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Prepared for Oxygen
Attn: James Hayter
98-100 Halifax Street
Adelaide SA 5000
Date: 7th May 2026

ABN. 16 804 909 619
15/15 Fullarton Road
Kent Town SA 5067
Ph. 08 8351 4849
E. info@adelaidearb.com.au

Arboricultural Impact Assessment Report

29-31 Austral Terrace, Morphettville



Prepared for
James Hayter
Oxygen

Compiled by
Shane Selway
Adelaide Arb Consultants

Executive Summary

- Adelaide Arb Consultants assessed two significant trees within the Sturt River Linear Reserve, to the west of 29-31 Austral Terrace, Morphettville on the 4th May 2026 in relation to a proposed development.
- The trees are identified as *Eucalyptus camaldulensis* - River Red Gum and *Eucalyptus leucoxylon* – South Australian Blue Gum.
- These trees both display trunk circumference measurements that exceed 200cm at one metre above ground level and each is therefore controlled as a significant tree under the current provisions of the *Planning, Development & Infrastructure Act 2016*.
- The trees are located on publicly managed land and are both therefore controlled assets of the City of Marion under the provisions of the *Local Government Act 1999*.
- Tree 1 displays fair health with slightly reduced foliage density while Tree 2 displays good health. Both trees however are sustainable within their current environment. The health of Tree 1 is recommended to be remedied with an application of beneficial soil microbiota during the development start-up phase and more specifically during tree protection zone establishment.
- The structure of both trees is good and neither require crown management to remain sustainable at an acceptable level of risk to public and private safety at this time.
- The ISA – TRAQ risk assessment process has demonstrated that the trees represent a low risk to public and private safety.
- The development proposal will not change the structural integrity of either tree, nor will it increase the target occupancy within their vicinity. Risk mitigation or maintenance therefore should remain the responsibility of the asset owner/manager.
- An Arboricultural Impact Assessment was undertaken, and the proposed development is not likely to have an adverse impact on the trees. No design modifications are required.
- Tree protection specifications and a tree protection plan are attached to provide guidelines to the various construction teams to ensure the tree is/trees are adequately protected during the construction phase.

Date: 7th May 2026

Thank you for the opportunity to provide you with this advice. Should you require any further assistance or clarification, please do not hesitate to call, or email me.

Yours sincerely,

A blue ink handwritten signature, appearing to read "Shane Selway", with a long horizontal flourish extending to the right.

Shane Selway
Senior Consulting Arboriculturist
MSc Arboriculture & Urban Forestry
Graduate Certificate of Arboriculture
Diploma of Arboriculture
International Society of Arboriculture – Certified Arborist AU-0270A

Table of Contents

Introduction	6
Site Details	8
Tree Observations	10
Tree 1 <i>Eucalyptus camaldulensis</i> - River Red Gum	10
Tree 2 <i>Eucalyptus leucoxylon</i> - South Australian Blue Gum	12
Planning and Design Code – (Regulated and Significant Tree Overlay)	14
Attribute Assessment – Trees 1 and 2	14
Development Proposal	15
Arboricultural Impact Assessment	16
NRZ Encroachment Assessment	16
Discussion	17
Considerations in determining the TPZ	18
Planning and Design Code – (Regulated and Significant Tree Overlay)	21
Justification of tree-damaging activity – Trees 1 and 2	21
Tree Protection Specifications (TPS)	22
TPS - General	22
TPS - Site specific	23
Tree Protection Measures	24
Tree Protection Zone (TPZ) establishment	24
Site establishment	28
Demolition and site clearing activities	29
Earthworks	31
Cut and fill	31
Footing preparation	32
Installation of underground services	32
Construction activities	34
Hardstand installation within a TPZ	35

Date: 7th May 2026

Landscaping around established trees	38
Development Monitoring and Certification	40
Conclusions	42
Appendix A – Assessment Methodology Categories	43
Endnotes	47
Appendix B – Arboricultural Plans	
Tree Survey Plan	
Arboricultural Impact Assessment	
Tree Protection Plans	
Tree Protection Signage	

Introduction

Brief

Adelaide Arb Consultants were commissioned by James Hayter of Oxygen to conduct a comprehensive tree assessment of two trees located within the public reserve area to the west of the BUPA Aged Care Morphettville facility, located at 29-31 Austral Terrace, Morphettville.

The purpose of the requested assessment was to undertake the following.

- Identify the legislative controls that apply to the trees.
- Assess the potential impacts of the proposed development on the subject trees.
- Where impacts are identified, provide guidance to the property owner and design team to develop design solutions to minimise the impacts on any affected tree.
- Provide a range of tree protection measures designed to enable sustainable retention of trees during development and construction processes.
- Provide supporting documentation for the planning application process.
- Provide feedback relating to the likelihood that tree damaging activity may occur as a result of the development proposal construction.

Tree Report Scope

The assessment criteria included the following attributes:

- Trees adjacent to the BUPA land that may be affected by the proposed development.
- The tree's condition and tree related benefits within its current environmental conditions.
- The tree's control status under the current provisions of the *Planning, Development and Infrastructure Act 2016*, the *Native Vegetation Act 1991*, and *Local Government Act 1999* including an assessment against the relevant *Planning & Design Code Performance Outcomes*.
- Tree retention value¹.
- Undertake and Arboricultural Impact Assessment of the proposed development on the trees with reference to the guidance outlined in AS 4970:2025 *Protection of trees on development sites*.
- To recommend trees for retention, crown management or transplanting.
- Generate Tree Protection Specifications (TPS) and a Tree Protection Plan (TPP) requirements as defined within Australian Standard AS 4970:2025.
- Any other factors that were relevant to tree management in the situation considering development and construction activities may occur within the vicinity of some trees.

Date: 7th May 2026

Assessment Methodology

This involved a Level 2 Visual Tree Assessment², carried out from ground level. Tree locations are plotted using GIS software and trunk dimensions are measured on site to the nearest centimetre. Measurements relating to the tree's location, and root zone extents are taken from the centre of the tree at ground level. Tree condition and tree related benefits have also been assessed. More detailed specifications of assessment methods are provided within Appendix A – Assessment Methodology Categories.

Provided Information

The following documents and plans were provided by James Hayter to assist in the assessment process.

- Email of instruction, James Hayter. 30th April 2026.
- Development proposal plan – (snip), James Hayter. 30th April 2026

Date: 7th May 2026

Site Details

An arboricultural assessment of 2 trees was conducted on the May 4th, 2026 within the public reserve extending between the Sturt River culvert and the western boundary of the property at 29-31 Austral Terrace, Morphettville. Tree observations describe features noted during the assessment from the public reserve area where the trees are situated as well as the car parking area within the BUPA facility, to the east of the trees. The weather at the time of the assessment was warm and slightly overcast. All areas surrounding the trees were sufficiently accessible for the purpose of the assessment and health and structural features of the tree were suitably visible despite the overcast weather.

The trees are located to the west of the development site at 29-31 Austral Terrace, within the public reserve. Tree 1 is situated approximately 5.5m from the existing carpark boundary and 7.3m from the top of the culvert for the Sturt River channel. Tree 2 is situated approximately 6.5m from the existing carpark boundary and 5.9m from the top of the river culvert. The trees are labelled '1' and '2' respectively on the attached site plan.



Date: 7th May 2026

The vegetative character of the local area consists of a small to moderate number of remnant indigenous trees along the Sturt River with a mixture on remnant, indigenous, introduced native and exotic trees within the urban environment. The site is tenuously linked to a wildlife corridor formed by the Sturt River immediately adjacent to the tree's locations.

The climatic conditions and growing environment at the site consist of the following features and conditions. The climate of the central Adelaide Plains is typically defined by the hot dry summers with some summer rainfall and cool wet winters³. The mean annual rainfall is 437mm and temperatures range from -2.6°C to 45.8°C. The prevailing winds in the morning are from the north to east and in the afternoon from the southwest.

The tree root zones consist of open garden areas existing as a strip of land running parallel to the river channel. A bitumen footpath extends within this reserve and is 4m west of Tree 1 and 1m east of Tree 2 while the car park surfacing associated with the BUPA facility is located 5.5m east of Tree 1 and 6.5m east of Tree 2. There have been no obvious recent disturbances within the root zone of either tree.

Date: 7th May 2026

Tree Observations

Tree 1 <i>Eucalyptus camaldulensis</i> - River Red Gum			
Species Origin	Indigenous (planted)		
Height	8-13m		
Spread (Diameter)	8-13m		
Age	Mature		
Useful Life Expectancy ⁴	10-20 years		
Health	Fair		
Structure	Good		
Form	Good		
Trunk Circumference	308cm		
Legislative Control	Significant Tree ⁵		Above: Tree 1 when viewed from the south and standing on the public footpath to the west of the Bupa facility.
Protection Zones			
Diameter @ Standard Height ⁶	102cm	Diameter @ Root Buttress ⁷	107cm
Notional Root Zone ⁸	Radius = 12.24m Area = 471m ²	Structural Root Zone ⁹	Radius = 3.40m

Above: Tree 1 when viewed from the south and standing on the public footpath to the west of the Bupa facility.

Date: 7th May 2026

General Observations

The tree consists of a single trunk to 4m above ground level at which point it divides into two primary stems. The northern stem is subordinate and tends to a horizontal alignment at approximately 5m above ground level. Each of these stems supports many radiating primary branches which in turn support lower order branches. Foliage density is slightly reduced creating a domed crown which is somewhat open and typical of the species in form, however not foliar density.

Tree health is fair. Foliage colour and size is typical of the species however density is reduced. A minor proportion of small diameter deadwood is noted within the internal crown with a further occurrence of small diameter terminal deadwood in the southern crown. The primary structure has an exaggerated proportion of boring insect activity and a wasp gall infestation is also noted within the northern lower order branches.

Tree structure is good. Root and trunk buttressing is present, leading into typical trunk taper. Branch unions throughout the form are free of recognisable defects. Branch extension and distribution are typical of the species and there is no notable history of branch failure within the form.

Tree Risk Assessment – ISA TRAQ Model¹⁰

Risk component	Value	Notes
Risk Assessment Timeframe	3 years	
Target Impact Likelihood ¹¹	Low	Car Park (Frequent) Recreation Area (Occasional) Footpath (Occasional)
Likelihood of Failure ¹²	Possible	Primary Branch
Likelihood Failure & Impact	Unlikely	
Consequence of Failure & Impact ¹³	Significant	Primary branch failure would result in medium to large diameter branches falling unimpeded on to target areas noted.
TRAQ Risk Rating ¹⁴	Low	

Date: 7th May 2026

Tree 2		<i>Eucalyptus leucoxylon</i> - South Australian Blue Gum	
Species Origin	Indigenous (planted)		
Height	8-13m		
Spread (Diameter)	8-13m		
Age	Mature		
Useful Life Expectancy	>20 years		
Health	Good		
Structure	Good		
Form	Good		
Trunk Circumference	230cm		
Legislative Control	Significant Tree	Above: Tree 2 when viewed from the northwest and standing on the public footpath to the west of the Bupa facility.	
Protection Zones			
Diameter @ Standard Height	72cm	Diameter @ Root Buttress	93cm
Notional Root Zone	Radius = 8.64m Area = 235m ²	Structural Root Zone	Radius = 3.21m

Date: 7th May 2026

General Observations

The tree consist of a single dominant trunk that supports various radiating primary branches. These branches support many lower order branches to create a broadly domed crown which is typical of the species.

Tree health is good. Foliage colour, size and density throughout the form is typical of the species and there are no significant signs of pests or disease that may indicate tree health decline or environmental stress.

Tree structure is good. Root and trunk buttressing is well developed which leads into good trunk taper. Branch unions throughout the form are free of recognisable defects while branch taper is also well formed. Branch elongation is slightly exaggerated however distribution is good and there is no recent history of branch failure within the form. One large diameter branch failure is notable from the primary structure at 2m above ground level. This occurred many years ago as noted by wound conclusion. A good history of pruning management is also notable.

Tree Risk Assessment – ISA TRAQ Model

Risk component	Value	Notes
Risk Assessment Timeframe	3 years	
Target Impact Likelihood	Low	Car Park (Frequent) Recreation Area (Occasional) Footpath (Occasional)
Likelihood of Failure	Possible	Primary Branch
Likelihood Failure & Impact	Unlikely	
Consequence of Failure & Impact	Significant	Primary branch failure would result in medium to large diameter branches falling unimpeded on to target areas noted.
TRAQ Risk Rating	Low	

Planning and Design Code – (Regulated and Significant Tree Overlay)

Attribute Assessment – Trees 1 and 2

Desired Outcomes (DO)

DO 1. Conservation of regulated and significant trees to provide aesthetic and environmental benefits and mitigate tree loss.

The subject trees provide significant aesthetic benefit to the local area. As indigenous species that are linked to wildlife corridors, each tree has important environmental value.

Performance Outcomes (PO) – Tree Retention and Health

PO 1.2 Significant trees are retained where they [achieve any of the following attributes]:

a) make an important contribution to the character or amenity of the local area.

Yes – The trees are established within a corridor reserve area that has a high density of indigenous vegetation. As indigenous trees, the subjects both contribute to the vegetative character of the local area. As broad canopy trees, both trees provide important amenity to the landscape.

b) are indigenous to the local area and are listed under the *National Parks and Wildlife Act 1972* as a rare or endangered native species.

No – While both species is indigenous to the local area, neither are listed as rare or endangered under the provisions of the *National Parks and Wildlife Act 1972*.

c) represent an important habitat for native fauna.

Yes - These trees have the potential to be important habitat for native fauna as each provides invertebrates with niches to nest and feed, provides smaller vertebrates with habitat under the bark on the lower trunk and nesting locations within the smaller and larger branches of the crown.

d) are part of a wildlife corridor of a remnant area of native vegetation.

Yes - The trees are linked to a wildlife corridor formed by the Sturt River that is located immediately to the west.

e) are important to the maintenance of biodiversity in the local environment.

Yes – These trees are important for the maintenance of biodiversity in the local area as each provides important habitat for native fauna and is connected to a wildlife corridor.

f) form a notable visual element to the landscape of the local area.

Yes – the trees are located within an open linear reserve area extending adjacent to the Sturt River. Each tree displays a broad crown that is notable from both the walking trail adjacent each tree as well as the various properties and public locations nearby.

Date: 7th May 2026

Development Proposal

The development activities proposed at the site include the following, based on the plans provided to me.

- Demolition and site clearing activities including:
 - Demolition of the existing car park surfacing located 5.5m east of Tree 1 and 6.5m east of Tree 2.
 - Demolition of various smaller trees within the allotment of 29-31 Austral Terrace.
- Construction of a new buildings located 8.5m to the northeast of Tree 1 and 12.6m to the north of Tree 2.
- Construction of new pavement surfacing including a replacement car parking area 7m east of Tree 2, an alfresco style outdoor living area with concrete surfacing 5.1m east of Tree 1, a link pathway extending from the alfresco living area to the Sturt River Linear Reserve pathway.
- Moderate earthworks, including cut/fill and trenching to construct the footing relating to the new building tot the east of Tree 1.
- Underground services have not been shown on the plans provided however are unlikely to be required to traverse within the notional root zone of either tree.
- New landscaping at the perimeter of the new building and car parking areas.

Date: 7th May 2026

Arboricultural Impact Assessment

NRZ Encroachment Assessment

To ensure suitable trees are retained and protected from potentially damaging activities during the development of the site, an Arboricultural Impact Assessment is necessary. This assessment considers the proposed areas of encroachment into the notional root zone (NRZ) to determine potential tree impacts.

The NRZ for this tree is calculated as follows.

Protection Zone Type	Protection Zone Extent	
	Tree 1	Tree 2
The NRZ radius from the centre of the trunk	12.24m	8.64
The NRZ area around tree	470.65m ²	234.51m ²
The Structural Root Zone (SRZ) radius from the centre of the trunk	3.40m	3.21

The proposed development activities at the site encroach into the NRZ area as follows. (Refer also to the Arboricultural Impact Assessment Plan attached as an addendum of the report.)

Encroachment Type	Area / Encroachment Present	
Existing car park	~112.5m ² (23.9%)	~9.3m ² (3.97%)
Existing river culvert	~77.95m ² (16.56%)	~26.3m ² (11.21%)
Existing reserve footpath	~72.2m ² (15.34%)	~51.0m ² (21.75%)
Proposed cut and fill (building area)	~31.97m ² (6.79%)	null
Proposed car park reinstatement	null	~7.83m ² (3.34%)
Proposed paving works	~107.46m ² (22.83%)	~8.0m ² (3.4%)
Total encroachment	~289.58m ² (61.53%)	~93.13m ² (39.7%)
New encroachment	~26.93m ² (5.72%)	~8.0m ² (3.4%)
Works within structural root zone (SRZ)	No	No

Note** The above new encroachment areas provide an offset areas to allow for 300mm of over excavation by contractors.

Discussion

Two mature trees located within the Sturt River Linear Reserve to the west of 29-31 Austral Terrace, Morphettville were assessed to determine tree protection requirements during proposed construction at this property. The trees are identified as *Eucalyptus camaldulensis* – River red Gum and *Eucalyptus leucoxylon* – South Australian Blue Gum.

Each of the trees attains a trunk circumference measurement that exceeds 2m at one metre above ground level. Both trees are therefore controlled as significant trees under the provisions of the *Planning Development and Infrastructure Act 2016*. Additionally, both trees are located on publicly managed land and are therefore controlled as Council Assets of the City of Marion under the provisions of the *Local Government Act 1999*.

The trees display fair and good health with well development foliage that appears sustainable, and without relevant pest or disease concerns. The foliage density of Tree 1 is slightly reduced however and maintenance of the trees growing environment will be important to maintain ongoing sustainability irrespective of development or construction activities at the site.

Each tree's structure is well formed and stable in the current environment. The risks associated with the trees is low and therefore acceptable to public safety. Pruning management options are available to maintain tree structure and the risks associated with the trees at the current level. Given the project will not make significant changes to the local environment and does not increase the target occupancy below either tree, pruning management remains the responsibility of the asset owner and managers.

The site consists of an elevated proportion of sealed surfacing with various car parking areas, the pedestrian footpath and Sturt River culvert all located within the root zones of both trees.

The development proposal seeks to remove areas of car parking to the east of the trees and create a building, alfresco living area and associated pathways. Reinstatement of a smaller car park is also proposed. These activities will result in a minor change in the form of each tree's root zones, which equates to 5.72% of the root zone of Tree 1 and 3.4% of this area for Tree 2. It must also be noted that the existing encroachments have been in situ for a considerable timeframe and offset root development has occurred to maintain the trees in their current sustainable state.

With this view, while the total encroachments are notably high in both cases, the level of alteration is minor and unlikely to result in health decline where appropriate tree protection outcomes are employed during and post construction activities.

Considerations in determining the TPZ

It may be possible to encroach into the NRZ when determining the TPZ.

As the total level of new NRZ encroachment associated with Tree 2 is minor (<10% of the NRZ area) and can be sufficiently compensated for by the remaining area around the tree which will remain undeveloped, the NRZ area will remain intact with a modified shape. The proposed development is not likely to have an adverse impact on this tree.

The total level of new NRZ encroachment for Tree 1 is also minor however the health of Tree 1 is not as vibrant and detailed assessment to determine impact potential is therefore required. It is noted that all new encroachments can sufficiently compensated for by the remaining area around the tree which will remain undeveloped, and as such, recovery to full health is expected to be achieved.

When determining the potential impacts of encroachment into the NRZ, the project arborist¹⁵ shall consider the following, as outlined in Section 3.3.2 Considerations in determining the TPZ within Australian Standard AS 4970:2025 *Protection of trees on development sites*.

a) Location and distribution of the roots.

The tree is located within an open garden area with various structures to the east and west of the trunk. The pedestrian pathway appears to be a lightweight pathway and is unlikely to have restricted root development while the car parking area may have restricted root development to a moderate level and the river culvert will have restricted root development completely. It is likely that offset root development has occurred within the linear reserve areas and that the circular notional root zone shape does not suitably depict the actual location of tree roots supporting this tree.

b) Potential loss of root mass resulting from the encroachment: number and diameter of roots.

The area of the proposed building to the east of Tree 1 will require earthworks to establish a footing. This will result in the severance of root density in this location, should such be present. It is noted that this area is currently formatted as a car parking area with bitumen surfacing and therefore less root density is expected to be present than areas of open earth garden.

c) Tree species and tolerance to root disturbance.

The species *Eucalyptus camaldulensis* is a riparian species that has adapted to erosion and sediment events through evolution. As such, it has a good tolerance to environmental change through development activities.

d) If the works will result in a temporary (e.g. service trench) or permanent (e.g. basement carpark) loss of available soil volume.

The works involve the construction of a building and associated infrastructure, which will form a permanent change in the trees growing environment.

e) Age, health, current size and projected size of the tree.

The tree displays fair health, as noted by slightly reduced foliage density and an above average proportion of boring insect activity within the primary structure. As a mature tree, it is unlikely that it will increase significantly in size.

f) Presence of other trees with overlapping NRZ or grafted roots.

The tree is growing within an open grown, reserve environment. Tree 2 located to the south is identified as a different species of the same genera and there is potential for root grafting albeit minor. Other vegetation within the locality includes various shrubs and grasses which are unlikely to be having an effect on the subject tree or its resources.

g) Proposed staging and timing of excavation or root cutting.

The development construction timeline has not been provided for the purpose of the assessment however it is logical to presume that construction activities will continue in a steady progression between project commencement and completion.

h) Proposed tree maintenance and tree care activities.

It is recommended that a soil drench of beneficial soil microbiota, elements and sugars be completed at the beginning of the construction process and as part of the tree protection zone establishment.

i) Lean and stability of the tree.

The tree displays an upright primary form that is free of recognisable defects. Tree integrity at ground level is not in question and there are no works proposed within the structural root zone that may result in tree integrity changes.

j) Soil characteristics and volume, topography and drainage.

Native soils at this location include Alluvial Soils – Layered stream alluvium including silts, sands and gravels. The species is well adapted to riparian environments with such soil profiles.

k) Presence of existing or past structures, obstacles affecting root growth or recent encroachments.

Many structures have been noted to consume portions of the trees notional root one including the pedestrian pathway within the linear reserve, the culvert forming the Sturt River and existing car parking. These structures will have restricted root development to varying levels. It is noted that the area of construction falls within an areas of existing development (existing car parking area).

l) Proposed construction measures that reduce the impact on trees.

A variety of tree protection techniques are recommended to be employed during the project construction including barrier separation between the tree and construction zone, an application of beneficial soil additives, mulches and scheduled irrigation.

Date: 7th May 2026

- m) Whether a root investigation is required. The location and distribution of the roots should be determined through minimally destructive methods (pneumatic, hydraulic, hand digging or ground penetrating radar). Photographs should be taken and, where needed to address geospatial issues, a root map should be prepared.**

Based on the minor proportion of new encroachment, the level of encroachment already existing and the cross over between existing and proposed redevelopment indicate that preexcitation to determine root density or location is not warranted in this case.

After considering these factors, the proposed development design in its current form is not likely to have an adverse impact on the tree. No design modifications are required.

Planning and Design Code – (Regulated and Significant Tree Overlay)

Justification of tree-damaging activity – Trees 1 and 2

PO 1.4 A tree-damaging activity in connection with other development satisfies the following:

- (a) it accommodates the reasonable development of land in accordance with the relevant zone or subzone where such development might not otherwise be possible.**

Yes – The proposal involves the redevelopment of an aged care facility within the vicinity of two significant trees. The proposal has considered the subject trees and targeted areas of existing encroachment to achieve an altered facility layout. With this view, both the reasonable development of the allotment is achievable whilst also retaining regulated and significant trees.

- (b) in the case of a significant tree, all reasonable development options and design solutions have been considered to prevent substantial tree-damaging activity occurring.**

Yes – The proposed development plans will not result in significant environmental change for either subject tree. Alternative development options and design solutions are unlikely to further reduce impacts to tree sustainability, which is already acceptable under the proposed plan.

Performance Outcomes (PO) – Ground work affecting trees

PO 2.1 Regulated and significant trees, including their root systems, are not unduly compromised by excavation and / or filling of land, or the sealing of surfaces within the vicinity of the tree to support their retention and health.

No – The development proposal aims to utilise areas of existing encroachment wherever possible to redefine the facility form and layout. It is not expected that either of the subject trees will be compromised by construction activities where tree protection outcomes are employed.

Tree Protection Specifications (TPS)

TPS - General

To protect suitable trees during the development process, a range of tree protection specifications and measures are required. The tree protection zone is usually a restricted area delineated by fencing and is the most important method of protecting trees during development activities. This zone is determined by the project arborist and is designed to isolate trees suitable for retention during development from activities that may result in their harm and ensure their viability. A tree protection zone may or may not be an equivalent area to the notional root zone.

The following activities are restricted within the specified TPZ. Some of these works may be permitted by the determining authority and must be supervised by the project arborist.

- a) Excavation, cultivation or disturbance of the soil, including scraping of the surface.
- b) Equipment and material storage.
- c) Preparation of chemicals, including preparation of cement products.
- d) Movement or parking of vehicles and plant.
- e) Dumping of waste.
- f) Spreading or stockpiling of fill.
- g) Refuelling.
- h) Washing down and cleaning of equipment or hard surfaces.
- i) Fires.
- j) Physical damage to the tree.

Prior to any site works commencing, the site/project manager and relevant sub-contractors should meet on site with the project arborist to review work procedures, access routes, storage areas, parking areas and tree protection measures.

TPS - Site specific

- Tree protection zone establishment is to occur prior to any machinery or materials being delivered to the site. Tree protection zones will require:
 - Weekly irrigation between September and April.
 - Mulching within all available areas of the root zone. It is noted that some mulch is present however this may require replenishment.
 - A soil drench of beneficial microbiota throughout the available areas of root zone associated with Tree 1.
- Demolition and clearing activities
 - Removal of existing car park surfacing is to be achieved under strict adherence to the recommendations listed within the 'Demolition and site clearing activities' section of this report.
- Earthworks and construction activities
 - Earthworks are required within the notional root zone of Tree 1, and to a lesser extent Tree 2. It is not expected that significant root density will be encountered during construction works.
 - In any case where root density with a diameter greater than 50mm is exposed, the project arborist is to be contacted immediately for further consultation and direction on how to proceed.
- Underground services
 - Installation of underground services are to be directed outside of any tree protection zone. Where this is not achievable, further consultation with the project arborist is required.
- Landscaping within tree protection zones
 - Due consideration of tree root locations and other vegetative conflicts is required when designing and implementing a landscaping program. It is acknowledged that Oxigen will fulfil this service and that tree protection outcomes will be achieved. Adelaide Arb Consultants will remain available to assist if required.
- Certification of tree protection compliance
 - Certification of compliance is required to be attained from the project arborist at various checkpoints throughout the construction process. A listing of the compliance check timeline is attached for further reference.

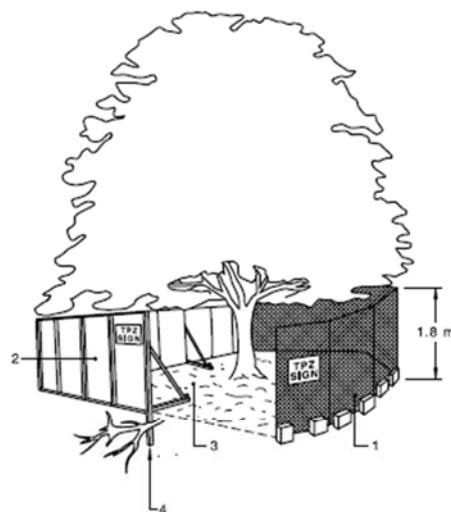
Tree Protection Measures

To be applied where designated within the TPS - site specific requirements.

Tree Protection Zone (TPZ) establishment

Fencing should be erected before any vehicles, machinery or materials are brought onto the site and before the commencement of works, including demolition. Once erected, protective fencing must not be removed or altered without approval by the project arborist unless where specified within the TPS. The TPZ should be secured to restrict access. The TPZ should be established and managed as follows. Please refer to the attached Tree Protection Plan.

- Identify the trees within and adjacent to the subject allotment that are to be retained and protected during the development process. This may include trees on adjoining land and Council owned street trees and reserve trees.
- The tree protection zone fencing is to be installed at the locations shown on the attached Tree Protection Plan (TPP).
- Identify and mark the alignment of protective fencing as indicated on the TPP. This may vary from the NRZ radius after considering areas of acceptable encroachment (determined in consultation with the project arborist) and site access requirements. Fencing is only required within the subject allotment (provided boundary fencing is in place).
- Erect/construct protective fencing as indicated in the image below. AS 4687 *Temporary fencing and hoardings* specifies applicable fencing requirements. Shade cloth or similar should be attached to reduce the transport of dust, other particulate matter, and liquids into the protected area.



KEY:

- 1 Chain wire mesh panels that are held in place with concrete feet.
- 2 Alternatively, plywood or wooden paling fence panels may be used. This fencing material also prevents building materials or soil from entering the TPZ.
- 3 Mulch installation across the surface of the TPZ (as detailed in the TPS). No excavation, construction activity grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ other than those indicated in the TPS.
- 4 Bracing may be used within the TPZ. Installation of posts or supports should avoid damaging roots.

- Right: Australian Standard AS 4970:2025 *Protection of trees on development sites*, p18.

Figure 4 — Protective fences

Date: 7th May 2026

- All visible faces of the TPZ to the construction area must be signed with appropriate TPZ signage as shown below. A copy of such is attached as an addendum to this report and may be duplicated as required without permission. No alterations to the TPZ sign are permitted without written consent from the author.



- **Irrigation**
Provide supplementary irrigation during the development process. Drip irrigation systems are an effective way of applying water to the root zone of trees. Install in-line dripper hose that emits ~3L of water per drip emitter per hour. Connect the system to a reliable water source, preferably using a battery-operated programmable timer. A parallel row pattern or a spiral pattern are simple installation methods to use with lines installed at 0.5m – 1.0m spacing. Use pressure reducers and relief valves as required. Irrigation should be applied during hotter months by providing one good soaking per week. Less water can be applied during cooler and wetter months. Alternative irrigation systems may be used to suit the site in consultation with the project arborist.
- **Mulching**
Apply mulch around the tree/s. Mulches should be organic in origin, semi composted and contain a mixture of coarse and fine particles, conforming to AS4454-2012. Mulches should be 75-100mm thick and applied out to the Tree Protection Zone fencing (or further if possible), without coming into contact with the trunk. This mulch is not intended as a compaction mitigation tool.

Date: 7th May 2026

- Where pedestrian pathways have been allowed within a TPZ to facilitate low impact construction works, ground protection suitable for construction personnel and scaffolding will be required as follows. This is required to minimise soil compaction and to capture any building material spills/waste that may contaminate soils.
 - Install ground protection as indicated on the tree protection plan.
 - Install a layer of geotextile fabric on top of the natural ground.
 - Cover the geotextile with a 100mm thick layer of mulch or coarse gravel/ballast.
 - Install ground protection mats on top of the mulch to make walking/wheelbarrowing easier if required.
- Where vehicle access tracks have been allowed within the TPZ, heavy-duty ground protection will be required. This is required for essential vehicles, excavators, cranes, pier drilling machinery, and/or hydro-excavation trucks etc.
 - Install heavy-duty ground protection as indicated on the tree protection plan.
 - Install a layer of geotextile fabric on top of the natural ground.
 - Cover the geotextile with a 250mm thick layer of mulch or coarse gravel/ballast.
 - Install ground protection mats (e.g., BogMat <https://www.bogmat.com.au/>).
 - Alternative ground protection for heavy machinery can include coarse rock ballast set into a cellular webbing system such as Geoweb.



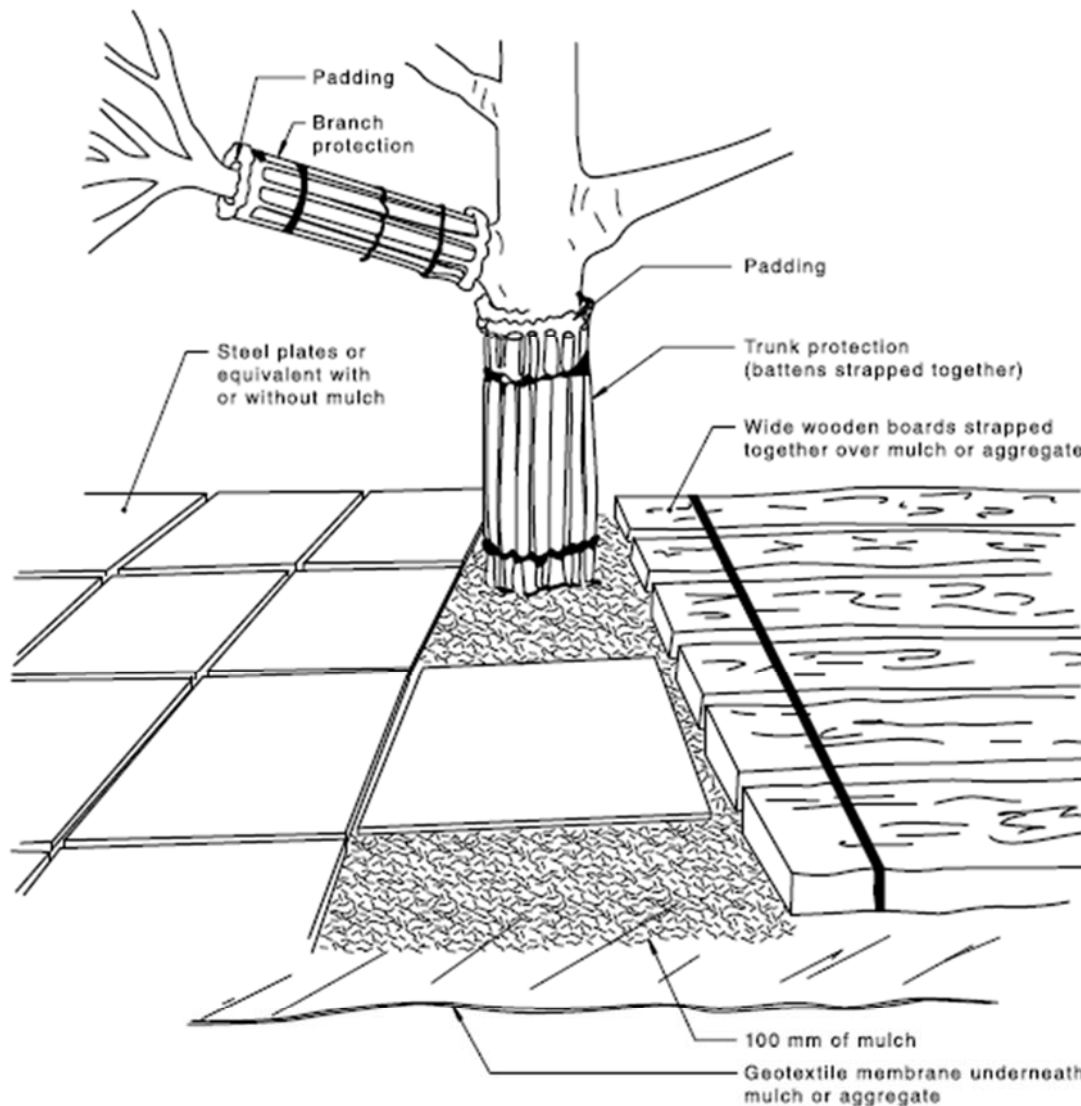
Left: Track mat ground compaction mitigation
(image <https://www.rampchamp.com.au/>)



Right: Geoweb ground compaction mitigation
(image www.greenfix.co.uk)

Date: 7th May 2026

- Where construction activities or vehicle access is in close proximity to any tree, install protection to the trunk and branches of trees as shown in the figure below. A minimum height of 2m is recommended. Ground protection (as described above) will also be required in this situation.
 - o Install breathable padding or hessian around the trunk of the tree.
 - o Install closely spaced timber battens around the trunk, with the top edge protecting the trunk/bark by the padding/hessian. Secure with strapping.



NOTE 1 For trunk and branch protection, boards and padding may be used to prevent damage to bark. Boards shall be joined to each other using hoop straps and screws or similar. They shall not be screwed or nailed to the tree.

NOTE 2 Wide wooden boards or plastic or metal plates should be of a suitable thickness to spread the load and prevent soil compaction and root damage.

Figure 5 — Examples of trunk, branch and ground protection

Site establishment

The establishment of the work site should occur in conjunction with the establishment of the TPZ structures and features. This may include site access, storage areas, construction huts, waste management areas etc.

1. Refer to the previous section on TPZ establishment which outlines some of the essential TPZ requirements.
2. All ancillary zones required for construction purposes should be located outside the TPZ. This includes, but is not limited to:
 - o Site access routes for various vehicles and machinery.
 - o Areas to receive and store construction materials.
 - o Areas for skip bins and waste management.
 - o Wash out areas.
 - o Site huts and toilets.
 - o Storage of chemicals.
 - o Car parking areas.
3. Where site constraints prevent this, and any of these activities are necessary within a TPZ, suitable ground and trunk protection measures are required as set out in the previous section on TPZ establishment.
4. Where the work site is within the vicinity of any tree, the above applies, irrespective of whether the specific trees are included within the report or not.

Demolition and site clearing activities

The demolition of existing structures, surfaces and vegetation will require heavy machinery to move about on the site. If these works occur within any TPZ area, it should be expected that such will result in tree damaging activity. Demolition and site clearing works should follow these guidelines:

1. Ensure TPZ fencing and other tree protection specifications are in place prior to demolition works commencing.
2. All vegetation proposed to be removed within or adjacent to a TPZ must be removed using suitable tools in a manner that will not cause harm to remaining trees or disturb their root zone.
 - o Herbicides can be used to remove unwanted vegetation at the site during demolition activities. Herbicides should be applied by appropriately experienced contractors according to the manufacturer's product label recommendations. Apply herbicides with care to avoid accidental applications to surrounding vegetation.
3. The project arborist should be on site during demolition activities within a TPZ. Further details will be noted on the TPP regarding these requirements.
4. No stockpiling of building rubble, demolition material, soil, or any other material within the TPZ. These materials must be removed from site immediately or stockpiled outside of the TPZ area for later disposal.
5. No grade changes within the TPZ. Lowering (cut) or raising (fill) of the grade within the TPZ is not permitted.
6. The demolition of structures within the vicinity of a TPZ shall be carried out by machinery as carefully as possible to avoid damage to surrounding trees.
 - o Demolition machinery shall stand outside the TPZ to avoid soil compaction.
 - o Demolition machinery can work on existing hard surfaces where present (e.g., existing driveways), or be placed inside the building/structure to pull material in and down, away from the trees.
 - o Where machinery must work within a TPZ, suitable ground protection measures must be put in place as outlined in the section on TPZ establishment.
7. Existing underground services should not be removed within a TPZ as there is a risk of damage to a tree's root system. These services should be de-commissioned and left in place where possible. If they must be removed, consult with the project arborist is required.
8. Existing hard surfaces (concrete/paving/bitumen/compacted gravel etc.) should be retained where possible to act as ground protection from demolition machinery where possible. These surfaces can be removed after demolition works as required.

Date: 7th May 2026

9. When removing hard surfaces (concrete/paving/bitumen/compacted gravel etc.) within a TPZ, it is expected that there will be some root growth below the hard surface being removed.
 - o Hand tools should be used to remove these hard surfaces adjacent to the trunk (within the structural root zone).
 - o Demolition machinery should be used to carefully pull these surfaces up and away from the tree. The wheels of the machinery shall be standing outside the TPZ, on any existing hard surfaces, or on established ground protection areas away from the tree. The works should proceed in a retreating manner, away from the tree.
 - o Any roots that are exposed below the hard surfaces shall be wet down by hand and covered with a 50-100mm layer of mulch as soon as possible after being exposed.
 - o Alternatively, exposed roots could be protected from desiccation by placing Hessian cloth (or similar) on top that is kept moist by periodic wetting. This must remain in place until the new surfaces are put into place.

Earthworks

Earthworks required to establish the new structure may include, excavation, cut and fill, levelling, footing preparation, batter formation and trenching activities. These activities have the potential to damage to tree trunks, branches, and the root zone. To minimise the impacts of these activities on the trees to be retained on site, the following precautions are required.

1. Ensure TPZ fencing, and other tree protection specifications are in place prior to earthworks commencing.
2. Excavation works can only proceed as approved by Council.
3. The project arborist should be on site during any earthworks works within a TPZ.
4. All excavation machinery must be kept outside the TPZ to avoid soil compaction, or suitable ground protection measures must be in place as outlined in the section on TPZ establishment.
5. Excavation machinery must not come into contact with the trunk, branches, or roots within the TPZ. Consider using a spotter to supervise, and/or use a smaller machine.
6. No earthworks are permitted within the Structural Root Zone without approvals. Seek direction from the project arborist.
7. No stockpiling of soil, debris, or any other material within the TPZ. These materials are to be removed from the site immediately or stockpiled outside the area for later disposal.
8. Woody tree roots >50mmØ are not to be pulled out by excavation machinery.
9. Any root pruning should be carried out in consultation with the project arborist.

Cut and fill

10. No lowering of grade (cut) within a TPZ. The soil surface can be skimmed by removing loose organic matter, turf or old gravel surfaces carefully using hand tools or with a trimming bucket of an excavator standing outside the TPZ (or on suitable ground protection). Skimming of the surface should cease when fine tree roots are encountered and should not exceed 50mm below the original level.
11. Deep excavations adjacent to or within a TPZ may require a batter or terraced levels. These may encroach further into the TPZ and may require approval. If this is required, please consult with the project arborist before proceeding.
12. There shall be no placement of additional material (fill) within a TPZ without approval.
13. In some cases, fill material within a TPZ may be permitted. If approved, the fill must consist of graded material that allows air and moisture movement. Suitable materials include single graded, no-fines gravel, washed single grade aggregate or similar. An aeration system may also be required that may consist of a system of vertical and horizontal slotted pipes wrapped in a suitable breathable material.

Footing preparation

14. Excavations for footings must not occur within a TPZ unless approved by Council and the project arborist.
15. Excavation machinery should stand outside the TPZ to avoid soil compaction, or suitable ground protection measures must be in place as outlined in the section on TPZ establishment.
16. When installing footing systems consisting of piers or screw piles within a TPZ, the following precautions are required.
 - o The smallest possible diameter hole should be used, subject to engineering requirements.
 - o Mini drilling rigs should be used in these areas to avoid damage to tree branches.
 - o Suitable vehicle ground protection is required where piling vehicles enter a TPZ.
 - o Excavations for piers are to be conducted through the mulch/ballast. Excavate by hand or drill the holes using machinery that stands off the TPZ or an area with suitable ground protection.

Installation of underground services

A range of underground services may be required to service a new development. These may include but are not limited to:

- Gas supply
- Electricity supply
- Water supply
- Sewer drainage
- Septic tank connections
- Stormwater drainage
- Irrigation pipes
- Fire mains
- Telecommunication cables

Open trenching to install these services within a TPZ has the potential to sever roots which can adversely affect tree health and stability. Unless otherwise approved, underground services should be installed according to the following guidelines:

17. All services should be routed outside the TPZ where possible. If underground services must pass through a TPZ, consult with the project arborist. These services should be installed by directional drilling or in manually excavated trenches.
18. Directional drilling.
 - o The directional drilling bore should be at least 600mm deep (below the tree's root plate). The project arborist should assess the likely impacts of boring and bore pits on retained trees.
 - o The directional drilling bore should preferably not pass below the SRZ of any tree.
 - o Entry, exit points, connection points and inspection points should be located outside the TPZ where possible.

Date: 7th May 2026

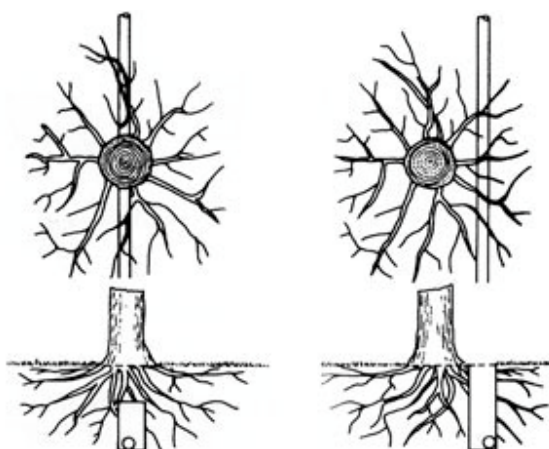
19. Manual excavation

- o For manual excavation of trenches, the project arborist should advise on roots to be retained and should monitor the works. Manual excavation may include the use of hand tools, pneumatic or hydraulic tools.
- o Excavate the soil down to the required depth for the entire length of the service required within the TPZ.
- o Use the lowest pressure possible to carry out the excavations whilst avoiding damage to the outer bark on tree roots.
- o When tree roots are encountered, the operator should avoid damaging the protective layer by directing high pressure air or water away from tree roots.
- o Smaller tree roots <30mmØ may be damaged by the process, as this is generally unavoidable.
- o Tree roots greater than 50mmØ shall left intact and undamaged.

20. Root management:

- o Insert the underground service into the trench by weaving between exposed tree roots. Retain as many roots as possible extending across the trench.
- o Roots smaller than 50mmØ may be pruned back (preferably to a side branching root) using sharp pruning tools (such as secateurs or tree pruning handsaws).
- o Roots larger than 50mmØ should only be pruned after consultation with the project arborist.

21. Backfill the trench as soon as possible after the service is installed to avoid root desiccation. If a trench is to remain exposed for more than 2 hours, the exposed roots and surrounding soil must be kept moist by hand irrigation and/or use of shading materials (hessian or boards). These roots must not be allowed to dry out.



Less damage is done to tree roots if utilities are tunneled under a tree (left, top and bottom) rather than across the roots (right, top and bottom).



- Above: Examples of directional drilling (left) and manual excavation with hydro-excavation (right).

Construction activities

Construction activities may include (but are not limited to); installation of building footings, concrete slabs, frame construction, installing brickwork or other wall cladding materials, crane lifting operations, scaffolding, roofing, interior fitting, waste disposal etc. If these activities are not appropriately managed within a TPZ, there may be adverse impacts for the trees and their growing environment. Construction activities must be well supervised and adhere to the following guidelines.

22. Ensure TPZ fencing, and other tree protection measures are in place prior to construction works commencing.
23. TPZ fencing shall not be removed or repositioned to facilitate construction activities. Consult with the project arborist if access to a TPZ is required.
24. Scaffolding for construction activities and crane operations should not interfere with trees to be retained on site.
 - o Minor pruning may be permitted to facilitate the installation of scaffolding and crane operations.
 - o Any required pruning works should be confirmed with the project arborist and performed by qualified arborists, not construction staff.
 - o Pruning may be subject to Planning Consent and should not be conducted prior to relevant approvals being attained.
25. Parking areas for building staff and sub-contractor vehicles must be clearly defined, well away from TPZs.
26. Where vehicle access has been allowed within the TPZ, heavy-duty ground protection will be required as defined within Tree Protection Zone (TPZ) establishment section. This is required for all vehicles, excavators, cranes, concrete trucks.
27. A defined delivery and storage area for building materials and hazardous chemicals should be marked out well away from any TPZ as required. If a storage area is to be set up within a TPZ (due to site limitations), then ground protection measures are required. Refer to the previous section on TPZ establishment.
28. Areas for waste disposal and skip bins must be clearly defined, well away from the TPZ. If skips are to be set up within a TPZ (due to site limitations), then ground protection measures are required and certified by the project arborist.
29. A wash out area should be defined well away from any tree and waste appropriately managed. Contaminated water must not be allowed to drain into tree root zone.

Hardstand installation within a TPZ

Hardstand surface treatments include concrete paths and driveways, unit pavers, compacted gravel and asphalt etc. Hardstand within a TPZ can create an impervious surface, limiting gas exchange and water infiltration into the root zone, and may adversely affect tree health. In addition, compaction works can increase soil density, impairing root development and growth. There is also a risk of root damage from grade changes (cut) when preparing for paving works. To ensure hardstand works do not adversely affect trees to be retained on site, the following guidelines should be followed, in consultation with a suitably qualified engineer:

1. Hardstand surface treatments should be excluded from the TPZ where possible.
2. If hardstand surfaces are required within a TPZ, materials and construction methods should aim to avoid damage to the root system and use permeable materials.
3. Consider the finished floor levels in relation to the levels of surrounding hardstand in the design phase of the project. Adjust finished floor levels to ensure hardstand construction works do not lower natural grade by more than 50mm.
4. Tree root investigations may be required prior to designing and installing hardstand surfaces.
5. Consider future growth of tree roots and how they may impact on the hardstand surface. Hardstand surfaces should remain outside the structural root zone to reduce the likelihood of surface disruption in the future.
6. The project arborist should supervise any hardstand installation within a TPZ.
7. Grade changes
 - o No lowering of grade (cut) within a TPZ for hardstand construction can occur without approval. The soil surface can be skimmed by removing loose organic matter, turf or old gravel surfaces carefully using hand tools or with a straight edge trimming bucket of an excavator standing outside the TPZ (or on suitable ground protection). Skimming of the surface should cease when fine tree roots are encountered and should not exceed 50mm below the original level.
 - o Any increase in grade (fill) must use permeable base layers that allow air and water to infiltrate.
8. Root damage
 - o Damage to woody tree roots is not permitted. If woody tree roots are encountered, consult with the project arborist.
9. The natural soil structure and density within the TPZ should be maintained when installing hardstand surfaces. The natural soils below hardstand surfaces should not be compacted unless absolutely necessary (e.g., trafficable loads). Compaction of natural soils should not be necessary for pedestrian or light traffic hardstand treatments.

Date: 7th May 2026

10. Where the hardstand surface (including base levels) is to be constructed above the natural grade, the following provisions should be implemented:

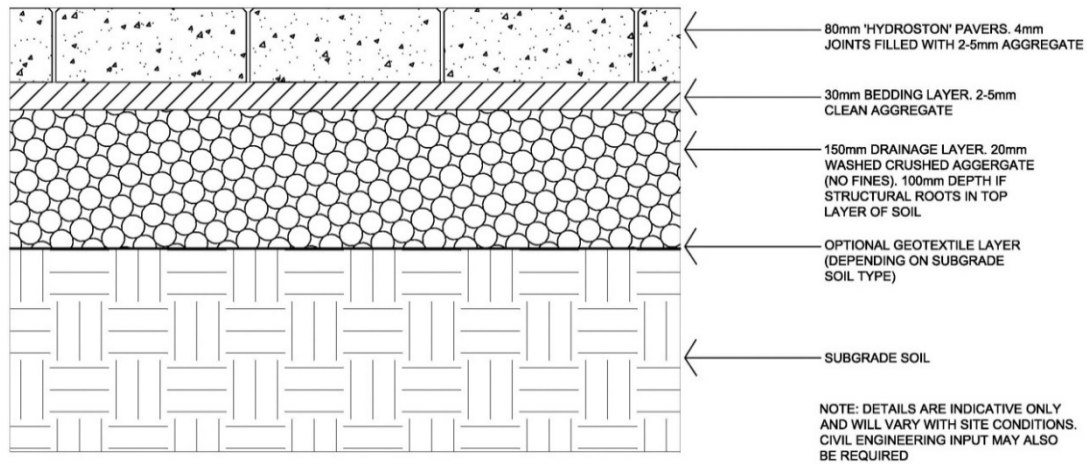
O Base layer

- The depth of the base layer will vary depending on the intended load. Vehicular areas will require a deeper preparation while pedestrian areas can be shallower.
- Base layer materials should allow air and water to infiltrate and consist of a graded material with no fines, such as 2-5mm graded particle size (or larger).
- Deeper base layer support systems (>300mm) will require aeration systems consisting of perforated pipes extending from the lowest layer of the hardstand support and extending above the soil grade at the perimeter of the hardstand surfaces.
- A geotextile layer can be used between the base layer and subgrade to prevent fine particles moving between support layers.
- A three-dimensional cellular confinement system (geocells) can be used for the base layer where required. This is a system of cells into which the base material is placed.
- The base layer material can then be compacted. Compaction should be to the minimum level required to support the intended load.
- The bedding layer, if required, should use a single-graded material to provide good porosity and permeability.

O Surface treatments

- Final surface treatments should allow air and water to infiltrate into the root zone. There are two main types of permeable surface treatments:
- Systems in which the unit pavers are impervious but contain permeable joints where air and water can pass between pavers (e.g., Ecotrihex - <https://www.adbrimasonry.com.au/products/ecotrihex-80/> or Ecopave - <https://apcmtbarker.com.au/product/ecopave>).
- Systems in which the paver material is porous, and air and water can pass through the paver (e.g., Porouslane - <https://www.porouslane.com.au> and Hydropavers International - <https://hydropavers.com.au>).
- The unit pavers should have a single-graded aggregate swept in to fill in the gaps between pavers to allow air and water to infiltrate. Regular paving sand is not suitable for this application.

Date: 7th May 2026



- Above: An example of a permeable paving system (Tree Environs)

Landscaping around established trees

Care is required when landscaping around established trees. Damage to trees can occur from a range of activities, including soil compaction, soil contamination, impact during landscaping works, trenching and level changes, hardstand surface treatments, planting works and lawn installation etc.

To minimise the possible adverse impacts, a TPZ is required. The TPZ is a designated area required to maintain sufficient root density to ensure tree viability, and is depicted clearly within the attached TPP. All potentially adverse activities must not occur within this zone or must be modified to minimise the impacts. The following guidelines should be followed when landscaping around established trees:

1. The landscape design should be reviewed by the project arborist prior to being finalised.
2. Landscaping contractors should observe the guidelines set out in the previous sections on Tree Protection Zone (TPZ) establishment and Site establishment.
3. The growing environment for mature trees should be optimised with the use of mulches. Mulches should be organic in origin, semi composted and contain a mixture of coarse and fine particles. Mulches should be 75-100mm thick and applied out to the drip line of trees or further, if possible, without coming into contact with the trunk. Mulches should be topped up every 1-2 years as required.
4. Irrigation systems around established trees should be set up as follows.
 - o Drip irrigation systems are an effective way of applying water to the root zone of trees.
 - o Connect the system to a reliable water source, preferably using a battery-operated or hardwired programmable timer.
 - o Use pressure reducers and relief valves as required.
 - o Irrigation main lines should be radially arranged in relation to the root system rather than traversing the root system. Deep trenching across the drip line of trees must be avoided.
 - o Install in-line dripper hose that emits ~3L of water per drip emitter per hour.
 - o A parallel row pattern or a spiral pattern are simple installation methods to use with lines installed at 0.5m – 1.0m apart.
 - o Irrigation should be applied during hotter months by providing one good soaking per week (2-3 hours at a time). Less water can be applied during cooler and wetter months.
 - o Irrigate in the early morning or evening. Avoid watering during the middle of the day.
 - o Irrigation requirements should be adjusted according to species, soil type and climatic conditions.

Date: 7th May 2026

5. Hardstand surfaces should be kept to a minimum within the TPZ. If hardstand surfaces must occur, refer to the previous section on Hardstand installation within a TPZ.
6. Use caution when applying herbicides in the vicinity of established trees. Target the unwanted plants carefully and follow manufacturer's recommendations.
7. Pruning of established trees should be carried out by qualified arborists (Certificate III in Arboriculture). Pruning may require planning consent.
8. Retaining walls should not be installed within any TPZ. If required, consult with the project arborist.
9. Fences on the boundaries of the property must be installed without damaging the root system of established trees.
 - o Fencing must not use continuous strip footings or plinths.
 - o Lightweight fencing panels attached to concrete pads and posts are recommended.
 - o Concrete pads should be located outside the structural root zone.
 - o Grade changes (cut and fill) must be avoided during fence installation.
10. Care is required when planting new vegetation within the NRZ of established trees. Cultivation of the area under the tree should be kept to a minimum and undertaken with hand tools.
11. Grade changes (cut or fill) within the NRZ of established trees should be avoided. Do not build up soil levels by more than 100mm.
12. The use of competitive plants should be kept to a minimum. Minimise the use of turf, and dense groundcovers etc.
13. The mature size of larger plants and trees should be considered. Plants should be well spaced to allow them to reach their mature size.
14. Select the largest tree species for the size available. Larger trees provide greater benefits than smaller trees.
15. Provide adequate growing area for the trees to grow. Small openings in hardstand areas are usually inadequate for healthy tree growth.
16. Species diversity is important in a sustainable garden (and urban forest). While monoculture plantings may provide a desired aesthetic, they are generally more vulnerable to pest and disease outbreaks.
17. Consider when to use evergreen or deciduous trees in relation to building orientation, private open space, the movement of the sun and the placement of windows.
18. The use of locally indigenous vegetation should be considered for their habitat, biodiversity, and wildlife corridor value.

Date: 7th May 2026

Development Monitoring and Certification

Through various stages of development, compliance certification provided in writing by a suitably qualified AQF Level 5 Arboriculturist is required.

These are outlined as follows with compliance recommended to be supplied to council as a condition of Development Approval:

Indicative Stages in Development and the Tree Protection Process

Stage in development	Tree protection process	
	Matters for consideration	Actions and certification
Planning (AS 4970:2025 Sections 2 and 3)		
Site acquisition	Legal constraints	
Detail surveys	Council plans and policies Planning instruments and controls Heritage Threatened species	Existing trees accurately plotted on the survey plan, including trees on adjoining land if the proposed works could take place in their NRZ
Preliminary tree assessment	Hazards/risks Tree retention value	Evaluate all trees on the site Verify that the survey represents the trees present onsite Provide preliminary arboricultural report (PAR), NRZs and retention values to guide development layout
Preliminary development design	Condition of trees Proximity to buildings Location of services Roads Level changes Building operations space Long-term management	Planning selection of trees for retention Design review by proponent Design modifications to minimise impact on trees
Development submission	Identify trees for retention through comprehensive arboricultural impact assessment (AIA) of proposed development Determine tree protection measures Landscape design	Provide arboricultural impact assessment (AIA) including TPS and TPP, unless not required by the relevant authority at this stage
Development approval	Development controls Conditions of consent	Review consent conditions relating to trees, including updating TPS and TPP

Date: 7th May 2026

Pre-site works (AS 4970:2025 Sections 4 and 5)		
Review of approval (development details)	Identify changes to works or additional works and details provided that may impact trees to be retained	Review impact and update TPS and TPP
Initial site preparation	State based Work Health and Safety requirements for tree work Approved retention/removal Refer to AS 4373 for 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
Site works (AS 4970:2025 Sections 4 and 5)		
Site establishment	Temporary infrastructure Demolition, bulk earthworks, hydrology	Locate temporary infrastructure to minimise impact on retained trees Maintain protective measures Certification of tree protection measures
Construction work	Liaison with site manager, compliance Conformance with TPS, TPP and relevant conditions of consent Deviation from approved documentation	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 and condition
Post development (AS 4970:2025 Section 5)		
Defects liability / maintenance period	Tree health and structure	Maintenance and monitoring Final remedial tree works Final certification of tree condition

Conclusions

- Adelaide Arb Consultants assessed two significant trees within the Sturt River Linear Reserve, to the west of 29-31 Austral Terrace, Morphettville on the 4th May 2026 in relation to a proposed development.
- The trees are identified as *Eucalyptus camaldulensis* - River Red Gum and *Eucalyptus leucoxylon* – South Australian Blue Gum.
- These trees both display trunk circumference measurements that exceed 200cm at one metre above ground level and each is therefore controlled as a significant tree under the current provisions of the *Planning, Development & Infrastructure Act 2016*.
- The trees are located on publicly managed land and are both therefore controlled assets of the City of Marion under the provisions of the *Local Government Act 1999*.
- Tree 1 displays fair health with slightly reduced foliage density while Tree 2 displays good health. Both trees however are sustainable within their current environment. The health of Tree 1 is recommended to be remedied with an application of beneficial soil microbiota during the development start-up phase and more specifically during tree protection zone establishment.
- The structure of both trees is good and neither require crown management to remain sustainable at an acceptable level of risk to public and private safety at this time.
- The ISA – TRAQ risk assessment process has demonstrated that the trees represent a low risk to public and private safety.
- The development proposal will not change the structural integrity of either tree, nor will it increase the target occupancy within their vicinity. Risk mitigation or maintenance therefore should remain the responsibility of the asset owner/manager.
- An Arboricultural Impact Assessment was undertaken, and the proposed development is not likely to have an adverse impact on the trees. No design modifications are required.
- Tree protection specifications and a tree protection plan are attached to provide guidelines to the various construction teams to ensure the tree is/trees are adequately protected during the construction phase.

Date: 7th May 2026

Appendix A – Assessment Methodology Categories

Assessment of trees requires the collection of data based on tree features observed. The following categories are assessed, and the tables below described the meaning of outcomes recorded during field assessment of trees.

Location (plotted onto the various plans)	Data collected during the tree assessment process is recorded within the TreePlotter data inventory. The tree location is plotted onto a live aerial image with observations regarding tree features recorded in this system. Mapping for tree reporting processes is completed based on tree location plotting during field assessments.
Naming and classification of vegetation	• Botanical Name ○ A unique name, given to plants written in Botanical Latin (although some plants may have been known by another botanic name previously – synonyms). Botanic names are created by two levels of classification, the genus and species and are important as a consistent language to distinguish plant identification between provinces. • Common Name ○ Important for describing trees with people not familiar with botanic naming of trees. These names often relate to local experiences with trees and are not governed by formal nomenclature rules. Common names may therefore relate to different tree species relative to the province where the tree is located. • Species Origin ○ Outlines the relevance of the plant to local species diversity at a broad level and includes: ▪ Indigenous – Native to the location where the tree was assessed. ▪ Introduced – Native to Australia however introduced to the location where the tree was assessed. ▪ Exotic – Introduced to Australia.
Crown size (height x spread)	The tree height range x crown spread range in metres. These are recorded in the following categories: • <3m • 4-7m • 8-13m • 14-20m • >20m

Date: 7th May 2026

Circumference (at 1m)	The circumference (girth) of trunk, measured at 1m above ground level as the basis to determine legislative control under the provisions of the <i>Planning, Development and Infrastructure Act 2016</i> .
Legislative Control	• <i>Planning, Development and Infrastructure Act 2016</i> • <i>Native Vegetation Act 1991</i> • <i>Local Government Act 1999</i>
Trunk diameter (DSH)	The diameter of the trunk (circumference $\div \pi$) measured at standard height (1.40m above ground level). This diameter is used to calculate the notional root zone radius (NRZ) using the Australia Standard method outlined in AS 4970:2025 <i>Protection of trees on development sites</i> .
Notional Root Zone (NRZ)	An area surrounding a tree enclosed by a radius of 12 times DSH that is a primary trigger for arboricultural input on a development site. This is calculated as follows. $\text{Radius of NRZ} = \text{DSH} \times 12$ DSH = trunk diameter measured at 1.4 m above ground. • The radius of the NRZ is measured from the centre of the stem. • The NRZ for palms, cycads, tree ferns and the like should not be less than 2m. Any NRZ radius should not be less than 2 m nor greater than 15 m (except where crown protection is required).
Tree protection zone (TPZ)	The principal means of providing protection for trees during development and includes both root development areas as well as crown projection. This area must be isolated from construction works of any kind, and its location and extent from the tree will be detailed on the Tree Protection Plan.
Diameter at root buttress (DRB)	The diameter of the stem (circumference $\div \pi$) measured immediately above the root buttress (basal flare). This measurement is taken in metres which is included within the formula to calculate a tree's Structural Root Zone.
Structural root zone (SRZ radius (m))	The area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and expressed by its radius in metres.

Date: 7th May 2026

Tree Health

Tree health is a core feature used in combination with other features to determine a tree's overall condition, useful life expectancy and risk presented. Outcomes of this attribute do not necessarily extend to other attributes such as tree structure e.g. a dead tree may have low risks and display good structure, while a healthy tree may have other attributes that cause its useful life expectancy to be reduced. The following attribute outcomes describe the health of a tree when observed and recorded to be in these categories.

Good	The tree displays a full foliated crown or living foliar buds/tissue that is common for the species and season. The tree is free of or displays inconsequential pest or diseases signs or symptoms. Intervention is not required to maintain tree health and sustainability.
Fair	The tree displays sustainable, however reduced foliage density or living foliar buds/tissue that is common for the species and season. Deadwood is noted within the crown and tree vigour may be reduced. The tree may display minor occurrences of known consequential pest or diseases signs or symptoms. Intervention may be required to maintain tree health and sustainability.
Poor	The tree displays poor foliage density or living foliar buds/tissue, with terminal deadwood or dysfunction. The tree displays notable to significant pest or diseases signs or symptoms. Intervention will be required to maintain tree health and sustainability.
Dead	The tree has declined and is not reparable. The canopy is void of foliage or contains significant dieback, failing epicormic growth or delaminating cambium.

Structure

Similarly, tree structure is a core feature used in combination with other features to determine tree condition, useful life expectancy and risk. Again, outcomes of this attribute do not necessarily extend to other attributes. e.g. a tree displaying poor structure may be visually healthy and provide high amenity values however will still require structural remediation. The following attributes outcomes describe the health of a tree when observed and recorded to be in these categories.

Good	Primary structural attributes are free of observable defects including connection with the soil profile, stability at ground level and main branch unions. Trunk and branch taper are well formed, secondary and tertiary tree parts are free of notable defects and branch extension is typical for the species. The tree is considered a good example of the species.
Fair	Primary structural attributes are free of observable defects including connection with the soil profile, stability at ground level and main branch unions. Trunk taper is well formed however branch taper may be reduced. Secondary and tertiary tree parts may display minor defects and branch extension may be elongated for the species. The tree could be retained with some corrective pruning.
Poor	Primary structural attributes such as connection with the soil profile, stability at ground level and/or main branch unions display observable defects. Trunk and branch taper is poor, and/or secondary tree parts display notable defects. The tree is unlikely to be repaired or rendered structurally stable with corrective pruning.

Date: 7th May 2026

Useful Life Expectancy (ULE)	Life expectancy is the estimated life span, or remaining life span of a tree. The useful life expectancy is the number of years a tree can be expected to be useful at the site, with acceptable levels of amenity, health and risk under the current site conditions. Consideration should be given to tree benefits, amenity value, historical values, tree surroundings, site use, risk management options and costs, habitat opportunities and other relevant factors. Simply remaining alive (life expectancy) may not be reasonable in an urban setting. Trees should continue to provide amenity and other benefits with acceptable levels of risk (useful life expectancy). For some trees, habitat value may contribute to or increase a trees useful life expectancy. • ULE - An estimate of the time the tree will continue to provide a safe and useful contribution to the landscape - o >20 years - o 10-20 years - o 5-10 years - o 1-5 years - o Dead
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Tree Age

Tree age will range between young and senescent and provides background information that may give context to values provided by trees including habitat provision, amenity values and tree vigour. The following criteria are considered.

Young	Newly planted, establishing trees at the site. Tree is not reproductively mature.
Semi Mature	Established trees within the first 20% of the trees ULE. Trees are not yet full size but are reproductively mature.
Mature	Established trees that have developed their full crown potential. These trees may range between 20-70% of their ULE.
Over-Mature	Established trees that have developed their full crown potential and have started health and/or structural decline. These trees may range between 70 and 95% of their ULE.
Senescent	Trees nearing or at the end of their ULE and past 95% of this parameter.

Endnotes

¹ Retention Value

The retention value ranges between high and low and various factors are considered when documenting the values provided by trees. The following table outlines the features noted when tree retention values are recorded.

High	These trees are expected to be retained, and cannot be removed without planning consent. - It qualifies as a protected class of vegetation under the following: <i>Planning, Development and Infrastructure Act 2016, and/or</i> <i>Native Vegetation Act 1991 and/or</i> <i>Local Government Act 1999.</i> - It is in average to good health, <u>and</u> - It has average to good structure, <u>and</u> - It has a useful life expectancy in excess of 10 years, and - It possesses one or more attributes worthy of retention described within Performance Outcome 1.2 or 1.3 in the PlanSA <i>Planning and Design Code</i>.
Medium	These trees are likely to provide long term benefits at the site and should be retained to enhance the development where possible. - It <u>does not</u> qualify as a protected class of vegetation under South Australian legislation, and - It is in average to good health, <u>and</u> - It has average to good structure, <u>and</u> - It has a useful life expectancy in excess of 10 years, <u>and</u> - It possesses one or more attributes worthy of retention described within Performance Outcome 1.2 in the PlanSA <i>Planning and Design Code</i>. (Please note that while such trees do not qualify as regulated or significant trees, their attributes are considered in the same framework as described in the PlanSA <i>Planning and Design Code</i>).
Low	These are trees that are recommended for removal (subject to development approval if they qualify as a regulated or significant tree.) - The tree may or may not qualify as a protected class of vegetation under South Australian legislation, <u>and</u> - The tree has a poor health rating, <u>or</u> - The tree has a poor structure rating, <u>or</u> - The tree represents a moderate, high or extreme risk to public or private safety, <u>or</u> - The tree has a short useful life expectancy of less than 10 years, <u>or</u> - It does not possess any attributes worthy of retention described within Performance Outcome 1.2 or 1.3 in the PlanSA <i>Planning and Design Code</i>.

Date: 7th May 2026

² **ISA TRAQ – Levels of Assessment** - Tree and risk assessments can be conducted at different levels of detail, each employing varying methods and providing the client with varied options for reporting and recommendations. The level selected should be appropriate for the assignment.

Level 1 - Limited Visual Assessment

- Visual assessment of an individual tree or population of trees near specified targets
- Conducted from a specified perspective.
- To identify certain obvious defects or specified conditions.
- Typically focusses on identifying trees with imminent and/or probable likelihood of failure.
- Typically, one or two of the three factors is/are considered as a constant.
- This is the fastest, but least thorough, means of assessment and are intended primarily for managing large populations of trees when time and resources are limited.
- This can be carried out as a walkover, drive-by or fly-over inspection.

Level 2 – Basic Assessment

- A level 2 or basic assessment is a detailed visual inspection of a tree and its surrounding site.
- This is the level of assessment that is commonly performed by arborists in response to client's requests for individual tree risk assessments.
- It is ground based and requires the arborist to inspect completely around the tree – looking at the site and visible buttress roots, trunk, and branches.
- The use of simple tools may be required (measuring tools, Binoculars, magnifying glass, mallet, probe, hand digging tools, compass, camera)
- Often a basic assessment is adequate for assessing risk and making recommendations, but it sometimes reveals the need for more advanced assessment measures.
- The primary limitation of a basic assessment is that it only includes conditions that can be detected from a ground based visual inspection. Internal, below-ground, and upper-crown factors may be impossible to see or difficult to assess.

Level 3 - Advanced Assessment

- Advanced assessments are performed to provide detailed information about specific tree parts, defects, targets or site conditions.
- An advanced assessment may be conducted in conjunction with or after a basic assessment if additional information is needed and the client approves the additional service.
- Specialised equipment, data collection and analysis and/or expertise are usually required for advanced assessments.
- The assessments are generally more time intensive and expensive.
- There are many types of advanced assessments that can be conducted (aerial inspection, detailed target analysis, detailed site evaluation, decay testing, health evaluation, root inspection, tree stability monitoring and load testing).

(Dunster, J et.al. (2017), *Tree Risk Assessment Manual – Second Edition* – International Society of Arboriculture, Champaign, Illinois, pp. 15-34.)

³ **Climate statistics** taken from the Bureau of Meteorology Website [Climate Data Online - Map search \(bom.gov.au\)](https://www.bom.gov.au) for the years of 1997 at the 2026 weather station. This weather station at Adelaide Airport is 4.25km northwest from the tree location. Specific weather conditions at the site may vary from that at the weather station.

⁴ **Life expectancy** is the estimated life span, or remaining life span of a tree. The **useful life expectancy** is the number of years a tree can be expected to be useful at the site, with acceptable levels of amenity, health and risk under the current site conditions. Consideration should be given to tree benefits, amenity value, historical values, tree surroundings, site use, risk management options and costs, habitat opportunities and other relevant factors. Simply remaining alive (life expectancy) may not be reasonable in an urban setting. Trees should continue to provide amenity and other benefits with acceptable levels of risk (useful life expectancy). For some trees, habitat value may contribute to or increase a trees useful life expectancy.

⁵ **Significant tree meaning (Updated 16/5/2024)**

Date: 7th May 2026

Planning, Development and Infrastructure Act 2016

Preliminary - Part 1

Section 3 – Interpretation

significant tree means—

- (a) a tree declared to be a significant tree, or a tree within a stand of trees declared to be significant trees, under the Planning and Design Code (whether or not the tree is also declared to be a regulated tree, or also falls within a class of trees declared to be regulated trees, by the regulations); or
- (b) a tree declared to be a regulated tree by the regulations, or a tree within a class of trees declared to be regulated trees by the regulations that, by virtue of the application of prescribed criteria, is to be taken to be a significant tree for the purposes of this Act;

Planning, Development and Infrastructure (General) Regulations 2017

Preliminary—Part 1

3F—Regulated and significant trees

- (1) Subject to this regulation, the following are declared to constitute classes of regulated trees for the purposes of paragraph (a) of the definition of regulated tree in section 3(1) of the Act, namely trees within a designated regulated tree overlay that have a trunk with a circumference of 1 m or more or, in the case of trees that have multiple trunks, that have trunks with a total circumference of 1 m or more and an average circumference of 310 mm or more, measured at a point 1 m above natural ground level.
- (2) Subject to this regulation—
 - (a) a prescribed criterion for the purposes of paragraph (b) of the definition of significant tree in section 3(1) of the Act is that a regulated tree under subregulation (1) has a trunk with a circumference of 2 m or more or, in the case of a tree with multiple trunks, has trunks with a total circumference of 2 m or more and an average circumference of 625 mm or more, measured at a point 1 m above natural ground level; and
 - (b) regulated trees under subregulation (1) that are within the prescribed criterion under paragraph (a) are to be taken to be significant trees for the purposes of the Act.
- (3) For the purposes of subregulations (1) and (2), the measurement of the circumference of the trunks of a tree with multiple trunks is to be undertaken on the basis of the actual circumference of each trunk and without taking into account any space between the trunks.

⁶ **Diameter at Standard Height (DSH)** is the diameter of the trunk (circumference ÷ π) measured at standard height (1.40m above ground level). This diameter is used to calculate the Tree Protection Zone radius (TPZ) using the Australia Standard method outlined in AS 4970:2025 *Protection of trees on development sites*.

For trees where there are multiple stems, the combined stem DSH is calculated using the formula:

$$\text{Total DSH} = \sqrt{(\text{DSH}_1)^2 + (\text{DSH}_2)^2 + (\text{DSH}_3)^2 \text{ etc.}}$$

(Refer to appendix A of AS 4970:2025 *Protection of trees on development sites*.)

⁷ The diameter of the stem (circumference ÷ π) measured immediately above the root buttress (basal flare). This measurement is taken in metres which is included within the formula to calculate a tree's Structural Root Zone.

⁸ **Notional Root Zone (NRZ).**

An area surrounding a tree enclosed by a radius of 12 times DSH that is a primary trigger for arboricultural input on a development site. This is calculated as follows.

$$\begin{aligned} \text{Radius of NRZ} &= \text{DSH} \times 12 \\ \text{DSH} &= \text{trunk diameter measured at 1.4 m above ground.} \end{aligned}$$

- The radius of the NRZ is measured from the centre of the stem.
- The NRZ for palms, cycads, tree ferns and the like should not be less than 2m.
- Any NRZ radius should not be less than 2 m nor greater than 15 m (except where crown protection is required).
- Clause 3.3 covers variations to the TPZ.

(Australian Standard AS4970:2025 *Protection of trees on development sites*)

Date: 7th May 2026

⁹ **Structural Root Zone (SRZ)** The area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and expressed by its radius in metres.

This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area.

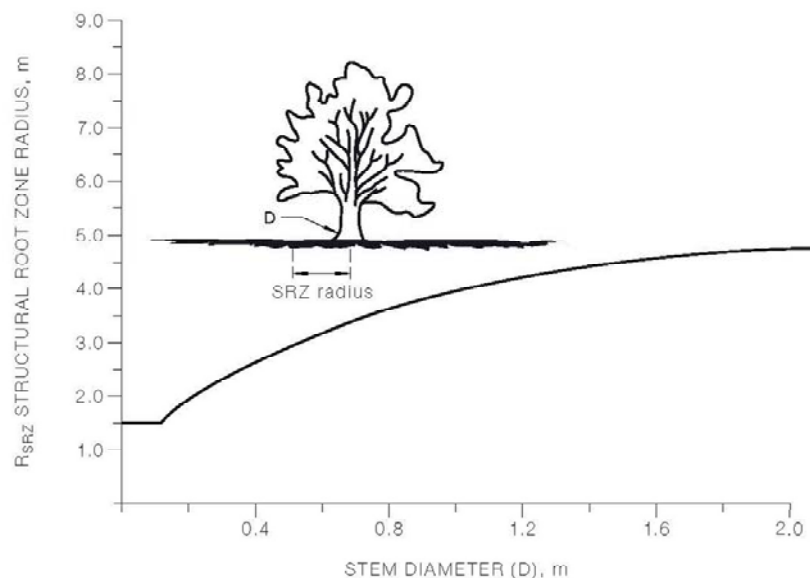
The SRZ only needs to be calculated when major encroachment into the TPZ is proposed.

There are many factors that affect the size of the SRZ (e.g., tree height, crown area, soil type, soil moisture). The SRZ may also be influenced by natural or built structures, such as rock and footings. An indicative SRZ radius can be determined from trunk diameter measured immediately above the root buttress using the following formula. Root investigation may provide more information on the extent of these roots.

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

Where D = trunk diameter, in metres measured above the root buttress

Note** The SRZ for trees with trunk diameters less than 0.15m will be 1.5m.



The curve can be expressed by the following formula:
 $R_{SRZ} = (D \times 50)^{0.42} \times 0.64$

NOTES:

- 1 R_{SRZ} is the structural root zone radius.
- 2 D is the stem diameter measured immediately above root buttress.
- 3 The SRZ for trees less than 0.15 m diameter is 1.5 m.
- 4 The SRZ formula and graph do not apply to palms, other monocots, cycads and tree ferns.
- 5 This does not apply to trees with an asymmetrical root plate.

FIGURE 1 STRUCTURAL ROOT ZONE

¹⁰ The International Society of Arboriculture (ISA) **Tree Risk Assessment Qualification (TRAQ)** is a tree risk assessment method used by trained and experienced arborists to define the level of risk from tree or branch failure. This method assesses three components of tree risk: Likelihood of Failure, Likelihood of Impact and Consequences of Failure. A qualitative descriptor is applied to each of these components of risk. These descriptors are applied to a pair of matrices to define the level of risk posed by the tree. I am a qualified user of the TRAQ method. More information about this method can be found in Dunster, J et.al. (2017), *Tree Risk Assessment Manual – Second Edition* – International Society of Arboriculture, Champaign, Illinois.

Date: 7th May 2026

¹¹ **ISA TRAQ - Targets and Likelihood of Impact.** One of the factors that must be considered in tree risk assessment is the likelihood of a failed tree or tree part impacting a target of concern. To estimate this likelihood, you estimate, research or measure the occupancy rate of any targets that would be impacted by the failure (the target zone) and any factors that could protect the target from impact of the falling tree or tree part.

The likelihood of impacting a target can be categorised using the following guidelines:

- **High:** The failed tree or tree part is likely to impact the target. This is the case when there is a constant target, with no protection factors, and the direction of fall is toward the target.
- **Medium:** The failed tree or tree part could impact the target, but is not expected to do so. This is the case for people in a frequently used area when the direction of fall may or may not be toward the target. An example of a *medium* likelihood of impacting people could be passengers in a car travelling on an arterial street (frequent occupancy) next to the assessed tree with a large, dead branch over the street.
- **Low:** There is a slight chance that the failed tree or tree part will impact the target. This is the case for people in an occasionally used area with no protection factors and no predictable direction of fall; a frequently used area that is partially protected; or a constant target that is well protected from the assessed tree. Examples are vehicles on an occasionally used service road next to the assessed tree or a frequently used street that has a large tree providing protection between vehicles on the street and the assessed tree.
- **Very Low:** The chance of the failed tree or tree part impacting the specified target is remote. Likelihood of impact could be *very low* if the target is outside the anticipated target zone or if occupancy rates are rare. Another example of *very low* likelihood of impact is people in an occasionally used area with protection against being struck by the tree failure due to the presence of other trees or structures between the tree being assessed and the targets.

(Dunster, J et.al. (2017), *Tree Risk Assessment Manual – Second Edition* – International Society of Arboriculture, Champaign, Illinois, p. 42.)

¹² **ISA TRAQ - Likelihood of Failure.** Likelihood of Failure is classified based on an evaluation of defects and structural conditions of the tree or its parts, expected loads, site conditions and weather. The likelihood of failure must have a time frame specified to have meaning. Definitions of the likelihood of failure categories are as follows:

- **Imminent:** Failure has started or is most likely to occur in the near future, even if there is no significant wind or increased load. The imminent category overrides the time frame stated in the scope of work.
- **Probable:** Failure may be expected under normal weather conditions within the specified timeframe.
- **Possible:** Failure may be expected in extreme weather conditions, but it is unlikely during normal weather conditions within the specified timeframe.
- **Improbable:** The tree or tree part is not likely to fail during normal weather conditions and may not fail in extreme weather conditions within the specified timeframe.

(Dunster, J et.al. (2017), *Tree Risk Assessment Manual – Second Edition* – International Society of Arboriculture, Champaign, Illinois, p. 102.)

¹³ **ISA TRAQ - Consequences of Failure.** Consequences of tree failure and impact are categorized based on the value of the target and harm that may be done to it.

The consequences of failure can be categorised using the following guidelines:

Severe consequences are those that could involve serious personal injury or death, high value property damage, or major disruption of important activities. Examples of *severe* consequences include:

- Injury to one or more people that may result in hospitalization or death
- Destruction of a vehicle of extremely high value
- Major damage to or destruction of a house
- Serious disruption of high-voltage distribution circuits or transmission power lines

Date: 7th May 2026

Significant consequences are those that involve substantial personal injury, moderate- to high-value property damage, or considerable disruption of activities. Examples of *significant* consequences include:

- Injury to a person requiring medical care
- Serious damage to a vehicle
- High-monetary damage to a structure
- Disruption of distribution primary voltage power lines
- Disruption of arterial traffic that causes an extended blockage and/or rerouting of traffic

Minor consequences are those that involve minor personal injury, low- to moderate-value property damage, or small disruption of activities. Examples of *minor* consequences include:

- Minor injury to a person, typically not requiring professional medical care
- Damage to a landscape deck
- Moderate monetary damage to a structure or vehicle
- Short term disruption of power on secondary lines, streetlights, and individual services
- Temporary disruption of traffic on a secondary road

Negligible consequences are those that do not result in personal injury, involve low-value property damage, or disruptions that can be replaced or repaired. Examples of *negligible* consequences include:

- Striking a person, causing no more than a bruise or scratch
- Damage to a lawn or landscape bed
- Minor damage to a structure requiring inexpensive repair
- Disruption of power to landscape lighting
- Disruption of traffic on a neighbourhood street

(Dunster, J et.al. (2017), *Tree Risk Assessment Manual – Second Edition* – International Society of Arboriculture, Champaign, Illinois, pp. 129-130.)

¹⁴ **ISA TRAQ - Levels of Risk.** In the risk rating matrix, four terms are used to define levels of risk: *extreme*, *high*, *moderate*, and *low*. These risk ratings are used to communicate the level of risk and to assist in making recommendations to the owner or risk manager for mitigation and inspection frequency. The priority for action depends on the risk rating and the risk tolerance of the owner or manager.

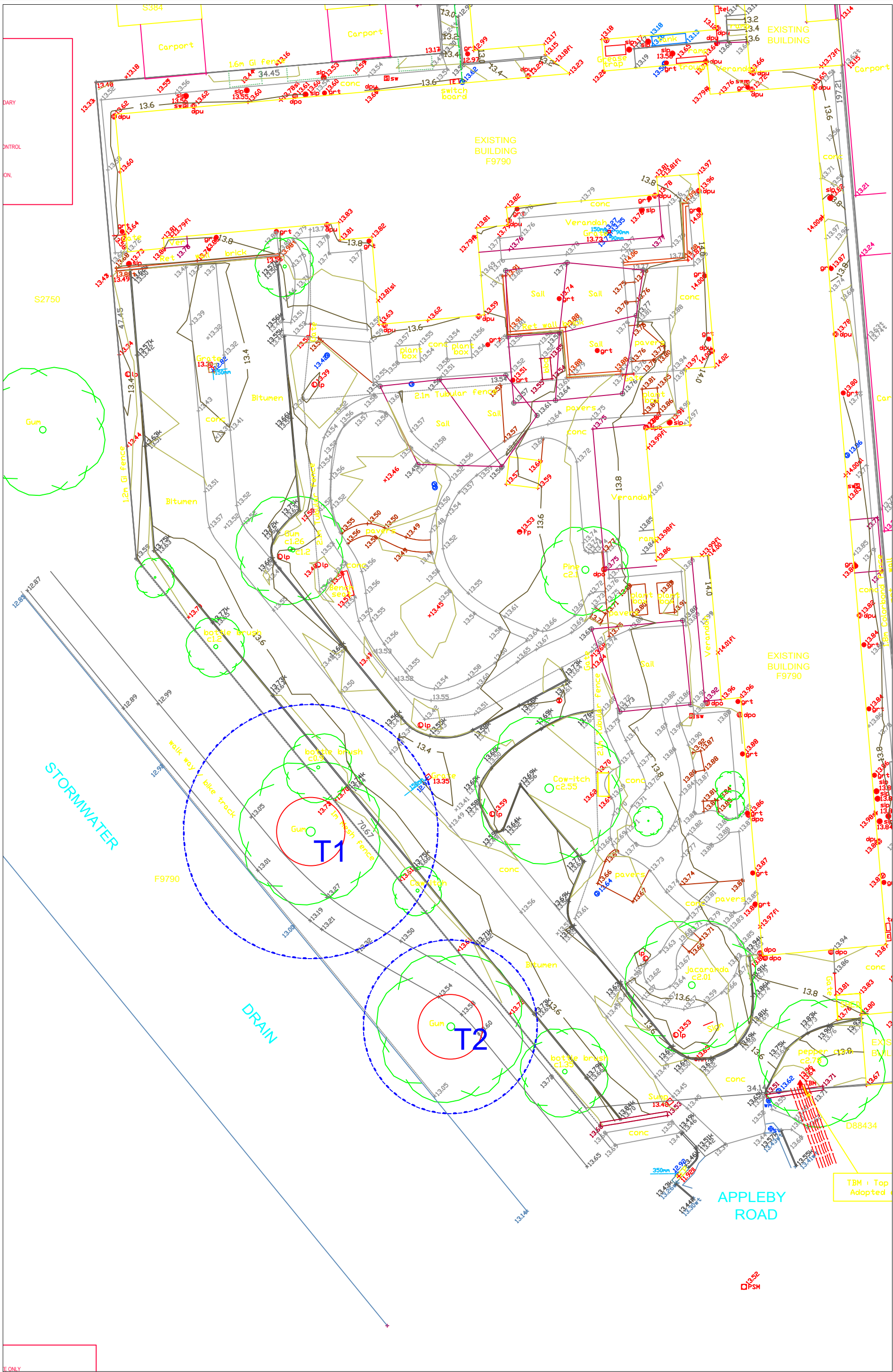
- **Extreme:** The extreme-risk category applies in situations in which failure is *imminent*, with a *high* likelihood of impacting the target, and the consequences of the failure are *severe*. The tree risk assessor should recommend that mitigation measures be taken as soon as possible. In some cases, this may mean recommending or implementing immediate restriction of access to the target zone area to avoid injury to people.
- **High:** High-risk situations are those for which consequences are *significant* and likelihood of failure and impact is *very likely* or *likely*, or consequences are *severe* and likelihood is *likely*. This combination of likelihood and consequences indicates that the tree risk assessor should recommend mitigation measures be taken. The decision for mitigation and timing of treatment depends on the risk tolerance of the tree owner or risk manager. In populations of trees, the priority of high-risk trees is second only to extreme-risk trees.
- **Moderate:** Moderate-risk situations are those for which consequences are *minor* and likelihood of failure and impact is *very likely* or *likely*, or likelihood is *somewhat likely* and consequences are *significant* or *severe*. The tree risk assessor may recommend mitigation and/or retaining and monitoring. The decision for mitigation and timing for treatment depends on the risk tolerance of the tree owner or manager. In populations of trees, moderate-risk trees represent a lower priority than high- or extreme-risk trees.
- **Low:** The low-risk category applies when consequences are *negligible*, when likelihood of failure and impact is *unlikely*, or consequences are *minor* and likelihood is *somewhat likely*. Mitigation is generally not required. Mitigation or maintenance measures may be desired for some trees, because it is sometimes possible to reduce the risk even further at very low cost, but the priority for action is low. Tree risk assessors may recommend retaining and monitoring these trees, as well as mitigation that does not include removal of the tree. Mitigation treatments may reduce risk or future risk, but the categorised risk rating is already at the lowest level.

(Dunster, J et.al. (2017), *Tree Risk Assessment Manual – Second Edition* – International Society of Arboriculture, Champaign, Illinois, p. 132.)

Date: 7th May 2026

¹⁵ **Project arborist** - The person responsible for carrying out the tree assessment, report preparation, consultation with designers, specifying tree protection measures, monitoring and certification. The project arborist will be suitably experienced and competent in arboriculture, having acquired through training, qualification (minimum Australian Qualification Framework (AQF) 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.

(AS 4970:2025 *Protection of trees on development sites*)



TREE LEGEND

-  Tree Crown (assessed)
-  NRZ
-  SRZ
-  Tree no.

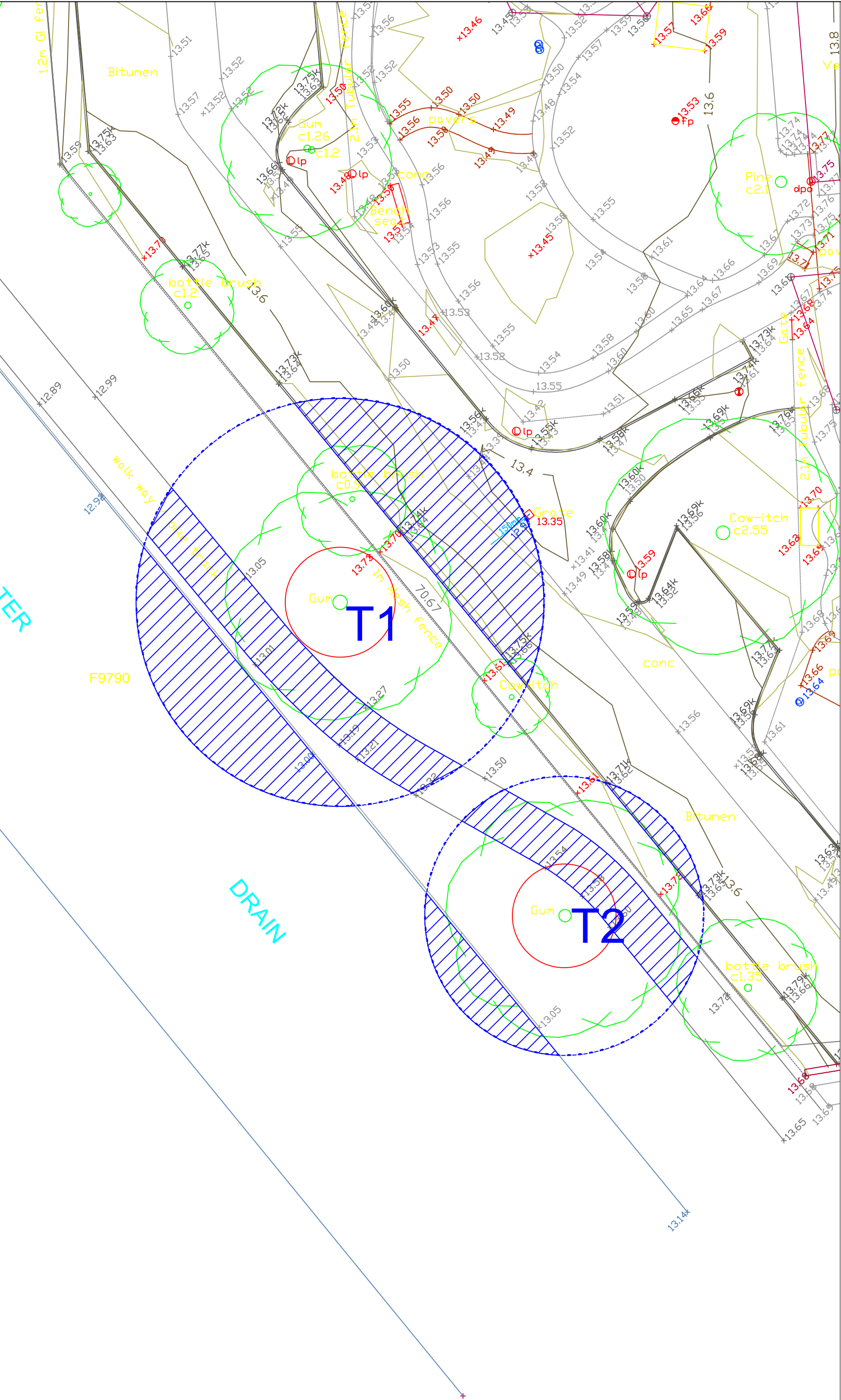
Tree survey plan
29-31 Austral Terrace, Morphettville
Oxygen
Base drawing by State Surveys Surveyors 25499 (DETAIL) 27.08.25



DATE 07/05/2026	DRAWING NO TS01
SCALE NTS	DRAWN BY SS



15/15 Fullarton Road
Kent Town SA 5067
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TREE LEGEND

Tree Crown

NRZ

SRZ

Tree no.

TPZ Encroachment

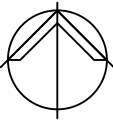
SRZ Encroachment

T1: *Eucalyptus camaldulensis*
Circ. @ 1.0m = 308cm
Significant
NRZ Radius = 12.24m
NRZ Area = 471m²
SRZ Radius = 3.40m

NRZ Encroachment
Sturt River culvert = 77.95m² (16.56%)
Pedestrian path= 72.2m² (15.34%)
Car park paving = 112.5m² (23.9%)
Total = 262.65m² (55.76%)
SRZ Encroachment: No
Encroachment Level: Major

T2: *Eucalyptus leucoxydon*
Circ. @ 1.0m = 230cm
Significant
NRZ Radius = 8.64m
NRZ Area = 235m²
SRZ Radius = 3.21m

NRZ Encroachment
Sturt River culvert = 26.3m² (11.21%)
Pedestrian path = 51m² (21.75%)
Car park paving = 9.3m² (3.97%)
Total = 86.6m² (36.93%)
SRZ Encroachment: No
Encroachment Level: Major





TREE LEGEND

Tree Crown

NRZ

SRZ

T1Tree no.

TPZ Encroachment

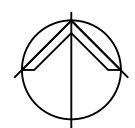
SRZ Encroachment

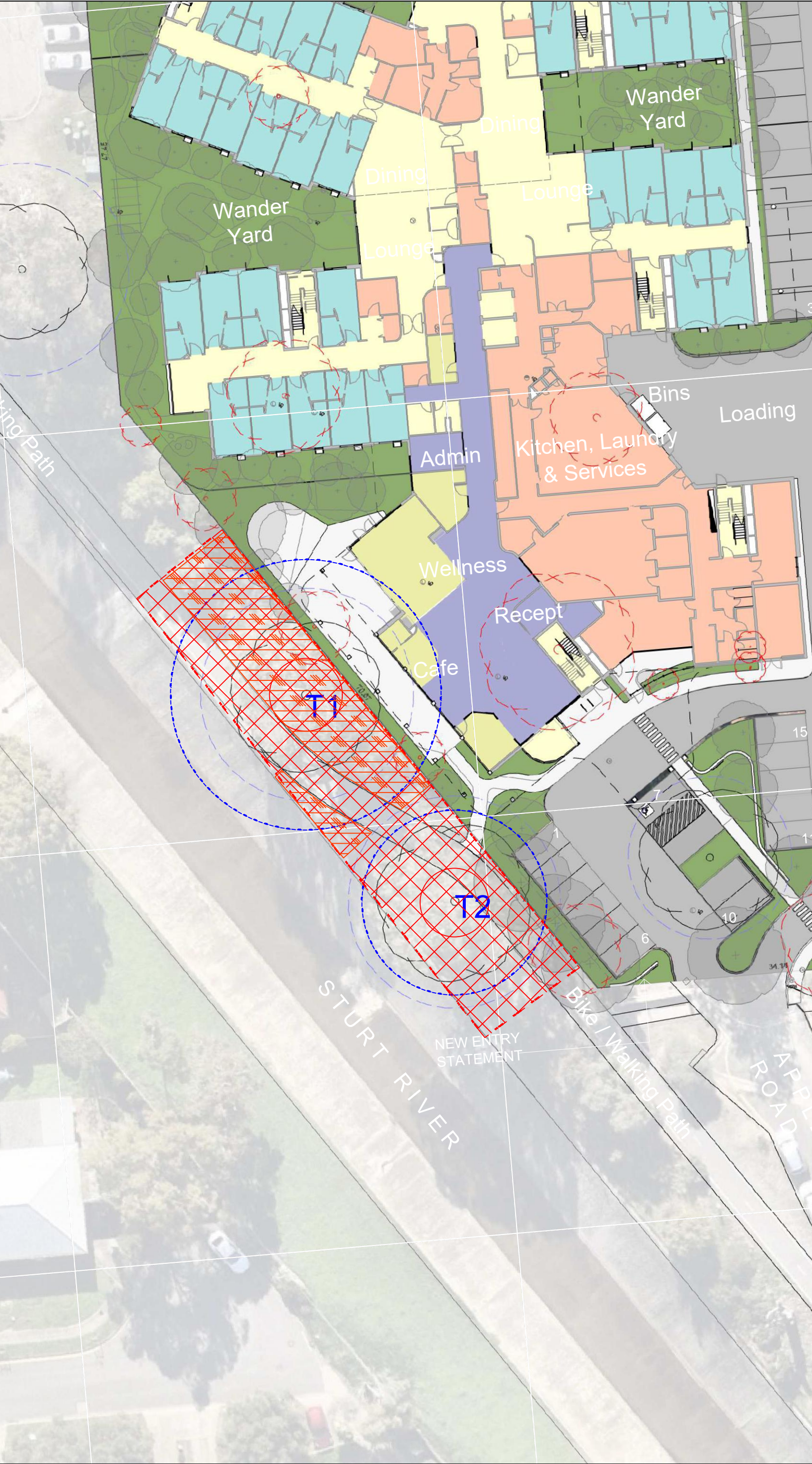
T1: *Eucalyptus camaldulensis*
Circ. @ 1.0m = 308cm
Significant
NRZ Radius = 12.24m
NRZ Area = 471m²
SRZ Radius = 3.40m

NRZ Encroachment
Proposed
Building = 31.97m² (6.79%)
Pavement = 107.46m² (22.83%)
Demolished/reutilised
Existing car park = -112.5m² (-23.9%)
Total New Encroachment = 26.93m² (5.72%)
SRZ Encroachment: No
Encroachment Level (new): Minor

T2: *Eucalyptus leucoxyton*
Circ. @ 1.0m = 230cm
Significant
NRZ Radius = 8.64m
NRZ Area = 235m²
SRZ Radius = 3.21m

NRZ Encroachment
Proposed
Pedestrian link path = 8.0m² (3.4%)
Altered Car park = 7.83m² (3.34%)
Demolished/reutilised
Existing Car park = 9.3m² (3.97%)
Total = 86.6m² (36.93%)
SRZ Encroachment: No
Encroachment Level (new): Minor





- TREE LEGEND
- Tree Crown
 - TPZ
 - SRZ
 - T1 Tree no.

- TREE PROTECTION LEGEND
- Protective fencing
 - Beneficial Additive Application

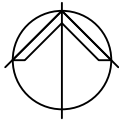
T1: *Eucalyptus camaldulensis*
Circ. @ 1.0m = 308cm
Significant
NRZ Radius = 12.24m
NRZ Area = 471m²
SRZ Radius = 3.40m

NRZ Encroachment
Proposed
Building = 31.97m² (6.79%)
Pavement = 107.46m² (22.83%)
Demolished/reutilised
Existing car park = -112.5m² (-23.9%)
Total New Encroachment = 26.93m² (5.72%)
SRZ Encroachment: No
Encroachment Level (new): Minor

T2: *Eucalyptus leucoxylon*
Circ. @ 1.0m = 230cm
Significant
NRZ Radius = 8.64m
NRZ Area = 235m²
SRZ Radius = 3.21m

NRZ Encroachment
Proposed
Pedestrian link path = 8.0m² (3.4%)
Altered Car park = 7.83m² (3.34%)
Demolished/reutilised
Existing Car park = 9.3m² (3.97%)
Total = 86.6m² (36.93%)
SRZ Encroachment: No
Encroachment Level (new): Minor

It is acknowledged that the Sturt River Linear Park is a public reserve that required continual access to the public. The Tree Protection Fence location in this instance is indicative and will be achieved by maintaining the boundary fence between the project and the reserve only.



Tree Protection Zone (TPZ) guidelines All trees to be retained on site to be protected in accordance with Australian Standard AS 4970-2009 <i>Protection of trees on development sites</i> and relevant council conditions of approval. Refer to Tree Report by Adelaide Arb Consultants dated xxxx for detailed tree protection measures. Tree Protection Zone Fencing (TPZ) Sturdy 1.8m high chainmesh fence to be erected as indicated on the plans prior to any works. Protective fencing and other protective measures to remain in place till completion of project. TPZ signage to be attached to fencing. Area within TPZ to be mulched - 75-100mm deep. The fenced area shall not be used for storage of machinery or construction materials. The fenced area shall not be used for parking or vehicle access. No entry to TPZ without consulting project arborist. Fencing can be removed to facilitate final soft landscaping. Trunk and branch protection Where works are in close proximity to trees, trunk and branch protection is required. Soft padding and timber battens to be installed around trunk and branches. Site Access Site access should be directed around tree protection zones. Vehicle access through TPZ requires ground protection. Ground protection – pedestrians Ground protection required between TPZ and construction zone. Install geotextile base layer, then 100mm mulch then walking boards. Demolition Protective fencing shall be established prior to demolition works. Fencing may be modified to facilitate demolition works in consultation with the project arborist. Demolition works must proceed with caution in and adjacent to the TPZ. Demolition machinery must work with caution by standing on hard surfaces and/or outside the TPZ, removing material in a retreating fashion away from the tree. Demolition of any structures, hard surfaces and/or underground services within the TPZ must be undertaken under supervision from the project arborist. No stockpiling of debris, soil or any other material within any TPZ. Any trees and vegetation to be removed must be done without affecting trees to be retained.	Site earthworks All earthworks and trenching must stay outside of the TPZ unless approved by council and project arborist. Any approved earthworks within the TPZ must be carried out with caution under the supervision of the project arborist. No grade changes (cut or fill) within any TPZ without approval. Excavation machinery should stand in a position away from the TPZ to avoid soil compaction and conflict with the trunk and branches. No stockpiling of soil within any TPZ. Fill material within any TPZ must use coarse, single graded materials with no fines. No continuous trenching for underground services within the TPZ without approval. Construction The tree must be well protected with fencing and ground protection during all phases of the construction process. Areas for parking, storage, waste disposal, mixing and wash out areas must be clearly defined, well away from the tree protection zone. Scaffolding in or adjacent to the TPZ requires ground protection below (geotextile and 100mm mulch layers). Any pruning of regulated/significant trees to be done by Level 3 qualified arborists with council approval. Underground services No underground services to be installed within any TPZ without council approval and approval from project arborist. Underground services to be routed around tree protection zones. If underground services must pass through any TPZ, they must be installed with consultation with the project arborist. This may require directional drilling or hydro excavation. Landscaping guidelines TPZ fencing can be removed to facilitate final soft landscaping. The landscape design should provide the tree with suitable growing conditions. Landscaping activities must avoid disturbance to the root system. Existing natural levels must be retained within the TPZ. Retaining walls should be located outside the TPZ. Paving works should be kept to a minimum within the TPZ. Any trees/vegetation to be removed must be done without affecting trees to be retained. Any pruning of regulated/significant trees to be done by Level 3 qualified arborists with council approval. The root zone of trees should have a 75-100mm layer mulch applied. Cultivation of the area under the tree should be kept to a minimum and undertaken with hand tools. The TPZ area shall not be used for storage, parking or vehicle access.				
Tree Protection Plan - Specification notes 29-31 Austral Terrace, Morphettville Oxygen		DATE 07/05/2026 SCALE NTS	DRAWING NO TPP-Specs-1 DRAWN BY SS	15/15 Fullarton Road Kent Town SA 5067 (p) (08) 8351 4849 www.adelaidearb.com.au	