ARBORICULTURAL IMPACT ASSESSMENT REPORT

Prepared For:	Scott Shepherd
Site Address:	67 Woolgoolga Street, North Balgowlah, NSW, 2093
Inspection Dates:	17th January 2023
Report Date:	19th January 2023
Revised Date:	9th March 2023

Figure 1: The property as seen from the street.

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1 Contents

1 Introduction

1.1 Background

1.1.1 Blues Brothers Arboriculture has been engaged by the owner to inspect and report on trees for development purposes. A new dwelling is proposed.

1.1.2 The scope of works includes the assessment of 11 trees within the vicinity of the property.

1.1.3 Information supplied and relied upon in the preparation of this report included:

- NSW Planning Portal report; Accessed 19/01/2023.
- Detail Survey produced by Total Surveying Solutions; Dated 01/10/2020.
- Architectural suite of plans produced by Rama Architects; Issue DA-A, Dated 01/03/2021 and inclusive of:
    - Site plan,
    - Floor plans,
    - Sections,
    - Elevations, and
    - Details.
- Dial Before You Dig (DBYD).

1.1.4 The use of these documents / sources is acknowledged with thanks.

1.1.5 The NSW Rural Fire Service online tool for determining eligibility under the '10/50' legislation was interrogated for the purposes of this report. As at the date of this report, the property is ***not*** designated as an entitled area and as such, relevant clearing provisions do not apply to the site.

1.2 Definitions & Abbreviations:

1.2.1 ***The Standard*** refers to the Australian Standard AS4970:2009 – *Protection of trees on development sites.*

1.2.2 ***The site*** refers to the land within the proposed development site.

1.2.3 ***A significant root*** is defined as any woody root with a diameter of 30mm or larger.

1.2.4 ***LGA*** – Local Government Area.

1.2.5 ***DBH*** – Diameter at Breast Height; Approximately 1.4 metres above ground level measured in metres.

1.2.6 ***DGL*** – Diameter at Ground Level; Measured above the root flare / collar measured in metres.

1.2.7 ***TPZ*** – Tree Protection Zone. Calculated per the standard:

$$TPZ\ radius = 12\ \times DBH$$

1.2.8 ***SRZ –*** Structural Root Zone. Calculated per the standard:

$$SRZ\ radius = (DGL \times 50)^{0.42} \times 0.64$$

1.2.9 ***FFL***- Finished Floor Level.

1.2.10 ***RL*** – Reduced Level.

1.2.11 ***SEPP*** – State Environmental Planning Policy.

1.2.12 ***DBYD*** – Dial Before You Dig

1.3 Change log:

1.3.1 Version 1 – Original.

1.4 Disclaimers:

1.4.1 This report is considered limited to what could reasonably be seen from ground level only and expresses no commentary on changes which may have, or will, impact the trees or their environment outside the scope of works.

2 Methodology

2.1.1 The trees were visually inspected from ground level only in accordance with VTA (Visual Tree Assessment); a methodology derived by Mattheck and Breloer (1994).

2.1.2 Canopy Assessment included foliage condition (volume and colour); the presence of pests and diseases, dieback, deadwood and epicormic growth.

2.1.3 Tree condition included assessment of structural stability, previous pruning and any damage/disturbance which may have occurred.

2.1.4 No destructive or aerial investigations occurred to the tree.

2.1.5 Hollows, where found or suspected, were probed to ascertain their size and extent to assist in calculating ratios of notional cavity size and useful life expectancy.

2.1.6 A tree numbering schedule was located on a previously undertaken Impact assessment by the Author. This numbering schedule was adopted in preparation of this report.

2.1.7 Tree data is displayed in Appendix 1.

2.1.8 Appendix 2 – Arboricultural mark-up including Tree identification, TPZ and SRZ zones and the degree of encroachment proposed by the development.

2.1.9 Tree height and canopy width were estimated with the assistance of a Leica Disto X4 ® (Laser Distometer).

2.1.10 A diameter tape was used to assist in the estimation of trunk diameters of the trees.

3 Results

3.1 Desktop Research

3.1.1 Research from the NSW Planning portal revealed the following information for the properties:

- Zoning: R2 – Low Density Residential
- No Heritage item / area applies to this property.
- Landslide risk land: Area A & B.

3.1.2 In accordance with published directives of Northern Beaches Council, a protected tree is a tree meeting the following criteria[1]:

- Has a height of 5m or more;
- Is located 2m of further from an approved dwelling.
- Not listed on the *Exempt Tree Species List;*

3.1.3 None of the assessed trees were listed in the Council significant tree register or listed under the Threatened species conservation Act 1995.

3.1.4 Interpretation of DBYD data indicates the existence of a Sydney Water Sewer main terminating within the Southern boundary of the property within the vicinity of Trees T3, T4 & T5.

[1] Northern Beaches Council: Trees on Private Land: https://www.northernbeaches.nsw.gov.au/planning-development/tree-management/private-land

3.2 The Site

3.2.1 Located in the western extent of the north Balgowlah locality, the site presented without any structures following recent demolition.

3.2.2 The site presented as mostly flat developing a south-westerly aspect along the southern and western perimeters.

3.2.3 Vegetation on the site was limited to grasses which have likely self-seeded following demolition. Vegetation around the assessed trees, as previously identified, had been removed.

3.3 The Development

3.3.1 A new two storey dwelling is proposed for construction towards the front of the property. The development proposal includes the construction of:

- A detached in-ground pool.
- Lower-level rumpus,
- Attached single garage, and
- Various living areas (covered & uncovered).

3.3.2 Supplied plans and elevations indicate the new dwelling is proposed as a slab-on-ground construction.

3.3.3 The development will require the construction of a new driveway to the street. It is unknown if the existing crossover & layback will be replaced as part of the development.

3.3.4 Supplied plans indicate the removal of a single tree.

3.3.5 Moderate levels of excavation are required to accommodate the development with a focus on the pool and rumpus room.

3.3.6 Associated landscaping is assumed to complement the development proposal; details of this were not supplied.

3.3.7 Consultation with the architect has resulted in a design proposing significant reductions in proposed development encroachment of high significance trees on the site.

3.4 The Trees

3.4.1 A total of eleven trees were assessed or identified as part of the scope of works, categorised as follows:

- One Street Tree.
- Six trees located on neighbouring properties.
- Four trees located within the property.

3.4.2 The mature cohort was seen to have generally good canopy health and condition. The dominant tree species was Smooth Barked Apple (*Angophora costata*). Unless mentioned otherwise, commentary below relates to this species.

3.4.3 Access to neighbouring vegetation was not sought during site attendance. Neighbouring vegetation within the vicinity of development included a mix of small shrubs and large trees.

3.4.4 Demolition works appear to have caused damage to some of the remaining trees on the site. Damage ranges from the breakage of canopy limbs to the severance of significant roots.

3.4.5 Trees 1-3 presented in mature form and with good health. Despite minor Kino staining, the trees appeared true to form.

3.4.6 Tree 4 was neighbouring Caffir Plum appearing healthy and stable despite evidence of girdled roots.

3.4.7 Tree 7 was mature and appearing in good health. This tree was seen with a timber batten affixed to the tree's trunk and with epicormic shoots forming within the canopy. Minor branch breakage was also noted.

3.4.8 Tree 8 was mature, presenting healthy and true to form.

3.4.9 Tree 10 was mature and in good health. This tree was of the highest landscape significance on the site. Recent minor branch and canopy damage was noted in the tree's canopy. Recent epicormic shoots were noted within the vicinity of this damage.

Photographic comparison with the previously commissioned AIA report by the Author indicates soil levelling has occurred within the SRZ area of this tre, possibly associated with the removal of monstera vine.

Of concern was the observation of structural root damage to the North-East of the tree with a 1.5m offset. Based on this observation, the stability of the tree *may* have been compromised due to negligence of demolition contractors *et al.*

3.4.10 Tree 14 was the only street tree of the assessment. The Brushbox (*Lophostemon confertus*) species appeared in good health and condition despite an abnormally fused branch.

3.4.11 Tree 15 (Crimson Bottlebrush) and Tree 16 (Heath-leaved Banksia) were located on neighbouring property.

Tree 15 presented in good health without comment.

Tree 16 appeared dead.

3.4.12 Neighbouring trees are located such that they will be largely unaffected by development.

3.4.13 Further commentary, TPZ and SRZ areas for the trees can be found in Appendices 1 & 2.

3.5 Construction impacts to each tree:

3.5.1 *Major* TPZ & SRZ encroachment is proposed for Tree 3 due to the excavation of soils and construction the pool coping. Despite encroachment into the SRZ, a **Low impact** is likely.

3.5.2 *Minor* TPZ encroachment is proposed the neighbouring Tree 4 due to excavation of the rumpus room. This is likely to cause a **low impact** to the tree.

3.5.3 Tree 7 is located *within the proposed development area*. The retention of this tree is not possible.

3.5.4 *Minor* TPZ encroachment is proposed for Tree 8 due to the construction of pool coping causing **minor impact** due to the likelihood of works being above existing grade.

3.5.5 *Major* TPZ encroachment is proposed for Tree 10 due to the construction of the dwelling and outdoor entertainment area. The proposed encroachment occupies approximately 16% of the tree's TPZ area.

Approximately 10% of the proposed encroachment area contained previous development. Noting the previous dwelling was of Clad construction it is unlikely that old footings would have acted as a barrier to root growth.

Demolition works that appear to have occurred within the TPZ and SRZ area may have already caused damage to the tree's root system; it is unclear what effect this may have on the proposed development impacts.

The proposed development is likely to cause at least a **low impact** to this tree.

3.5.6 *Major* TPZ encroachment is proposed for Tree 14 due to the construction of a new driveway. Based on the proposed FFL's of the garage, it is likely that the proposed driveway can be constructed at, or above existing grade, lessening development impacts. With proper management, **low impact** is possible.

3.5.7 *Major* TPZ & SRZ encroachment is proposed for the neighbouring Tree 16. Despite this, the tree appears dead & should not form a constraint on the development.

3.5.8 For trees assessed and not otherwise mentioned above, a **negligible impact** is likely to occur as part of the proposed development.

4 Conclusion

4.1.1 Eleven trees were assessed or identified as part of the scope of works, all seen to be in mostly good health.

4.1.2 Many of the assessed trees will be impacted to some degree by the proposed development.

4.1.3 The apparent negligence of the demolition contractor (or other parties working within the vicinity of the trees) has resulted in permanent damage to some of the trees on the site.

This highlights a shortcoming of the development process where works are permitted to occur without the appropriate tree protection measures in place.

4.1.4 The proposed development is supported from an Arboricultural perspective provided the following recommendations are adhered to.

5 Recommendations:

5.1 Construction recommendations:

5.1.1 It is recommended that the driveway detail proposes construction at or above existing grade to minimise impact to the street tree, T14. Hard edges, where they pose a trip hazard, shall be battered using soft landscaping.

5.2 Trees for retention:

5.2.1 All assessed trees other than tree 7 are recommended for retention.

5.3 Trees for removal:

5.3.1 Tree 7 is the only tree recommended for removal due to its location within the development footprint.

Removal of this tree is supported as it facilitates the retention of higher significance trees on the site by limiting development encroachments.

5.4 Other recommendations:

5.4.1 Due to observed damage following demolition, it is recommended that routine tree health assessments are scheduled annually for the 5 years following completion of the development to monitor long-term impacts from damage.

6 Tree Protection Plan:

6.1.1 Refer to Appendix 3 - Tree Protection Plan for graphical representation of the installation of protective measures.

6.1.2 A Tree Protection Plan (TPP) is recommended for this project.

6.1.3 The appointment of a project arborist is required for this project.

6.1.4 The following table summarises the most appropriate tree protection devices required for the life of the project where trees are retained:

Tree ID	Fencing Required	Trunk Armouring Required	Ground Protection Required	Signage Required
3	Yes @ SRZ offset	No	No	Yes
8	Yes, with 3.5m trunk offset	No	No	Yes
10	Yes, with 4m offset	No	No	Yes
14	No	Yes (to 2m above existing ground)	Yes, over driveway where hard paving does not exist.	Yes

6.1.5 All neighbouring trees will be adequately protected by existing boundary fencing. No additional protection devices are required.

6.1.6 Where ambiguity or questions present regarding Tree Protection, a Project Arborist (or otherwise suitably qualified person) must be contacted in the first instance for advice. This clause is not a recommendation for the appointment of a project arborist.

6.1.7 Recommendations provided above are the minimum specification required for compliance. Additional protection zones should be afforded to the trees where possible.

6.1.8 Tree protection is a vitally important part of the development. Damage that occurs during construction is, in most cases, permanent. Consideration of living with unsightly scarring should occur before any works commence.

6.1.9 Refer to the following sections for details of the implementation of tree protection.

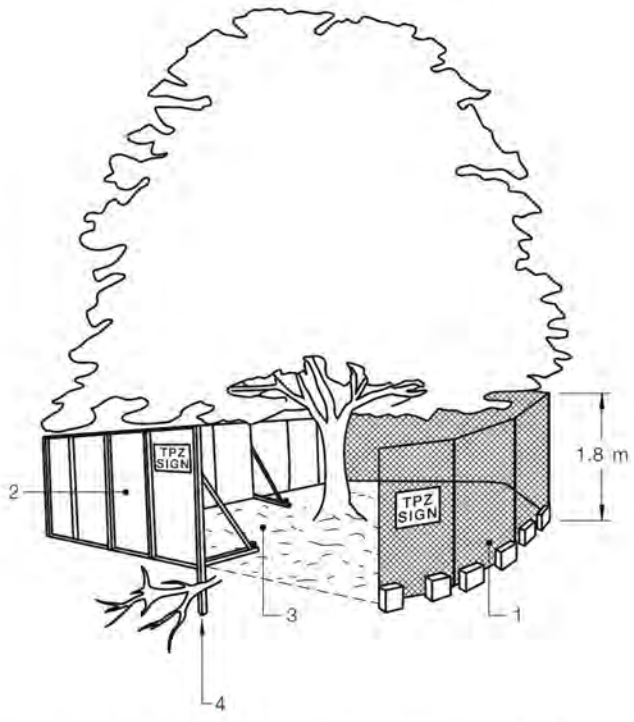
6.1 Protective Fencing:

6.1.1 Protective fencing shall consist of standard temporary fencing panels enclosing all soft areas (turfed /exposed soil etc) beneath the canopies of trees to be retained. A radial offset from trunk centre may be stipulated for specific trees; however, Fencing shall ideally be located at the edge of the TPZ unless otherwise advised by the site arborist.

6.1.2 Fencing shall be erected in a manner that prevents worker or plant access during all phases of construction and demolition. Fencing may integrate with existing fences on the site. Protective fencing may also be the site perimeter fencing.

6.1.3 Signage (referred below) shall be affixed to the outer faces of the fence to maintain worker awareness.

6.1.4 The project arborist shall be contacted prior to any contractor entering the restricted area or upon discovery of unauthorised entry / interference. No exceptions to this clause are permitted.



LEGEND:
1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

FIGURE 3 PROTECTIVE FENCING

Figure 2: An example of Tree Protective Fencing. Diagram Copyright of Standards Australia (AS4970:2009 - Protection of Trees on Development Sites.)

6.2 Trunk Armouring

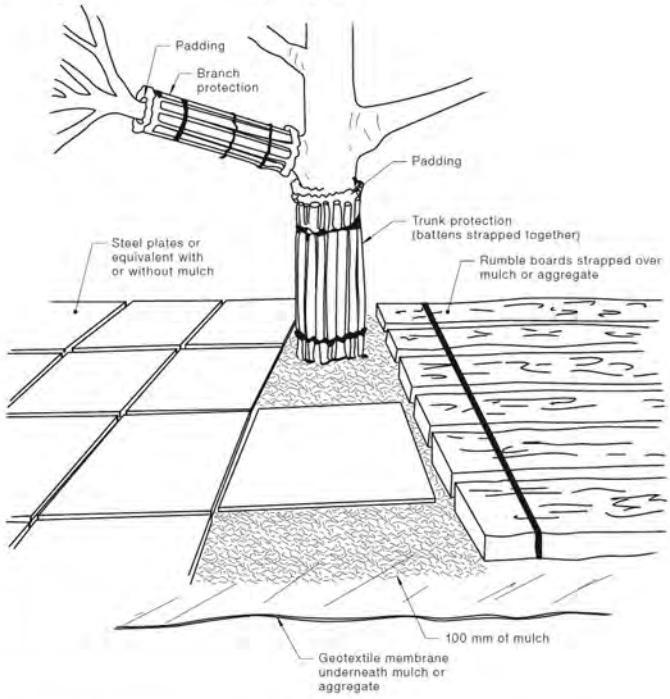
6.2.1 Trunk armouring is the temporary affixing of battens around a tree's trunk (including root flare) and or branches. Trunk armouring requires three main components:

- Porous, readily draining materials such as hessian or Geo-Textile fabric shall be used for padding limbs to be armoured. Duct tape or gaffer's tape can be used to temporarily affix padding during installation.
- Timber battens with a minimum size of 40x80mm are to be arranged around the trunk & branches to be protected. Battens shall be spaced no further than 100mm apart.
- Battens and padding can be secured using either galvanised builders strapping (preferred) or nylon tie-down straps (both ratchetting, and cam-buckle styles are acceptable).

6.2.2 Nylon straps may be beneficial in temporarily supporting timber battens during installation.

6.2.3 The use of 25mm (or thicker) plywood board may be used in conjunction with cushioning and battens around the root flare of trees to be protected.

6.2.4 Under no circumstance may the tree be physically harmed during the installation of trunk armouring. This means the tree shall not be drilled, nailed, or otherwise used to support powerlines, stays, guys etc.



NOTES:

1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.

2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

FIGURE 4 EXAMPLES OF TRUNK, BRANCH AND GROUND PROTECTION

Figure 3: An example of trunk armouring and ground protection. Diagram Copyright of Standards Australia (AS4970:2009 - Protection of Trees on Development sites.)

6.3 Signage

6.3.1 Fenced areas shall be appropriately signposted prominently with the appointed project arborist's contact details and the wording:

"TREE PROTECTION ZONE
NO ACCESS WITHOUT PRIOR APPROVAL OF THE PROJECT ARBORIST"

6.3.2 Trunk armouring devices shall be appropriately signposted with the appointed project arborist's contact details and the wording:

"TREE PROTECTION DEVICE
DO NOT INTERFERE WITHOUT PRIOR APPROVAL OF THE PROJECT ARBORIST"

6.4 Ground Protection

6.4.1 Ground protection is the installation of devices which reduce soil compaction and root damage.

6.4.2 Ground protection shall consist of a woodchip mulch layer distributed evenly over the indicated areas having a minimum thickness of 100mm.

6.4.3 The mulched area is then covered with commercially available load distribution boards, road plates or plywood sheeting (with a minimum thickness of 25mm.)

6.4.4 Areas indicated for ground protection shall not be utilised for the stockpiling of materials or vehicular parking throughout the life of the project. Likewise, these areas must not be used for washing down or cleaning of any equipment or plant due to the risk of soil contamination and tree impact.

Appendix 1 – Tree Data Summary

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Tree Data Summary - 67 Woolgoolga St, North Balgowlah - Assessed 17/01/2023

Tree ID	Species	Height (m)	Canopy dims n/s in metres	DBH (cm)	DGL (cm)	Foliage condition	Maturity	Trunk type	Trunk lean	Canopy Balanced	Past Pruning	Stability	Vigour	Canopy deadwood	Significance value	Notes	TPZ (M) Radius	SRZ (M) Radius
T1	*Angophora costata* (Smooth Barked Apple)	10	17	58	69	Good	Mature	Single	Upright	Yes	No	Appears Stable	Good	0-5%	High	Kino Staining around base of tree is uncharacteristic in nature for the species. Some exposed bedrock within vicinity.	7.0	2.8
T2	*Angophora costata* (Smooth Barked Apple)	10	13	35	42	Good	Mature	Single	Upright	Yes	No	Appears Stable	Good	0-5%	High	No Access to tree, no obvious remarks.	4.2	2.3
T3	*Angophora costata* (Smooth Barked Apple)	11	14	32	48	Good	Mature	Single	Upright	Yes	Lower limbs to 6m	Appears Stable	Good	0-5%	High	Minor Kino at base of tree but otherwise good.	3.8	2.4
T4	*Harpephyllum caffrum* (Caffir Plum)	9	13	46	53	Good	Mature	Single	Upright	Yes	Not evident	Appears stable despite girdled roots	Good	0-5%	Low	Canopy spread touching dwelling with signs that the tree has suckered.	5.5	2.5
T5	*Tree Previously Removed*																0.0	0.0
T6	*Tree Previously Removed*																0.0	0.0
T7	*Angophora costata* (Smooth Barked Apple)	9	13	28	38	Good	Mature	Single	Upright	Bias South East	Lower limbs to 3m	Appears stable	Good	0-5%	Moderate	Previously assessed stump has been removed. Timber batten remains affixed to trunk. Epicormic shoots forming on trunk. Minor evidence of branch loss in canopy.	3.4	2.2
T8	*Angophora costata* (Smooth Barked Apple)	12	14	44	60	Good	Mature	Twin	Upright	Bias Norh	Not evident	Appears Stable	Good	0-5%	High	Tree appearing true to form	5.3	2.7
T9	*Tree Previously Removed*																0.0	0.0
T10	*Angophora costata* (Smooth Barked Apple)	14	20	74	113	Good	Mature	Twin	Bias North	Bias North	Lower limbs to 6m throughout	Appears stable*	Good	0-5%	High	Very prominent feature of the rear yard. Previously observed ground swelling around base has been levelled. Monstera vine to 3m previously identified has been all but removed. Canopy showing early epicormic growth shoots in canopy. Structural root damage noted on North-Eastern flank with offset of approximately 1.5m. Minor canopy & branch damage occurred recently.	8.8	3.5
T11	*Tree Previously Removed*																0.0	0.0
T12	*Tree Previously Removed*																0.0	0.0

Tree Data Summary - 67 Woolgoolga St, North Balgowlah - Assessed 17/01/2023

Tree ID	Species	Height (m)	Canopy dims n/s in metres	DBH (cm)	DGL (cm)	Foliage condition	Maturity	Trunk type	Trunk lean	Canopy Balanced	Past Pruning	Stability	Vigour	Canopy deadwood	Significance value	Notes	TPZ (M) Radius	SRZ (M) Radius
T13	*Tree Previously Removed*																0.0	0.0
T14	*Lophostemon confertus* Brushbox	12	10	65	58	Good	Mature	Twin	Upright	Yes	No	Appears Stable	Good	0-5%	High	Twin trunked tree which has fused do to contact with low branch. Driveways on both sides of base are sunken by approximately 30cm.	7.8	2.6
T15	*Callistemon citrinus* (Crimson Bottlebrush)	6	4	17	22	Good	Mature	Single	Upright	Bias North West	No	Appears Stable	Good	5-10%	Low	NEIGHBOURING TREE Otherwise without comment.	2.0	1.8
T16	*Banksia ericifolia* (Heath-leafed Banksia)	7	5	16	15	Appearing Dead	Mature	Single to 1m then Twin	Upright	Bias West	Driveway Clearance	Appears St	Very Poor	0-5%	Low	NEIGHBOURING TREE Appearing dead	2.0	1.5
T17	*Syzygium sp* (Lilli Pilli)	8	6	22	27	Good	Mature	Single	Upright	Yes	Crown lifted	Appears Stable	Good	0-5%	Low	NEIGHBOURING TREE Appearing true to form without comment otherwise.	2.6	1.9

Appendix 2 - Tree identification and incursion potentials

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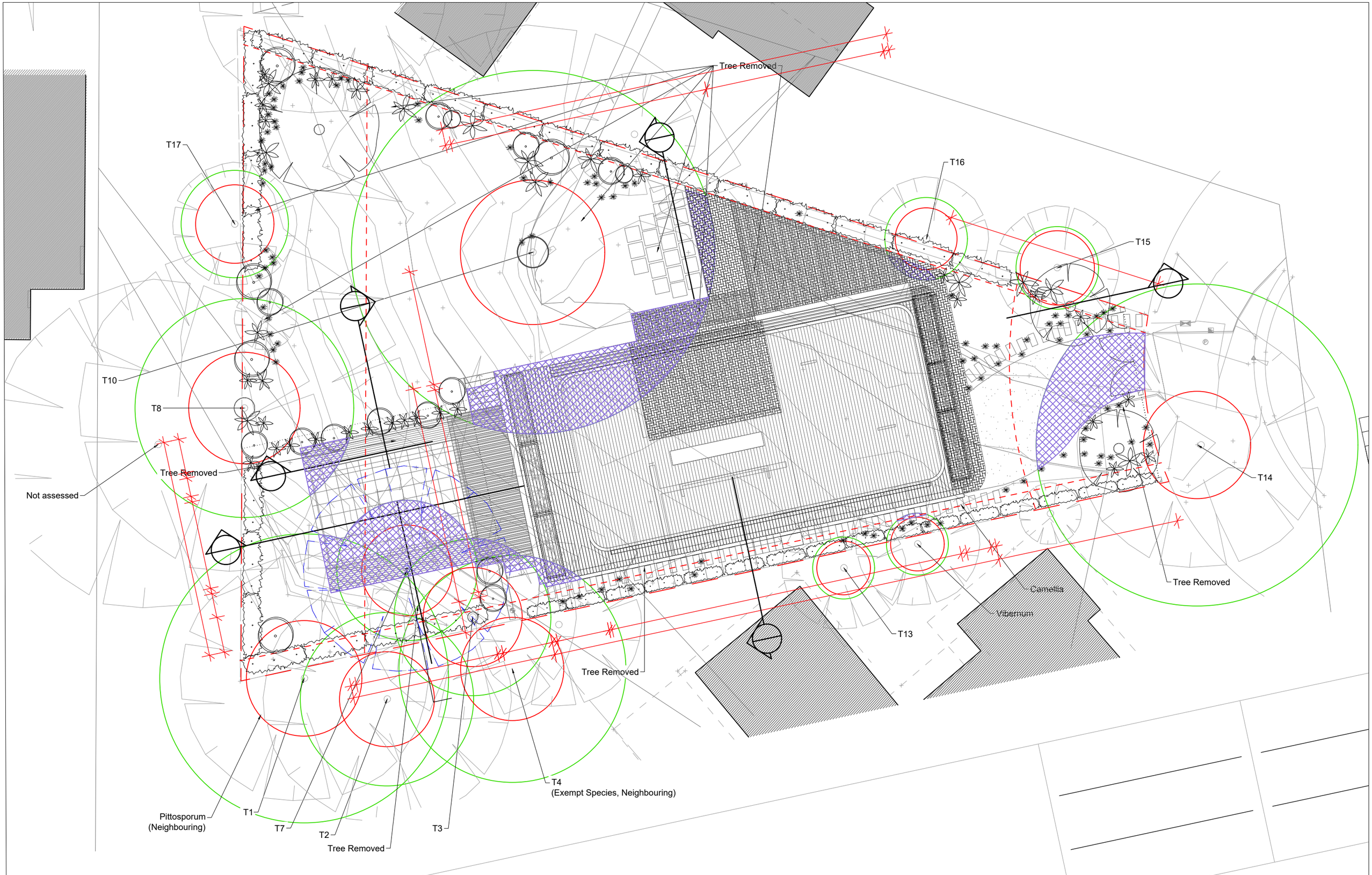

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Title: Encroachment Potentials

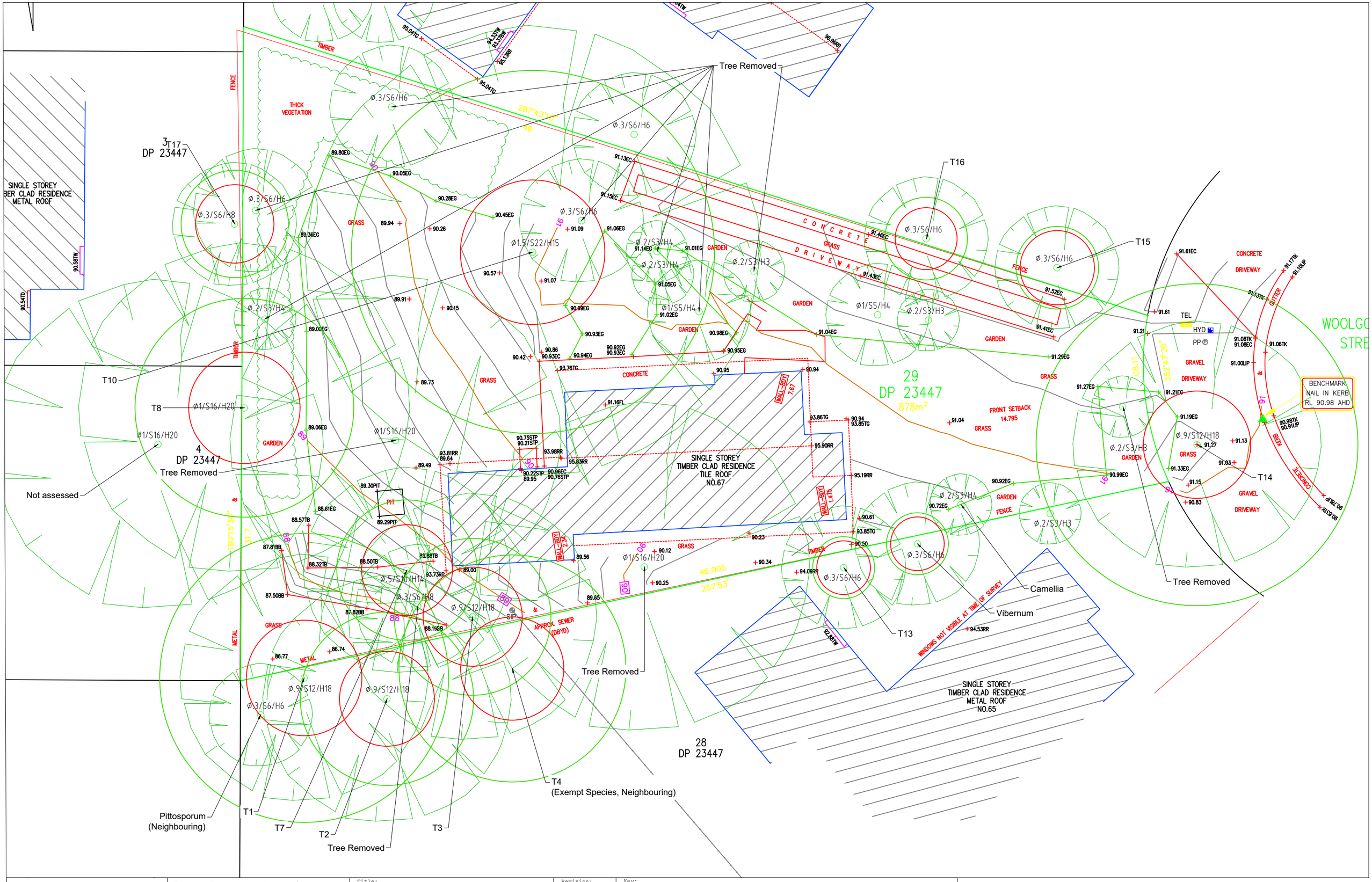
Project: 67 Woolgoolga St, Nth Balgowlah.dwg

Revision: 01

Plot Date: 09/03/2023

Key:

- Tree Protection Zone (TPZ)
- Structural Root Zone (SRZ)
- Canopy Spread
- Encroachment Area



Blues Bros ARBORICULTURE	Blues Brothers Arboriculture PO BOX 4, TERREY HILLS, NSW, 2084 0439991122 www.bluesbros.com.au gordon@bluesbros.com.au	Title: Tree Identification Project: 67 Woolgoolga St, Nth Balgowlah.dwg	Revision: 01 Plot Date: 09/03/2023	Key: Tree Protection Zone (TPZ) Structural Root Zone (SRZ) Canopy Spread Encroachment Area

Appendix 3 - Tree Protection Plan

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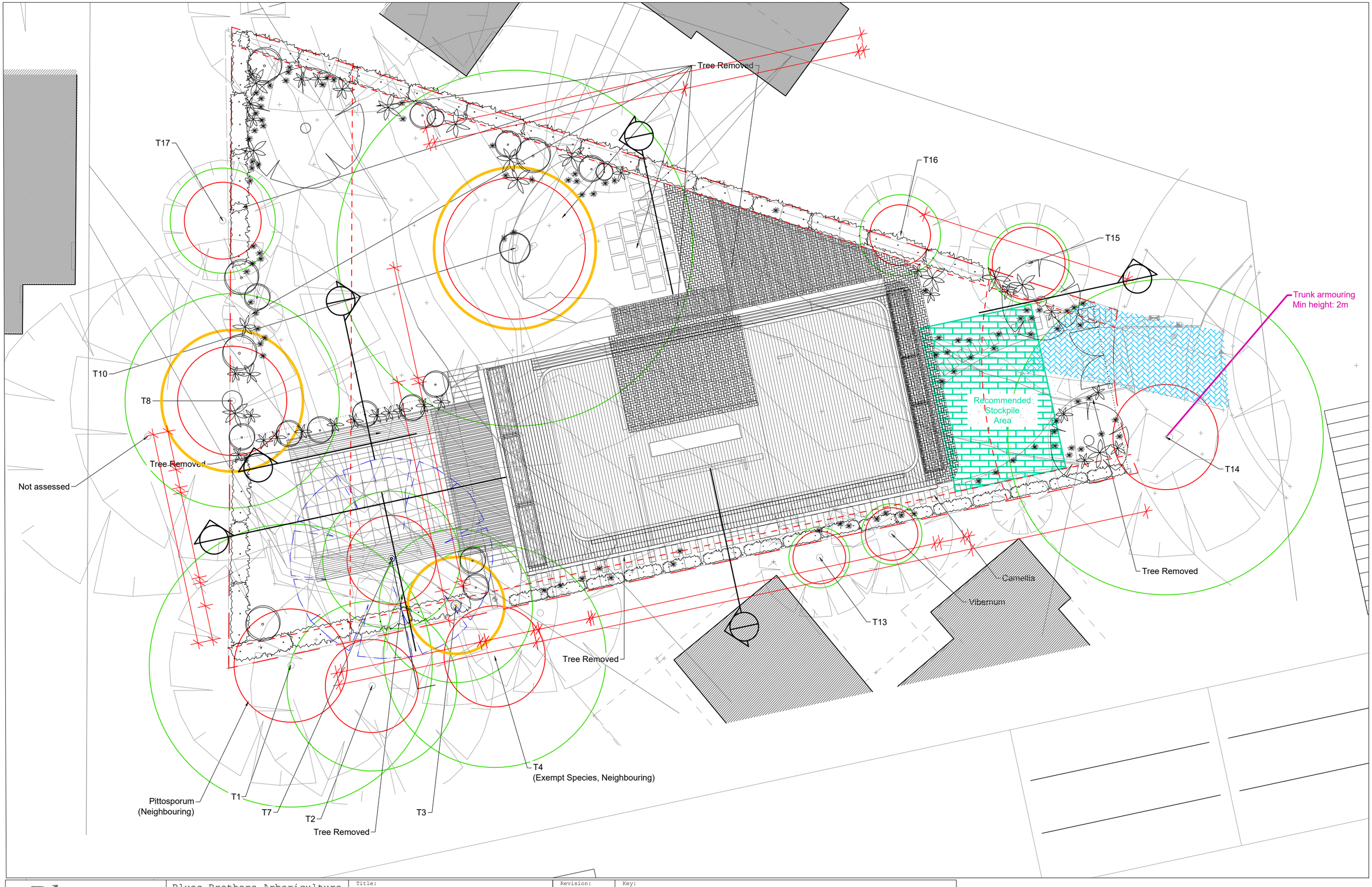

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Title:
Tree Protection Plan

Revision:
01

Project:
67 Woolgoolga St, Nth Balgowlah.dwg

Plot Date:
09/03/2023

Key:

- Tree Protective Fencing
- Trunk armouring required (Minimum 2m height)
- Ground Protection required in this area

Appendix 4 – Photographs

Image 1: Trees at the rear of the site as seen.

Image 2: Soil levelling was noted at the base of Tree 10.

Image 3: Recent epicormic shooting on Tree 10 is a common side-effect of injuries or stress.

Figure 4: Root damage for Tree 10 as seen.

Image 4: Vegetation at the front of the property.