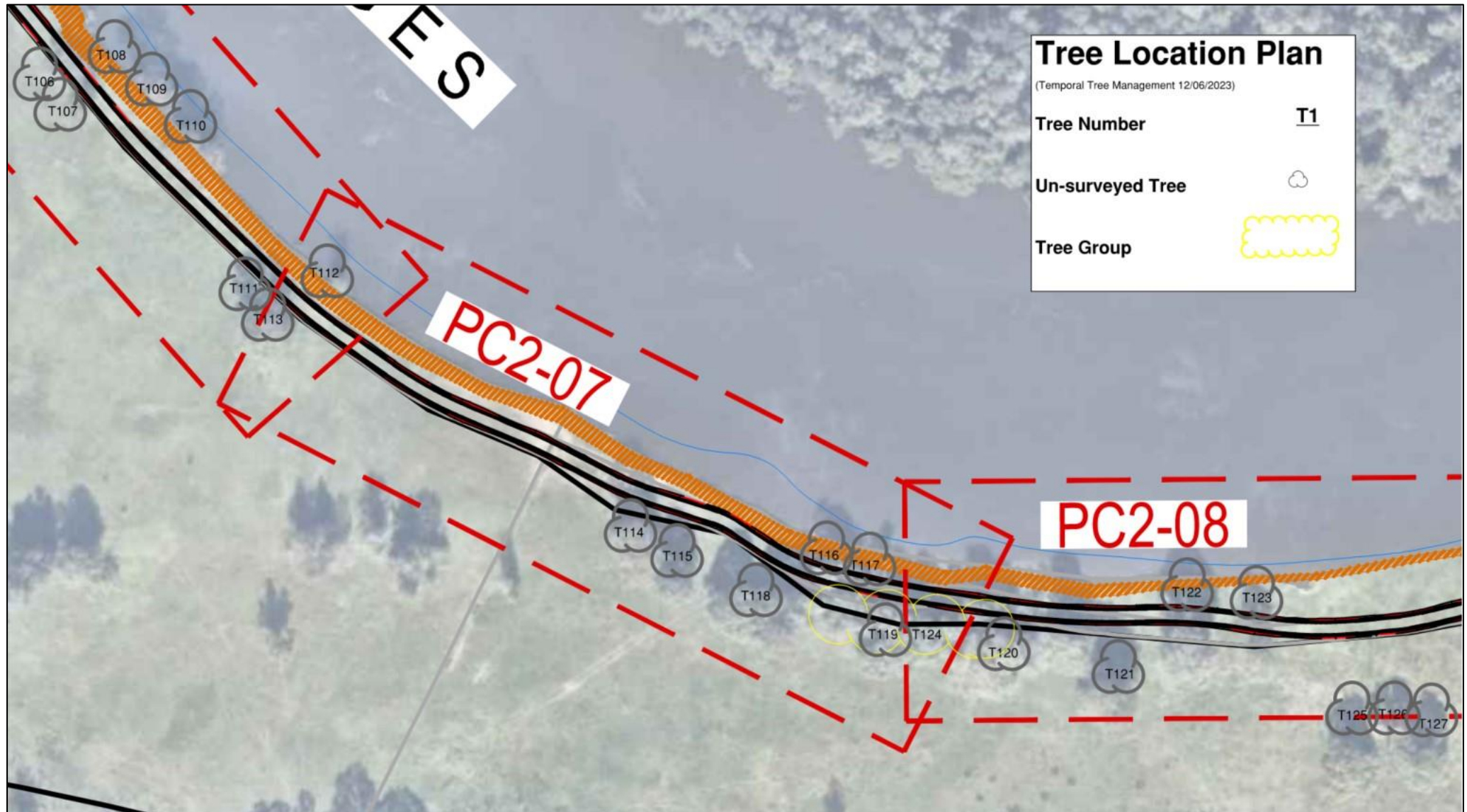
Temporal Tree Management Pty Ltd.

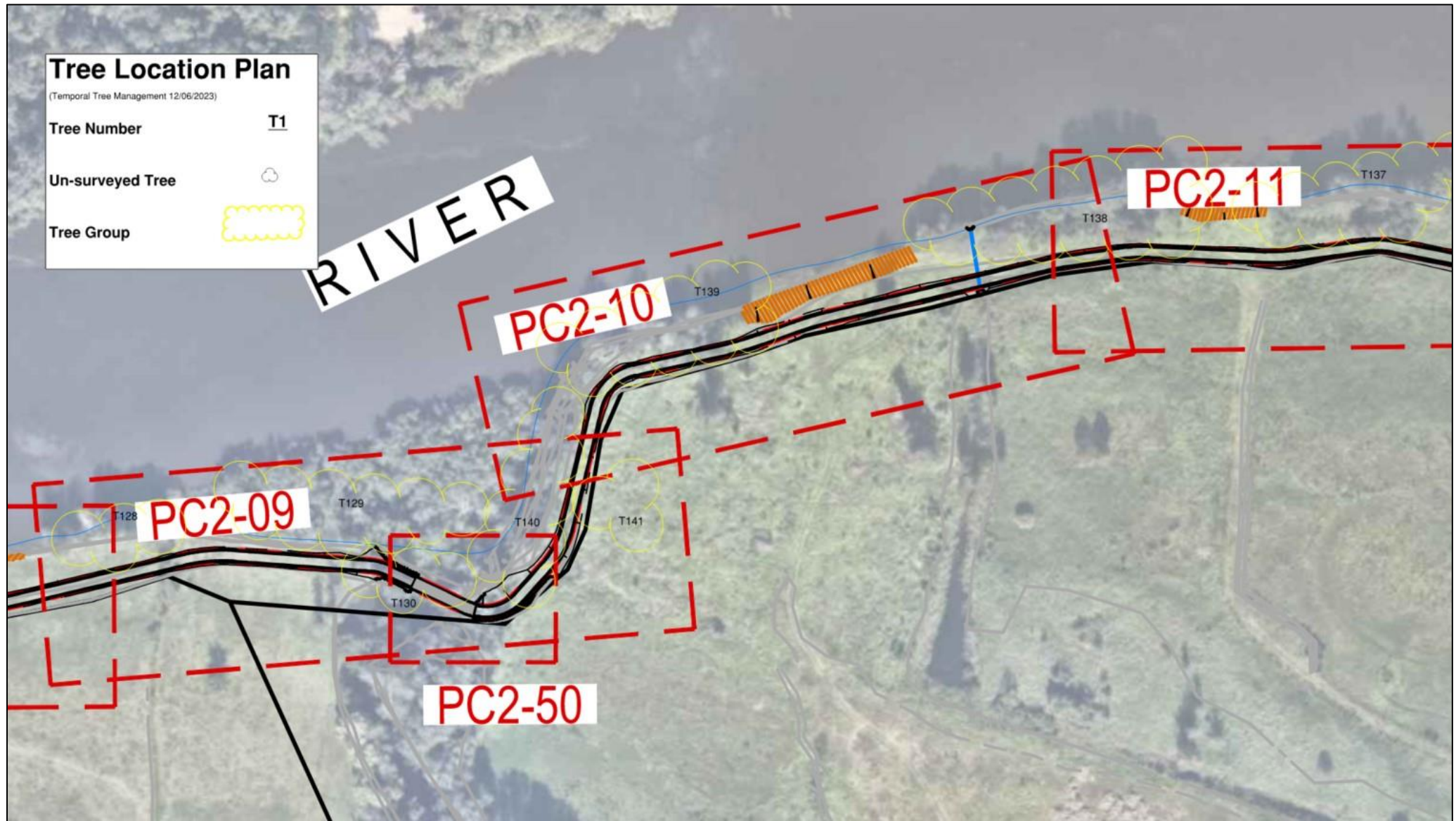
William Dunlop: Consulting Arborist
(M. UrbHort, Grad. Dip(Arb), B.Sc).

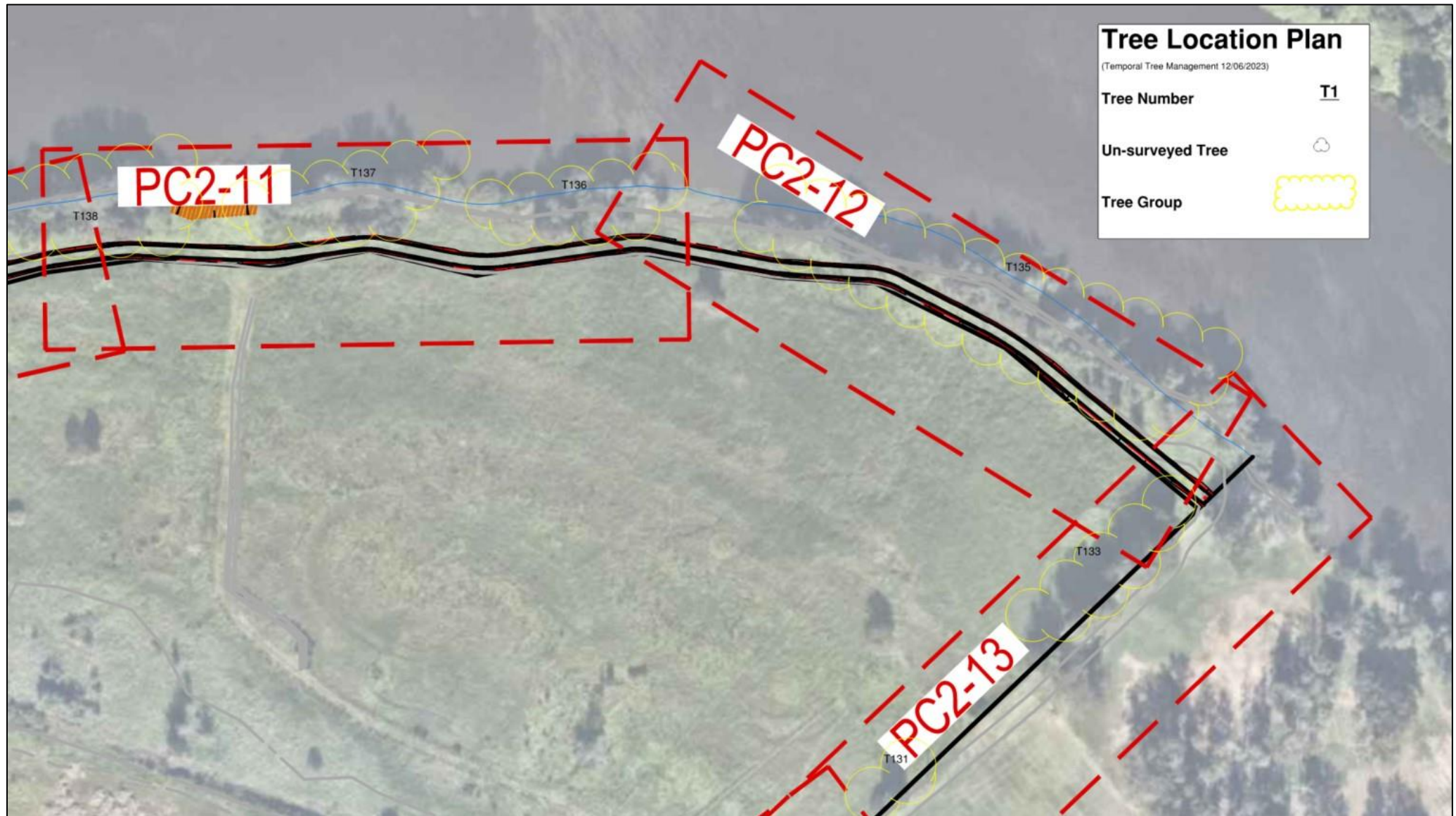














Appendix G: Tree Assessment Data

Tree	Scientific Name	Common Name	Maturity	Height (Estimated) [m]	Canopy Width (m)	DBH [cm]	DRF [cm]	Condition	Canopy Structure	Useful Life Expectancy	Landscape Value	Retention Value	R _{TPZ} [m]	R _{SRZ} [m]	Tree Comments
1	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Over mature	16	3	58	63	Fair	Poor	Short	High	Moderate	7.0	2.7	Tree number 222. Unsurveyed. Major stem failure on northern side of stem at 2 metres height has significantly impacted trees ULE
2	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Mature	21	6	71	92	Good	Fair	Long	Very High	High	8.5	3.2	Tree 224. Large tree in mostly good condition.
3	<i>Eucalyptus moluccana</i>	Grey Box	Mature	15	4	37	49	Good	Fair	Medium	High	Moderate	4.4	2.5	Tree 223. Canopy with asymmetric form due to suppression from larger neighbouring tree.
4	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	29	9	89	98	Good	Good	Long	Very High	High	10.7	3.3	Tree 229. Unsurveyed. Large tree observed to be in mostly good condition. Potential hollow in codominant stem union at 10 metres height.
5	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	23	5	49	66	Good	Fair	Medium	Very High	High	5.9	2.8	Tree 225. Mostly well-structured. Canopy shows minor signs of dieback. This underpinned the reduced ULE estimate for this tree.
6	<i>Grevillea robusta</i>	Silky Oak	Semi mature	12	2	30	39	Good	Good	Medium	Low	Low	3.6	2.2	Tree 226. Smaller size and reduced species value underpinned reduced landscape significance.
7	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Mature	17	5	41	49	Good	Good	Long	High	High	4.9	2.5	Tree B19. Observed to be in mostly good condition and with no obvious structural defects.
8	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	15	3	23	31	Fair	Poor	Short	High	Moderate	2.8	2.0	Tree B18. Smaller tree with northerly stem orientation and canopy asymmetry due to suppression from neighbouring tree. Canopy with minor signs of dieback.
9	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	13	2	21	36	Fair	Poor	Short	High	Moderate	2.5	2.2	Tree B17. Smaller tree with northerly stem orientation and canopy asymmetry due to suppression from neighbouring tree. Canopy with minor signs of dieback.
10	<i>Eucalyptus racemosa</i>	Narrow-leaved Scribbly Gum	Mature	22	8	70	83	Good	Good	Long	Very High	High	8.4	3.1	Tree B16. Large specimen observed to be in mostly good condition. Canopy with hazardous deadwood.
11	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Mature	15	7	31	39	Fair	Fair	Medium	High	Moderate	3.7	2.2	Tree B15. Canopy with minor signs of dieback upper stem with southerly orientation due to suppression from larger neighbouring tree. Becomes codominant at 6 metres.
12	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	21	4	41	48	Poor	Good	Short	High	Moderate	4.9	2.4	Tree B14. Canopy noticeably thin and with signs of dieback.
13	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	19	2	32	40	Fair	Poor	Short	High	Moderate	3.8	2.3	Tree B13. Canopy with minor signs of dieback. Stem with column of tissue necrosis and advanced decay on northern side.



14	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Mature	23	8	51	58	Good	Fair	Long	Very High	High	6.1	2.6	Tree B12. Large tree observed to be in mostly good condition.
15	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Over mature	7	1	35	39	Dead	Very Poor	Remove	Low	Very Low	4.2	2.2	Tree B11. Has died and canopy removed to 7 m height
16	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	18	3	39	44	Good	Good	Long	High	High	4.7	2.3	Tree B10. Slight canopy asymmetry due to close proximity to neighbouring tree. Canopy mostly well structured and in good condition.
17	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	16	6	79	88	Fair	Poor	Short	High	Moderate	9.5	3.1	Tree B8. Canopy noticeably thin. Stem with large column of tissue necrosis with advanced decay on western side. Canopy growth suppressed by adjacent trees.
18	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	19	8	98	112	Fair	Fair	Medium	High	Moderate	11.8	3.5	Tree B9. Large tree with minor signs of canopy dieback. Codominant stem union with tissue necrosis.
19	<i>Melaleuca decora</i>	White Feather Honey myrtle	Mature	7	2	21	32	Fair	Fair	Medium	Moderate	Moderate	2.5	2.1	Tree B7. Smaller suppressed tree of reduced landscape significance.
20	<i>Melaleuca decora</i>	White Feather Honey myrtle	Mature	7	3	35.4	46	Fair	Fair	Medium	Moderate	Moderate	4.2	2.4	Tree B6. Smaller suppressed tree of reduced landscape significance. Becomes multistemmed at ground level.
21	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	20	6	53	69	Good	Fair	Medium	Very High	High	6.4	2.8	Tree B4. Canopy with minor southern asymmetry due to suppression from larger neighbouring tree.
22	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	22	7	62	76	Fair	Good	Long	Very High	High	7.4	2.9	Tree B5. Larger tree observed to be in mostly good condition. Tissue necrosis in primary branch unions from bird damage.
23	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	21	7	83	101	Good	Fair	Long	Very High	High	10.0	3.3	Large tree observed to be in mostly good condition. Small wound with associated tissue necrosis on lower northern side of stem.
24	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Semi mature	7	2	22	24	Good	Fair	Medium	Moderate	Moderate	2.6	1.8	Smaller tree with suppressed growth due to close proximity to larger tree.
25	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Mature	18	5	62	80	Good	Fair	Long	High	High	7.4	3.0	Tree positioned along northern edge of heavily trees area. Observed to be in mostly good health. Stem becomes codominant at ground level.
26	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	18	5	46	59	Fair	Fair	Medium	High	Moderate	5.5	2.7	Tree positioned adjacent to northern edge of heavily vegetated area. Canopy noticeably thin. Stem with patches of tissue necrosis associated with borer damage.
27	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Semi mature	12	3	34	39	Good	Good	Long	High	High	4.1	2.2	Tree positioned adjacent to northern edge of heavily vegetated area. Smaller tree in mostly good condition.
28	<i>Melaleuca decora</i>	White Feather Honey myrtle	Semi mature	10	2	32	40	Good	Fair	Long	Moderate	Moderate	3.8	2.3	Tree positioned adjacent to northern edge of heavily vegetated area. Smaller tree in mostly good condition. Becomes multistemmed at ground level.
29	<i>Eucalyptus moluccana</i>	Grey Box	Semi mature	20	3	36	41	Good	Good	Long	High	High	4.3	2.3	Tree positioned adjacent to northern edge of heavily vegetated area. Larger tree in mostly good condition
30	<i>Eucalyptus moluccana</i>	Grey Box	Semi mature	18	2	29	35	Good	Good	Long	High	High	3.5	2.1	Tree positioned adjacent to northern edge of heavily vegetated area. Larger tree in mostly good condition
31	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Semi mature	11	2	19	22	Good	Poor	Medium	Moderate	Moderate	2.3	1.8	Tree positioned adjacent to northern edge of heavily vegetated area. Smaller tree in suppressed position.



32	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Mature	16	3	30	37	Fair	Poor	Medium	High	Moderate	3.6	2.2	Tree B257. Canopy thin. Stem has previously failed at 9 metres height.
33	<i>Eucalyptus moluccana</i>	Grey Box	Mature	22	8	64	76	Good	Fair	Long	Very High	High	7.7	2.9	Tree B258. Observed to be in mostly good condition. Upper stem with easterly orientation.
34	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Semi mature	8	3	21	23	Fair	Very Poor	Remove	Low	Very Low	2.5	1.8	Tree B259. Suppressed tree. Stem has previously failed at 5 metres. Phellinus fruiting body observed in stem failure wound with large column of tissue necrosis extending down stem. Tree likely to die or pose increased risk to pedestrians using shared pathway. Tree should be removed
35	<i>Eucalyptus moluccana</i>	Grey Box	Mature	20	5	57	64	Good	Good	Long	Very High	High	6.8	2.7	Tree B260. Larger tree observed to be in mostly good condition
36	<i>Eucalyptus eugenioides</i>	Thin-leaved Stringybark	Semi mature	10	4	34	39	Very poor	Poor	Remove	Low	Very Low	4.1	2.2	Tree B262. Canopy with major signs of dieback. Tree will be entirely dead within 12 months.
37	<i>Eucalyptus eugenioides</i>	Thin-leaved Stringybark	Over mature	9	1	22	24	Dead	Poor	Remove	Low	Very Low	2.6	1.8	Tree B261. Tree has died and should be removed as part of pathway works.
38	<i>Eucalyptus eugenioides</i>	Thin-leaved Stringybark	Mature	17	6	31	47	Fair	Good	Medium	High	High	3.7	2.4	Tree B263. Canopy with minor signs of thinning. Mostly well-structured.
39	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Mature	21	6	48	69	Good	Poor	Medium	Very High	High	5.8	2.8	Tree B265. Southern minor stem has failed in past. Tissue necrosis and decay have extended into southern root crown. Remaining canopy mostly well structured.
40	<i>Eucalyptus moluccana</i>	Blue Box	Semi mature	15	4	46.5	56	Good	Poor	Medium	High	Moderate	5.6	2.6	Unsurveyed tree adjacent to old clubhouse. Upper stem has failed. Lower stem with large column of advanced decay.
41	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	19	5	49	57	Good	Good	Long	Very High	High	5.9	2.6	Large tree observed to be in mostly good condition. Positioned adjacent to existing asphalt roadway.
42	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Mature	18	8	96	94	Good	Fair	Long	Very High	High	11.5	3.2	Large tree observed to be in mostly good condition. Positioned adjacent to existing asphalt roadway. Canopy will require uplift to facilitate access and works. Prune descending branches to maintain 4.5 m ground clearance.
43	<i>Melaleuca decora</i>	White Feather Honey myrtle	Mature	9	2	23	29	Good	Good	Medium	Moderate	Moderate	2.8	2.0	Smaller tree in suppressed position.
44	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Over mature	9	1	21	25	Dead	Has Failed	Remove	Low	Very Low	2.5	1.8	Dead tree has failed at base and is resting in adjacent tree. Should be removed prior to commencement of works.
45	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Semi mature	11	1	19	22	Good	Fair	Medium	Moderate	Moderate	2.3	1.8	Smaller tree in suppressed position. Failed dead tree resting in canopy.
46	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Over mature	7	1	18	20	Dead	Very Poor	Remove	Low	Very Low	2.2	1.7	Dead tree should be removed prior to commencement of works.
47	<i>Eucalyptus eugenioides</i>	Thin-leaved Stringybark	Semi mature	7	2	15	17	Poor	Fair	Short	Low	Low	2.0	1.6	Small tree with obvious signs of dieback.
48	<i>Eucalyptus moluccana</i>	Grey Box	Mature	19	7	51	68	Good	Good	Long	Very High	High	6.1	2.8	Large tree observed to be in good condition. Stem positioned 4 metres from edge of asphalt.
49	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Mature	19	7	46	57	Good	Good	Long	Very High	High	5.5	2.6	Large tree observed to be in good condition. Stem positioned 3 metres from edge of asphalt



50	<i>Eucalyptus baueriana</i>	Blue Box	Mature	18	6	45	58	Good	Good	Long	Very High	High	5.4	2.6	Large tree observed to be in good condition.
51	<i>Eucalyptus eugenioides</i>	Thin-leaved Stringybark	Mature	15	2	54	60	Poor	Poor	Short	High	Moderate	6.5	2.7	Larger tree with suppressed structural form. Canopy with obvious signs of dieback.
52	<i>Ligustrum lucidum</i>	Privet	Mature	5	2	33.1	36	Fair	Poor	Remove	Low	Very Low	4.0	2.2	Small unsurveyed tree adjacent to edge of asphalt. Tree of potentially invasive species. Suitable for removal as part of works.
53	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Over mature	18	5	38	42	Dead	Very Poor	Remove	Low	Very Low	4.6	2.3	Large dead tree should be removed prior to the commencement of works.
54	<i>Eucalyptus baueriana</i>	Blue Box	Mature	20	3	42	58	Good	Good	Long	Very High	High	5.0	2.6	Large tree in heavily vegetated area observed to be in good condition.
55	<i>Eucalyptus moluccana</i>	Grey Box	Mature	18	8	57	76	Poor	Fair	Short	High	Moderate	6.8	2.9	Large tree in heavily vegetated area. Canopy with obvious signs of dieback.
56	<i>Eucalyptus eugenioides</i>	Thin-leaved Stringybark	Semi mature	9	1	18	20	Fair	Poor	Medium	Moderate	Moderate	2.2	1.7	Smaller suppressed tree in heavily vegetated area. Canopy with signs of dieback.
57	<i>Eucalyptus crebra</i>	Narrow-leaved Red Ironbark	Mature	22	6	64	78	Good	Good	Long	Very High	High	7.7	3.0	Large tree in heavily vegetated area observed to be in mostly good condition.
58	<i>Acacia binervia</i>	Coast Myall	Mature	8	5	43.1	45	Fair	Has Failed	Remove	Low	Very Low	5.2	2.4	Smaller tree. Stem becomes codominant at 400mm. Union has partially failed. Tree should be removed to reduce potential risk to pedestrians using shared pathway.
59	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Semi mature	9	1	23	20	Good	Good	Long	Moderate	Moderate	2.8	1.7	Smaller tree in good condition.
60	<i>Melaleuca decora</i>	White Feather Honey myrtle	Semi mature	6	1	11	13	Good	Fair	Medium	Low	Low	2.0	1.4	Small tree in suppressed position within heavily vegetated area. Positioned within footprint of proposed pathway. Will require removal to facilitate works.
61	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Semi mature	7	1	16	19	Good	Poor	Short	Low	Low	2.0	1.6	GROUP of two small trees of the same species in suppressed position within heavily vegetated area. Positioned within footprint of proposed pathway. Will require removal to facilitate works
62	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Semi mature	10	2	23	31	Fair	Poor	Short	Moderate	Low	2.8	2.0	Smaller tree with wounding and associated tissue necrosis at base of stem.
63	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Mature	19	3	41	48	Good	Fair	Medium	High	Moderate	4.9	2.4	Larger tree in heavily vegetated area. Observed to be in mostly good condition. Western canopy is encroaching in Henry Lawson Drive.
64	<i>Melaleuca decora</i>	White Feather Honey myrtle	Mature	14	6	76.2	96	Good	Fair	Long	Moderate	Moderate	9.1	3.3	Large tree in heavily vegetated area. Becomes multi-stemmed at ground level.
65	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Over mature	10	1	20	28	Dead	Very Poor	Remove	Low	Very Low	2.4	1.9	Dead tree in heavily vegetated area positioned adjacent to cycleway. Should be removed prior to commencement.
66	<i>Eucalyptus microcorys</i>	Tallow Wood	Semi mature	12	2	15	20	Good	Fair	Short	Moderate	Low	2.0	1.7	Small tree in heavily vegetated area. Recent borer damage around lower stem.
67	<i>Eucalyptus tereticornis</i>	Forest Red Gum	Semi mature	9	1	8	10	Good	Good	Medium	Low	Low	2.0	1.3	Small tree in heavily vegetated area positioned adjacent to footprint of pathway. Should be removed prior to commencement



68	<i>Eucalyptus microcorys</i>	Tallow Wood	Mature	16	3	41.8	49	Good	Poor	Medium	High	Moderate	5.0	2.5	Tree in heavily vegetated area. Stem becomes codominant at ground level.
69	<i>Casuarina glauca</i>	Grey She-oak	Semi mature	12	1	11	12	Good	Good	Medium	Moderate	Moderate	2.0	1.4	Small suppressed tree in heavily vegetated area.
70	<i>Eucalyptus microcorys</i>	Tallow Wood	Semi mature	9	2	18	30	Good	Fair	Medium	Low	Low	2.2	2.0	Small suppressed tree close to northern edge of heavily vegetated area.
71	<i>Eucalyptus microcorys</i>	Tallow Wood	Semi mature	7	1	12	20	Good	Fair	Medium	Low	Low	2.0	1.7	Group of 7 small suppressed trees of the same species that are close to northern edge of heavily vegetated area.
72	<i>Eucalyptus moluccana</i>	Grey Box	Mature	23	7	80	101	Good	Good	Long	Very High	High	9.6	3.3	Large tree positioned adjacent to northern edge of heavily vegetated area. Observed to be in mostly good condition.
73	<i>Eucalyptus microcorys</i>	Tallow Wood	Semi mature	13	2	14	20	Good	Fair	Medium	Low	Low	2.0	1.7	Small suppressed tree within heavily vegetated area. Stem within edge of proposed pathway.
74	<i>Casuarina glauca</i>	Grey She-oak	Semi mature	14	1	18	22	Fair	Fair	Short	Moderate	Moderate	2.2	1.8	Small suppressed tree within heavily vegetated area. Canopy with minor thinning. Stem within footprint of proposed pathway. Should be removed prior to commencement of works.
75	<i>Casuarina glauca</i>	Grey She-oak	Semi mature	14	1	19	29	Good	Fair	Short	Moderate	Moderate	2.3	2.0	Small suppressed tree within heavily vegetated area. Stem within footprint of proposed pathway.
76	<i>Eucalyptus moluccana</i>	Grey Box	Mature	18	8	68	84	Good	Poor	Medium	Very High	High	8.2	3.1	Large tree positioned in asphalt turning circle. Canopy observed to be in mostly good condition. Stem and canopy with tissue necrosis and decay on northern side from previous limb failure. Lowest primary branch will require uplift pruning to facilitate works. Lowest branches should be pruned to maintain 4.5 m ground clearance.
77	<i>Eucalyptus moluccana</i>	Grey Box	Mature	18	7	57	79	Poor	Poor	Short	Very High	Moderate	6.8	3.0	Tree positioned within asphalt turning circle area. Canopy with major dieback. Large wound on northern side of stem with tissue necrosis and advanced decay extending into root crown. Tree requires continued monitoring of risk.
78	<i>Eucalyptus moluccana</i>	Grey Box	Mature	17	8	78	83	Poor	Poor	Short	Very High	Moderate	9.4	3.1	Large tree positioned within asphalt area. Canopy with major signs of dieback. Central stem has failed in past. Tissue necrosis from old stem stub extending into lower stem. Wound on lower eastern stem with tissue necrosis and decay extending into root crown. Tree requires continued monitoring of risk.
79	<i>Eucalyptus moluccana</i>	Grey Box	Mature	18	8	67	85	Fair	Very Poor	Short	High	Moderate	8.0	3.1	Larger tree positioned on northern side of asphalt area. Large wound on western side of stem extends from ground level to 2 metres. Tissue necrosis and decay in wound. Additional smaller wound on eastern side of stem with signs of decay. Suggests extensive degradation of internal stem tissue. Tree requires continued monitoring of risk.



80	<i>Casuarina glauca</i>	Grey She-oak	Semi mature	15	2	35	50	Good	Good	Medium	Moderate	Moderate	4.2	2.5	GROUP of 13 closely positioned specimen of the same species and similar size. All positioned within 2 metres of the river bank. Trees suitable for moderate TPZ encroachments due to smaller size and good health
81	<i>Eucalyptus racemosa</i>	Narrow-leaved Scribbly Gum	Mature	12	4	47	51	Poor	Poor	Short	Moderate	Moderate	5.6	2.5	Tree positioned adjacent to river bank. Stem with westerly orientation. Canopy with obvious signs of dieback.
82	<i>Casuarina glauca</i>	Grey She-oak	Mature	13	2	25	38	Fair	Fair	Short	Moderate	Moderate	3.0	2.2	GROUP of 5 specimens of the same species and similar size. All positioned within 2 metres of river bank. Suitable condition, size and species for moderate TPZ encroachments.
83	<i>Casuarina glauca</i>	Grey She-oak	Mature	13	3	35	40	Good	Fair	Short	Moderate	Moderate	4.2	2.3	GROUP of 4 specimens of the same species and similar size. All positioned within 2 metres of river bank. Suitable condition, size and species for moderate TPZ encroachments.
84	<i>Casuarina glauca</i>	Grey She-oak	Semi mature	7	1	10	13	Good	Fair	Medium	Moderate	Moderate	2.0	1.4	GROUP of 14 small specimens of the same species and similar size. Small size underpinned reduced landscape significance. Good health and small size renders tree's suitable for retention with moderate TPZ encroachments. 4 x small specimens positioned within and adjacent to pathway suitable for removal.
85	<i>Casuarina glauca</i>	Grey She-oak	Semi mature	7	1	13	15	Good	Fair	Medium	Moderate	Moderate	2.0	1.5	GROUP of 21 small specimens of the same species and similar size. All positioned within 2 metres of river bank. All trees suitably distanced from proposed pathway. Suitable condition, size and species for moderate TPZ encroachments.
86	<i>Casuarina glauca</i>	Grey She-oak	Semi mature	6	1	11	13	Good	Fair	Medium	Moderate	Moderate	2.0	1.4	GROUP of approx 30 small specimens of the same species and similar size. All positioned within 2 metres of river bank. Two trees with obvious easterly orientation suitable for removal to facilitate pathway construction if required. Small trees in good condition are suitable condition, size and species for moderate TPZ encroachments.
87	<i>Casuarina glauca</i>	Grey She-oak	Mature	8	2	20	28	Good	Fair	Medium	Moderate	Moderate	2.4	1.9	GROUP of 6 smaller specimens of the same species and similar size. All positioned within 2 metres of river bank. Smaller trees in good condition are suitable condition, size and species for moderate TPZ encroachments
88	<i>Casuarina glauca</i>	Grey She-oak	Mature	8	1	20	25	Good	Fair	Medium	Moderate	Moderate	2.4	1.8	GROUP of 8 small specimens of the same species and similar size. All positioned within 2 metres of river bank. All suitably distanced from proposed pathway. Small trees in good condition are suitable condition, size and species for moderate TPZ encroachments
89	<i>Casuarina glauca</i>	Grey She-oak	Mature	9	2	22	28	Good	Fair	Medium	Moderate	Moderate	2.6	1.9	GROUP of 4 smaller specimens of the same species and similar size. Positioned away from river bank. Pathway positioned has been altered to accomodate tree. Closest tree suitable for removal of required. Small trees in good condition are suitable condition, size and species for moderate TPZ encroachments



90	<i>Casuarina glauca</i>	Grey She-oak	Mature	13	2	30	38	Good	Poor	Short	Moderate	Moderate	3.6	2.2	GROUP of 5 larger specimens of the same species and similar size. Positioned away from river bank. Pathway positioned has been altered to accommodate tree. Dead tree should be removed prior to commencement of works. Three closest trees suitable for removal of required. Small trees in good condition are suitable condition, size and species for moderate TPZ encroachments
91	<i>Casuarina glauca</i>	Grey She-oak	Mature	13	2	25	30	Good	Fair	Medium	Moderate	Moderate	3.0	2.0	GROUP of approx 30 larger specimens of the same species and similar size. Positioned less than 2 metres from river. Suitable distance from pathway. trees in good condition are suitable condition, size and species for moderate TPZ encroachments
92	<i>Casuarina glauca</i>	Grey She-oak	Mature	7	2	23	30	Good	Poor	Short	Moderate	Moderate	2.8	2.0	Tree positioned close to edge of proposed pathway with poor stem orientation. Suitable for removal if required. Will require clearance pruning if retained.
93	<i>Casuarina glauca</i>	Grey She-oak	Mature	9	2	25	35	Good	Fair	Short	Moderate	Moderate	3.0	2.1	GROUP of approx 50 specimens of the same size and species. All positioned within flooded bank area less than 4 metres from river. Trees along eastern edge of group may sustain acceptable encroachments. Observed to be in good health.
94	<i>Casuarina glauca</i>	Grey She-oak	Mature	10	2	25	35	Good	Fair	Medium	Moderate	Moderate	3.0	2.1	GROUP of 8 larger specimens of the same species and similar size. Positioned away from river bank. Pathway positioned has been altered to accommodate tree. Three closest trees suitable for removal of required. Species good condition are suitable condition, size and species for moderate TPZ encroachments
95	<i>Avicenna marina</i>	Grey Mangrove	Mature	5	3	35	50	Good	Good	Long	High	High	4.2	2.5	Group of approx 150 <i>Avicenna marina</i> specimens. Suitably distanced from proposed works. Suitable place protection measures in engineering plans.
96	<i>Ligustrum lucidum</i>	Privet	Mature	6	3	38	40	Good	Good	Remove	Low	Very Low	4.6	2.3	Group of approx 20 closely positioned large-leaves privet and camphor laurel specimen. Should be removed as part of works. Pathway should track through privet and avoid she oaks.
97	<i>Casuarina glauca</i>	Grey She-oak	Semi mature	10	15	20	25	Good	Good	Medium	Moderate	Moderate	2.0	1.8	GROUP of approx 10 smaller specimens of the same species and similar size. Small trees in good condition are suitable condition, size and species for moderate TPZ encroachments
98	<i>Casuarina glauca</i>	Grey She-oak	Semi mature	10	15	20	25	Good	Good	Medium	Moderate	Moderate	2.0	1.8	GROUP of approx 100 smaller specimens of the same species and similar size. Small trees in good condition are suitable condition, size and species for moderate TPZ encroachments. Approximately twelve specimens will be within or adjacent to the pathway footprint.
99	<i>Casuarina glauca</i>	Grey She-oak	Mature	13	3	35	45	Good	Good	Medium	Moderate	Moderate	4.2	2.4	GROUP of 9 larger specimens of the same species and similar size. trees in good condition are suitable condition, size and species for moderate TPZ encroachments. FOUR specimens will be within or adjacent to the pathway footprint.



100	<i>Avicenna marina</i>	Unknown	Mature	5	3	35	50	Good	Good	Long	High	High	4.2	2.5	Group of approx 150 <i>Avicenna marina</i> specimens. Suitably distanced from proposed works. Suitable place protection measures in engineering plans.
101	<i>Casuarina glauca</i>	Grey She-oak	Mature	10	1	25	35	Good	Good	Medium	Moderate	Moderate	3.0	2.1	GROUP of approx 30 specimens of the same species and similar size. Maturing trees in good condition are suitable condition, size and species for moderate TPZ encroachments. Trees in large clustered group along and perpendicular to river waterline. Selective removal of approximately 15 individual trees within middle of group will be required to facilitate pathway construction.
102	<i>Casuarina glauca</i>	Grey She-oak	Semi mature	9	1	10	15	Good	Good	Medium	Moderate	Moderate	2.0	1.5	GROUP of approx 200 smaller specimens of the same species and similar size. Small trees in good condition are suitable condition, size and species for moderate TPZ encroachments. Trees clustered along river waterline. Selective removal of approximately 5 individual trees within middle of group will be required to facilitate pathway construction.
103	<i>Casuarina glauca</i>	Grey She-oak	Semi mature	9	1	15	20	Good	Good	Medium	Moderate	Moderate	2.0	1.7	GROUP of 23 smaller specimens of the same species and similar size. Small trees in good condition are suitable condition, size and species for moderate TPZ encroachments. Trees clustered along river waterline. Suitable space for path to avoid tree removal.
104	<i>Avicenna marina</i>	Unknown	Mature	5	3	35	50	Good	Good	Long	High	High	4.2	2.5	GROUP of approx 100 <i>Avicenna marina</i> specimens within river edge. Suitable for retention and protection as part of development.
105	<i>Casuarina glauca</i>	Grey She-oak	Mature	17	2	30	45	Good	Good	Medium	Moderate	Moderate	3.6	2.4	GROUP of approx 100 maturing specimens of the same size and species positioned along river edge. Trees form natural corridor for pathway to be positioned within. Approx 10 trees within centre of corridor will require removal to facilitate construction. Remaining trees suitable for moderate encroachment.
106	<i>Eucalyptus baueriana</i>	Blue Box	Mature	17	4	88	94	Fair	Fair	Medium	Very High	High	10.6	3.2	Large tree of species significance positioned adjacent to river. Canopy with minor signs of dieback. Deadwood and tissue necrosis observed within canopy. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping.
107	<i>Eucalyptus baueriana</i>	Blue Box	Mature	10	4	42.4	42	Good	Good	Long	High	High	5.1	2.3	Tree of species significance positioned adjacent to river. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping
108	<i>Eucalyptus baueriana</i>	Blue Box	Mature	14	5	84	91	Fair	Fair	Medium	Very High	High	10.1	3.2	Tree of species significance positioned adjacent to river. Canopy with minor signs of dieback. Tree with northerly stem orientation. Thin column of tissue necrosis on southern side of stem. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping



109	Eucalyptus baueriana	Blue Box	Mature	11	4	49	57	Good	Good	Long	High	High	5.9	2.6	Tree of species significance positioned adjacent to river. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping
110	Eucalyptus baueriana	Blue Box	Mature	10	4	40	53	Good	Good	Long	High	High	4.8	2.5	Tree of species significance positioned adjacent to river. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping. Southern canopy will require uplift pruning to facilitate path construction.
111	Eucalyptus baueriana	Blue Box	Mature	10	3	38	46	Fair	Good	Long	High	High	4.6	2.4	Tree of species significance positioned adjacent to river. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping
112	Casuarina glauca	Grey She-oak	Semi mature	7	1	18	21	Good	Good	Medium	Moderate	Moderate	2.2	1.7	Small She oak growing within river bank.
113	Eucalyptus tereticornis	Forest Red Gum	Mature	18	6	39	48	Good	Good	Long	High	High	4.7	2.4	Larger tree observed to be in mostly good condition.
114	Eucalyptus baueriana	Blue Box	Mature	17	7	110	123	Fair	Fair	Medium	Very High	High	13.2	3.6	Large tree of species significance positioned adjacent to river. Canopy with minor signs of dieback. Tissue necrosis in canopy within old branch failure wounds. Tissue necrosis at base on northern side associated with borer damage. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping. Lower northern canopy will require minor uplift to facilitate path construction.
115	Eucalyptus baueriana	Blue Box	Mature	13	4	36	41	Good	Good	Long	High	High	4.3	2.3	Tree of species significance positioned adjacent to river. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping
116	Eucalyptus baueriana	Blue Box	Mature	12	3	40.3	42	Fair	Fair	Medium	High	Moderate	4.8	2.3	Medium-sized tree of species significance positioned adjacent to river. Canopy with minor signs of dieback. Becomes codominant at ground level.
117	Eucalyptus baueriana	Blue Box	Semi mature	6	1	13	18	Good	Good	Long	Medium	Moderate	2.0	1.6	Small tree of indigenous species significance positioned adjacent to river. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping
118	Eucalyptus baueriana	Blue Box	Mature	16	7	115	130	Fair	Fair	Medium	Very High	High	13.8	3.7	Large tree of indigenous species significance. Stem and canopy with tissue necrosis in old wounds. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping.
119	Eucalyptus baueriana	Blue Box	Mature	16	6	86	109	Fair	Fair	Medium	Very High	High	10.3	3.4	Large tree of indigenous species significance. Wound at base of stem with tissue necrosis. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping



120	Eucalyptus baueriana	Blue Box	Mature	17	8	115	140	Fair	Poor	10-19 years	Very High	High	13.8	3.8	Large tree of indigenous species significance. Stem and canopy with extensive tissue necrosis in old wounds. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping
121	Eucalyptus baueriana	Blue Box	Mature	20	5	99.3	130	Good	Good	Long	High	High	11.9	3.7	Large tree of indigenous species significance. Observed to be in good condition. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping
122	Eucalyptus baueriana	Blue Box	Mature	21	5	97	114	Good	Fair	Medium	Very High	High	11.6	3.5	Large tree of indigenous species significance. Stem and with tissue necrosis in old wound on southern side of stem extending from ground level to 4 metres. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping
123	Eucalyptus baueriana	Blue Box	Mature	14	4	43	49	Good	Good	Long	High	High	5.2	2.5	Medium-sized tree of indigenous species significance. Thick grass and compact clay suggests deep root plate similar to trees that were subject to root mapping
124	Eucalyptus baueriana	Blue Box	Semi mature	11	2	25	35	Good	Good	Long	Medium	Moderate	3.0	2.1	GROUP of 34 closely positioned semi mature specimens of the same size and species. Closest specimens are 3.5-4 metres from edge of pathway. Group can be suitably retained and protected.
125	Eucalyptus baueriana	Blue Box	Mature	13	5	44.9	47	Good	Fair	Long	High	High	5.4	2.4	Medium sized tree of species significance. Stem becomes codominant at ground level. Suitably distanced from proposed pathway.
126	Eucalyptus baueriana	Blue Box	Mature	15	5	47	49	Good	Poor	Medium	High	Moderate	5.6	2.5	Medium sized tree of species significance. Stem with decay and hollow at 5 metres height. Suitably distanced from proposed works
127	Eucalyptus baueriana	Blue Box	Mature	13	4	32	44	Good	Good	Long	High	High	3.8	2.3	Medium sized tree of species significance. Suitably distanced from proposed works
128	Casuarina glauca	Grey She-oak	Semi mature	14	1	20	30	Good	Good	Medium	Moderate	Moderate	2.4	2.0	GROUP of approx 30 closely positioned smaller trees of the same size and species. Trees positioned adjacent to river bank. Suitably distanced from proposed pathway.
129	Avicenna marina	Grey Mangrove	Semi mature	8	3	20	40	Good	Good	Long	High	High	2.4	2.3	GROUP of approx 250 closely positioned Avicenna marina specimens of the same size and species. Trees positioned adjacent to river bank. Suitably distanced from proposed pathway
130	Casuarina glauca	Grey She-oak	Semi mature	11	1	25	35	Good	Good	Medium	Moderate	Moderate	3.0	2.1	GROUP of approx 30 closely positioned specimens of the same size and species. Trees positioned adjacent to river bank and tributary. Approximately 10 specimens within or adjacent to boardwalk footprint that will require removal.
131	Cinnamomum camphora	Camphor Laurel	Semi mature	10	3	35	45	Good	Good	Short	Low	Very Low	4.2	2.4	GROUP of 3 small trees of low species significance.
132	Casuarina glauca	Grey She-oak	Mature	20	2	35	45	Good	Good	Medium	Moderate	Moderate	4.2	2.4	GROUP of approx 10 larger trees in mostly good condition. Approximately four specimens will require removal to facilitate at Auld Ave connection.



133	Casuarina glauca	Grey She-oak	Semi mature	17	2	20	25	Good	Good	Medium	Moderate	Moderate	2.4	1.8	GROUP of approx 50 closely positioned specimens of the same size and species. Approximately 15 will require removal to facilitate Auld Ave connection.
134	Casuarina glauca	Grey She-oak	Mature	20	2	35	45	Good	Good	Medium	Moderate	Moderate	4.2	2.4	Very large GROUP of approx 200 closely positioned specimens of the same size and species. Approximately 100 will require removal to facilitate Auld Ave connection.
135	Casuarina glauca	Grey She-oak	Mature	17	2	30	40	Good	Good	Medium	Moderate	Moderate	3.6	2.3	Very large GROUP of approximately 250 closely positioned specimens of the same size and species. Mostly positioned adjacent to river bank. Approximately 5 smaller specimens within group are inside or adjacent to pathway footprint and will require removal to facilitate works. Remaining trees on good condition and suitable for moderate encroachments to allow for retention as part of development.
136	Casuarina glauca	Grey She-oak	Mature	18	2	30	40	Good	Good	20-29 years	Moderate	Moderate	3.6	2.3	GROUP of approximately 50 closely positioned specimens of the same size and species. Mostly positioned adjacent to river bank. One smaller specimen within group are inside or adjacent to pathway footprint and will require removal to facilitate works. Remaining trees on good condition and suitable for moderate encroachments to allow for retention as part of development
137	Casuarina glauca	Grey She-oak	Mature	18	2	30	40	Good	Good	20-29 years	Moderate	Moderate	3.6	2.3	Large GROUP of approximately 100 closely positioned specimens of the same size and species. Mostly positioned adjacent to river bank. Approximately 7 smaller specimens along edge of group are inside or adjacent to pathway footprint and will require removal to facilitate works. Remaining trees on good condition and suitable for moderate encroachments to allow for retention as part of development
138	Casuarina glauca	Grey She-oak	Mature	18	2	30	40	Good	Good	20-29 years	Moderate	Moderate	3.6	2.3	Very large GROUP of approximately 150 closely positioned specimens of the same size and species. Mostly positioned adjacent to river bank. Approximately 5 smaller specimens within group are inside or adjacent to pathway footprint and will require removal to facilitate works. Remaining trees on good condition and suitable for moderate encroachments to allow for retention as part of development
139	Casuarina glauca	Grey She-oak	Semi mature	14	1	30	40	Good	Good	30-39 years	Moderate	Moderate	3.6	2.3	GROUP of approximately 50 closely positioned specimens of the same size and species. Approximately 5 smaller specimens within group are inside or adjacent to pathway footprint and will require removal to facilitate works. Remaining trees on good condition and suitable for moderate encroachments to allow for retention as part of development



140	Casuarina glauca	Grey She-oak	Mature	16	2	35	45	Good	Good	30-39 years	Moderate	Moderate	4.2	2.4	Very large GROUP of approximately 150 closely positioned specimens of the same size and species. Positioned adjacent to river bank and tributary. Approximately 15 trees within and immediately adjacent to footprint of boardwalk across tributary will require removal. Remaining trees can be suitably retained.
141	Casuarina glauca	Grey She-oak	Mature	17	2	40	45	Fair	Poor	5-9 years	Moderate	Moderate	4.8	2.4	Larger tree with four surrounding smaller specimens. Likely suckers. Extensive tissue necrosis and decay on stem from previous failures. Tee will require removal to facilitate pathway construction.



Appendix G: TPZ Encroachment Data

Tree	R _{TPZ} [m]	R _{SRZ} [m]	TPZ Area (m ²)	Encroachment Area (m ²)	Encroachment (%)	Impact of Encroachment	Comments
1	7.0	2.7	152.1	0	0.0	N/A	
2	8.5	3.2	227.9	0	0.0	N/A	
3	4.4	2.5	61.9	0	0.0	N/A	
4	10.7	3.3	358.2	15.7	4.4	Low	Minor TPZ encroachment with Low impact.
5	5.9	2.8	108.6	0	0.0	N/A	
6	3.6	2.2	40.7	0	0.0	N/A	
7	4.9	2.5	76.0	0	0.0	N/A	
8	2.8	2.0	23.9	0	0.0	N/A	
9	2.5	2.2	19.9	0	0.0	N/A	
10	8.4	3.1	221.6	0	0.0	N/A	
11	3.7	2.2	43.5	0	0.0	N/A	
12	4.9	2.4	76.0	0	0.0	N/A	
13	3.8	2.3	46.3	0	0.0	N/A	
14	6.1	2.6	117.6	0	0.0	N/A	
15	4.2	2.2	55.4	0	0.0	N/A	
16	4.7	2.3	68.8	0	0.0	N/A	
17	9.5	3.1	282.2	0	0.0	N/A	
18	11.8	3.5	434.3	0	0.0	N/A	
19	2.5	2.1	19.9	0	0.0	N/A	
20	4.2	2.4	56.5	0	0.0	N/A	
21	6.4	2.8	127.0	0	0.0	N/A	
22	7.4	2.9	173.8	0	0.0	N/A	
23	10.0	3.3	311.5	5.8	1.9	Low	Minor TPZ encroachment with Low impact.
24	2.6	1.8	21.9	0	0.0	N/A	
25	7.4	3.0	174.0	51.7	29.7	High	Major TPZ encroachment with significant impact mitigation due to existing asphalt surface being replaced.
26	5.5	2.7	95.7	35.4	37.0	Severe	Major TPZ encroachment with significant impact mitigation due to existing asphalt surface being replaced.
27	4.1	2.2	52.3	5.3	10.1	Moderate	TPZ encroachment with significant impact mitigation due to existing asphalt surface being replaced.
28	3.8	2.3	46.4	0	0.0	N/A	
29	4.3	2.3	58.6	7.5	12.8	Moderate	Major TPZ encroachment with significant impact mitigation due to existing asphalt surface being replaced.
30	3.5	2.1	38.0	0	0.0	N/A	
31	2.3	1.8	16.3	0	0.0	N/A	
32	3.6	2.2	40.7	0	0.0	N/A	



33	7.7	2.9	185.2	61.7	33.3	Severe	Major TPZ encroachment with impact mitigation due to existing asphalt surface being replaced. ROOT MAPPING SURVEY REQUIRED
34	2.5	1.8	19.9	14.3	71.7	Severe	
35	6.8	2.7	146.9	48.5	33.0	Severe	Major TPZ encroachment with impact mitigation due to existing asphalt surface being replaced. ROOT MAPPING SURVEY REQUIRED
36	4.1	2.2	52.3	4.3	8.2	Low	TPZ encroachment with significant impact mitigation due to existing asphalt surface being replaced.
37	2.6	1.8	21.9	0.8	3.7	Low	TPZ encroachment with significant impact mitigation due to existing asphalt surface being replaced.
38	3.7	2.4	43.5	0	0.0	N/A	
39	5.8	2.8	104.2	22.4	21.5	High	ROOT MAPPING SURVEY REQUIRED
40	5.6	2.6	97.9	0	0.0	N/A	
41	5.9	2.6	108.6	0	0.0	N/A	
42	11.5	3.2	416.7	44.1	10.6	Moderate	Major TPZ encroachment with significant impact mitigation due to existing asphalt surface being replaced.
43	2.8	2.0	23.9	0	0.0	N/A	
44	2.5	1.8	19.9	0	0.0	N/A	
45	2.3	1.8	16.3	7.6	46.6	Severe	Major TPZ encroachment with significant impact mitigation due to existing asphalt surface being replaced.
46	2.2	1.7	14.6	0	0.0	N/A	
47	2.0	1.6	12.6	0	0.0	N/A	
48	6.1	2.8	117.6	48.7	41.4	Severe	Major TPZ encroachment with significant impact mitigation due to existing asphalt surface being replaced.
49	5.5	2.6	95.7	45	47.0	Severe	Major TPZ encroachment with significant impact mitigation due to existing asphalt surface being replaced.
50	5.4	2.6	91.6	0	0.0	N/A	
51	6.5	2.7	131.8	0	0.0	N/A	
52	4.0	2.2	49.5	32.5	65.7	Severe	
53	4.6	2.3	65.3	18.3	28.0	High	Pathway height can be raised adjacent to tree in order to mitigate impact of major encroachment.
54	5.0	2.6	79.8	0	0.0	N/A	
55	6.8	2.9	146.9	31.5	21.4	High	Pathway height can be raised adjacent to tree in order to mitigate impact of major encroachment.
56	2.2	1.7	14.6	0	0.0	N/A	
57	7.7	3.0	185.2	32.8	17.7	Moderate	Pathway height can be raised adjacent to tree in order to mitigate impact of major encroachment.
58	5.2	2.4	84.1	0	0.0	N/A	
59	2.8	1.7	23.9	0	0.0	N/A	
60	2.0	1.4	12.6	8.7	69.3	Severe	Stem within pathway footprint
61	2.0	1.6	12.6	10.5	83.6	Severe	Stem within pathway footprint
62	2.8	2.0	23.9	14.5	60.6	Severe	Stem within pathway footprint
63	4.9	2.4	76.0	0	0.0	N/A	
64	9.1	3.3	262.7	74.4	28.3	High	Pathway height can be raised adjacent to tree in order to mitigate impact of major encroachment.
65	2.4	1.9	18.1	6.5	35.9	Severe	Stem adjacent to pathway footprint
66	2.0	1.7	12.6	10.5	83.6	Severe	Stem within pathway footprint
67	2.0	1.3	12.6	9.6	76.4	Severe	Stem within pathway footprint



68	5.0	2.5	78.9	18.3	23.2	High	Pathway height can be raised adjacent to tree in order to mitigate impact of major encroachment.
69	2.0	1.4	12.6	0	0.0	N/A	
70	2.2	2.0	14.6	1.4	9.6	Low	
71	2.0	1.7	12.6	N/A	N/A	N/A	GROUP of 7 small trees suitable for Moderate impact encroachment. All specimens that are 1.5 metres from the edge of the proposed pathway are suitable for retention. THREE Specimens less than 1.5 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
72	9.6	3.3	289.4	98.9	34.2	Severe	Major TPZ encroachment with impact mitigation due to existing asphalt surface being replaced. ROOT MAPPING SURVEY REQUIRED
73	2.0	1.7	12.6	12.56	100.0	Severe	Stem within pathway footprint
74	2.2	1.8	14.6	9.639609734	65.8	Severe	Stem within pathway footprint
75	2.3	2.0	16.3	12.15734435	74.5	Severe	Stem within pathway footprint
76	8.2	3.1	209.1	12.3	5.9	Low	TPZ encroachment with minor impact mitigation due to existing asphalt surface being replaced.
77	6.8	3.0	146.9	8	5.4	Low	TPZ encroachment with minor impact mitigation due to existing asphalt surface being replaced.
78	9.4	3.1	275.1	71.1	25.8	High	TPZ encroachment with minor impact mitigation due to existing asphalt surface being replaced.
79	8.0	3.1	203.0	11.6	5.7	Low	TPZ encroachment with minor impact mitigation due to existing asphalt surface being replaced.
80	4.2	2.5	55.4	0	N/A	N/A	GROUP of 13 small trees will not be impacted by pathway construction.
81	5.6	2.5	99.9	0	0.0	N/A	
82	3.0	2.2	28.3	N/A	N/A	N/A	GROUP of 13 small trees will not be impacted by pathway construction.
83	4.2	2.3	55.4	N/A	N/A	N/A	GROUP of 4 small trees will not be impacted by pathway construction.
84	2.0	1.4	12.6	N/A	Moderate	Moderate	GROUP of 14 small trees suitable for Moderate impact encroachment. All specimens that are 1.5 metres from the edge of the proposed pathway are suitable for retention. FOUR specimens less than 1.5 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
85	2.0	1.5	12.6	N/A	N/A	N/A	GROUP of 21 small trees will not be impacted by pathway construction.
86	2.0	1.4	12.6	N/A	Moderate	Moderate	GROUP of 30 small trees suitable for Moderate impact encroachment. All specimens that are 1.5 metres from the edge of the proposed pathway are suitable for retention. TWO specimens less than 1.5 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
87	2.4	1.9	18.1	N/A	N/A	N/A	GROUP of 6 small trees will not be impacted by pathway construction.
88	2.4	1.8	18.1	N/A	N/A	N/A	GROUP of 8 small trees will not be impacted by pathway construction.
89	2.6	1.9	21.9	N/A	Moderate	Moderate	GROUP of 9 small trees suitable for Moderate impact encroachment. All specimens that are 1.8 metres from the edge of the proposed pathway are suitable for retention. ONE specimen less than 1.8 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
90	3.6	2.2	40.7	N/A	Moderate	Moderate	GROUP of 5 small trees suitable for Moderate impact encroachment. All specimens that are 2.5 metres from the edge of the proposed pathway are suitable for retention. THREE specimens less than 2.5 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
91	3.0	2.0	28.3	N/A	N/A	N/A	GROUP of 30 small trees will not be impacted by pathway construction.
92	2.8	2.0	23.9	10.5	43.9	Severe	Tree's stem within footprint of proposed pathway.



93	3.0	2.1	28.3	N/A	N/A	N/A	GROUP of 50 small trees will not be impacted by pathway construction.
94	3.0	2.1	28.3	N/A	Moderate	Moderate	GROUP of 8 small trees suitable for Moderate impact encroachment. All specimens that are 1.5 metres from the edge of the proposed pathway are suitable for retention. THREE specimens less than 1.5 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
95	4.2	2.5	55.4	N/A	N/A	N/A	GROUP of 150 small trees will not be impacted by pathway construction.
96	4.6	2.3	65.3	N/A	Moderate	Moderate	GROUP of 20 trees within and adjacent to pathway footprint will require removal.
97	2.0	1.8	12.6	N/A	N/A	N/A	GROUP of 30 smaller trees will not be impacted by pathway construction.
98	2.0	1.8	12.6	N/A	Moderate	Moderate	GROUP of 50 small trees suitable for Moderate impact encroachment. All specimens that are 1.5 metres from the edge of the proposed pathway are suitable for retention. Approximately TWELVE specimens less than 1.5 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
99	4.2	2.4	55.4	N/A	Moderate	Moderate	GROUP of 9 trees suitable for Moderate impact encroachment. All specimens that are 3 metres from the edge of the proposed pathway are suitable for retention. FOUR specimens less than 3 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
100	4.2	2.5	55.4	N/A	N/A	N/A	GROUP of 150 smaller trees will not be impacted by pathway construction.
101	3.0	2.1	28.3	N/A	Moderate	Moderate	GROUP of 30 trees suitable for Moderate impact encroachment. All specimens that are 2.2 metres from the edge of the proposed pathway are suitable for retention. FIFTEEN specimens less than 2.2 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
102	2.0	1.5	12.6	N/A	Moderate	Moderate	GROUP of 200 trees suitable for Moderate impact encroachment. All specimens that are 1.5 metres from the edge of the proposed pathway are suitable for retention. Approximately TWENTY specimens less than 1.5 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
103	2.0	1.7	12.6	N/A	N/A	N/A	GROUP of 23 smaller trees will not be impacted by pathway construction.
104	4.2	2.5	55.4	N/A	N/A	N/A	GROUP of 100 small trees will not be impacted by pathway construction.
105	3.6	2.4	40.7	N/A	Moderate	Moderate	GROUP of 100 trees suitable for Moderate impact encroachment. All specimens that are 2.4 metres from the edge of the proposed pathway are suitable for retention. Approximately TEN specimens less than 2.4 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
106	10.6	3.2	350.2	82.8	23.6	High	Alter path design to mitigate impact and allow for tree's retention.
107	5.1	2.3	81.4	18.6	22.8	High	Alter path design to mitigate impact and allow for tree's retention.
108	10.1	3.2	319.0	91.3	28.6	High	Alter path design to mitigate impact and allow for tree's retention.
109	5.9	2.6	108.6	13	12.0	Moderate	Alter path design to mitigate impact and allow for tree's retention.
110	4.8	2.5	72.3	10.2	14.1	Moderate	Alter path design to mitigate impact and allow for tree's retention.
111	4.6	2.4	65.3	15.2	23.3	High	Alter path design to mitigate impact and allow for tree's retention.
112	2.2	1.7	14.6	0	0.0	N/A	Alter path design to mitigate impact and allow for tree's retention.
113	4.7	2.4	68.8	9.3	13.5	Moderate	
114	13.2	3.6	547.1	129.4	23.7	High	Alter path design to mitigate impact and allow for tree's retention.
115	4.3	2.3	58.6	0	0.0	N/A	
116	4.8	2.3	73.5	30.3	41.2	Severe	Alter path design to mitigate impact and allow for tree's retention.
117	2.0	1.6	12.6	0	0.0	N/A	
118	13.8	3.7	598.0	141.7	23.7	High	Alter path design to mitigate impact and allow for tree's retention.



119	10.3	3.4	334.4	22.3	6.7	Low	Alter path design to mitigate impact and allow for tree's retention.
120	13.8	3.8	598.0	124.6	20.8	High	Alter path design to mitigate impact and allow for tree's retention.
121	11.9	3.7	445.4	62.8	14.1	Moderate	Alter path design to mitigate impact and allow for tree's retention.
122	11.6	3.5	425.4	121.1	28.5	High	Alter path design to mitigate impact and allow for tree's retention.
123	5.2	2.5	83.6	7.8	9.3	Low	GROUP of 34 trees suitable for Moderate impact encroachment. All specimens that are 3.5 metres from the edge of the proposed pathway are suitable for retention. Pathway design modification will allow for all trees in group to be retained.
124	3.0	2.1	28.3	N/A	Low	Low	GROUP of 34 trees suitable for Moderate impact encroachment. All specimens that are 3.5 metres from the edge of the proposed pathway are suitable for retention. Pathway design modification will allow for all trees in group to be retained.
125	5.4	2.4	91.3	0	0.0	N/A	
126	5.6	2.5	99.9	0	0.0	N/A	
127	3.8	2.3	46.3	0	0.0	N/A	
128	2.4	2.0	18.1	N/A	N/A	N/A	GROUP of 30 smaller trees will not be impacted by pathway construction.
129	2.4	2.3	18.1	N/A	N/A	N/A	GROUP of 250 smaller trees will not be impacted by pathway construction.
130	3.0	2.1	28.3	N/A	Moderate	Moderate	GROUP of 34 trees suitable for Moderate impact encroachment. All specimens that are 2.2 metres from the edge of the proposed pathway are suitable for retention. TEN specimens less than 2.2 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
131	4.2	2.4	55.4	N/A	Severe	Severe	GROUP of 3 smaller trees will be within the footprint of the access road connecting pathway to Auld Avenue.
132	4.2	2.4	55.4	N/A	Moderate	Moderate	GROUP of 10 larger trees suitable for Moderate impact encroachment. All specimens that are 3 metres from the edge of the access road are suitable for retention. FOUR specimens less than 3 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
133	2.4	1.8	18.1	N/A	Moderate	Moderate	GROUP of 50 small trees suitable for Moderate impact encroachment. All specimens that are 2 metres from the edge of the access road are suitable for retention. Approximately FIFTEEN specimens less than 2 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
134	4.2	2.4	55.4	N/A	Moderate	Moderate	GROUP of 200 larger trees suitable for Moderate impact encroachment. All specimens that are 3 metres from the edge of the access road are suitable for retention. Approximately 100 specimens less than 3 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
135	3.6	2.3	40.7	N/A	Moderate	Moderate	GROUP of 250 small trees suitable for Moderate impact encroachment. All specimens that are 2.5 metres from the edge of the pathway are suitable for retention. FIVE specimens less than 2.5 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
136	3.6	2.3	40.7	N/A	Moderate	Moderate	GROUP of 50 small trees suitable for Moderate impact encroachment. All specimens that are 2.5 metres from the edge of the pathway are suitable for retention. ONE specimen less than 2.5 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
137	3.6	2.3	40.7	N/A	Moderate	Moderate	GROUP of 100 small trees suitable for Moderate impact encroachment. All specimens that are 2.5 metres from the edge of the pathway are suitable for retention. Approximately TEN specimens less than 2.5 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
138	3.6	2.3	40.7	N/A	Moderate	Moderate	GROUP of 150 small trees suitable for Moderate impact encroachment. All specimens that are 2.5 metres from the edge of the pathway are suitable for retention. Approximately FIVE specimens less than 2.5 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.



139	3.6	2.3	40.7	N/A	Moderate	Moderate	GROUP of 50 small trees suitable for Moderate impact encroachment. All specimens that are 2.5 metres from the edge of the pathway are suitable for retention. Approximately FIVE specimens less than 2.5 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
140	4.2	2.4	55.4	N/A	Moderate	Moderate	GROUP of 150 small trees suitable for Moderate impact encroachment. All specimens that are 3 metres from the edge of the pathway are suitable for retention. Approximately FIFTEEN specimens less than 3 metres from the closest edge of the pathway or within the pathway footprint are suitable for removal.
141	4.8	2.4	72.3	N/A	Severe	Severe	GROUP of 5 trees within the footprint of the proposed pathway.



Appendix H: TPZs and Encroachments for 141 Assessed Trees

