ARBORICULTURAL IMPACT ASSESSMENT REPORT

relating to construction of a new dwelling (House D) and driveway at

64 POWDERWORKS ROAD
NORTH NARRABEEN NSW 2101

Prepared for Somers Isles Pty Ltd
6 December 2023

Revision A

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APPENDICES

1. INTRODUCTION

1.1 This report was commissioned by Somers Isles Pty Ltd, the owner of 64 Powderworks Road, North Narrabeen to provide an Arboricultural Impact Assessment (AIA) report relating to the proposed works on the site and the existing trees located on the site or on an adjoining site and within close proximity to the works. This report shall accompany a development application submission to Northern Beaches Council involving construction of a two storey dwelling on the property and a new driveway and crossover at the front of the site.

1.2 A total of twelve (12) trees are included in this assessment including seven (7) trees located within the site boundaries and five (5) trees located on a neighbouring property or the council verge at the front of the site. Generally, a tree is protected in accordance with the Northern Beaches Council Local Environment Plan if it is a height greater than five (5) metres. In some instances a tree may meet the prescribed size, however may not be protected for other reasons such as it being a noxious weed species or a species listed by Council as exempt.

1.3 The purpose of this report is to undertake a visual assessment of the trees, determine the sustainability of the trees in the landscape, determine the impact of the proposed works on the trees and provide recommendations for tree protection measures to be implemented for those trees being retained.

1.4 This report shall reflect the expert opinion of the Arborist. The Arborist is acting independently of and not as the advocate for the owner. The Arborist shall not receive any commission to prune or remove the tree/s which is the subject of this report.

1.5 This report has been prepared in accordance the Australian Standard "*Protection of Trees on Development Sites*" (AS 4970:2009).

1.6 Details shown on the following plans were reviewed in this assessment:

Title	Author	Ref No.	Date
Architectural drawings	Inlet Design Studio	PWD001	14.10.23
Topographical survey plan	CMS Surveyors Pty Ltd	10184Cdetail	11.4.23

1.7 Key Definitions and Abbreviations used in this report.

- TPZ = Tree Protection Zone. This is the area as defined by AS 4970 – "*Protection of trees on development sites*" and means the typical minimum area above and below ground at a given distance from the trunk to provide for protection of the tree. Most importantly it represents the root zone required to be kept uninjured to maintain a healthy and viable tree. Note, roots will usually extend well beyond this zone, so this represents the minimum remaining root zone required, assuming all others are lost or damaged due to construction. It is typically calculated as a circle centred on the trunk unless existing site conditions can be assessed and indicate otherwise. According to the Australian Standard, a minor encroachment of 10% of the TPZ is allowable, provided the 10% is compensated for elsewhere and contiguous to the TPZ. For the purpose of this report the extent of impact has been broken down to the following categories:
  - 0% of root zone impacted – no impact of significance
  - 0 to 10% of root zone impacted – low level of impact
  - 10 to 15% of root zone impacted – low to moderate level of impact
  - 15 to 20% of root zone impacted – moderate level of impact
  - 20 to 25% of root zone impacted – moderate to high level of impact
  - 25 to 35% of root zone impacted – high level of impact
  - >35% of root zone impacted – significant level of impact
- SRZ = Structural Root Zone. This is the area as defined by AS 4970 – "*Protection of trees on development sites*" and means the area immediately around the base of the tree at a given distance from the trunk. The woody roots and soil cohesion in this area are considered vital to the structural stability of the tree. Damage or removal of soil and roots from this area will typically render the tree unstable and require its removal. It is typically calculated as a circle, centred on the trunk, unless existing site conditions can be assessed and indicate otherwise.

2. METHODOLOGY

2.1 Health and Condition Assessment

A site inspection was undertaken on 27 September 2023 to visually assess the trees in view from ground level. This report is limited to the methods of assessment listed below (and outlined in **Appendix 1**), and does not include any internal probing, compaction testing, drilling, root mapping, aerial inspection or diagnostic testing.

- Tree Species (botanical and common name).
- Tree height was measured using a Nikon Rangefinder Forestry Pro (where possible) otherwise estimated.
- Canopy spread was estimated.
- Diameter at Breast Height (DBH) and Diameter at Ground Level (DGL) was measured using a forestry diameter tape or estimated for those trees inaccessible.
- Health and vigour assessed, including indicators such as foliage size, colour, extension growth, presence of disease or pest infestation, canopy density, presence of deadwood, dieback, epicormic growth.
- Condition assessed, including visible evidence of structural defects, instability, evidence of previous pruning and physical damage as indicators.
- Life expectancy of the tree was estimated, suitability of the tree to the site and its existing location.
- The photographs included in this report were taken at the time of inspection.
- Assessment was carried out visually from ground level within the property.
- The comments and recommendations in this report are based on findings from the site inspection.

2.2 Landscape Significance

The significance of a tree in the landscape is a combination of its environmental, heritage and amenity values. A criteria for the assessment of landscape significance as devised by Andrew Morton (2003) and shown in **Appendix 2** have been applied. Whilst it may be somewhat subjective to assess these values consistently, it is appropriate to assign some measure to assist in determining the overall retention value of a tree.

The rating system which has been applied to the tree and to assist in determining a priority for retention, includes the following categories:

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

2.3 Tree Retention Value

The retention value shown in the Tree Assessment Schedule in **Figure 2** has been determined on the basis of the estimated longevity of the tree and its landscape significance rating, in accordance with Table 1 below. These retention values can help to determine the most appropriate position of any future building footprints and/or structures within the site, to minimise the impact on trees considered worthy of preservation.

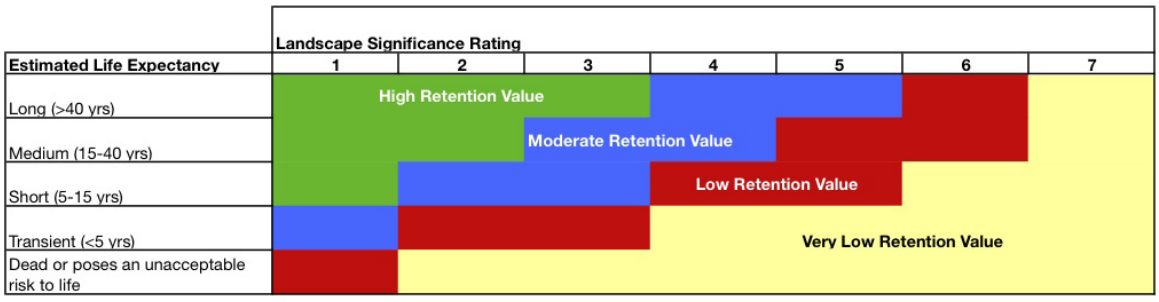

Table 1: Tree Retention Values - assessment methodology (Ref:- Morton, Andrew 2006 modified from Couston, Mark & Howden, Melanie (2001) Footprint Green Pty Ltd, Sydney, Australia)

3. OBSERVATIONS

3.1 The Site

The property is legally identified as Lot 35, Section 1 in Deposited Plan 6462 and is located on the southern side of Powderworks Road (refer to **Figure 1**). Almost rectangular in shape, the site has a total area of 1,745.3 square metres. Currently on the property is a dwelling positioned towards the front of the site that appears decrepit. Vehicular and pedestrian access on to the site is via a sloping driveway with stone paved driveway strips. The council reserve at the front of the site consists of a steep embankment, and the driveway crossover has been installed at a 45 degree angle relative to the kerb and front boundary line. A metal carport is located to the rear of the dwelling and adjacent to the eastern boundary.

The front portion of the site is relatively flat and then slopes steeply down from the rear of the dwelling to the southern rear boundary comprising a level change of approximately 16 metres. The rear of the site is heavily treed containing numerous native tree species. Large rock floaters are visible to the rear of the dwelling which is indicative of the geology of the area.

According to Northern Beaches Council zoning map, the site is zoned as C4 Environmental Living, being residential land identified with special environmental or scenic values. This is reflected in the trees found growing on and near the site, which are locally occurring species and as such hold ecological significance (in accordance with **Appendix 2**). This is also highlighted on the Biodiversity Values Map in **Figure 2** (https://www.planningportal.nsw.gov.au/) which identifies land with high biodiversity value that is particularly sensitive to impacts from development and clearing.

Figure 1: An aerial image of the site with boundary lines highlighted in red (accessed from http://maps.six.nsw.gov.au/ on 1/12/23).

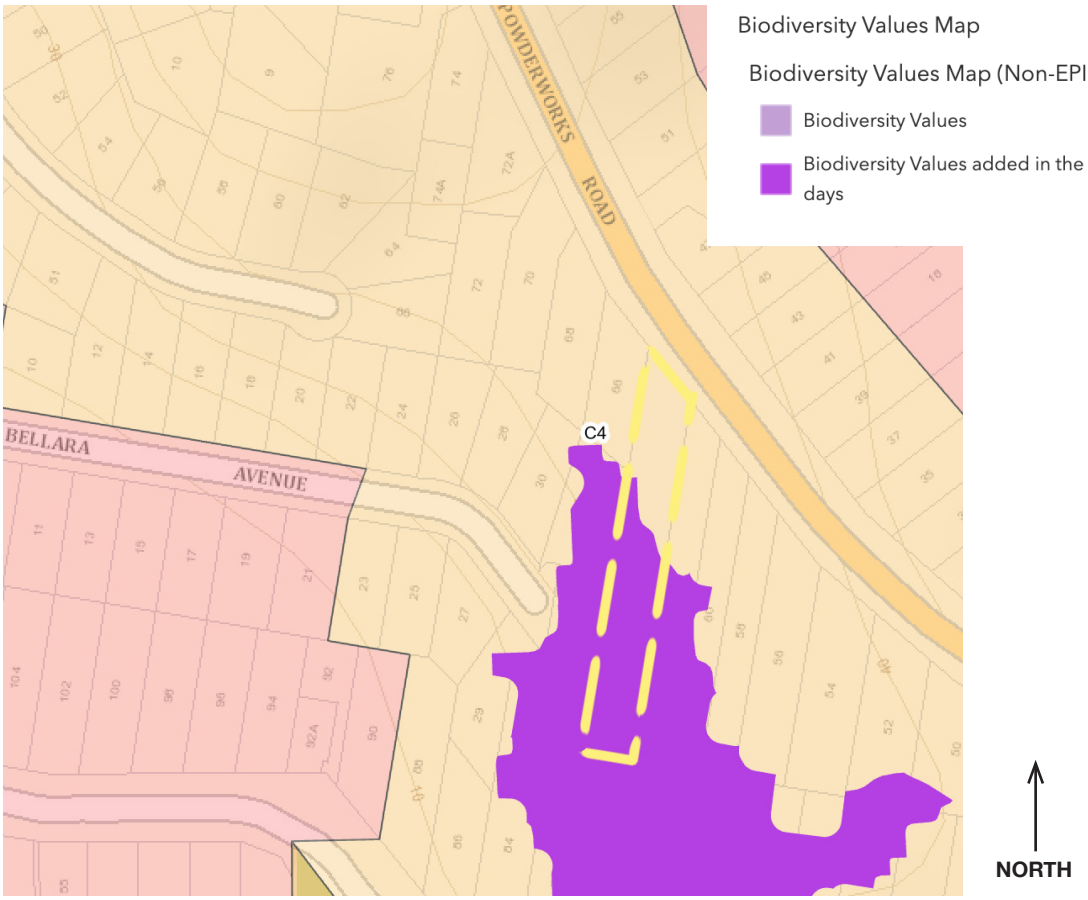

Figure 2: A screen grab from the Biodiversity Values Map sourced from the NSW Planning Portal (https://www.planningportal.nsw.gov.au/) showing the site boundary as yellow dashed lines and the portion of the site identified as land holding biodiversity value in dark purple shading (accessed 1/12/23).

3.2 **The Trees**

The information and characteristics of the trees are set out in the Tree Assessment Schedule in **Figure 3.** Each tree has been provided with an identification number for reference purposes which is noted on the Tree Location Plan (**Figure 4**) using the Topographical Survey Plan prepared by CMS Surveyors Pty Ltd as a base layer. The tree identification numbers on the plan correlate with the trees listed on the Tree Assessment Schedule. Site photos can be found in **Figure 5-12**.

Note: This tree assessment is limited to the trees located within proximity to the proposed works. This tree assessment does include the heavily treed area to the lower portion of the site which is well away from the proposed works.

Tree No.	Plant Name (Species/Common Name)	Age	Tree Height (m)	Average Canopy spread (m)	DBH (m)	DGL (m)	Crown Class	Vigour	Condition	Useful Life Expectancy	Landscape Significance	Tree Retention Value	Observations/ comments	Tree Protection Zone (TPZ) radius in metres	Structural Root Zone (SRZ) radius in metres	Proposed for removal or retention?	Impact / Incursion
1	*Angophora costata* (Sydney Red Gum)	mature	10.0	18.0	0.79	0.82	dominant	normal	good	long (40yrs+)	high	high	Locally occurring species indicative of original vegetation to the area - therefore ecological significance. Persistent deadwood, smaller rubbing branches. Growing on top of large sandstone rock floater.	9.5	3.0	retain	Existing dwelling encroachment in TPZ is approx. 11%. Proposed new dwelling represents an additional 5% encroachment in the TPZ, totalling a new encroachment of approx. 16%. Private open space should be permeable surface (ie. decking)
2	*Ficus benjamina* (Weeping Fig)	mature	8.0	8.0	multiple trunks	multiple trunks	suppressed	normal	fair	long (40yrs+)	very low	low	Listed on Council's Exempt Tree Species List, plus tree is located within 2m of existing dwelling. Supressed canopy by adjacent Sydney Red Gum.	est. 4.8	est. 2.5	remove (exempt)	New driveway and building works will necessitate removal of tree.
3	*Angophora costata* (Sydney Red Gum)	mature	10.0	20.0	0.44 0.47 0.75	0.92	dominant	low	fair	long (40yrs+)	high	high	Locally occurring species indicative of original vegetation to the area - therefore ecological significance. Three main trunks. Surface woody roots visible below canopy of tree. Base of tree abuts driveway. Small cavity at root buttress. Deadwood evident.	15.0	3.2	remove	Existing dwelling encroachment in TPZ is approx. 11%.New dwelling and new driveway represents an additional 13% encroachment, totalling a new encroachment of approx. 24%. Details relating to driveway and crossover levels need to be further analysed.
4	*Angophora costata* (Sydney Red Gum)	mature	6.0	7.0 (canopy bias to E)	0.24 0.34	0.35	suppressed	low	poor	medium (15-40yrs)	high	moderate	Locally occurring species indicative of original vegetation to the area - therefore ecological significance. Limited live crown density due to suppression.	5.0	2.1	retain	New driveway represents an encroachment in the TPZ of 14%.
5	*Schefflera actinophylla** (Umbrella tree)	mature	5.0	4.0	multiple trunks	multiple trunks	suppressed	normal	fair	medium (15-40yrs)	very low	low	Located on council land adjacent to front boundary line. Listed on Council's Exempt Tree Species List.	est. 2.6	est. 1.8	retain	Proposed works located outside TPZ of tree.
6	*Glochidion ferdinandi* (Cheese tree)	mature	5.5	4.0	0.15 2 x 0.10	multiple trunks	suppressed	normal	fair	long (40yrs+)	high	moderate	Locally occurring species indicative of original vegetation to the area - therefore ecological significance. Located immediately adjacent to front boundary line.	est. 2.5	est. 1.8	remove	New driveway is located in TPZ and SRZ of tree representing an encroachment of approx. 23%
7	*Michelia figo** (Port Wine Magnolia)	mature	3.0	3.0	multiple trunks	multiple trunks	suppressed	low	poor	short (5-15yrs)	very low	very low	Located on neighbouring property to west at No. 66 Powderworks Rd. Tree has been lopped to 3m high - less than the prescribed height and therefore exempt.	est. 1.8	est. 1.3	retain	Proposed works located outside TPZ of tree.
8	*Pittosporum undulatum* (Sweet Pittosporum)	mature	3.0	4.0	multiple trunks	multiple trunks	suppressed	low	poor	short (5-15yrs)	very low	very low	Tree is less than the prescribed height and therefore is exempt. Tree has been lopped.	est. 2.5	est. 1.5	remove (exempt)	New driveway abuts base of tree, representing an encroachment in the TPZ and SRZ of almost 50% - works will necessitate removal of tree.
9	*Angophora costata** (Smooth-barked Apple)	mature	7.0	7.0	0.25	0.28	dominant	normal	good	long (40yrs+)	high	moderate	Locally occurring species indicative of original vegetation to the area - therefore ecological significance. Located on neighbouring property to west at No. 66 Powderworks Rd.	3.0	1.9	retain	New driveway located in TPZ of tree representing an encroachment of 14%.
10	*Angophora costata** (Smooth-barked Apple)	mature	9.0	4.0 canopy bias to S)	0.30	0.35	suppressed	low	poor	medium (15-40yrs)	high	moderate	Located on the council verge at the front of the site. Poorly formed tree due to pruning for clearance to overhead electrical wires. Limited crown volume.	3.6	2.1	remove	New driveway located in TPZ and SRZ of council tree representing an encroachment of approx. 19%.
11	Camellia sasanqua (Camellia)	mature	4	3	multiple trunks	multiple trunks	dominant	normal	good	medium (15-40yrs)	very low	low	Less than the prescribed size - therefore exempt. Typical representation for the species.	2.00	1.4	retain	Proposed works located outside TPZ of tree.
12	Magnolia grandiflora (Bull-Bay Magnolia)	mature	10	18	0.6	0.71	dominant	normal	good	long (40yrs+)	moderate	moderate	Located in rear yard of neighbouring property	7.2	2.9	retain	Proposed works located outside TPZ of tree.

** Those trees located on adjoining land (also shaded)*

Figure 3: Tree Assessment Schedule

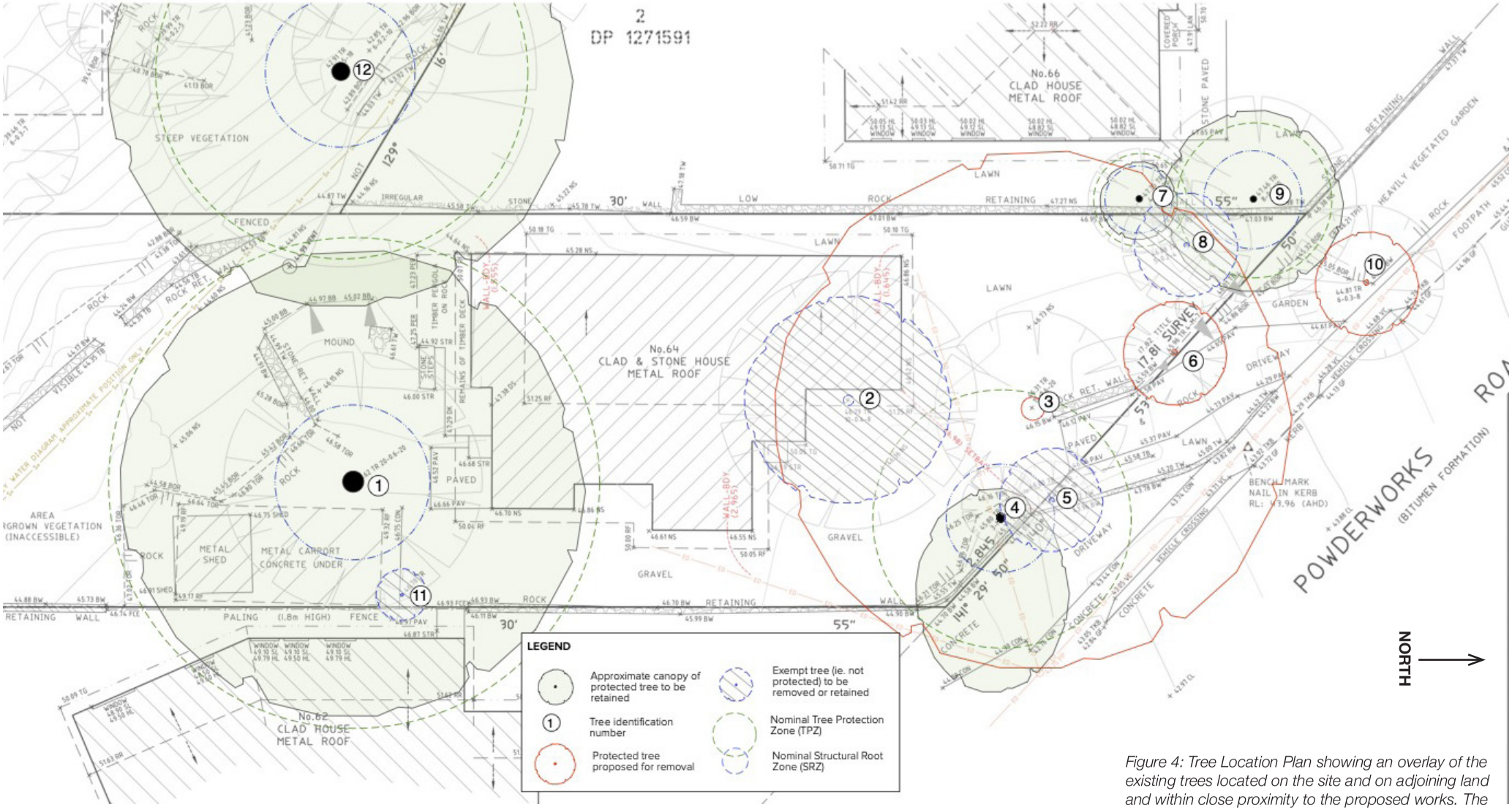

Figure 4: Tree Location Plan showing an overlay of the existing trees located on the site and on adjoining land and within close proximity to the proposed works. The protected trees proposed for removal are indicated on the drawing. The exempt trees are also shown. The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) for the protected and retained trees are indicated. (Note, do not measure from drawings).

Figure 5 (above): Photograph viewing west to Tree No. 10 (Smooth barked Apple) which is located on the council verge. (Photo: J Willis)

Figure 6 (above): Photograph viewing west to Tree No. 6 (Cheese tree) which is located immediately adjacent to the front boundary. (Photo: J Willis)

Figure 7 (above): Photograph viewing south to Tree No. 3 (Smooth barked Apple) which is located in the front of the dwelling. (Photo: J Willis)

Figure 8 (above): Photograph viewing north to Tree No. 3 (Smooth barked Apple) which is located in the front yard of the property. (Photo: J Willis)

Figure 9 (above): Photograph viewing east to Tree No. 1 (Smooth barked Apple) which is located to the rear of the dwelling. (Photo: J Willis)

Figure 10 (above): Photograph viewing south to the carport and Tree No. 1 (Smooth barked Apple) which is located to the rear of the dwelling and adjacent to the existing carport. (Photo: J Willis)

Figure 12 (above): Photograph viewing north to the lower trunk of Tree No. 1 (Smooth barked Apple) which is located to the rear of the dwelling. (Photo: J Willis)

Figure 11 (below): Photograph viewing northwest to the rear of the existing dwelling showing the existing rock and level changes to the rear of the dwelling. The canopy of Tree No. 12 (Bull Bay Magnolia) is visible in the background to the left hand side. (Photo: J Willis)

4. DISCUSSION | IMPACT ASSESSMENT

4.1 The intention of this assessment is to determine the level of incursion by the proposed works to the root zones and canopies of the trees located on the site or on adjoining land. Furthermore this assessment shall evaluate the likely impact resulting from the proposed works on the existing trees. The Tree Location Plan (**Figure 4**) indicates the tree locations and the calculated Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) for the retained protected trees. The numerical radius for the TPZ and SRZ is also listed on the Tree Assessment Schedule in **Figure 3**. The Tree Location Plan identifies those trees proposed for removal. Exempt (non-protected trees) are also identified on the plan.

The existing and proposed encroachment within the TPZ of the protected trees (where applicable) is indicated as blue and yellow hatching (respectively) on the Proposed Site Plan (**Figure 13**). The following criteria have been examined as part of this assessment:-

- Existing Relative Levels (RL)
- Tree Protection Zone (TPZ)
- Structural Root Zone (SRZ)
- Footprint of the proposed development and any temporary structures (such as scaffolding)
- Incursions to the TPZ & SRZ, including excavation, filling, and potential above ground impacts to tree canopy;
- Existing structures located in the TPZ of the retained trees; and
- Assessment of the likely impact of the works on the existing trees.

4.2 Summary of existing trees

i) The site and adjoining land contain numerous ecologically significant trees that are indicative of the original vegetation found growing in the area. Of the twelve (12) trees located to the upper portion of the site and included in this assessment, five (5) trees are identified as *Angophora costata* (Smooth-barked Apple). As a locally occurring species, these five trees hold ecological significance.

ii) With consideration to crown volume, tree condition and estimated life expectancy, two (2) trees are considered to have a high retention value (being Tree No. 1 and No. 3).

iii) Of the remaining ten (10) trees, five (5) trees are considered to have a moderate retention value and five (5) trees are considered to have a low or very low retention value.

iv) Of the twelve trees assessed, four (4) trees are identified as exempt (ie. non-protected), including Tree No. 2, 5, 8 and 11. The exempt trees are identified on the Tree Location Plan in **Figure 4** and also noted on the tree assessment schedule in **Figure 2**. These trees may be removed without seeking permission from Council.

v) Two (2) trees are located on the council reserve at the front of the site, identified as Tree No. 5 (Umbrella plant) and No. 10 (Smooth barked Apple).

4.3 Summary of proposed works (refer to **Figure 13**)

It is proposed to demolish the existing dwelling and construct a new two storey residence in a similar position to the existing dwelling. It is also proposed to replace the existing driveway and crossover with a new driveway and crossover. The new driveway shall be positioned towards the northern side of the property and include a turning area to provide manoeuvrability for vehicles exiting the site.

4.4 Driveway encroachment in TPZ of trees (refer to **Figure 13**)

i) Tree No. 3 (Smooth-barked Apple)

The proposed driveway area and crossover represent an encroachment in the TPZ and SRZ of 12%. With consideration to the new dwelling located in the TPZ of the tree, the combined encroachment of both dwelling and driveway totals 24%. The tree is considered to have a high retention value on the basis of its crown volume, ecological significance and a long estimated life expectancy. The owner is seeking permission from Council to remove the tree. The repositioning of the driveway and crossover to the northern side of the tree and the associated excavation works required will potentially result in a moderate to high level of impact upon the tree. If the tree is retained as part of the future works, details relating to the finished driveway levels would need addressed to ensure excavation within the TPZ is kept to a minimum and therefore mitigate any potential impact upon the tree.

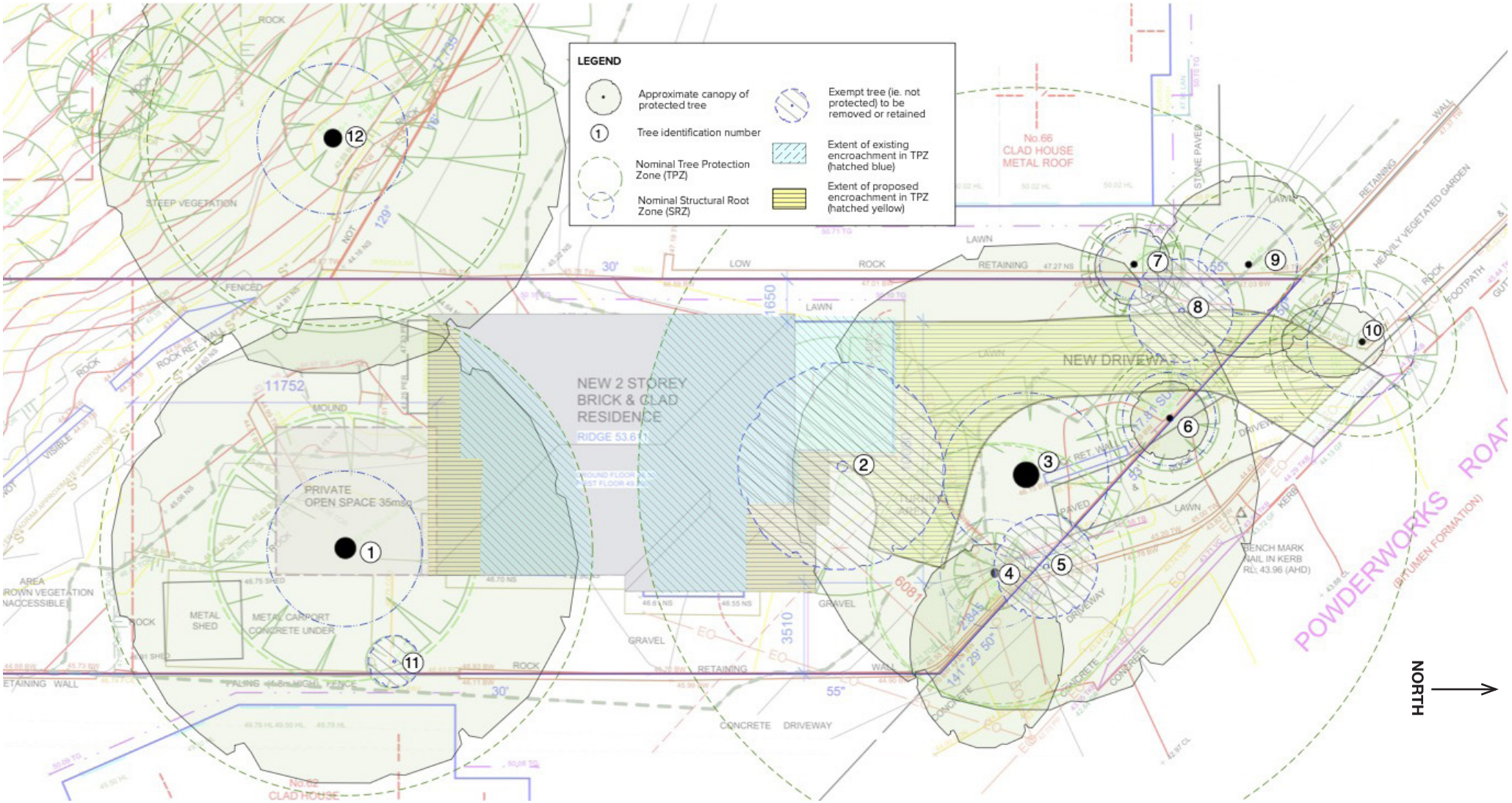

Figure 13: Proposed Site Plan showing an overlay of the protected and exempt trees included in the assessment. The Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) for the protected trees are indicated. The extent of existing and proposed encroachment within the TPZ is indicated as yellow and blue hatching. (Note, do not measure from drawings).

ii) Tree No. 4 (Smooth-barked Apple)
The turning area is located within the TPZ of Tree No. 4, representing an encroachment of 12% which is considered to be just above the acceptable 10% threshold. With consideration to existing levels, the author assumes the turning area shall be on or above existing levels. As such, the turning area can be installed to ensure there is no adverse impact upon the tree.

iii) Tree No. 6 (Cheese tree)
The new driveway and crossover represent a major encroachment of 23% in the TPZ and SRZ of Tree No. 6. It is assumed excavation will be required in the TPZ and SRZ to accommodate the new driveway. As such, the proposed works will potentially result in an adverse impact upon the tree. The tree is a fair specimen with ecological significance and overall is considered to hold a moderate retention value. It is the author's opinion it would be acceptable to remove the tree, providing compensatory tree planting is undertaken on the site following the works.

iv) Tree No. 9 (Smooth-barked Apple) - neighbouring tree
The new driveway is located within the TPZ of Tree No. 9, representing an encroachment of 14% which is considered to be just above the acceptable 10% threshold.

v) Tree No. 10 (Smooth-barked Apple) - council owned tree
The driveway crossover is located within the TPZ and SRZ of Tree No. 10, representing an encroachment in the TPZ and SRZ of 19% which is above the acceptable threshold. The excavation required for the driveway crossover may result in the severance of large woody roots that are providing anchorage and stability for the tree. The tree is a poorly formed specimen due to pruning of the canopy for overhead electrical wire clearance. Overall the tree is considered to hold a moderate retention value. It is the author's opinion it would be acceptable to remove the tree, providing compensatory tree planting is undertaken on the council verge as part of the works.

4.4 New dwelling encroachment in TPZ of Tree No. 1 (Smooth-barked Apple)

Tree No. 1 is located to the rear of the existing dwelling. On the basis of crown volume, ecological significance and a long estimated life expectancy, the tree is considered to hold a high retention value. The existing dwelling represents a numerical encroachment of 11% in the TPZ of the tree. The new dwelling represents an additional 5% encroachment, making a combined numerical encroachment of 16% in the TPZ of the tree. In order to minimise any potential impact upon the tree, the footing layout for the dwelling should consist of isolated piers in the TPZ. If the placement of all new footings in the TPZ does not result in the severance of any woody roots, the placement of the new dwelling should not result in any long term impact upon the tree.
Note: The private open space area to the rear of the dwelling should consist of a permeable surface (ie. decking) to allow for infiltration of water and gaseous exchange to the tree's root system.

4.5 Trenching for underground services

Should any trenching be required for underground services (new or existing) it is recommended the services are located outside the TPZ of the retained trees. When this is not possible, the location of the trench should be as far away as possible from the base of the tree and further advice should be sought by a qualified arborist.

4.6 Canopy pruning

The new dwelling will result in canopy pruning to Tree No. 1 (Smooth-barked Apple) to accommodate the upper storey level. The extent of pruning is estimated to be no more than 10% of the tree's crown volume. As such, the pruning works should not result in any adverse impact upon the tree. The preparation of a pruning specification would be appropriate prior to the commencement of any works on the site.
Note: In the event of Tree No. 3 being retained as part of the future works, it is envisaged some minor canopy pruning will be required to accommodate the upper storey level.

4.7 The remaining trees included in this assessment are located away from the proposed works and as such, the proposed works should not result in any impact upon these trees.

5. CONCLUSION | RECOMMENDATIONS

5.1 A total of twelve (12) trees are included in this assessment including seven (7) trees located within the site boundaries and five (5) trees located on the neighbouring property to the west or the council verge at the front of the site. A number of the trees found growing on the property or adjoining land are ecologically significant. This is consistent with the Biodiversity Values mapping of the site as well as Council's zoning of the site as C4 Environmental Living, being land identified as holding biodiversity and ecological significance.

5.2 The development application relates to the construction of a new multiple storey dwelling on the site, a new driveway and turning area, plus a new driveway crossover that will provide safer manoeuvrability for vehicles entering and exiting the property.

5.3 **Tree removal**

It is the author's opinion the driveway and crossover works will necessitate the removal of Tree No. 6 (Cheese tree) and the council owned Tree No. 10 (Smooth-barked Apple). The excavation proposed within the SRZ of both trees will potentially result in the severance of large structural roots that may well render the trees unviable. Both trees are considered to hold a moderate retention value. To compensate for loss of canopy, two replacement trees should be planted. The replacement trees should be the same species being removed or another locally occurring species to the area.

The owner is seeking permission from Council to remove Tree No. 3 (Smooth-barked Apple) as part of the application. The tree is a mature specimen that exhibits low vigour and fair condition. Overall the tree holds a high retention value. The excavation required for the driveway and crossover area will potentially result in a moderate to high level of impact to the root system of the tree. Should Council not grant permission for the tree's removal, the driveway and crossover design would need to be addressed to minimise the extent of excavation required in the TPZ. Additionally, the incorporation of a permeable surface for the driveway area should be considered to ensure water infiltration and gaseous exchange to the root system of the tree is maintained wherever possible.

5.4 **Retention of Tree No. 3 (Smooth-barked Apple)**

The proposed dwelling has been positioned in a similar location to the existing dwelling to ensure the Smooth-barked Apple (Tree No. 1) located to the rear of the existing dwelling can be safely retained. The following considerations should be addressed relating the future building works within the TPZ of the Tree No. 1:

i) Footing design/layout should consist of isolated piers in the TPZ and avoid the use of continuous strip footings. Excavation for piers/footings should be undertaken by non-destructive root investigation methods (such as hand digging or hydro excavation) unless rock is encountered. The final location of all piers and footings must ensure there is no cutting of any woody roots greater than 30mm diameter. Where woody roots greater than 30mm diameter are encountered and the foundation cannot be relocated, further advice must be sought from a qualified Arborist prior to root severance. Any roots less than 30mm in diameter shall be cut cleanly with sharp pruning implement.

ii) The tree is located in the area identified as private open space to the rear of the dwelling. It is recommended a decking material or alternative permeable surface is utilised for this area to ensure infiltration of water and gaseous exchange rates to the tree's root system are maintained.

5.5 **Tree Protection Plan**

To ensure the protection and long term preservation of the trees identified in this report, it is recommended an experienced and qualified consulting arborist (AQF Level 5) is engaged to oversee the approved activities located in the TPZ of the identified trees. The arborist should prepare a tree protection plan relating to tree protection measures of the retained trees, including a pruning specification for the applicable trees. The specified tree protection measures are to be adhered to during the course of the works. The consulting arborist should be engaged for the duration of the project and certify that all tree protection measures have been adhered to in accordance with the prepared tree protection plan.

5.6 **Trenching for underground services:** Should any new underground services be required on to the site, the line of trenching must be located outside the TPZ of the identified trees as much as possible. If the TPZ of the trees cannot be avoided, the builder must seek further advice from a qualified arborist.

5.7 Written approval from Council will be required to undertake tree removal of protected trees. Tree removal and pruning works is only to be undertaken by a qualified arborist (ISAAC member under the supervision of a person with AQF Level 3 or above).

If you have any questions regarding this report please do not hesitate to contact the undersigned.

Joanne Willis
Consultant Arboriculturalist (AQF 5)
Member of I.A.C.A. (Institute of Australian Consulting Arborists)
Member of I.S.A (International Society of Arboriculture)

Assumptions
Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible. However Joanne Leigh – Consulting Arborist can neither guarantee nor be responsible for the accuracy of information provided by others.
Unless stated otherwise:
- Information contained in this report covers only the tree that was examined and reflects the condition of the tree at the time of inspection: and
- The inspection was limited to visual examination of the subject tree without dissection, excavation, probing or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject tree may not arise in the future.

6. REFERENCES

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- Harris, R.W; Clark, J.R; & Matheny, N.P (2004) Arboriculture; Integrated Management of Landscape Trees, Shrubs & Vines 4th Edition, Prentice Hall, New Jersey.
- Mattheck, Claus (2007) “Updated Field Guide for Visual Tree Assessment”. Karlsruhe Research Centre, Germany.
- Standards Australia (2009) AS2970-2009 “Protection of Trees on Development Sites”, Sydney.
- Council’s relevant tree planning documents.

APPENDIX 1: TREE INSPECTION INVENTORY NOTES

The values for terminology provided below are sourced from SRIV© Sustainable Retention Index Value © From Draper BD and Richards PA 2009, Dictionary for Managing Trees in Urban Environments, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.

Age: Most trees have a stable biomass for the major proportion of their life. The estimation of the age of a tree is based on the knowledge of the expected lifespan of the taxa in situ divided into three distinct stages of measurable biomass, when the exact age of the tree from its date of cultivation or planting is unknown and can be categorized as Young, Mature and Over-mature.
Young - Tree aged less 20% of life expectancy, in situ.
Mature - Tree aged 20-80% of life expectancy, in situ.
Over-mature - Tree aged greater than >80% of life expectancy, in situ, or senescent with or without reduced vigour, and declining gradually or rapidly but irreversibly to death.

Height: In metres (estimated)

Spread: Average diameter of canopy in metres (estimated)

Crown class:
(D) Dominant (crown extends above general canopy; not restricted by other trees)
(C) Co-dominant (crown forms the bulk of the general canopy but crowded by other trees)
(I) Intermediate (crown extends into dominant/codominant canopy but quite crowded on all sides)
(S) Supressed (crown development restricted from overgrowing trees)

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g. dormant, deciduous or semi-deciduous trees. Vigour can be categorized as:
Normal Vigour Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
High Vigour Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe; water and nutrients from a leaking or disrupted sewer pipe; nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard; a tree subject to a stringent watering and fertilising program; or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.
Low Vigour Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
Dormant Tree Vigour Determined by existing turgidity in lowest order branches in the outer extremity of the crown, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.

Useful Life Expectancy: The life span of a tree in the urban environment may often be reduced by the influences of encroachment and the dynamics of the environment and can be categorized as Immediate, Short Term, Medium Term and Long Term.
Short Term - Period of time less than 15 years.
Medium Term - Period of time 15 - 40 years.
Long Term - Period of time greater than >40 years.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils), the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly second (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorized as:
Good Condition - Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.
Fair Condition - Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
Poor Condition - Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.

APPENDIX 2: CRITERIA FOR ASSESSMENT OF LANDSCAPE SIGNIFICANCE

The level of landscape significance has been determined using the following key criteria as a guide:

1. SIGNIFICANT
• The subject tree is listed as a Heritage Item under the Local Environment Plan (LEP) with a local, state or national level of significance; or
• The subject tree forms part of the curtilage of a Heritage Item (building /structure /artifact as defined under the LEP) and has a known or documented association with that item; or
• 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 scheduled as a Threatened Species or is a key indicator species of an Endangered Ecological Community as defined under the Threatened Species Conservation Act 1995 (NSW) or the Environmental Protection and Biodiversity Conservation Act 1999; or
• 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; or
• The subject tree is a Remnant Tree, being a tree in existence prior to development of the area; or
• The subject tree has a very large live crown size exceeding 300m2 with normal to dense foliage cover, is located in a visually prominent in the landscape, exhibits very good form and habit typical of the species and 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; or
• 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/artifact/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; or
• The subject tree is listed on Council's Significant Tree Register; or
• 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 subject tree has a very large live crown size exceeding 200m2; a crown density exceeding 70% Crown Cover (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.

3. HIGH
• The tree has a suspected historical association with a heritage item or landscape supported by anecdotal or visual evidence; or
• The tree is a locally-indigenous species and representative of the original vegetation of the area; or
• The subject tree has a large live crown size exceeding 100m2; and
• The tree is a good representative of the species in terms of its form and branching habit with minor deviations from normal (eg crown distortion/suppression) with a crown density of at least 70% Crown Cover (normal); and
• The subject tree is visible from the street and surrounding properties and makes a positive contribution to the visual character and the amenity of the area.

4. MODERATE
• The subject tree has a medium live crown size exceeding 40m2; and
• 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% Crown Cover (thinning to normal); and
• The tree makes a fair contribution to the visual character and amenity of the area; 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 has no known or suspected historical association

5. LOW
• The subject tree has a small live crown size of less than 40m2 and can be replaced within the short term with new tree planting; or
• 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% Crown Cover (sparse); and
• 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.

6. VERY LOW
• The subject tree is listed as an Environment Weed Species in the relevant Local Government Area, being invasive, or a nuisance species.
• The subject tree is scheduled as exempt (not protected) under the provisions of the local Council's Tree Preservation Order due to its species, nuisance or position relative to buildings or other structures.

7. INSIGNIFICANT
• The tree is a declared Noxious Weed under the Noxious Weeds Act (NSW) 1993

Ref:- Morton, Andrew (2003) Criteria for Assessment of Landscape Significance Earthscape Horticultural Services. Sydney, Australia