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PROFESSIONALS IN ARBORICULTURE

Arboricultural Impact Assessment and Development Impact Report

Site: 42-46 Unley Road, Unley

Date: Friday, 5 May 2023

ATS7209-42-46UnlRdDIR

Contents

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Report prepared for
Scott Twine, Senior Consultant, URPS - Otello

Author
Marcus Lodge, Senior Consulting Arborist, Arborman Tree Solutions Pty Ltd
Tom Richardson, Consulting Arborist, Arborman Tree Solutions Pty Ltd

Executive Summary

Arborman Tree Solutions has assessed two trees in the rear section of 42-46 Unley Road, Unley. The assessment has identified the potential impacts to the trees from the proposed development and supporting infrastructure and recommended mitigation strategies where appropriate. The proposal involves demolition of the existing rear building and carpark and the construction, expansion of a new carpark area, including associated infrastructure. This assessment provides recommendations in accordance with Australian Standard AS4970-2009 *Protection of trees on development sites* (AS4970-2009).

The assessment considered two trees which are both identified as *Callistemon viminalis* (Weeping Bottlebrush). These trees are not naturally occurring vegetation but have been planted as part of the landscaping of the area. The trees are considered to be in good health but in fair overall condition due their reduced structural conditions in association with the included bark unions in their primary trunk division and the elevated level of epicormic growth.

The growing environment of the Trees includes the adjacent compacted road reserve, kerbing, and current concrete car park area and the existing root system is expected to be highly restricted.

Tree 1 is a Significant Tree as defined in the *PDI Act 2016* and the *Planning and Design Code (Regulated and Significant Tree Overlay)*. Tree 2 is unregulated. Significant Trees should be preserved if they meet aesthetic and/or environmental criteria as described in the *Planning and Design Code (Regulated and Significant Tree Overlay)*. When assessed against the relevant 'Desired Outcomes', 'Performance Outcomes' and 'Designated Performance Features', Tree 1 is not considered to provide 'important' aesthetic and/or environmental benefit and as such its protection as Significant Tree that prevents an otherwise reasonable and expected development is not warranted.

The Arboricultural Impact Assessment has identified the Significant Tree in the area of the proposed development is likely to be negatively impacted by the proposed works and requires removal. As this tree has a Moderate Retention Rating and does not display attributes that indicate it should be protected, its removal to accommodate expected development is reasonable.

Additionally, Tree 2 has been identified as unregulated and is considered to be in fair overall condition due to its fair structural rating. Tree 2 will be negatively impacted by the proposed works and requires removal.

Site plans indicate the use of permeable paving within the SRZ of Tree 1. Installation of permeable paving is likely to have a detrimental effect on the subject tree as excavation and damage to the root zone would be required for installation.

Brief

Arborman Tree Solutions was engaged by Scott Twine, Senior Consultant, URPS - Otello to undertake an Arboricultural Impact Assessment and provide a Development Impact Report for two trees at 42-46 Unley Road, Unley. The purpose of the Arboricultural Impact Assessment and Development Impact Report is to identify potential impacts the proposed development will have on the trees and provide mitigation strategies to minimise the impact where appropriate.

The proposed development includes the demolition of the existing commercial building and carpark area and the resurfacing, updating and expansion of the carpark assessment will determine the potential impacts the proposal may have on the trees within the site and recommend impact mitigation strategies in accordance with Australian Standard AS4970-2009 *Protection of trees on development sites* (AS4970-2009) for trees to be retained.

In accordance with section 2.2 of the AS4970-2009 the following information is provided:-

- Assessment of the general condition and structure of the subject trees.
- Identification of the legislative status of trees on site as defined in the *Planning, Development and Infrastructure Act 2016 (PDI Act 2016).*
- Identify and define the Tree Protection Zone and Structural Root Zone for each tree.
- Identify potential impacts the development may have on tree health and/or stability.
- Provide information in relation to the management of trees.

Documents and Information Provided

The following information was provided for the preparation of this assessment:-

- Email instruction on Scope of Works.
- Design Drawings.
- Preliminary Tree Assessment.

Site Location

The trees are located in the rear garden of 42-46 Unley Road, Unley.

Figure 1: Site location – 42-46 Unley Road, Unley

Methodology

The proposed design was reviewed in association with the information in the Design Drawings and CAD files as provided by URPS - Otello.

The potential impact of the proposed works on tree condition is considered in accordance with the guidelines in AS4970-2009 *Protection of trees on development sites* (AS4970-2009). When determining potential impacts of an encroachment into a Tree Protection Zone (TPZ), the following should be considered as outlined in AS4970-2009 section 3.3.4 *TPZ encroachment considerations*:-

a) Location of roots and root development.

b) The potential loss of root mass from the encroachment.

c) Tree species and tolerance to root disturbance.

d) Age, vigour and size of the tree.

e) Lean and stability of the tree.

f) Soil characteristics and volume, topography, and drainage.

g) The presence of existing or past structures or obstacles affecting root growth.

h) Design factors.

The impacts on a tree can be varied and are not necessarily consistent with or directly corelated to a particular level of encroachment, to assist in providing consistency the levels of impact have been classified into the following categories:-

No Impact - no encroachment into the TPZ has been identified.

Low <10% - the identified encroachment is less than 10% of the TPZ area and not expected to impact tree viability.

Low >10% - the identified encroachment is greater than 10% of the TPZ area however there are factors that indicate the proposed development will not negatively impact tree viability.

High >10% - the identified encroachment is greater than 10% of the TPZ area and factors are present that indicate the proposed development will negatively impact tree viability. The impact is likely to lead to the long-term decline of the tree however it is unlikely to impact on its short-term stability.

Conflicted - the identified encroachment is greater than 10% of the TPZ area and in most cases will also impact the SRZ and/or the trunk. There are factors present that indicate the proposed development will negatively impact tree viability to the point where its removal is required as part of the development.

Trees with calculated encroachments greater than 10% and with an Impact identified as 'Low' have features or considerations identified in clauses in AS4970-2009 3.3.4 *TPZ encroachment considerations* which indicate these trees will be sustainable.

Trees with calculated encroachments greater than 10% and with an Impact identified as 'High' do not have any features or considerations identified in clauses in AS4970-2009 3.3.4 and therefore alternative design solutions, additional root investigations and/or tree sensitive construction measures are required if the tree is to be retained. Where alternative protection methodologies are not available tree removal may be required to accommodate the development.

Trees with an Impact identified as 'Conflicted' are impacted over the majority of their root zone and/or over the SRZ or on the trunk, additional root investigations or tree sensitive construction measures are not available, and the only option is alternative designs or tree removal.

Regulatory Status, Tree Protection Zones and Development Impacts are shown in Appendix B.

Assessment

Arborman Tree Solutions has assessed two trees in the rear section of 42-46 Unley Road, Unley. The assessment has identified the potential impacts to the trees from the proposed development and supporting infrastructure and recommended mitigation strategies where appropriate. The proposal involves demolition of the existing rear building and carpark and the construction, expansion of a new carpark area, including associated infrastructure. This assessment provides recommendations in accordance with Australian Standard AS4970-2009 *Protection of trees on development sites* (AS4970-2009).

Tree Assessment

The assessment considered two trees which are both identified as *Callistemon viminalis* (Weeping Bottlebrush). These trees are not naturally occurring vegetation but have been planted as part of the landscaping of the area. The trees are considered to be in good health but in fair overall condition due their reduced structural conditions in association with the included bark unions in their primary trunk division and the elevated level of epicormic growth.

The growing environment of the Trees includes the adjacent compacted road reserve, kerbing, and current concrete car park area. The existing root system is expected to be highly restricted.

Findings on individual tree health and condition are presented in Appendix B - Tree Assessment Findings.

Callistemon viminalis (Weeping Bottlebrush) is a native of the central New South Wales and southern Queensland mainly found on alluvial land between the coast and tablelands. *Callistemon viminalis* is a small to medium tree 6-8 metres high with a medium to broad domed crown. Red flower spikes are produced abundantly from September to November then sparsely through summer.

Legislative Assessment

Tree 1 is a Significant Tree as defined in the *PDI Act 2016* and the *Planning and Design Code (Regulated and Significant Tree Overlay)*. Tree 2 is unregulated. Significant Trees should be preserved if they meet aesthetic and/or environmental criteria as described in the *Planning and Design Code (Regulated and Significant Tree Overlay)*. When assessed against the relevant 'Desired Outcomes', 'Performance Outcomes' and 'Designated Performance Features', Tree 1 is not considered to provide 'important' aesthetic and/or environmental benefit and as such its protection as Significant Tree that prevents an otherwise reasonable and expected development is not warranted.

Retention Assessment

Trees that provide important environmental and/or aesthetic contribution to the area, are in good condition scored a High Retention Rating and conservation of these trees is encouraged. Trees that score a Moderate Retention Rating provide a level of environmental and/or aesthetic benefit however not to an important level; these trees should be retained if they can be adequately protected. Trees identified as not suitable for retention or attained a Low Tree Retention Rating, displayed one or a number of the following attributes:-

a) provide limited environmental/aesthetic benefit,

b) short lived species,

c) represent a material risk to persons or property,

d) identified as causing or threatening to cause substantial damage to a structure of value,

e) limited Useful Life Expectancy, and

f) young and easily replaced.

Both trees are considered to be suitable for retention as they achieved a Moderate Retention Rating. The Significant Tree that scored a Moderate Retention Rating, Tree 1, whilst partially meeting criteria within the *PDI Act 2016* does not do so to a level that identifies it as an important tree; both trees are however worthy of consideration for retention if they can be adequately protected in an otherwise reasonable and expected development.

***Note**: There are no trees on site that are identified as 'Special Value' trees due to their cultural or environmental value that would override their retention rating.*

Encroachment and Impact Assessment

Within AS4970-2009 relevant information is provided to assist with determining the impact on trees when developing in close proximity to them. Any tree that requires protection should be retained whilst remaining viable during and post development. Further guidance on how to suitably manage any proposed or encountered encroachments is identified in AS4970-2009. When assessing potential impacts, a Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) are the principle means of protecting a tree and are provided in accordance with AS4970-2009 section 1.4.5 and 3.2. This standard has been applied to ensure trees identified for retention remain viable and the redevelopment is achievable.

The encroachment for the subject trees is greater than 50% and will cause tree damaging activity that will result in their decline, death and/or failure. The encroachment for both trees impact the SRZ and/or the trunk and as such they will be destabilised by the required work, and they are therefore considered to be Conflicted by the proposed development.

The encroachment for the subject trees impacts the SRZ and as such the development is likely to lead to the trees being destabilised by the works and they are therefore Conflicted by the Development.

Conclusion

The Arboricultural Impact Assessment has identified one Significant Tree and one unregulated tree in the area of the proposed development which will be negatively impacted by the proposed works and require removal. As these trees have a Moderate Retention Rating and do not display attributes that indicate they should be protected, their removal to accommodate expected development is reasonable.

Additionally, Tree 2 has been identified as unregulated and is considered to be in fair overall condition due to its fair structural rating. Tree 2 will be negatively impacted by the proposed works and requires removal.

Site plans indicate the use of permeable paving within the SRZ of Tree 1. Installation of permeable paving is likely to have a detrimental effect on the subject tree as excavation and damage to the root zone would be required for installation. However. this permeable system will be beneficial for any future plantings.

Removal and Replacement

1. Pursuant to the *PDI Act 2016* Regulated/Significant trees require replacement when they are removed, as such Tree 1 is recommended for removal and replacement with a more suitable species, that will provide similar environmental and aesthetic benefits.
2. Replacement plantings should be positioned to avoid future conflicts with any adjacent infrastructure.

Thank you for the opportunity to provide this report. Should you have any questions or require further information, please contact me and I will be happy to be of assistance.

Yours sincerely,

MARCUS LODGE
Senior Consulting Arborist
Institute of Australian Consulting Arboriculturists – Accredited Consultant
Australian Arborist License AL11
Diploma in Arboriculture
ISA – Tree Risk Assessment Qualification
VALID Tree Risk Assessment (VALID)
Native Vegetation Council Trained Arborist

TOM RICHARDSON
Consulting Arborist
Diploma of Arboriculture – AHC50516
VALID Tree Risk Assessment (VALID)
Quantified Tree Risk Assessment (QTRA)
Native Vegetation Council Trained Arborist

Definitions

Circumference: trunk circumference measured at one metre above ground level. This measurement is used to determine the status of the tree in relation to the *Planning, Development and Infrastructure Act 2016 (PDI Act 2016)*.

Diameter at Breast Height: trunk diameter measured at 1.4 metres above ground level used to determine the Tree Protection Zone as described in Australian Standard AS4970-2009 *Protection of trees on development sites*.

Diameter at Root Buttress: trunk diameter measured just above the root buttress as described in Australian Standard AS4970-2009 *Protection of trees on development sites* and is used to determine the Structural Root Zone.

Tree Damaging Activity Tree damaging activity includes those activities described within the *Planning, Development and Infrastructure Act 2016 (PDI Act 2016),* such as removal, killing, lopping, ringbarking or topping or any other substantial damage such as mechanical or chemical damage, filling or cutting of soil within the TPZ. Can also include forms of pruning above and below the ground.

Tree Protection Zone: area of root zone that should be protected to prevent substantial damage to the tree's health.

Structural Root Zone: calculated area within the tree's root zone that is considered essential to maintain tree stability.

Project Arborist a person with the responsibility for conducting a tree assessment, report preparation, consultation with designers, specifying tree protection measures, monitoring and certification. The Project Arborist must be competent in arboriculture, having acquired through training, minimum Australian Qualification Framework (AQTF) Level 5, Diploma of Horticulture (Arboriculture) and/or equivalent experience, the knowledge and skills enabling that person to perform the tasks required by this standard.

Encroachment: the area of a Tree Protection Zone that is within the proposed development area.

Impact: the effect on tree health, structure and/or viability as a result of required works associated with the proposed development within the TPZ or the vicinity of the tree(s).

References

Australian Standard AS4970–2009 ***Protection of trees on development sites***: Standards Australia.

Matheny N. Clark J. 1998: ***Trees and Development a Technical Guide to Preservation of Trees During Land Development***: International Society of Arboriculture, Champaign, Illinois, USA.

Appendix A - Tree Assessment Methodology

Tree Assessment Form (TAF©)

Record	Description
Tree	In botanical science, a tree is a perennial plant which consists of one or multiple trunks which supports branches and leaves. Trees are generally taller than 5 metres and will live for more than ten seasons, with some species living for hundreds or thousands of seasons.
Genus and Species	Botanical taxonomy of trees uses the binominal system of a genus and species, often there are subspecies and subgenus as well as cultivars. When identifying tree species, identification techniques such as assessing the tree's form, flower, stem, fruit and location are used. Identifying the right species is critical in assessing the tree's legalisation and environmental benefit. All efforts are made to correctly identify each tree to species level, where possible. Genus is the broader group to which the tree belongs e.g. *Eucalyptus, Fraxinus* and *Melaleuca*. Species identifies the specific tree within the genus e.g. *Eucalyptus camaldulensis*, *Fraxinus griffithi* or *Melaleuca styphelioides*. Trees will also be assigned the most commonly used Common Name. Common Names are not generally used for identification due to their nonspecific use, i.e. *Melia azedarach* is commonly known as White Cedar in South Australia but is also called Chinaberry Tree, Pride of India, Bead-tree, Cape Lilac, Syringa Berrytree, Persian Lilac, and Indian Lilac; equally similar common names can refer to trees from completely different Genus e.g. Swamp Oak, Tasmanian Oak and English Oak are from the *Casuarina, Eucalyptus* and *Quercus* genus's respectively.
Height	Tree height is estimated by the arborist at the time of assessment. Tree height is observed and recorded in the following ranges; <5m, 5-10m, 10-15m and >20m.
Spread	Tree crown spread is estimated by the arborist at the time of assessment and recorded in the following ranges <5m, 5-10m, 10-15m, 15-20m, >20m.
Health	Tree health is assessed using the Arborman Tree Solutions - Tree Health Assessment Method that is based on international best practice.
Structure	Tree structure is assessed using Arborman Tree Solutions - Tree Structure Assessment Method that is based on international best practice.
Tree Risk Assessment	Tree Risk is assessed using Tree Risk Assessment methodology. The person conducting the assessment has been trained in the International Society of Arboriculture Tree Risk Assessment Qualification (TRAQ), Quantified Tree Risk Assessment (QTRA) and/or VALID Tree Risk Assessment (VALID). Refer to the Methodology within the report for additional information.
Legislative Status	Legislation status is identified through the interpretation of the *Development Act 1993*, the *Natural Resource Management Act 2004,* the *Native Vegetation Act 1991* and/or any other legislation that may apply.
Mitigation	Measures to reduce tree risk, improve tree condition, remove structural flaws, manage other conditions as appropriate may be recommended in the form of pruning and is listed in the Tree Assessment Findings (Appendix B). Tree pruning is recommended in accordance with AS4373-2007 *Pruning amenity trees* where practicable. Where measures to mitigate risk is not possible and the risk is unacceptable, then tree removal or further investigation is recommended.

Useful Life Expectancy (ULE)

ULE Rating	Definition
Surpassed	The tree has surpassed its Useful Life Expectancy. Trees that achieve a surpassed ULE may do so due to poor health, structure or form. Additionally, trees that are poorly located such as under high voltage powerlines or too close to structures may also achieve a surpassed ULE. Trees that achieve this status will be recommended for removal as there are no reasonable options to retain them.
<10 years	The tree displays either or both Poor Health and/or Structure and is considered to have a short Useful Life Expectancy of less than ten years. Some short-lived species such as *Acacia sp*. may naturally achieve a short ULE.
>10 years	The tree displays Fair Health or Structure and Good Health or Structure and is considered to have a Useful Life Expectancy of ten years or more. Trees identified as having a ULE of >10, will require mitigation such as pruning, stem injections or soil amelioration to increase their ULE.
>20 years	The tree displays Good Health and Structure and is considered to have an extended Useful Life Expectancy of more than twenty years.

Maturity (Age)

Age Class	Definition
Senescent	The tree has surpassed its optimum growing period and is declining and/or reducing in size. May be considered as a veteran in relation to its ongoing management. Tree will have generally reached greater than 80% of its expected life expectancy.
Mature	A mature tree is one that has reached its expected overall size, although the tree's trunk is still expected to continue growing. Tree maturity is also assessed based on species; as some trees are much longer lived than others. Tree will have generally reached 20-80% of its expected life expectancy.
Semi Mature	A tree which has established but has not yet reached maturity. Normally tree establishment practices such as watering will have ceased. Tree will generally not have reached 20% of its expected life expectancy.
Juvenile	A newly planted tree or one which is not yet established in the landscape. Tree establishment practices such as regular watering will still be in place. Tree will generally be a newly planted specimen up to five years old; this may be species dependant.

Tree Health Assessment (THA©)

Category	Description
Good	Tree displays normal vigour, uniform leaf colour, no or minor dieback (<5%), crown density (>90%). When a tree is deciduous, healthy axillary buds and typical internode length is used to determine its health. A tree with good health would show no sign of disease and no or minor pest infestation was identified. The tree has little to no pest and/or disease infestation.
Fair	Tree displays reduced vigour abnormal leaf colour, a moderate level of dieback (<15%), crown density (>70%) and in deciduous trees, reduced axillary buds and internode length. Minor pest and/or disease infestation potentially impacting on tree health. Trees with fair health have the potential to recover with reasonable remedial treatments.
Poor	Tree displays an advanced state of decline with low or no vigour, chlorotic or dull leaf colour, with high crown dieback (>15%), low crown density (<70%) and/or in deciduous trees, few or small axillary buds and shortened internode length. Pest and or disease infestation is evident and/or widespread. Trees with poor health are highly unlikely to recover with any remedial treatments; these trees have declined beyond the point of reversal.
Dead	The tree has died and has no opportunity for recovery.

Tree Structural Assessment (TSA©)

Category	Description
Good	Little to no branch failure observed within the crown, well-formed unions, no included bark, good branch and trunk taper present, root buttressing and root plate are typical. Trees that are identified as having good health display expected condition for their age, species and location.
Fair	The tree may display one or more of the following a history of minor branch failure, included bark unions may be present however, are stable at this time, acceptable branch and trunk taper present, root buttressing and root plate are typical. Trees with fair structure will generally require reasonable remediation methods to ensure the tree's structure remains viable.
Poor	History of significant branch failure observed in the crown, poorly formed unions, unstable included bark unions present, branch and/or trunk taper is abnormal, root buttressing and/or root plate are atypical.
Failed	The structure of the tree has or is in the process of collapsing.

Tree Form Assessment (TFA©)

Category	Description
Good	Form is typical of the species and has not been altered by structures, the environment or other trees.
Fair	The form has minor impacts from structures, the environment or adjacent trees which has altered its shape. There may be slight phototropic response noted or moderate pruning which has altered the tree's form.
Poor	The tree's form has been substantially impacted by structures, the environment, pruning or other trees. Phototropic response is evident and unlikely to be corrected.
Atypical	Tree form is highly irregular due to structures or other trees impacting its ability to correctly mature. Extreme phototropic response is evident; or the tree has had a substantially failure resulting in its poor condition, or extensive pruning has altered the tree's form irreversibly.

Priority

Category	Description
Low	Identified works within this priority should be carried out within 12 months.
Medium	Identified works within this priority should be carried out within 6 months.
High	Identified works within this priority should be carried out within 3 months.
Urgent	Identified works within this priority should be carried out immediately. Works within this priority rating will be brought to attention of the responsible person at the time of assessment.

Tree Retention Rating (TRR)

The Tree Retention Rating is based on a number of factors that are identified as part of the standard tree assessment criteria including Condition, Size, Environmental, Amenity and Special Values. These factors are combined in a number of matrices to provide a Preliminary Tree Retention Rating and a Tree Retention Rating Modifier which combine to provide a Tree Retention Rating that is measurable, consistent and repeatable

Preliminary Tree Retention Rating

The Preliminary Tree Retention Rating is conducted assessing Tree Health and Structure to give an overall Condition Rating and Height and Spread to give an overall Size Rating. The following matrices identify how these are derived.

Condition Matrix				
Structure	**Health**			
	Good	**Fair**	**Poor**	**Dead**
Good	Good	Fair	Poor	Very Poor
Fair	Fair	Fair	Poor	Very Poor
Poor	Poor	Poor	Poor	Very Poor
Failed	Very Poor	Very Poor	Very Poor	Very Poor

Size Matrix					
Spread	**Height**				
	>20	**15-20**	**10-15**	**5-10**	**<5**
>20	Very Large	Large	Medium	Medium	Medium
15-20	Large	Large	Medium	Medium	Medium
10-15	Medium	Medium	Medium	Medium	Medium
5-10	Medium	Medium	Medium	Small	Small
<5	Medium	Medium	Medium	Small	Very Small

The results from the Condition and Size Matrices are then placed in the Preliminary Tree Retention Rating Matrix.

Preliminary Tree Retention Rating				
Size	**Condition**			
	Good	**Fair**	**Poor**	**Very Poor**
Very Large	High	Moderate	Low	Low
Large	High	Moderate	Low	Low
Medium	Moderate	Moderate	Low	Low
Small	Moderate	Moderate	Low	Low
Very Small	Moderate	Low	Low	Low

The Preliminary Tree Retention Rating gives a base rating for all trees regardless of other environmental and/or amenity factors and any Special Value considerations. The Preliminary Tree Retention Rating can only be modified if these factors are considered to be of high or low enough importance to warrant increasing or, in a few cases, lowering the original rating.

Tree Retention Rating Modifier

The Preliminary Tree Retention Rating is then qualified against the recognised Environmental and Amenity benefits that trees present to the community thereby providing a quantitative measure to determine the overall Tree Retention Rating. Data is collected in relation to Environmental and Amenity attributes which are compared through a set of matrices to produce a Tree Retention Rating Modifier.

Environmental Matrix				
Origin	**Habitat**			
	High Habitat	**Medium**	**Low**	**No Habitat**
Indigenous	High	High	Moderate	Moderate
Native	High	Moderate	Moderate	Low
Exotic	Moderate	Moderate	Low	Low
Weed	Moderate	Low	Low	Low

Amenity Matrix				
Character	**Aesthetics**			
	High	**Moderate**	**Low**	**None**
High	High	High	Moderate	Moderate
Moderate	High	Moderate	Moderate	Low
Low	Moderate	Moderate	Low	Low
None	Moderate	Low	Low	Low

Tree Retention Rating Modifier			
Amenity	**Environment**		
	High	**Moderate**	**Low**
High	High	High	Moderate
Moderate	High	Moderate	Moderate
Low	Moderate	Moderate	Low

Tree Retention Rating

The results of the Preliminary Tree Retention Rating and the Tree Retention Rating Modifier matrices are combined in a final matrix to give the actual Tree Retention Rating.

Tree Retention Rating Matrix			
Tree Retention Rating Modifier	**Preliminary Tree Retention Rating**		
	High	**Moderate**	**Low**
High	High	High	Moderate
Moderate	Moderate	Moderate	Low
Low	Moderate	Low	Low

Special Value Trees

Trees can have 'Special Value' for reasons outside of normal Arboricultural assessment protocols and therefore would not have been considered in the assessment to this point; to allow for this a Special Value characteristic that can override the Tree Retention Rating can be selected. Special Value characteristics that could override the Tree Retention Rating would include factors such as the following:

Cultural Values

Memorial Trees, Avenue of Honour Trees, Aboriginal Heritage Trees, Trees planted by Dignitaries and various other potential categories.

Environmental Values

Rare or Endangered species, Remnant Vegetation, Important Habitat for rare or endangered wildlife, substantial habitat value in an important biodiversity area and various other potential categories.

Where a tree achieves one or more Special Value characteristics the Tree Retention Rating will automatically be overridden and assigned the value of Important.

Tree Retention Rating Definitions

Special Value These trees will in all instances be required to be retained within any future development/redevelopment. It is highly unlikely that trees that achieve this rating would be approved for removal or any other tree damaging activity. Trees will have either important cultural or environmental value, that warrant their protection regardless of other Arboricultural considerations.

High These trees will in most instances be required to be retained within any future development/redevelopment. It is unlikely that trees that achieve this rating would be approved for removal or any other tree damaging activity. Trees in this category will provide a high level of amenity and/or environmental benefit and are still good overall condition.

Moderate Trees with a moderate retention rating provide limited environmental benefit and amenity to the area. These trees may be semi mature or exotic species with limited environmental value. Moderate trees may also be large trees that display fair overall condition.

Low These trees may not be considered suitable for retention in a future development or redevelopment. These trees will either be young trees that are easily replaced or in poor overall condition. Trees in this category do not warrant special works or design modifications to allow for their retention. Trees in this category are likely to be approved for removal and/or other tree damaging activity in an otherwise reasonable and expected development. Protection of these trees, where they are identified to be retained, should be consistent with Australian Standard AS4970-2009 *Protection of trees on development sites*.

Development Impact Assessment

Potential development impacts were determined in accordance with Australian Standard 4970-2009 *Protection of trees on development sites.* The identification of the impact of development considers a number of factors including the following:

a. The extent of encroachment into a tree's Tree Protection Zone by the proposed development as a percentage of the area.

b. Results of any non-destructive exploratory investigations that may have occurred to determine root activity.

c. Any required pruning that may be needed to accommodate the proposed development.

d. Tree species and tolerance to root disturbance.

e. Age, vigour and size of the tree.

f. Lean and stability of the tree.

g. Soil characteristics and volume, topography and drainage.

h. The presence of existing or past structures or obstacles potentially affecting root growth.

i. Design factors incorporated into the proposed development to minimise impact.

The impacts on a tree can be varied and are not necessarily consistent with or directly corelated to a particular level of encroachment, to assist in providing consistency the levels of impact have been classified into the following categories: -

No Impact - no encroachment into the TPZ has been identified.

Low <10% - the identified encroachment is less than 10% of the TPZ area and not expected to impact tree viability.

Low >10% - the identified encroachment is greater than 10% of the TPZ area however there are factors that indicate the proposed development will not negatively impact tree viability.

High >10% - the identified encroachment is greater than 10% of the TPZ area and factors are present that indicate the proposed development will negatively impact tree viability. The impact is likely to lead to the long-term decline of the tree however it is unlikely to impact on its short-term stability.

Conflicted - the identified encroachment is greater than 10% of the TPZ area and in most cases will also impact the SRZ and/or the trunk. There are factors present that indicate the proposed development will negatively impact tree viability to the point where its removal is required as part of the development.

Trees with calculated encroachments greater than 10% and with an Impact identified as 'Low' have features or considerations identified in clauses in AS4970-2009 3.3.4 *TPZ encroachment considerations* which indicate these trees should be sustainable.

Trees with calculated encroachments greater than 10% and with an Impact identified as 'High' do not have any features or considerations identified in clauses in AS4970-2009 3.3.4 and therefore alternative design solutions, additional root investigations and/or tree sensitive construction measures are required if the tree is to be retained. Where alternative protection methodologies are not available tree removal may be required to accommodate the development.

Trees with an Impact identified as 'Conflicted' are impacted over the majority of their root zone and/or over the SRZ or on the trunk, additional root investigations or tree sensitive construction measures are not available and the only option is alternative designs or tree removal.

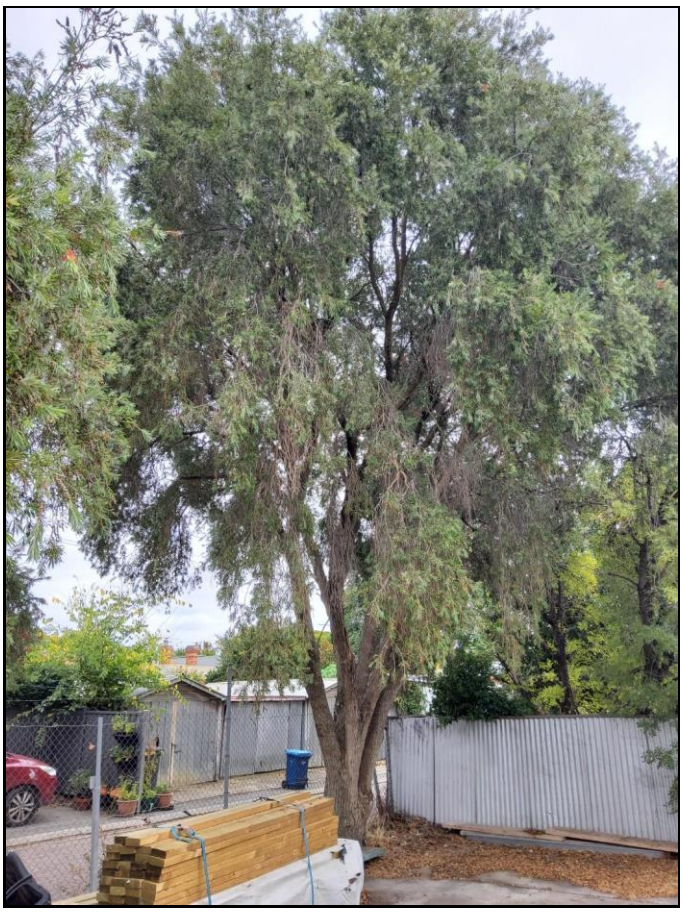
Appendix B - Tree Assessment Findings

Callistemon viminalis

Tree No: 1

Weeping Bottlebrush

Inspected:	13 April 2023
Height:	5-10 metres
Spread:	5-10 metres
Health:	Good
Structure:	Fair
Form:	Good
Trunk Circumference:	>3 metres
Useful Life Expectancy:	>10 years
Tree Protection Zone:	6.87 metres
Structural Root Zone:	2.90 metres



Observations

This tree is in good health however has fair overall condition due to the presence of stable included bark in the primary trunk division. There is deadwood within the crown but not at a level that would indicate reduced health and is typical of the species.

Legislative Status	Significant

This tree has a trunk circumference greater than three metres and is not subject to any exemption from regulation and therefore it is identified as a Significant Tree as defined in the PDI Act 2016.

Retention Rating	Moderate

This tree has a Moderate Retention Rating and could be considered for retention if it can be protected. Tree damaging activity, including removal, may be approved if it is shown that reasonable alternative design solutions are not available.

Development Impact	Conflicted

The identified encroachment is greater than 10% of the TPZ area and will also impact the SRZ and/or the trunk. There are factors present that indicate the proposed development will negatively impact tree viability to the point where its removal is required as part of the development.

Action	Removal Required

Tree removal is required to facilitate the proposed development.

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Callistemon viminalis

Tree No: 2

Weeping Bottlebrush

Inspected:	13 April 2023
Height:	5-10 metres
Spread:	5-10 metres
Health:	Good
Structure:	Fair
Form:	Fair
Trunk Circumference:	<2 metres
Useful Life Expectancy:	>10 years
Tree Protection Zone:	4.56 metres
Structural Root Zone:	2.30 metres

Observations

This tree is considered to be in Fair condition due to a currently stable included bark union and a moderate history of branch failure. Additionally, one of the main trunks emerging from the primary trunk division has been removed, which has resulted in an elevated level of basal epicormic growth.

Legislative Status	Unregulated

This tree does not achieve a regulated trunk circumference and therefore is not regulated by the Planning, Development and Infrastructure Act 2016.

Retention Rating	Moderate

This tree has a Moderate Retention Rating and could be considered for retention if it can be protected. It is likely that tree damaging activity, including removal, could be approved if it is shown that alternative design solutions are not available.

Development Impact	Conflicted

The identified encroachment is greater than 10% of the TPZ area and will also impact the SRZ and/or the trunk. There are factors present that indicate the proposed development will negatively impact tree viability to the point where its removal is required as part of the development.

Action	Removal Required

Tree removal is required to facilitate the proposed development.

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Appendix C - Mapping

SURVEY LEGEND

- SPOT HEIGHT
- TBM
- WATER METER
- STOBIE POLE
- SEWER
- GAS
- DOMESTIC OUTLET
- TELSTRA

NOTES:

1. STORMWATER LAYOUT IS INDICATIVE ONLY, AND MAY CHANGE TO SUIT SITE CONDITIONS.
THE INTEGRITY OF THE STORMWATER DRAINAGE DESIGN SHALL BE MAINTAINED AT ALL TIMES.

2. REFER TO ARCHITECTURAL SITE PLAN FOR ALL SET OUT DIMENSIONS, LANDSCAPING AND ADDITIONAL DETAILS.

3. BOUNDARY NOTE: BOUNDARY LOCATIONS ARE BASED ON FENCES ONLY. IT IS STRONGLY RECOMMENDED THAT AN IDENTIFICATION SURVEY BE DONE TO ESTABLISH TRUE BOUNDARIES.

4. EXISTING SERVICES NOTE:
APPROVAL WILL NEED TO BE SOUGHT FROM RELEVANT AUTHORITIES FOR ANY EXISTING SERVICES TO BE RELOCATED.

5. SITE IS VEGETATED. COMPLETE REMOVAL OF ALL TREES LOCATED WITHIN THE BUILDING PLATFORM MUST BE REMOVED SO AS NOT TO ALLOW ANY FUTURE GROWTH.
THIS REMOVAL PROCESS MUST INCLUDE THE BASE AND ALL MAJOR ROOT SYSTEMS OF EACH TREE. ANY VOIDS IN THE GROUND AFTER THE REMOVAL OF THE TREE MUST BE BACKFILLED WITH CLEAN MATERIAL TO A COMPACTION SIMILAR TO THE SURROUNDING NATURAL GROUND.

CONTINUED:

6. SITE SURVEY NOTE: SITE SURVEY BY OTHERS.

THE SURVEY DOESN'T COVERS GROUND LEVELS ON THE ADJACEN
PROPERTY.
IF ANY EXISTING RETAINING WALLS ARE ENCOUNTERED ALONG TH
BOUNDARY AND THE LEVELS BOTH SIDES OF THE BOUNDARY DIF
MORE THAN 100mm, CONTACT THIS OFFICE FOR FURTHER ADVIC

7. COUNCIL GENERAL NOTE: ALL WORKS BEYOND THE PROPERTY
ARE TO BE TO COUNCILS REQUIREMENTS AND STANDARD DETAILS

8. EXISTING BUILDINGS ON BLOCK NOTE:
PRIOR TO THE COMMENCEMENT OF SITE EARTHWORKS, IT IS REC
THAT ADDITIONAL SITE LEVELS BE TAKEN TO CONFIRM REQUIRED
LEVEL ONCE ALL EXISTING STRUCTURES HAVE BEEN REMOVED O
HOUSE SITE.

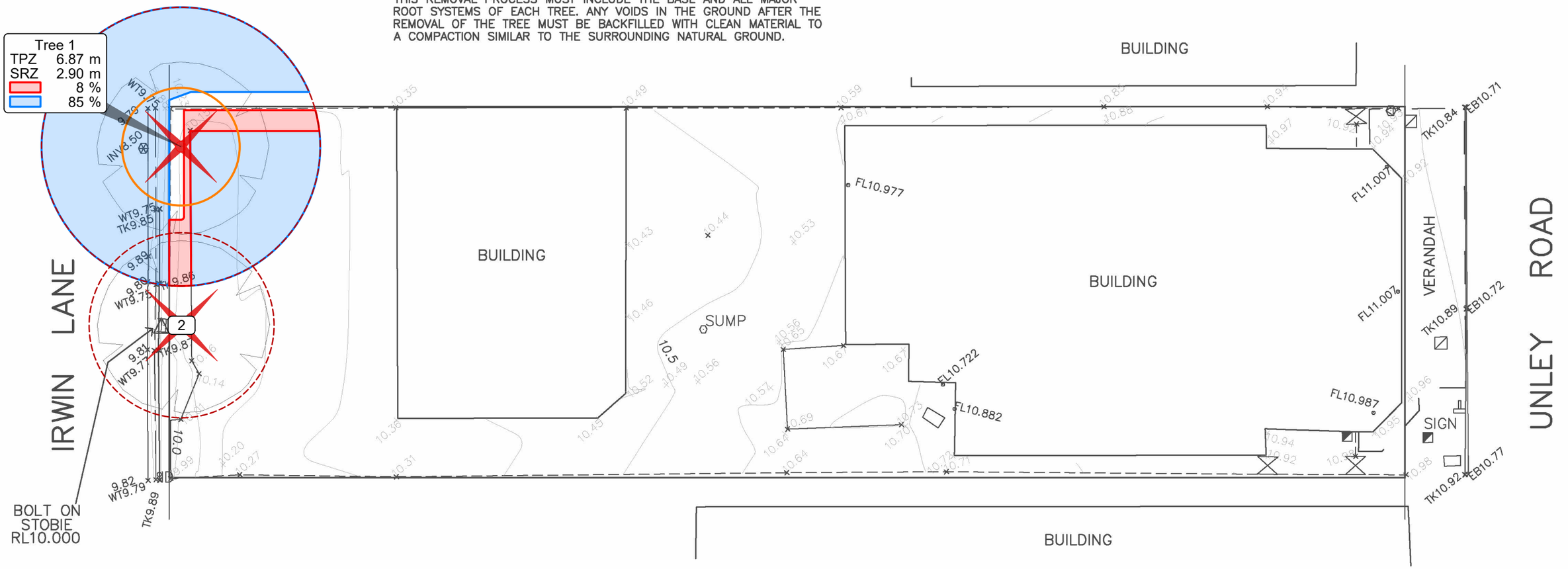
9. REFER TO ARCHITECTURAL SITE PLAN FOR ALL SET OUT DIMENSIONS, LANDSCAPING AND ADDITIONAL DETAILS.

ATS7209-42-46UnlRdDIR
Legend

- Tree Removal

Encroachments

- Proposed
- Existing



EXISTING CONTOUR PLAN.

SCALE 1:200

REFER TO ALL CIVIL SHEETS C1–C3.

ISSUE:	CHECKED:	DATE:	REVISION:
P2	G.P.	04.2023	FOR COUNCIL APPROVAL.
P1	G.P.	04.2023	FOR COUNCIL APPROVAL.

0 1000 2000 3000 4000 5000
MILLIMETRES
A3 SHEET

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

P & G STRUCTURES Pty Ltd
CONSULTING – STRUCTURAL – CIVIL
ABN 20 129 006 935
ACN 129 006 935
Suite 605 147 Pirie Street
Adelaide SA 5000
Ph/Fax: (08) 8223 2022
Mob: 0418 808 171
email: admin@pgstruct.com

P&G STRUCTURES

DESIGNED:	G.P.
DRAWN:	T.D.
CHECKED:	G.P.
DATE:	04.2023

PROJECT:
PROPOSED APARTMENTS
42–46 UNLEY ROAD,
UNLEY. S.A.

CLIENT:
OTELLO.

DRAWING TITLE:
EXISTING CONTOUR PLAN.

ORIGINAL SIZE: A3 SHEET
SCALES: AS SHOWN
JOB No: PG23016
DRAWING No: C1
ISSUE: P2

LEGEND:

SURFACE STORMWATER PIPE uPVC, DIAMETER AS SHOWN. GRADE AT 1% FALL.

300mm DIAMETER REINFORCED CONCRETE PIPE. CONNECTED TO STREET SYSTEM. GRADE AT 1% FALL.

NOTE:
PROVIDE ADEQUATE PROTECTION OR COVER TO STORMWATER PIPES, WHERE SUBJECTED TO VEHICULAR LOADING.

100mm DIAMETER AG. DRAIN AS PER PERMEABLE PAVING DETAIL. GRADE AT 1% FALL. CONNECT TO SUMP S1.

S... SUMP AS PER SCHEDULE. REFER TO DETAILS.

P... PIT AS PER SCHEDULE. REFER TO DETAILS.

10.20 PAVING CONTOUR LINE LEVEL.

10.00 PAVING SPOT LEVEL.

9.86 MEL. (COS.) PAVING SPOT LEVEL. MATCH EXISTING LEVEL. (CHECK ON SITE).

10.5 EXISTING CONTOUR LINE.

10.44 EXISTING SPOT LEVEL.

450mm WIDE CONCRETE SPOON DRAIN. FALL IN DIRECTION OF ARROWS.

PERMEABLE PAVING AS PER DETAIL ON C3.

K 100mm HIGH KERB.

T. UNDERGROUND RAINWATER TANK AS PER DETAIL ON C3. CONNECT ALL ROOF STORMWATER TO TANK. (REFER TO HYDRAULICS DRAWINGS).

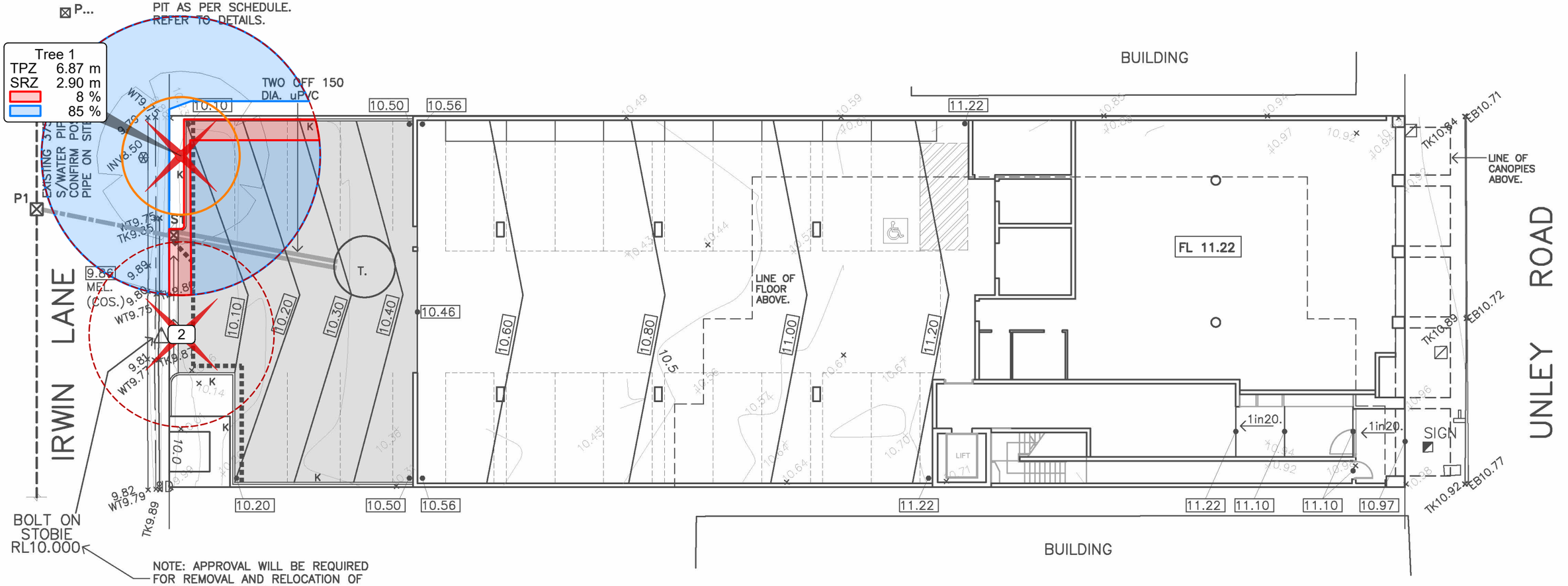
ATS7209-42-46UnlRdDIR
Legend

Tree Removal

Encroachments

Proposed

Existing



SITEWORKS AND DRAINAGE PLAN.

SCALE 1:200

REFER TO ALL CIVIL SHEETS C1–C3.

ISSUE:	CHECKED:	DATE:	REVISION:
P2	G.P.	04.2023	FOR COUNCIL APPROVAL.
P1	G.P.	04.2023	FOR COUNCIL APPROVAL.

0 1000 2000 3000 4000 5000
MILLIMETRES
A3 SHEET

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

P & G STRUCTURES Pty Ltd
CONSULTING – STRUCTURAL – CIVIL
ABN 20 129 006 935
ACN 129 006 935
Suite 605 147 Pirie Street
Adelaide SA 5000
Ph/Fax: (08) 8223 2022
Mob: 0418 808 171
email: admin@pgstruct.com

P&G STRUCTURES

DESIGNED:	G.P.
DRAWN:	T.D.
CHECKED:	G.P.
DATE:	04.2023

PROJECT:
PROPOSED APARTMENTS
42–46 UNLEY ROAD,
UNLEY. S.A.

CLIENT:
OTELLO.

DRAWING TITLE:
SITEWORKS AND DRAINAGE PLAN.

ORIGINAL SIZE: A3 SHEET
SCALES: AS SHOWN
JOB No: PG23016
DRAWING No: C2
ISSUE: P2

Appendix D – Tree Assessment Summary

Tree Assessment Summary

Tree No.	Botanic Name	Legislative Status	Retention Rating	Development Impact	TPZ Radius	Observations	Action
1	*Callistemon viminalis*	Significant	Moderate	Conflicted	6.87 metres	This tree is in good health however has fair overall condition due to the presence of stable included bark in the primary trunk division. There is deadwood within the crown but not at a level that would indicate reduced health and is typical of the species.	Removal Required
2	*Callistemon viminalis*	Unregulated	Moderate	Conflicted	4.56 metres	This tree is considered to be in Fair condition due to a currently stable included bark union and a moderate history of branch failure. Additionally, one of the main trunks emerging from the primary trunk division has been removed, which has resulted in an elevated level of basal epicormic growth.	Removal Required

Appendix E - Tree Protection Zone Guidelines

Tree Protection Zone General Specifications and Guidelines

The Tree Protection Zone(s) is identified on the site plan, the TPZ is an area where construction activities are regulated for the purposes of protecting tree viability. The TPZ should be established so that it clearly identifies and precludes development/construction activities including personnel.

If development activities are required within the TPZ then these activities must be reviewed and approved by the Project Arborist. Prior to approval, the Project Arborist must be certain that the tree(s) will remain viable as a result of this activity.

Work Activities Excluded from the Tree Protection Zone:

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.

o) Any other activity that could impact on the tree.

Protective Fencing

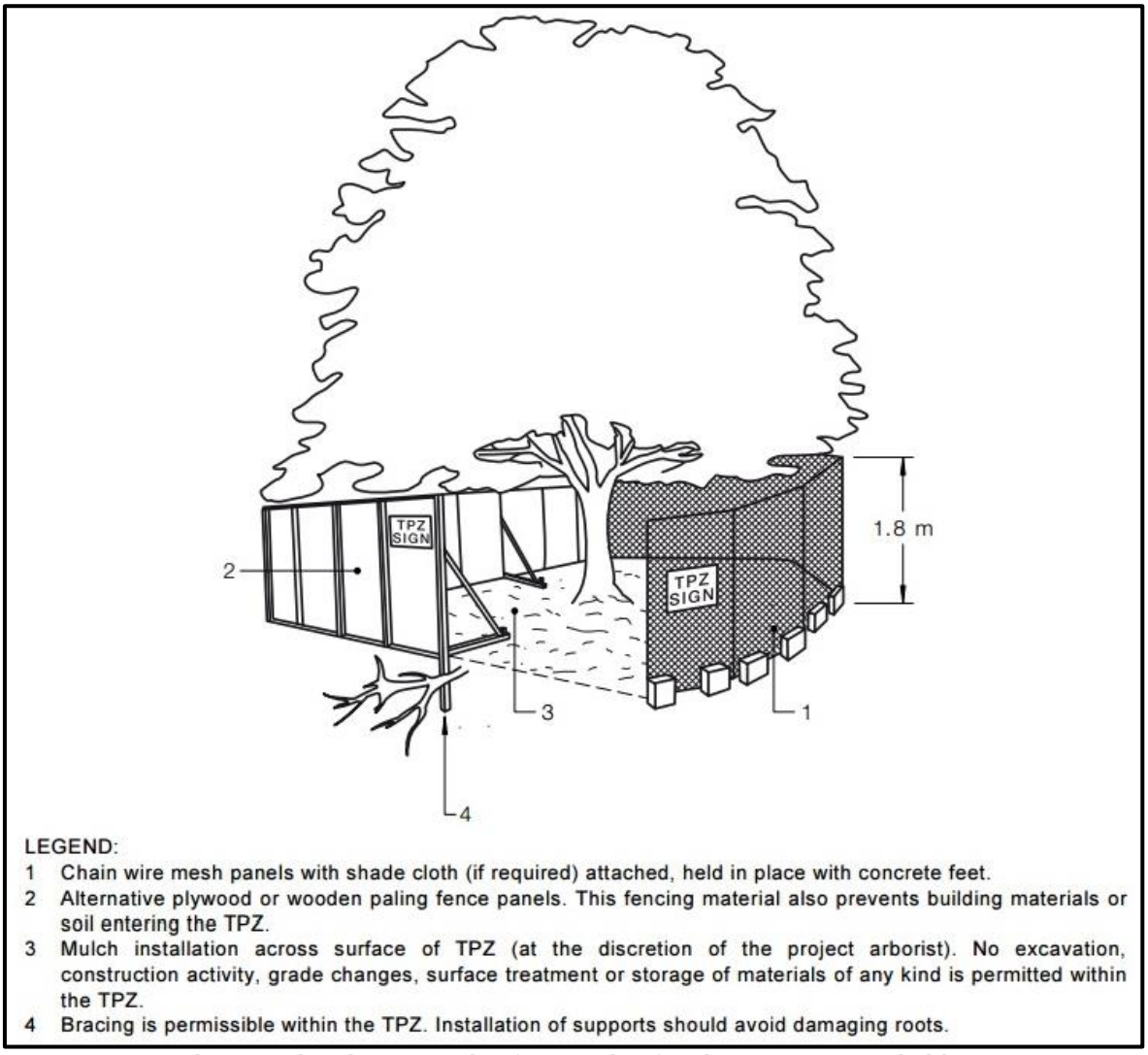
Protective fencing must be installed around the identified Tree Protection Zone (See Figure1). The fencing should by chain wire panels and compliant with AS4687 - 2007 *Temporary fencing and hoardings*. Shade cloth or similar material should be attached around the fence to reduce dust, other particulates and liquids entering the protected area.

Temporary fencing on 28kg bases are recommended for use as this eliminates any excavation requirements to install fencing. Excavation increase the likelihood of root damage therefore should be avoided where possible throughout the project.

Existing perimeter fencing and other structures may be utilised as part of the protective fencing.

Any permanent fencing should be post and rail with the set out determined in consultation with the Project Arborist.

Where the erection of the fence is not practical the Project Arborist is to approve alternative measures.



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 1 Showing example of protection fencing measures suitable.

Signage

The TPZ must be clearly identified with signs placed around the edge of the TPZ and be visible within the development site. Example of a Tree Protection Zone Sign at the end of this document..

Other Protection Measures

There are other protection methods that should be implemented within the development site and these include:

General

When a TPZ exclusion area cannot be established due to practical reasons or the area needs to be entered to undertake construction activities then additional tree protection measures may need to be adopted. Protection measures should be compliant with AS4970-2009 and approved by the Project Arborist

Installation of Scaffolding within Tree Protection Area.

Where scaffolding is required within the TPZ branch removal should be minimised. Any branch removal required should be approved by the Project Arborist and performed by a certified Arborist and performed in accordance with AS4373-2007. Approval to prune branches must be documented and maintained.

Ground below scaffold should be protected by boarding (e.g. scaffold board or plywood sheeting) as shown in Figure below. The boarding should be left in place until scaffolding is removed.

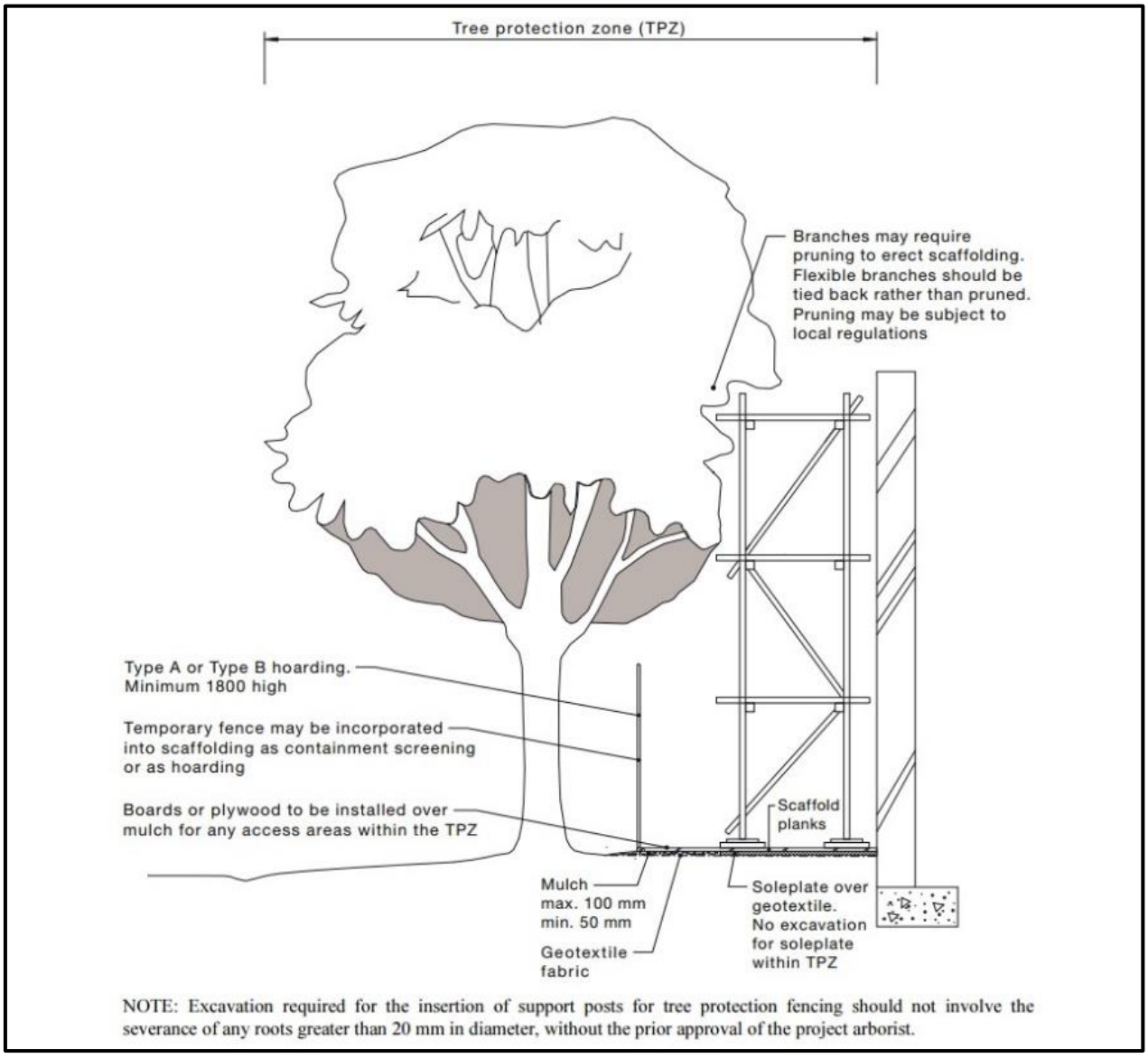
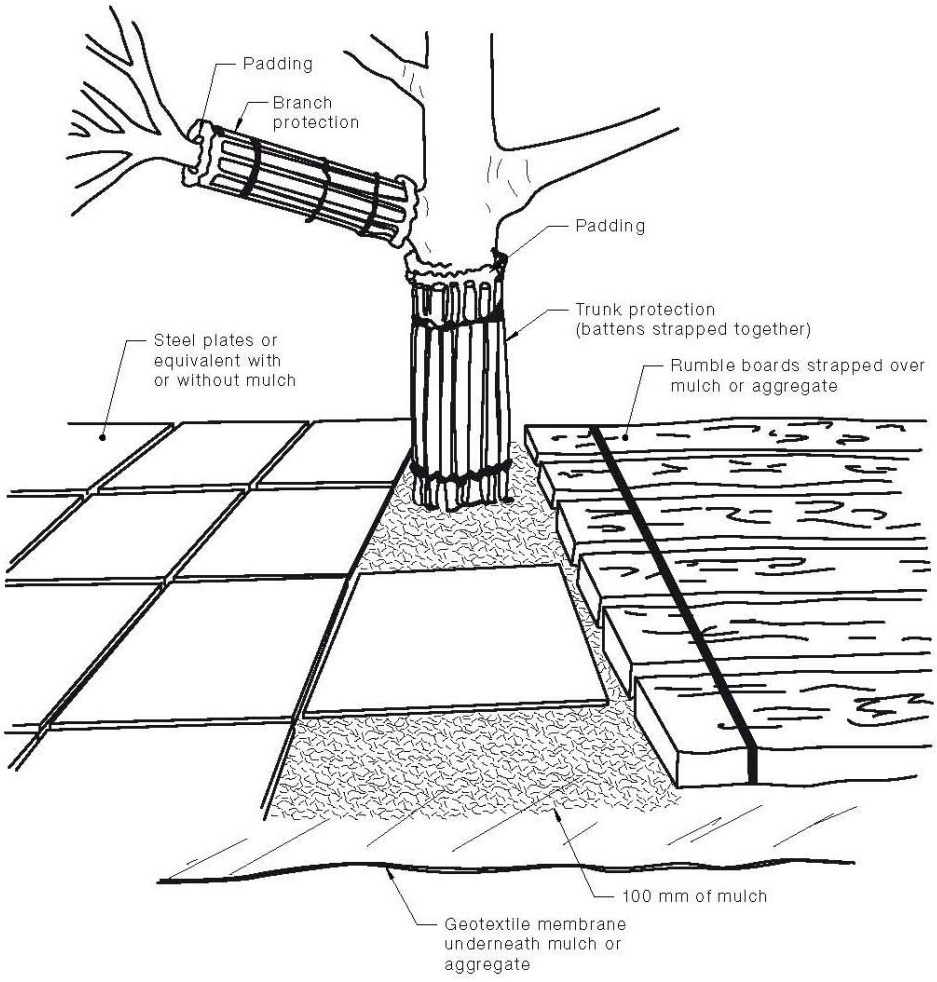


Figure 2 – Showing scaffold constructed within TPZ.

Ground Protection and TPZ Access

Temporary access within the TPZ can be achieved by the installation of suitable ground protection. The purpose of ground protection is to prevent damage to tree roots and avoid compaction of the soil.

Ground protection methods include the placement of a permeable membrane beneath a layer of non-compactable material such as mulch or a no fines gravel which is in turn covered with rumble boards or steel plates.



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 3 – Ground protection methods.

Document Source:

The previous three diagrams in this document are sourced from AS4970-2009 Protection of trees on development sites*. Further information and guidelines are available in within that document.*

Paving Construction within a Tree Protection Zone

Paving within any Tree Protection Zone (TPZ) must be carried out above natural ground level unless it can be shown with non-destructive excavation (AirSpade® or similar) that no or insignificant root growth occupies the proposed construction area.

Due to the adverse effect filling over a Tree Protection Zone (TPZ) can have on tree health; alternative mediums other than soil must be used. Available alternative mediums include structural soils or the use of a cellular confinement system such as *Ecocell*®.

Ecocell®

Ecocell® systems are a cellular confinement system that can be filled with large particle sized gravels as a sub-base for paving systems to reduce compaction to the existing grade.

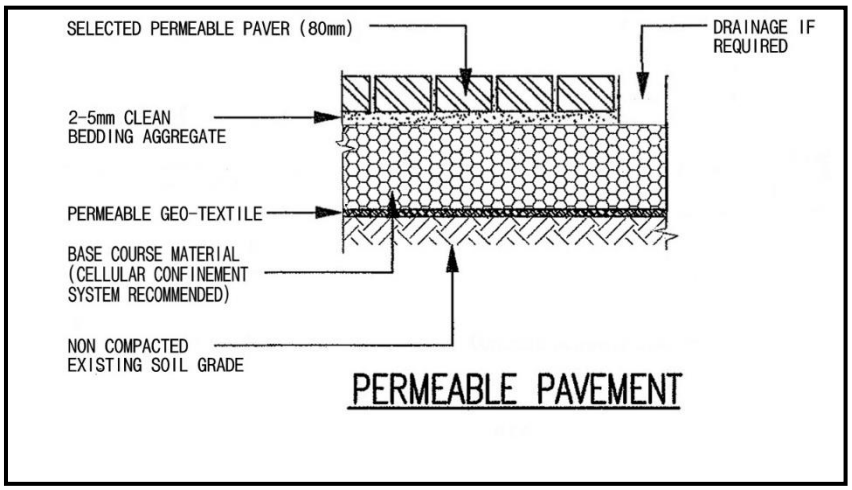
Site preparation

- Clearly outline to all contracting staff entering the site the purpose of the TPZ's and the contractors' responsibilities. No fence is to be moved and no person or machinery is to access the TPZ's without consent from the local council and/or the Project Arborist.

- Fence off the unaffected area of the TPZ with a temporary fence leaving a 1.5 metre gap between the work area and the fence; this will prevent machinery access to the remaining root zone.

Installation of Ecocell® and EcoTrihex Paving®

- Install a non-woven geotextile fabric for drainage and separation from sub base with a minimum of 600mm overlap on all fabric seams as required.
- Add Ecocell®, fill compartments with gravel and compact to desired compaction rate.
- If excessive groundwater is expected incorporate an appropriate drainage system within the bedding sand level.
- Add paving sand to required depth and compact to paving manufacturer's specifications.
- Lay EcoTrihex Paving® as per manufactures specifications and fill gaps between pavers with no fines gravel.
- Remove all debris, vegetation cover and unacceptable in-situ soils. No excavation or soil level change of the sub base is allowable for the installation of the paving.
- Where the finished soil level is uneven, gullies shall be filled with 20 millimetre coarse gravel to achieve the desired level.



This construction method if implemented correctly can significantly reduce and potentially eliminated the risk of tree decline and/or structural failure and effectively increase the size of the Tree Protection Zone to include the area of the paving.

Certificates of Control

Stage in development	Tree management process	
	Matters for consideration	**Actions and certification**
Development submission	Identify trees for retention through comprehensive arboricultural impact assessment of proposed construction. Determine tree protection measures Landscape design	Provide arboricultural impact assessment including tree protection plan (drawing) and specification
Development approval	Development controls Conditions of consent	Review consent conditions relating to trees
Pre-construction (Sections 4 and 5)		
Initial site preparation	State based OHS requirements for tree work Approved retention/removal Refer to AS 4373 for the requirements on the pruning of amenity trees Specifications for tree protection measures	Compliance with conditions of consent Tree removal/tree retention/transplanting Tree pruning Certification of tree removal and pruning Establish/delineate TPZ Install protective measures Certification of tree protection measures
Construction (Sections 4 and 5)		
Site establishment	Temporary infrastructure Demolition, bulk earthworks, hydrology	Locate temporary infrastructure to minimize impact on retained trees Maintain protective measures Certification of tree protection measures
Construction work	Liaison with site manager, compliance Deviation from approved plan	Maintain or amend protective measures Supervision and monitoring
Implement hard and soft landscape works	Installation of irrigation services Control of compaction work Installation of pavement and retaining walls	Remove selected protective measures as necessary Remedial tree works Supervision and monitoring
Practical completion	Tree vigour and structure	Remove all remaining tree protection measures Certification of tree protection
Post construction (Section 5)		
Defects liability/ maintenance period	Tree vigour and structure	Maintenance and monitoring Final remedial tree works Final certification of tree condition

Document Source:

This table has been sourced from AS4970-2009 Protection of trees on development sites. *Further information and guidelines are available in within that document.*

Tree Protection Zone

NO ACCESS

Contact: Arborman Tree Solutions

0418 812 967

e: arborman@arborman.com.au

arborman tree solutions
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