

City of Adelaide – Tree Risk Assessment Protocol (TRAP)

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Introduction

Tree risk management is the application of policies, procedures and practices to identify, evaluate and communicate risks associated with trees. Where unacceptable levels of risk are identified, it extends to mitigation and monitoring measures. Risk mitigation and management will be supported by the City of Adelaide's Tree Management Operational Guideline, **AS4373: Pruning of Amenity Trees**, **MIS308: Tree Pruning**, and other recognised industry standards.

Tree risk assessment sits within the broader framework of tree risk management. It involves the systematic processes used to identify, analyse and evaluate tree risk, with risk determined by both the likelihood of an event occurring and the severity of its potential consequences.

It is not realistic to eliminate all risk associated with trees. The aim of an effective tree management program is to maintain risk at an acceptable level while preserving the many benefits trees provide. It is also important to note that what may be perceived as high risk by a member of the public may not align with the professional assessment of a qualified arborist.

Tree risk assessment for the City of Adelaide will be undertaken in accordance with the Tree Risk Assessment Protocol (TRAP) to ensure a consistent, systematic and transparent approach to identifying and managing tree risk.

Purpose

The City of Adelaide Tree Risk Assessment Protocol provides guidance to Council employees, contractors and arboriculture consultants on the operational aspects of managing the City's trees. It serves as a reference document for Council officers, operational staff and external specialists, defining the processes and application of the City's chosen tree risk assessment methodology, while aligning with the provisions of **MIS501: Tree Risk Assessment**.

All trees in public areas carry some level of risk. To remove risk entirely would require removing every tree from the City, a response that is neither sensible nor sustainable, as it would also remove the many benefits trees provide. The City of Adelaide therefore accepts that some level of risk must be tolerated.

In managing tree risk, Council balances its duty of care with the social, environmental and economic benefits of its urban forest. Risk mitigation is applied in a way that is reasonable, proportional and practicable. Importantly, the overall risk of injury from tree or branch failure remains low, and Council's approach reflects this in a balanced, evidence-based manner.

Tree Biology and Mechanics

The City of Adelaide requires arboriculture staff and contractors to hold a minimum **Certificate III in Arboriculture** to apply this risk assessment protocol, a sound understanding of tree biology and mechanics underpins all inspections.



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Tree assessors will apply knowledge of:

- **Wood decay processes**, including progression and compartmentalisation of decay
- **Symptoms of health decline**, pests and pathogens
- **Species-specific traits**, including typical responses to defects or environmental stressors
- **Tree mechanics**, particularly the severity and location of defects in relation to roots, trunk, branches and surrounding site conditions

Industry experience, which varies among assessors, supports more in-depth evaluation of species characteristics and response patterns.

In addition, untrained staff and members of the public may assist by reporting notable tree features or concerns that could indicate potential risk issues, which will then be assessed by qualified arboriculture staff or contractors.

Method

The City of Adelaide applies the **International Society of Arboriculture's (ISA) Tree Risk Assessment Qualification (TRAQ)** methodology. TRAQ is an industry-recognised, endorsed, qualitative tree risk assessment system. Its qualitative approach is advantageous as it is straightforward to apply and produces outcomes that can be more easily understood by non-specialists.

Other accepted and industry-recognised methods include **VALID** and the **Quantified Tree Risk Assessment (QTRA)** system.

Qualifications

All City of Adelaide staff and external contractors undertaking TRAQ inspections must:

- Hold a minimum **Certificate III in Arboriculture (or equivalent)**, and
- Hold the **ISA Tree Risk Assessment Qualification**.

Levels of Inspection

The TRAQ methodology provides three levels of inspection, with the level selected according to the scope of work, site sensitivity and tree history.

- **Level 1 – Limited Visual Inspection**
A broad visual assessment of a tree or population of trees, conducted from a specified perspective, to identify obvious defects or conditions. Typically used to identify trees with imminent or probable likelihood of failure.
- **Level 2 – Basic Assessment**
A detailed visual inspection of a tree and its surrounding site, synthesising information collected. This is the most common assessment, ground-based and requiring inspection around the entire tree.



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- **Level 3 – Advanced Assessment**

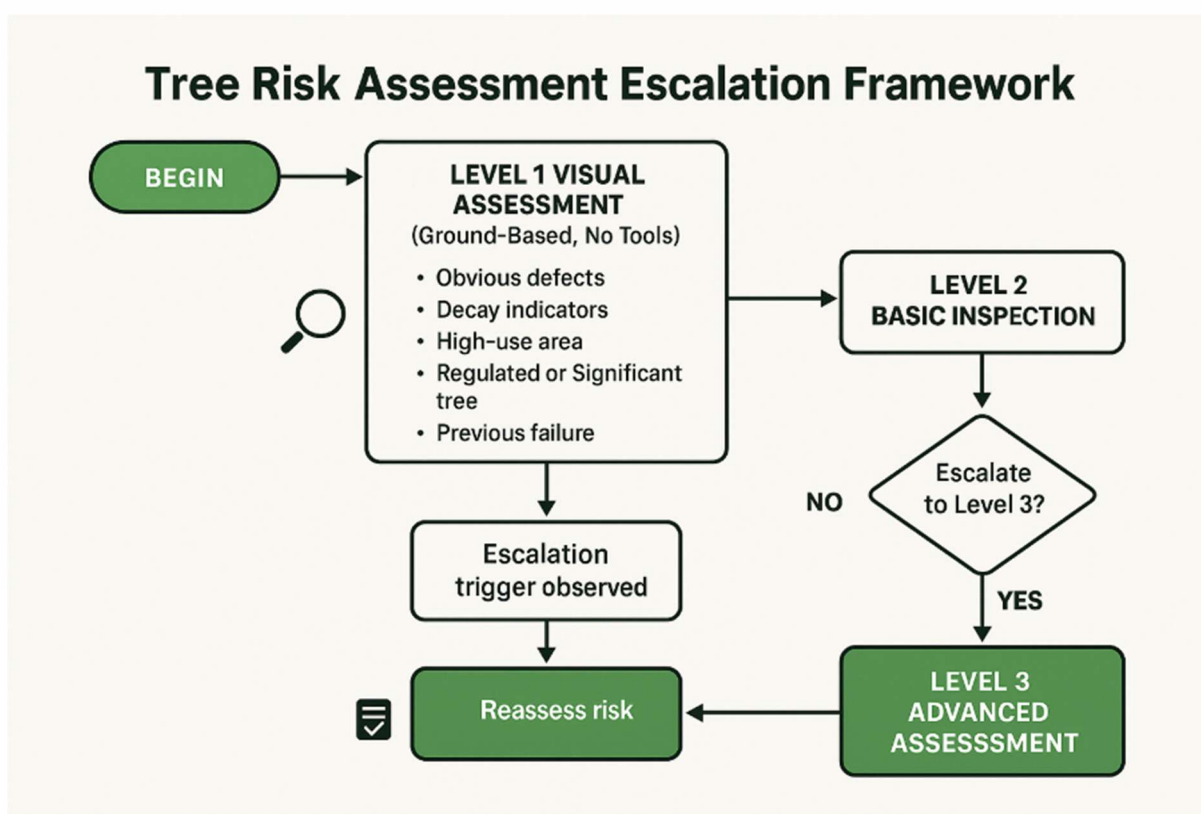
A targeted, detailed assessment of specific tree parts, defects, targets or site conditions. Typically undertaken in conjunction with or following a Level 2 assessment where additional information is required.

Safety Considerations

Inspectors must prioritise site safety for both themselves and the public during assessments. Where necessary, exclusion zones should be established immediately or the requirement communicated to the appropriate authority.

Application by the City of Adelaide

- **In-house:** City of Adelaide arboriculture staff with the relevant qualification and training may conduct Level 1, 2 and 3 inspections.
- **External contractors:** Appropriately qualified arborists may be engaged to conduct any level of inspection as required.



Inspection Frequencies

Tree risk levels vary depending on a range of factors. Risk may be higher where trees are large and overhang areas with high occupancy rates. To manage tree assessments efficiently, the City of Adelaide will prioritise inspections in areas where large trees coincide with higher-use zones.



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Confluence Zones

Inspection frequency is determined by the *zone of confluence*, which reflects the relationship between:

- **Target occupancy** (frequency of people or vehicles beneath/near the tree), and
- **Consequence of failure** (generally higher where trees are larger).

Note:

- Trees less than 4 m tall are generally assessed for plant health only and are not subject to formal TRAQ risk assessment. This default may be departed from where site conditions, observable structural defects, complaint history, or target occupancy warrant a formal risk assessment, at the discretion of a qualified arborist.
- Large trees are defined as those taller than 15 m.

High Confluence Zones – Annual Inspection

Large trees + constant/frequent occupancy. Includes:

- Playgrounds
- Squares
- High-volume congregation points
- High pedestrian traffic areas (e.g. Adelaide Oval, Rundle Mall, North Terrace)
- Major roads with large adjacent trees (see Appendix A)
- Buildings

Also included: Trees of significant cultural or amenity importance.

Medium Confluence Zones – Biennial Inspection

Large trees + occasional occupancy. Includes:

- Seating areas
- Exercise equipment zones
- Barbecue areas
- Busy pathways
- Sporting facilities and ovals

Low Confluence Zones – Inspection every 4 years

All remaining trees in lower-use occupancy zones. Includes:

- Occasional-use pedestrian paths and roadways
- Maintained but unserviced portions of Park Lands (without facilities that encourage pedestrian congregation)

Note: Trees in areas of very low confluence (rare occupancy) will not be risk-assessed unless circumstances require.



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Zones of Elevated Occupancy

Several high confluence zones have been identified on the map below, including the River Torrens walking path, Adelaide Oval and a number of city parks that attract consistently high levels of foot traffic.

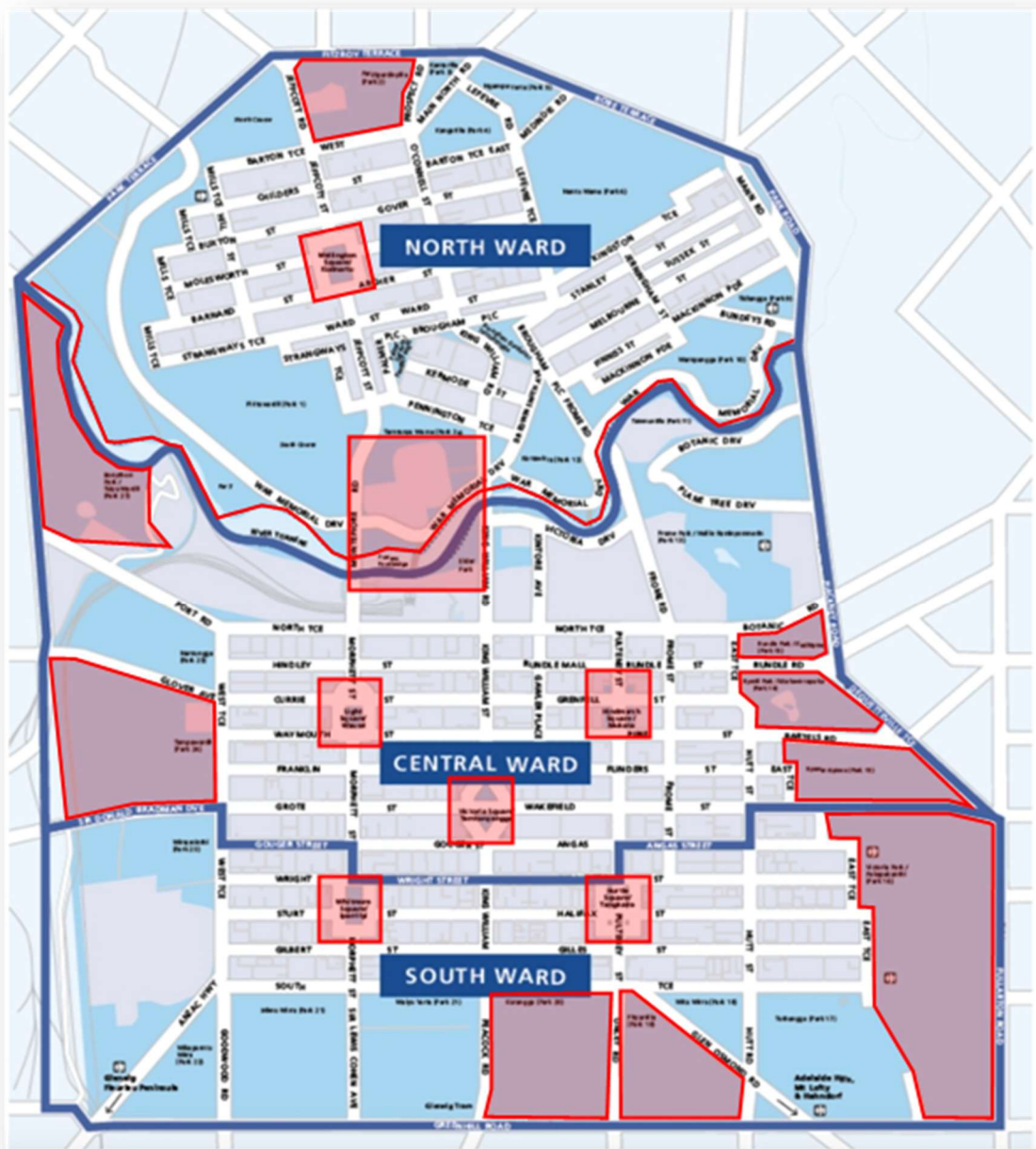
- **Very High Occupancy:** 300,000+ annual visits
- **High Occupancy:** 200,001–300,000 annual visits

Updated visitation data for the Park Lands, including total visitation and activity breakdowns (organised sport, events, informal recreation), is available through the **Park Land Usage – Total Visitation dataset** published by the Government of South Australia (data.sa.gov.au). This dataset is typically updated every three years and provides the most reliable reference for assessing occupancy levels.



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Order of Inspection

The first factor considered in the risk assessment process is the likelihood of impact at the site where a tree is located.

- Where the likelihood of impact is assessed as Very Low, no further risk assessment is generally required under this protocol. This assessment is made at the time of inspection and may be revisited if new information arises, including complaints, observable defect changes, nearby works, weather events, or changed site occupancy.



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- If the likelihood of impact is assessed as Low, Medium or High, the assessor will proceed with the next stage of the process, considering the likelihood of failure of the subject tree.

This process aligns with the TRAQ methodology and applies the following matrices:

1. Risk Matrix 1 – Likelihood Matrix

- Combines the likelihood of failure with the likelihood of impact.

2. Risk Matrix 2 – Risk Rating Matrix

- Combines the result of Risk Matrix 1 with the consequence of failure to derive a final risk rating for the tree.

Risk Matrix

The TRAQ system uses two interrelated matrices to determine a final tree risk rating. These combine the inputs of:

- **Likelihood of failure**
- **Likelihood of impact**
- **Consequence of failure**

All inputs must be assessed within the timeframe established for the inspection. Assessment timeframes are aligned with inspection frequencies, which are determined by the zone of confluence.

Matrix 1 – Likelihood Matrix

This matrix combines:

Likelihood of Failure (X) Likelihood of Impact

The outcome identifies the combined likelihood of failure and impact, which is then carried forward into the second matrix.



Likelihood of Failure	Likelihood of Impact			
	<i>Very low</i>	<i>Low</i>	<i>Medium</i>	<i>High</i>
<i>Imminent</i>	Unlikely	Somewhat likely	Likely	Very likely
<i>Probable</i>	Unlikely	Unlikely	Somewhat likely	Likely
<i>Possible</i>	Unlikely	Unlikely	Unlikely	Somewhat likely
<i>Improbable</i>	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2 – Risk Rating Matrix

The Risk Rating Matrix combines the output from Matrix 1 (Likelihood of Failure and Impact) with the Consequence of Failure to determine the final risk rating.

Matrix 2 Calculation:

Likelihood of Failure and Impact (X) Consequence of Failure

This matrix defines the overall level of tree risk. Definitions of the qualitative terms used (e.g. “Low,” “Moderate,” “High”) are provided in the **Glossary**.

Likelihood of failure & impact	Consequences of Failure			
	<i>Negligible</i>	<i>Minor</i>	<i>Significant</i>	<i>Severe</i>
<i>Very Likely</i>	Low	Moderate	High	Extreme
<i>Likely</i>	Low	Moderate	High	High
<i>Somewhat likely</i>	Low	Low	Moderate	Moderate
<i>Unlikely</i>	Low	Low	Low	Low

Levels of Risk and Required Mitigation

The output of the TRAQ matrices provides an overall risk level: **Extreme, High, Moderate or Low**. The City of Adelaide manages risk to a level that is acceptable or tolerable for the given site and circumstance.

Different tree risk assessment systems use varying terminology. For the purpose of this protocol, the following terms are considered equivalent:

TRAQ Rating	Comparable Terms	Interpretation
Low	Acceptable	No action generally required
Moderate	Tolerable (with mitigation)	Requires management to reduce risk
High	Unacceptable	Requires prompt mitigation or removal of risk
Extreme	Unacceptable	Requires prompt mitigation or removal of risk



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Priority Ratings and Timeframes

Where mitigation is required, actions are assigned a priority rating with associated timeframes:

- **Urgent – within 7 days**
 - Applied where immediate risk is identified.
 - For regulated or significant trees, urgent works may be undertaken under *Section 136 – Urgent Work in Relation to Trees* of the *Planning, Development and Infrastructure Act 2016*. Approval from the Planning Department is sought once the risk has been mitigated.
- **High – within 3 months**
- **Medium – within 6 months**
- **Low – within 12 months**

Mitigation Options

Risk mitigation measures may include:

- Tree pruning
- Tree removal
- Cable and bracing
- Establishing exclusion zones
- Improving growing conditions
- Tree monitoring

Where resources do not allow immediate resolution of an unacceptable risk, temporary mitigation (such as bunting or exclusion zones) may be implemented until full works can be scheduled

Delegation and Elevation of Work

In addition to the cyclic auditing of City of Adelaide trees, customer requests relating to potential tree risks will be investigated by an authorised officer. These include the **Technical Officer Arboriculture, Work Group Leader Arboriculture, Tree Protection Officer Arboriculture**, or other delegated staff.

All inspections will be conducted in line with the procedures outlined in this protocol. Details of the assessment and any recommended or completed mitigation will be recorded in the City's asset management system.

Where required, inspections may be elevated to more experienced or senior staff, or to external contractors, to ensure appropriate expertise is applied to the assessment and risk management process

Managing Your Own Risk

While the City of Adelaide has an obligation to reasonably manage tree risk, residents and visitors also play a role in managing their own safety. Most injuries and fatalities



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associated with tree failure occur during or immediately after severe weather events. Limiting time spent outdoors during these periods reduces the likelihood of being impacted by falling trees or branches.

Community Feedback

The City of Adelaide manages more than 70,000 trees across its jurisdiction, with a dedicated team of staff responsible for their care, maintenance and risk management. Routine inspections are undertaken by trained Council employees through active assessments, which include Level 1, 2 and 3 TRAQ assessments. These cover only a portion of the tree population.

The broader tree population benefits from both active cyclic assessments and incidental observations by Council staff, contractors, and the public. Public reports submitted through Council's Customer Service portal are a valued complement to formal inspection programs and where necessary are reviewed by qualified arborists in accordance with the triage process described in this protocol.

Encouraging more observers increases the effectiveness of identifying and managing tree risk. The City of Adelaide therefore welcomes members of the public to participate by reporting tree concerns through the Customer Service online portal.

- Requests should only be submitted for non-risk issues where trees meet the relevant criteria for works such as pruning or removal (see the *Tree Management Operational Guidelines*).
- Where elevated levels of risk are suspected, these reports can be submitted for an initial desktop assessment by a Council Arborist, who will determine the need for further assessment and set priorities accordingly.
- Every tree inspected in response to a customer request will receive, at minimum, a Level 1 risk assessment.

Record Keeping

All tree assessment outcomes will be recorded in Council's asset management database to support effective tracking and long-term management of tree assets.

Records will include (but are not limited to):

- Tree location
- Species identification
- History of tree works and interventions
- Risk assessment outcomes and condition notes

GIS System

To support effective management, the City of Adelaide collects, maintains and analyses tree data using Forestree, the City's Geographical Information System (GIS) for tree management.



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- Council's tree database is maintained within Forestree.
- The system will be managed and updated by qualified staff or contractors trained in its effective use.

Responsibilities of the Arboriculture Officer

The Arboriculture Officer is responsible for maintaining and overseeing the integrity of Council's tree data and ensuring professional standards in arboriculture assessments.

Key responsibilities include:

- Collecting and integrating existing tree data
- Entering data for newly planted trees
- Updating records following pruning, removal or other works
- Analysing tree data to inform planning, reporting and operational priorities
- Ensuring that assessments requiring advanced professional expertise—such as street tree risk assessments or tree protection advice during development—are undertaken by staff holding a Diploma of Arboriculture (or equivalent qualification)

Inspection Frequencies

Tree risk levels vary due to multiple factors. Risk is generally elevated where trees are large in size and located in areas with high occupancy rates. To ensure efficient and effective tree assessments, the City of Adelaide prioritises inspections in areas where these conditions intersect.

Inspection frequency is determined by the zone of confluence, defined as the relationship between:

- **Target occupancy** (frequency of people/vehicles under or near a tree), and
- **Consequence of failure** (typically greater for larger trees).

Definitions:

- **Large trees** are those taller than 15 m.
- **Small trees** less than 4 m will not be risk-assessed, regardless of occupancy, but will be assessed for plant health.

High Confluence Zones – Annual Inspection

Large trees + constant/frequent occupancy. Includes:

- Playgrounds
- Squares
- High-volume congregation points
- High pedestrian traffic areas (e.g. Adelaide Oval, Rundle Mall, North Terrace)
- Major roads with high traffic volumes and large adjacent trees (see Appendix A)
- Buildings



Also included: Trees of significant cultural or amenity importance.

Medium Confluence Zones – Biennial Inspection

Large trees + occasional occupancy. Includes:

- Seating areas
- Exercise equipment zones
- Barbecue areas
- Busy pathways
- Sporting facilities and ovals

Low Confluence Zones – Inspection Every 4 Years

All remaining trees in all occupancy zones. Includes:

- Occasional-use pedestrian paths and roadways
- Maintained but unserviced areas of Park Lands without pedestrian congregation points

Note: Trees in very low confluence areas (rare occupancy) will not be assessed unless specific circumstances require.

Event Areas – Assessment Prior to Every Major Event

Areas that are typically occasional or rare use but become frequent to constant occupancy zones during events.

Inspections will be carried out by suitably qualified arborists prior to the event. Following assessment, the City may:

- Undertake risk mitigation (e.g. pruning), or
- Require event organisers to alter site design to exclude high-risk target areas.

Risk assessments must be conducted with sufficient lead time for:

- Inspection and reporting
- Approval of recommended works
- Completion of mitigation before event set-up begins

Event organisers must provide adequate notice and will bear the costs of additional assessments and mitigation.

Event Responsibility for Tree Risk in the Park Lands

When an event leases an area of the Adelaide Park Lands, the event organiser assumes responsibility for risks associated with trees within the leased area. While the City of



Adelaide undertakes regular tree inspections and risk management in accordance with its Tree Operating Guideline, it cannot eliminate all tree-related risk.

Event organisers are required to:

- Acknowledge and accept that some level of tree risk is inherent within the natural Park Lands environment.
- Provide and implement a weather policy that sets out reasonable safety measures during severe weather, including postponement or cancellation of activities where appropriate.
- Allow sufficient lead time for Council to conduct pre-event tree risk assessments, and to undertake or require mitigation works where necessary.
- Meet the costs of tree risk assessments and any associated mitigation works identified prior to the event that are not related to normal Park Lands use.

The City of Adelaide will support event organisers by providing the outcomes of recent tree inspections and, where required, conducting additional risk assessments before major events. Where unacceptable risks are identified, mitigation will either be undertaken by the City or the organiser may be directed to adjust event layout to avoid high-risk areas.

Relevant Policy

- Tree Operating Guideline
- Tree Management Policy

Legislation

- *Planning, Development and Infrastructure Act 2016*
- *Planning, Development and Infrastructure Regulations 2017*
- *Local Government Act 1999*

References

- Tree Risk Assessment Manual *Second Edition*, (2017) International Society of Arboriculture.
- Location SA Map Viewer, Accessed on 08/08/2024 via: <https://location.sa.gov.au/viewer/?map=hybrid&uids=138>
- Australian Standard AS4373: *Pruning of amenity trees*
- MIS308: *Tree Pruning*
- MIS501 *Tree Risk Assessment*

Appendix A - Category 2 roads with large trees

Category 2 roads are defined by the Department of Infrastructure and Transport as roads that experience annual average traffic volumes >10,000 vehicles per day on roads with <60km/h speed limits and 3,000 vehicles per day on roads with >60km/h speed limits. All roads within the City of Adelaide are identified as Category 2 roads (Location SA Map



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Viewer). Below is a list of Category 2 roads that have large trees located adjacent them (High confluence).

- Fullarton Road
 - Between Wakefield Street and Greenhill Road
- Glen Osmond Road
 - Between South Terrace and Hutt Road
 - Between Hutt Road and Greenhill Road
- Goodwood Road
 - Between South Terrace and Greenhill Road
- Peacock Road
 - Between South Terrace and Greenhill Road
- Hutt Road
 - Between South Terrace and Glen Osmond Road
 - Between Glen Osmond Road and Greenhill Road
- Unley Road
 - Between South Terrace and Greenhill Road
- Anzac Highway
 - Between South Terrace and Greenhill Road
- Sir Donald Bradman
 - Between West Terrace and Railway Terrace
- Wakefield Road
 - Between East Terrace and Dequetteville Terrace
- Bartells Road
 - Between East Terrace and Dequetteville Terrace
- Rundle Road
 - Between East Terrace and Dequetteville Terrace
- Botanic Road
 - Between East Terrace and Dequetteville Terrace
- Montefiore Road
 - Between Pennington Terrace and War Memorial Drive
 - War Memorial Drive and North Terrace
- Jeffcott Street
 - Between Pennington Drive and Fitzroy Terrace
- East Terrace
 - Between Carrington Street and Angus Street
- Greenhill Road
 - Between Anzac Highway and Goodwood Road
 - Between Goodwood Road and Peacock Road
 - Between Peacock Road and Unley Road
 - Between Unley Road and Hutt Road
 - Between Hutt Road and Glen Osmond Road
 - Between Glen Osmond Road and Fullarton Road
- King William Street
 - Between South Terrace and Gilbert/Gilles Streets
 - Between Gilbert/Gilles Streets and Halifax/Sturt Streets
 - Between Halifax/Sturt Streets and Carrington/Wright Streets
 - Between Carrington/Wright Streets and Angas/Gouger Streets
 - Between Angas/Gouger Streets and Wakefield/Grote Streets
 - Between Wakefield/Grote Streets and Flinders/Franklin Streets



- Between Flinders/Franklin Streets and Pirie/Waymouth Streets
- Between Pirie/Waymouth Streets and Grenfell/Currie Streets
- Between Grenfell/Currie Streets and Rundle Mall/Hindley Streets
- Between Rundle Mall/Hindley Streets and North Terrace
- Frome Road
 - Between Melbourne Street and War Memorial Drive
 - Between War Memorial Drive and Victoria Drive
 - Between Victoria Drive and North Terrace
- War Memorial Drive
 - Between King William Road and Golf Course Road
 - Between Golf Course Road and Montefiore Road
 - Between Montefiore Road and Park Terrace
- King William Road
 - Between Pennington Terrace and War Memorial/Sir Edwin Smith
 - Between War Memorial/Sir Edwin Smith and Victoria Drive
 - Between Victoria Drive and North Terrace
- Jeffcott Street
 - Between Pennington Terrace/Montefiore Hill and Barton Terrace West
 - Between Barton Terrace West and Fitzroy Terrace
- Hutt Street
 - Between Bartels Road and Flinders Street/Flinders Street East
 - Between Flinders Street/Flinders Street East and Wakefield Street/Road
 - Between Wakefield Street/Road and Angas Street
 - Between Angas Street and Carrington Street
 - Between Carrington Street and Halifax Street
 - Between Halifax Street and Gilles Street
 - Between Gilles Street and South Terrace
- Hutt Street/Carrington Street intersection

Glossary

TRAQ – Levels of Risk

The *TRAQ Risk Rating Matrix* uses four categories to define levels of risk: Extreme, High, Moderate, and Low. These categories communicate the level of risk and help guide recommendations for mitigation and inspection frequency. The priority for action depends on the risk rating and the risk tolerance of the tree owner or manager.

- **Extreme:** Failure is imminent, with a high likelihood of impacting the target, and consequences are severe. Immediate mitigation is required, which may include restricting access to the target zone.
- **High:** Consequences are significant and failure/impact is very likely or likely, or consequences are severe and likelihood is likely. Mitigation is recommended within the manager's risk tolerance. In populations, these trees are second in priority only to extreme-risk trees.
- **Moderate:** Consequences are minor and failure/impact is very likely or likely, or likelihood is somewhat likely with significant or severe consequences. Mitigation



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or monitoring may be recommended, depending on the manager's risk tolerance. These are a lower priority than extreme or high-risk trees.

- **Low:** Consequences are negligible and likelihood of failure/impact is low, or consequences are minor with a somewhat likely failure. Mitigation is generally not required, though low-cost works may be considered. Monitoring is usually sufficient.

(Dunster et al., 2017, Tree Risk Assessment Manual, 2nd Ed., ISA, p.132)

TRAQ – Likelihood of Failure

The likelihood of failure is based on tree defects, structural condition, expected loads, site conditions and weather. Timeframes must be specified to give the rating meaning.

- **Imminent:** Failure has started or is expected in the near future, regardless of weather.
- **Probable:** Failure may be expected under normal weather conditions within the specified timeframe.
- **Possible:** Failure may be expected only under extreme weather conditions.
- **Improbable:** Failure is not likely under normal conditions and may not occur even in extreme weather.

(Dunster et al., 2017, p.102)

TRAQ – Likelihood of Impact

This describes the likelihood that a failed tree or tree part will strike a target. It depends on occupancy rates in the target zone and any protective factors.

- **High:** The failed part is likely to impact the target (constant target, no protection, direction of fall toward target).
- **Medium:** Impact is possible but not certain (e.g. people in a frequently used area where the fall direction may or may not be toward them).
- **Low:** Impact is unlikely (e.g. occasional-use areas, frequently used areas with partial protection, or constant targets with strong protection).
- **Very Low:** Impact is highly unlikely (e.g. target outside the zone of fall, rare occupancy, or protection from intervening trees/structures).

(Dunster et al., 2017, p.42)

TRAQ – Occupancy Rates

Occupancy rate is the proportion of time one or more targets are present in the target zone.

- **Constant:** Target is present nearly all the time (e.g. buildings, highways with continuous traffic, busy shopping streets).
- **Frequent:** Target zone is occupied a large part of the day or week (e.g. suburban streets, daytime car parks, busy sidewalks).
- **Occasional:** Target is present irregularly or infrequently (e.g. country roads, low-use trails, or fields used for special events).
- **Rare:** Target zone is seldom used (e.g. remote trails, fenced-off areas).



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Occupancy may also be influenced by weather. For example, fewer people may use parks during heavy storms, while road traffic may increase as people avoid walking or cycling.
(Dunster et al., 2017, p.40–42)

TRAQ – Typical Weather Conditions

Tree risk assessments are conducted under the assumption of normal and typical weather conditions, which may include storms. Most tree failures occur during adverse weather (e.g. high winds, heavy rain, ice or snow), and these conditions must be factored into risk assessment.
(Dunster et al., 2017, p.52)



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