# Safety Assurance Framework

Government of South Australia
Department for Infrastructure and Transport

## Automated Vehicle Trials Safety Assurance Framework

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## CONTENT

## GLOSSARY OF TERMS

| Abbreviation | Term |
|---|---|
| Act | *Motor Vehicles (Trials of Automotive Technologies) Amendment Act 2016* |
| ADR | Australian Design Rules |
| ADS | Automated driving system |
| ADSE | Automated driving system entity |
| AV | Automated vehicle |
| AVTAC | Autonomous Vehicle Trial Advisory Committee (within DIT) |
| DIT | Department of Infrastructure and Transport |
| HMI | Human-machine interface |
| Minister | Minister for Infrastructure and Transport |
| NTC | National Transport Commission |
| ODD | Operational design domain |
| SA | South Australia |
| SAPOL | South Australian Police |
| SWMS | Safe Work Management System |
| TIC | Transport and Infrastructure Council |
| TMP | Traffic Management Plan |

## INTRODUCTION

In 2016 the South Australian Parliament enacted legislation, the *Motor Vehicles (Trials of Automotive Technologies) Amendment Act 2016* (the Act) to allow automated vehicles to be tested, developed and deployed on-roads in South Australia (SA).

The South Australian government actively encourages on-road trials, as well as the testing and development of driverless vehicles and advanced automated technologies.

This document provides a safety assurance framework to guide the safety for all automated vehicle (AV) trials in SA. The document outlines the requirements and current best practice to ensure the safe deployment and operations of an AV trial.

The document also provides an outline of the application process, with safety being a paramount consideration in the approval of AV trials in SA. The application process incorporates a variety of obligations on an applicant to ensure the safe deployment and operations during a trial.

The framework is designed to align with a Safe Systems approach to road safety, which focuses on the delivery of four elements: safer people, safer roads, safer speeds, and safer vehicles.

## APPLICATION OF THE FRAMEWORK

The framework applies to all AV trials authorised under the Act.

There are three categories of test environments which are available for AV trials in SA: controlled (test track), semi-controlled (private roads) and public (public roads). The safety considerations and requirements will differ between the environments. The framework has been established specifically in consideration of public roads, requiring the highest level of safety and consideration in the deployment of a trial.

The framework, however, applies to all categories of test environments. The level of detail required in more controlled environments may be lower.

# 1. SAFETY ASSURANCE FRAMEWORK

## 1.1 Purpose and Scope of the Safety Framework

The safety assurance framework applies to all AV trial in SA, which are authorised under legislation, the *Motor Vehicles (Trials of Automotive Technologies) Amendment Act 2016.*

The framework is designed to guide the safe operations and deployment of AVs by standardising requirements and the information required for trial authorisation. The framework assists in identifying challenges and effective risk controls to manage any challenges and emerging risks.

### 1.1.1 Trial aims and objectives

The trialling organisation must provide clear trial aims and objectives – describing the use case, overall trial methodology and phases including the key elements of the automated technology that will be tested.

### 1.1.2 Roles and responsibilities

The trialling organisation must provide information on its entity, its capability, previous trial information and financial status.

The trialling organisation must provide information on the roles and responsibilities of all the parties involved in the trial, including any legal engagement between parties that underpin the trial. The trialling organisation is responsible for these relationships and ensuring that the roles and responsibilities are clear. The trialling organisation should also provide detail around a contingency plan in the event that roles and responsibilities of third parties are not met. The trialling organisation is ultimately responsible for covering any third party obligations.

### 1.1.3 Vehicles or service under test

The trialling organisation must provide detail on the vehicle(s) or service to be tested. Technical specifications of the vehicle as well as:

- information on first supply and conditions including meeting of current Australian Design Rules;
- information on safety and achieving an ANCAP/EuroNCAP rating; and
- information on the technical and safety validation of the vehicle and its automated driving systems.

## 1.2 Process and procedure

Key elements of the process and procedure of the safety assurance framework are outlined below.

### 1.2.1 Ownership

From all parties involved in any AV trial, the trialling organisation has control of the trial and is likely to have the strongest understanding of the technology being tested. As a result, they are best placed to develop the safety case and maintain overall responsibility for risks presented by the trial.

### 1.2.2 Acceptance

Although the trialling organisation retains responsibility for safety assurance, verification is required to ensure that the process defined in this framework is followed. The following features are a key part of the process:

- Department of Infrastructure and Transport (DIT) and the Minister for Infrastructure and Transport has final say as to whether a trial goes ahead once they have reviewed the safety case and the trial application.
- The safety assurance frameworks should be consistent between test environments of the same type.

### 1.2.3 Revisions and changes

A completed robust safety case is required, however the document remains live throughout the length of the trial. As such, throughout a trial the safety case may require occasional updating to ensure it remains relevant and covers any new or emerging safety or operational issues.

Updates should be considered periodically, but should be triggered by certain changes or events, including:

- a significant change in trial operations, the operational environment or vehicle functionality;
- an incident or high potential near miss during the trial; and
- an event which brings the underlying assumptions of the safety case into question.

### 1.2.4 Audits

An audit process may be applied to ensure that the controls outlined within the safety case are applied throughout the trial.

## 1.3 Operational Design Domain

The Operational Design Domain (ODD) or service area is a key initial consideration of a safety assurance framework. As agreed by the Transport and Infrastructure Council (TIC) an ODD will form one of the eleven safety criteria for first supply (importation) of automated driving systems in Australia. Appendix A outlines all eleven safety criteria.

### 1.3.1 Details of the ODD

The trialling organisation must identify and provide detail of the ODD, describing the specific conditions under which the vehicle is designed to operate in autonomous mode. As a minimum the following should be included:

- roadway types;
- geographic area;
- speed range;
- complex intersections or merges
- regional variations in the road design
- rail, traffic light, infrastructure or other interfaces
- environmental conditions (weather, day/night time); and
- other domain constraints and issues.

Documentation should exist to also outline how any changes to the defined ODD will be handled.

### 1.3.2 Behavioural safety in defined environment

It must be demonstrated how the automated driving system will be:

- able to operate safely within its defined ODD;
- incapable of operating in areas outside of its defined ODD; and
- able to transition to a minimal risk condition when outside of its defined ODD.

## 1.4 Operational Risk Assessment

The trialling organisation must investigate all risks associated with a proposed trial. The trial organisation must provide a methodical overview including tolerability of risk criteria, operational risk assessment and safety governance, risk evaluation and risk decisions or tolerances. Guidance on building the risk assessment is available from the risk register template provided online at DIT's driverless vehicles website.

Operational risks may include, but are not limited to:

- use in inappropriate conditions

- insufficient infrastructure
- technological failure
- cybersecurity failure; and
- software updates.

#### 1.4.1 Overview of mitigations

Mitigations to identified risks must be detailed and documented by the trialling organisation. This will form part of the application process, and must be updated with any changes throughout the trial.

### 1.5 Operational guidance

As an element of the framework, the operational guidance of the trial must be considered in line with the following elements.

#### 1.5.1 Trial staff roles and responsibilities

A clear delineation between roles and responsibilities of those involved in the trial should be documented by the trialling organisation. All stakeholders should be involved in the process and where applicable, there should be formal agreements between stakeholders.

#### 1.5.2 Safe work practices

All stakeholders are to apply relevant safe work practices and the appropriate legal requirements, such as the *Work Health and Safety Act 2012*.

#### 1.5.3 Safety driver selection, training and ongoing development

The trialling organisation must outline and conduct the appropriate education and training for operators of the automated driving system. All procedures should be documented and made easily accessible to operators.

In SA, an operator must hold a current Australian driver licence class C and a valid working with children check, as per the *Child Safety (Prohibited Persons) Act 2016.*

These requirements are outlined in Autonomous Vehicle Safety Guidelines – Seatbelts and Passenger Safety at Appendix D.

### 1.6 Vehicle and automated systems

Consideration needs to be given to elements of the vehicle and the automated system to ensure a safe trial, the safety assurance framework requires information on key criteria.

### 1.6.1 Build, design and compliance

The overall objective of the vehicle and its system design should be that the Automated Driving System (ADS) is free of safety risks insofar as is reasonably practicable.

#### *1.6.1.1 Safe design*

The trialling organisation must explain why a chosen design, validation and verification process has been used and how they will ensure the safety of the technology is developed and maintained for the life of the vehicle. Any decisions in relation to the design, validation and verification process should be documented. This includes a clear outline of the capabilities and limitations of the ADS.

#### *1.6.1.2 Design life*

The life of the ADS should be made clear by the trialling organisation, including how long they intend to support the ADS.

#### *1.6.1.3 Installation of system upgrades*

The trialling organisation must demonstrate the management and procedures of system upgrades, including how the updates will be communicated to operators, including any ongoing training.

### 1.6.2 Sensors and modifications

The trialling organisation must provide details on the sensors including validation of navigation and localisation, which are to be provided in the application process.

Any hardware changes should be tested. The nature of the testing will differ depending on the change made; it could be appropriate for the process to be outlined for each trial within the safety case.

### 1.6.3 Switching between manual and automated modes

#### *1.6.3.1 Reverting to minimal risk condition*

The trialling organisation must demonstrate how the ADS will detect that it cannot operate safely (failure warnings) and the steps it will take to ensure a minimal risk condition is applied to the vehicle. Where a minimum risk condition requires the vehicle to stop, this must be in a legal parking or stopping area.

The minimal risk condition is a requirement under the eleven safety criteria for first supply of an ADS.

#### 1.6.4 Storage facilities

The trialling organisation will be required to work with stakeholders to identify storage facilities close to the route or ODD of the vehicle. This must be identified as part of the application process. Agreements with third parties to be provided.

#### 1.6.5 Charging

The trialling organisation must provide details on charging specifications, infrastructure requirements and procedures.

The organisation must also make available direction on dealing with the battery in the event of an emergency.

#### 1.6.6 Maintenance

The trialling organisation must provide documentation which facilities maintenance and repair of the vehicle as well as emergency procedures for first responders. Detail on the levels of maintenance required and responsibilities for the provision of all levels of maintenance are also required, thereby providing detail of agreements with third parties.

### 1.7 Route Selection and assessment

#### 1.7.1 Route selection and analysis

The trialling organisation must provide detail on the route selection and analysis.

The trialling organisation is required to discuss with DIT any potential route selections. This should take place before the trial application is submitted. DIT will consider known safety concerns in advising a trialling organisation.

On selection of a route, a trialling organisation is required to undertake a variety of analyses in regards to the safety of the route. This is part of the application process, and includes a risk analysis, a traffic management plan, road safety audit and a site assessment report (further detail is provided in discussing application requirements below).

The trialling organisation is to provide detail on the route data collection and mapping process.

#### 1.7.2 On street equipment or physical changes to infrastructure

To mitigate risks, equipment or infrastructure may be required. This must be discussed with DIT and, where applicable, the local council.

AV signage must be installed, providing information to other road users that an AV is in use in the area. There are established signage guidelines to be followed, Autonomous Vehicle Trials Signage Guidelines, Appendix B

Infrastructure changes require approval by the asset owner.

## 1.8 Remote monitoring, operation or control

### 1.8.1 Operation with a remote safety driver

A trialling organisation must identify when a remote driver is involved in a trial. The organisation must provide details on:

- the remote driver, including that they hold an Australian driver licences class C and a valid working with children check;
- where the remote driver is located;
- when the remote driver will undertake the driving task instead of the ADS;
- security, both physical and cyber;
- monitoring role they will undertake; and
- any other relevant material.

### 1.8.2 Other remote monitoring and control

Details must be provided of any monitoring or control that may take place, including monitoring other than by a remote driver or on board safety operator. The requirements for this criterion will vary depending on the role played.

## 1.9 Security

### 1.9.1 Mitigations

The testing organisation must demonstrate the:

- capacity and competence of the ADS to minimise cybersecurity threats and vulnerabilities;
- ability of the ADS to detect and minimise consequences of cyber intrusions and data security breaches;
- the compliance of the ADS with recognised safety ISO standards; and
- processes in place to ensure continuation of the system's capacity, competence and detection ability.

## 1.10 Functional safety

### 1.10.1 Functional Safety Assessments

As part of the application process, a functional safety assessment is required. Functional safety is the overall safety of the system.

The trialling organisation must demonstrate the safety of the trial throughout the entire lifecycle. It is recommended in undertaking the assessment that the organisation considers ISO 26262, which is a standard for functional safety in road vehicles.

## 1.11 Safety testing and acceptance process

### 1.11.1 Overview of testing and acceptance process

The design and verification processes must cover all safety-critical issues, such as unsafe maintenance, repairs, physical modifications and other system failures.

#### *1.11.1.1 Human-machine interface (HMI)*

The trialling organisation must define how the HMI will facilitate interaction between the ADS and other relevant elements (inside and outside the vehicle) that allow the vehicle to operate safety.

The items communicated to the human driver by the HMI should include, but are not limited to:

- whether it is safe to engage the automated driving system;
- when control of the vehicle is required to be taken back; and
- whether the automated driving system is functioning properly or experiencing malfunctions.

#### *1.11.1.2 On-road behavioural competency*

The trialling organisation must demonstrate how the ADS will appropriately respond to any foreseeable conditions that may affect the safe operation. The organisation must further demonstrate that the ADS will interact in a predictable and safe way with other road users.

This may include documentation outlining the process for verifying the ADS, such as:

- object and event detection and response capabilities;
- crash avoidance capabilities;
- ability to respond to unusual events within the ODD;

- on road interaction with other road users, including vulnerable road users.

#### *1.11.1.3 Testing for Australian road environments*

The trialling organisation must demonstrate how the ADS has been designed and verified considering the Australian road environment, including left hand drive, interaction with road signs, Australian weather conditions, flora and fauna.

#### *1.11.1.4 Moving between test environments*

Moving between test environments will be endeavoured to be made as easy as possible for organisations. However, a number of regulatory and safety assurance processes will need to be completed and documented.

A consistent approach and standards will be applied across similar test environments, allowing for simpler transitions.

### 1.11.2 Hardware or software changes

The trial organisation must provide details on the procedures for hardware and software updates. All changes to the hardware and software of a trial vehicle should be recorded during a trial.

All software changes or updates must be subject to extensive and well-documented testing. Typically, this will start through bench testing and simulation, before moving to trials in a controlled environment. All or some of this testing may occur by the vehicle or a technology provider outside of SA.

All hardware changes should also be tested. The nature of the testing will differ depending on the change made. It could be appropriate for the process to be outlined for each trial within the safety case.

## 1.12 Compliance

### 1.12.1 Vehicle assessment

The applicant must provide details on the vehicles to be used in the trial. Basic details of the vehicle are to be provided in the application, but a detailed specification document from the vehicle manufacturer should be provided.

Applicants will also need to provide an Australian Design Rules (ADR) Compliance Statement for the vehicle.

### 1.12.2 Compliance with relevant road traffic laws

The trialling organisation must demonstrate how it will ensure the vehicle operates in compliance with the relevant road traffic laws when the automated

driving system is engaged. It should also be demonstrated how the automated driving system will respond in a safe way when strict compliance with the relevant road laws is not possible (i.e. crossing of a solid white line to avoid an obstacle).

Compliance with relevant road safety laws is one of eleven safety criteria for first supply (importation) of an ADS in Australia, outlined in Appendix A.

1.12.3 Interaction with enforcement/emergency services

The trialling organisation must demonstrate how it will ensure the police can access accurate information about whether the ADS was engaged at a particular point in time. Additionally, the organisation must outline how access can be provided when there is need to gather this information.

The trialling organisation must demonstrate how it will interact with emergency services vehicles within its vicinity.

Interaction with enforcement/emergency services forms one of eleven safety criteria for first supply of an ADS in Australia, outlined at Appendix A.

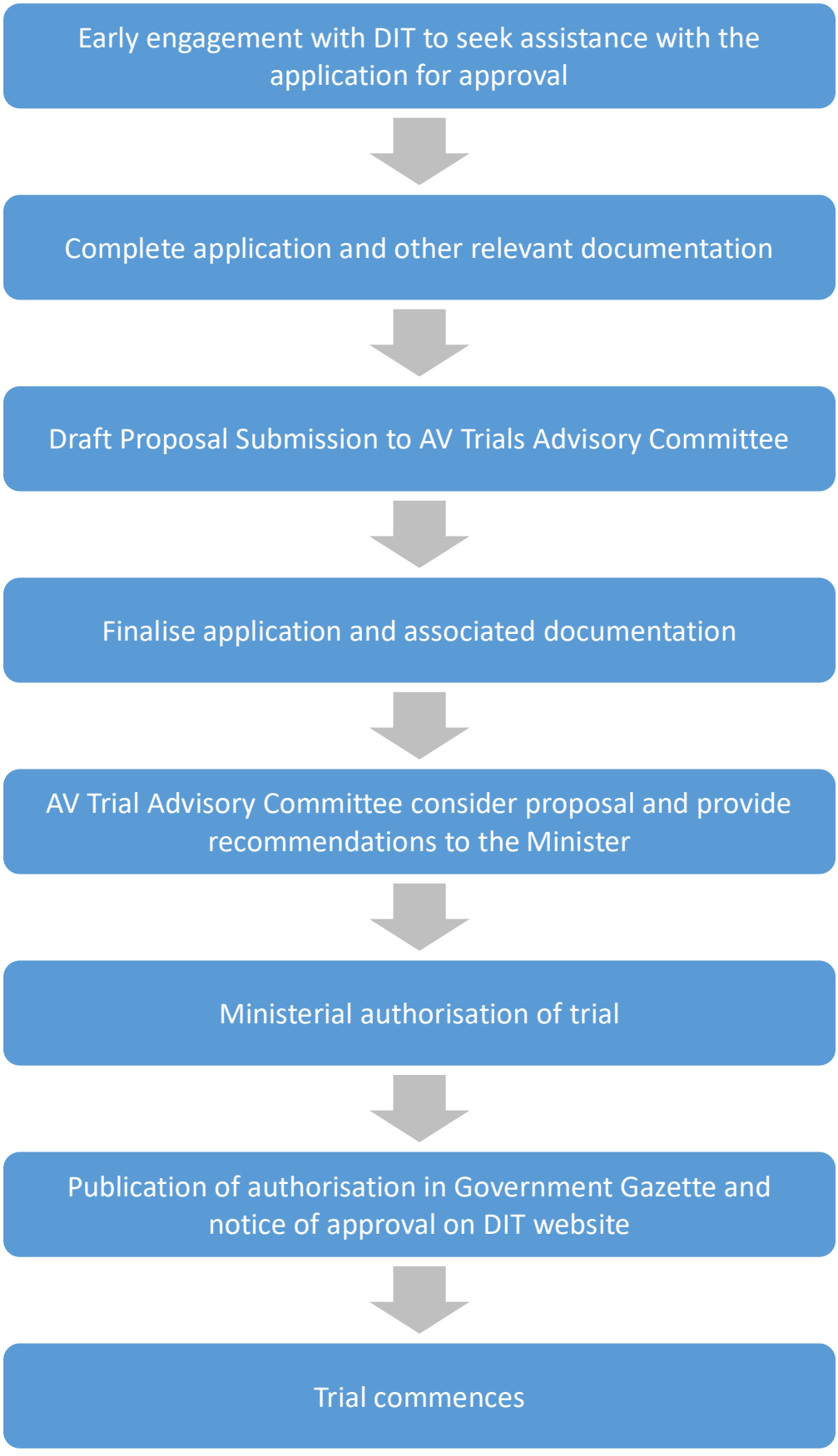
The organisation must also make available a guide for interacting with the vehicle and the ADS in the case of an emergency.

1.12.4 Data protection

The trialling organisation must comply with the *Autonomous Vehicle Trials Incident and Data Protocols*, available at Appendix C. The Protocols outline requirements for storage and sharing of data.

# 2 APPROVAL PROCESS

## 2.1 Trial Assessment Process



It is encouraged prior to making an application that the applicant make early contact with DIT, as DIT will work with the applicant to ensure a clear understanding of the assessment process and relevant timeframes.

Applicants planning to import test vehicles also need to be aware of Circular 0–4–8 Registration and use of evaluation vehicles which outlines the current requirement of the Commonwealth *Motor Vehicle Standards Act 1989*. This Circular specifies the arrangements under which manufacturers and importers may register vehicle(s) for the purposes of evaluation. Trial applicants should note that vehicles temporarily imported under other arrangements, such as *carnet de passage*, cannot be used as evaluation vehicles.

High level guidance on requirements of AV trials has been developed by the National Transport Commission (NTC) and Austroads, in the *Guidelines for Trials of Automated Vehicles in Australia* document.

The Autonomous Vehicle Trial Advisory Committee (AVTAC) within DIT will review any application and documentation made. AVTAC will determine if the trial should proceed, making a recommendation to the Minister for Infrastructure and Transport (the Minister) to authorise the trial.

AVTAC is comprised of key DIT personnel, along with SAPOL and other members as needed.

The assessment process undertaken by AVTAC is intended to be flexible and will included consultation with the trial application and other relevant stakeholders as required.

Overall the application process follows the process outlined below:

- Initial discussions with DIT.
- Application for trial, addressing the safety assessment framework criteria and the *Guidelines for Trial of Automated Vehicles in Australia*, is received by DIT.
- Appropriate AVTAC members will consult with the trial applicant to:
    - better understand the trial scope and provide initial observations regarding information required from the applicant;
    - provide initial feedback on possible conditions of authorisation;
    - provide initial indication on support for requested exemptions from Acts, laws or standards; and
    - provide further information to all Advisory Committee members.
- DIT receives a final formal application from the trial applicant, which must include the following documents:
    1. Application;
    2. Risk Matrix;

3. Vehicle Specifications/Details;
4. Traffic Management Plan (TMP);
5. Insurance – both Motor Vehicle and Public Liability;
6. Safe Work Method Statement (SWMS);
7. Road Safety Audit Report; and
8. Site Assessment Report.

- AVTAC will meet to consider the final application. If required, the applicant will be asked to provide a formal presentation to the Committee.
- AVTAC will make a recommendation to the Minister, including conditions of authorisation and exemptions from Acts, laws and standards.
- The Minister considers the trial application and the recommendations from AVTAC and make a determination on authorising the trial.
- If authorised, the determination is published in the *South Australian Government Gazette* and published on dit.sa.gov.au/driverlessvehicles
- DIT advises trial applicant of the authorisation of the trial and the trial start date.

## 2.2 Application Documentation

### 2.2.1 Application

An applicant will apply using the application form available online at the DIT driverless vehicles page. The form requires a summary of the trial, details of the vehicle to be used, trial management information, insurance and, data and information.

This application will be part of the initial conversations to occur between the applicant and DIT.

### 2.2.2 Risk Matrix

In that initial conversations, the applicant will also be required to investigate risks associated with the trial. Guidance on risk is available from the risk register template available online and the safety assurance framework.

### 2.2.3 Vehicle Specifications/Details

The applicant must provide details on the vehicles to be used in the trial. Basic details of the vehicle are to be provided in the application, but a detailed specification document from the vehicle manufacturer should also be provided.

Applicants will also need to provide a copy of an Australian Design Rules (ADR) Compliance Statement about the vehicle.

### 2.2.4 Traffic Management Plan (TMP)

The applicant must provide a TMP that identifies the trial's anticipated traffic risks and the mitigating actions. Consideration should be given to:

- Traffic density;
- Speed environment;
- Pedestrians;
- Signage;
- Irregular events – construction, community events, road detours, flooding;
- Complex intersections and merges;
- Regional variations in the road design; and
- Rail-road or other interfaces.

### 2.2.5 Insurance

The applicant must hold and provide evidence of motor vehicle insurance which includes insurance for the vehicle and compulsory third-party, and public liability insurance up to $20 million.

### 2.2.6 Safe Work Method Statement (SWMS)

The SWMS is a legal document that outlines the high-risk work activities and the hazards that may arise, and the safety measures put in place to control the risks.

A SWMS template is available at Appendix F.

### 2.2.7 Road Safety Audit Report

A pre-trial road safety audit report for the proposed trial should be undertaken. This should be undertaken by an independent qualified auditor. The report will provide details on crash potential and safety performance of the trial route and mitigating factors to increase safety.

### 2.2.8 Site Assessment Report

The applicant must provide a site assessment report, which provides details over the route and proposed pick-up spots, the associated risks and

mitigation actions, the service level to be provided, project requirements including on site storage, and the operational rules.

### 2.3 *Motor Vehicles (Trials of Automotive Technologies) Amendment Act 2016*

All trials of AVs are enabled under the *Motor Vehicles (trials of Automotive Technologies) Amendment Act 2016* (the Act), through an exemption by the Minister.

On AVTAC accepting the application, DIT will draft an exemption notice which will provided to the Minister along with AVTAC's recommendation. The Minister, on accepting the recommendation, will provide a determination to be published in the *South Australian Government Gazette* before the trial can proceed.

This legislation provides a framework to facilitate on-road trials, testing, and development of AVs and other advanced automotive technology on SA roads.

### 2.4 Standards, protocols and guidelines

All approved AV trials are required to comply with any standards, protocols or guidelines approved by AVTAC.
The following must currently be complied with:

1. Autonomous Vehicle Trials Signage Guidelines - Appendix B
2. Autonomous Vehicle Trials Incident and Data Protocols - Appendix C
3. Autonomous Vehicle Safety Guidelines – Seatbelts and Passenger Safety - Appendix D

## 3 REPORTING REQUIRMENTS DURING THE TRIALS

All trialling organisations during the running of a trial are required to provide periodic and event based reporting.

### 3.1 Monthly Reporting

At the end of each month the trialling organisation must provide a report on the progress of the trial. The report must include: an overview of the status, key statistics, tracking on deliverables and details of any incidents or service interruptions.

A monthly reporting template will be provided by DIT.

When a trial has been supported by the Future Mobility Lab Fund, along with the monthly report, the trial organisation must also provide financials.

### 3.2 Incident Reporting

Following the obligations established in the Autonomous Vehicle Trials Incident and Data Protocols, the trialling organisation must complete an incident report as required. DIT will provide an incident reporting template which is to be followed.

### 3.3 Completion of trial reporting

On the completion of any trial authorised under the Act, a final report must be provided. The content of the report will be negotiated with DIT in the last months of the trial.

Generally a close out report will include: details about the project, roles and responsibilities of the project team, project implementation, findings and recommendations, survey results, and commercial feasibility of the service.

If the trial was supported by the Future Mobility Lab Fund, a final financial report will also be required. The report will provide details on the planned and actual spend of the project. A DIT designed template is available.

# 4 APPENDIX A – 11 SAFETY CRITERIA

The National Transport Commission (NTC) has developed safety criteria as part of producing an end-to-end regulatory framework for AVs, with the Commonwealth, States and Territories. The criteria will need to be demonstrated by the Automated Driving System Entity (ADSE) as part of a self-certification process through a Statement of Compliance. The criteria will be applied on the first supply (importation) of the vehicles with an ADS in Australia.

The criteria have been agreed to by the Transport and Infrastructure Council (TIC).

The eleven principles based safety criteria are:

1. **Safe system design and validation processes**
   The ADSE must be able to explain why it chose a particular design, validation and verification process and how this will be maintained for the life of the ADS.

2. **Operational design domain (ODD)**
   The ADSE must identify the ODD of the ADS and demonstrate how it will ensure that the ADS is able to operate safely within the defined ODD, that it is incapable of operating in areas outside of the ODD, and that it is able to transition to a minimal risk condition when outside its defined ODD.

3. **Human-machine interface (HMI)**
   The interaction between the ADS and relevant parties (both internal and external to the vehicle) must be outlined. This will include information communicated by the HMI that:
   - advises the human driver when it is safe for the driver to engage the ADS;
   - informs the human driver if the ADS is engaged and the level off automation engaged; and
   - indicates whether the ADS is functioning properly or experiencing a malfunction.

4. **Compliance with relevant road traffic laws**
   It must be demonstrated how the vehicle will operate in compliance with relevant road traffic laws when the ADS is engaged, including the variations that may occur across States or Territories, and instances where amendments to laws occur.

5. **Interaction with enforcement and emergency services**
   The ADSE must demonstrate how it will ensure the police can access accurate information about whether the ADS was engaged at a given time, the level of automation engaged, and the handover of control requests made to the human driver.

6. **Minimal risk condition**
   It must be demonstrated how the system will detect that it cannot operate safely, and the steps that will be taken to bring the vehicle to a minimal risk condition.

7. **On-road behavioural competency**
   Demonstration is required of how the system will appropriately respond to foreseeable and unusual conditions that may affect safe operations and interact in a predictable and safe manner with other road users.

8. **Installation of system upgrades**
   It must be demonstrated how system upgrades will be managed, including ensuring safety-critical system upgrades.

9. **Verifying for the Australia road environment**
   It must be demonstrated how the Australian road environment is reflected in the design, development and verification of the systems.

10. **Cybersecurity**
    The ADSE must demonstrate the:

    - capacity and competency of the automated driving system to minimise cybersecurity threats and vulnerabilities;
    - automated driving systems ability to detect and minimise consequences of cyber intrusions and data security breaches; and
    - processes in place to ensure continuation of the system's capacity, competency and detection.

11. **Education and training**
    The ADSE must outline the education and training that it will provide to all relevant parties regarding its systems, and how it will minimise the safety risks of using and operating those systems.

Along with the eleven safety criteria, the Statement of Compliance will require three other obligations:

1. *Data recording and sharing* – an outline of how the data will be recorded and provided to relevant parties.

2. *Corporate presence in Australia* – evidence must be provided of the ADSE's corporate presence in Australia.

3. *Minimum financial requirements* – evidence of its current financial position and the level of insurance held must be supplied.

For further detail on the safety criteria, visit the NTC website.

# 5 APPENDIX B – AUTONMOUS VEHICLE TRIALS SIGNAGE GUIDELINES

This document outlines the guidelines for signage for autonomous vehicle trials in South Australia.

The sign standards which must be followed for any displayed signage for an AV Trial to ensure consistency and recognition of AV trial zones all road users.

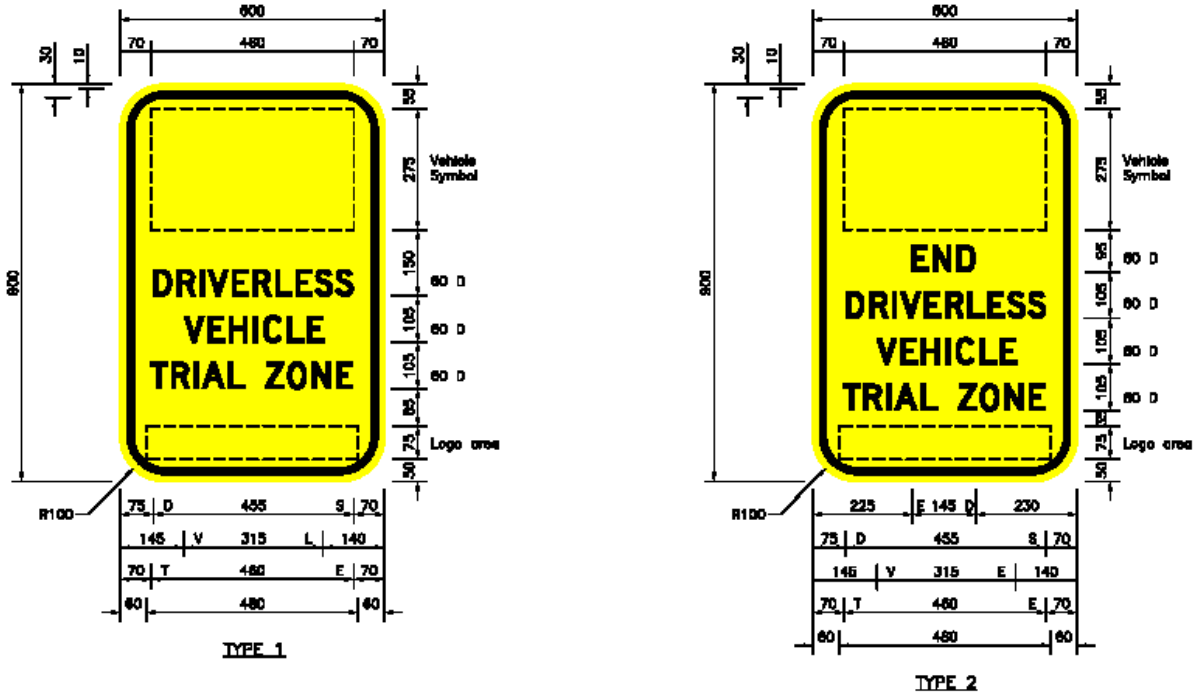
Responsibility for signage is with trial proponents following the approval of a traffic management plan as part of the application and approval process for on-road AV trials in South Australia as per the *Motor Vehicles (Trials of Automotive Technologies) Amendment Bill 2016*.

Further information on the application process can be found at www.dit.gov.au/driverlessvehicles

*These standards have been endorsed by Department of Infrastructure and Transport Autonomous Vehicle Trial Advisory Committee.*

**TES 19708 is to be used on Council Local Roads to inform motorists**

***Road and Marine Services***
***Traffic Services, Traffic Solutions Unit***
***Specific Road Signs - Specifications, South Australia***




TES19708 to be used on Council local roads.

Yellow class 400
White class 400
Black

Scale: 1:10
ALL DIMENSIONS ARE IN MILLIMETRES
Total Sign Area: 0.53 sqm
Sign Type: Information
Location: Various

Drawn: A. Sinister
Edition: A Rev: 0
Date: 18 March, 2019

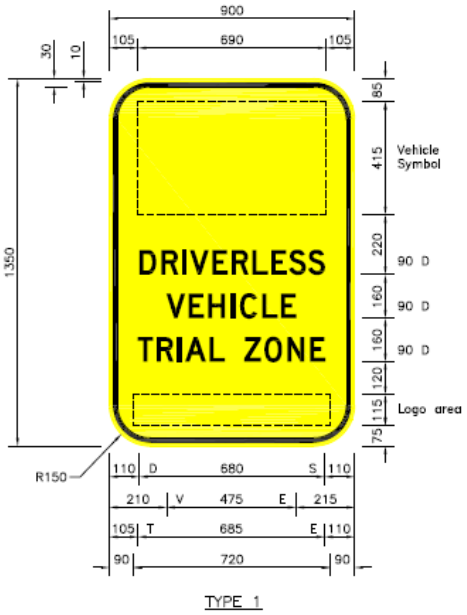
Authorisation:
Date:

**- NOTE -**
**Series 2000 Font**

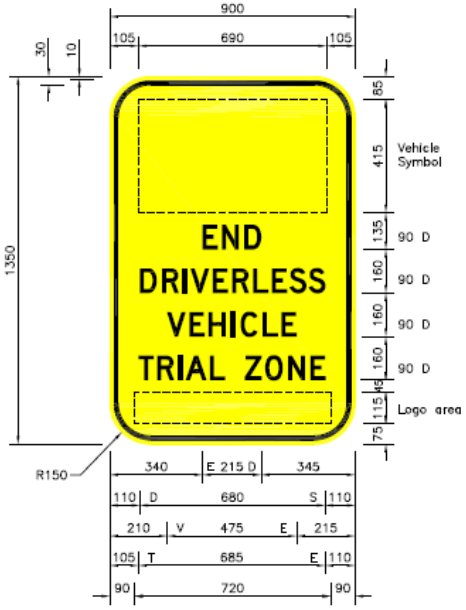
***TES 19708***

**TES 19714 is to be used on Arterial Roads to inform motorists**

***Road and Marine Services***
***Traffic Services, Traffic Solutions Unit***
***Specific Road Signs - Specifications, South Australia***




TYPE 1




TYPE 2

Yellow class 400
White class 400
Black

TES19714 to be used on DPTI arterial roads.

Scale: 1:15
ALL DIMENSIONS ARE IN MILLIMETRES
Total Sign Area: 1.20 sqm
Sign Type: Information
Location: Various

Drawn: A. Simister
Edition: A Rev: 0
Date: 18 March, 2019

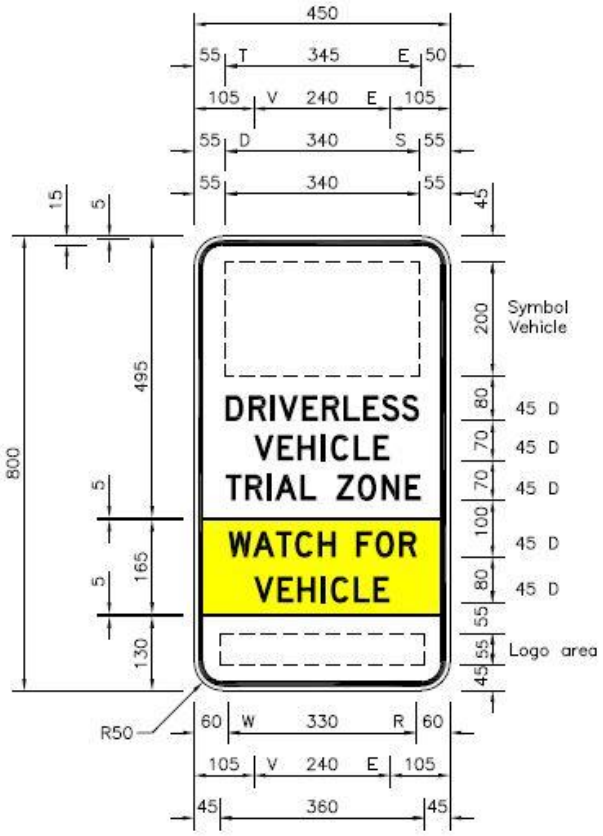
Authorisation:
Date:

- NOTE -
Series 2000 Font

***TES 19714***

**TES 19715 should be used to advise pedestrians of the driverless vehicle**

***Road and Marine Services***
***Traffic Services, Traffic Solutions Unit***
***Specific Road Signs - Specifications, South Australia***




TES19715 shall be used to warn pedestrians of the Driverless Vehicle Trial Zone.

Black
Yellow class 400
White class 400

Scale: 1:10
ALL DIMENSIONS ARE IN MILLIMETRES
Total Sign Area: 0.36 sqm
Sign Type: Information
Location: Various

- NOTE -
Series 2000 Font

Drawn: A. Simister
Edition: A Rev: 0
Date: 18 March, 2019

Authorisation:
Date:

***TES 19715***

# 6 APPENDIX C – AUTONMOUS VEHICLE TRIALS INCIDENT AND DATA PROTOCOLS

This document outlines the protocol for collecting and reporting of all data relating to trials and incidents for driverless vehicles and other advanced automotive technology.

These protocols align requirements with the National Transport Commission (NTC) Guidelines for Trials of Automated Vehicles in Australia.

Along with the general requirements for reporting a crash under Rule 287 of the *Australian Road Rules*, trialling organisations must abide by the details set out below.

The table below defines the type of incidents which may occur on an autonomous vehicle trial and the associated reporting requirements.

**Types of incidents and reporting requirements**

| Incident Type | Definition | Reporting Requirement |
|---|---|---|
| Serious | Any crash or near miss involving a trial vehicle or a contravention of any law, including:<br>• injury to anyone inside or outside the vehicle;<br>• property damage, including vehicle fire or collision;<br>• violation of any laws including the *Australian Road Rules*;<br>• near misses of any of the above items;<br>• security or data/cyber breach; and<br>• any other grave safety concern.<br>This includes incidents not resulting from vehicle operations directly. | • verbal report to DIT within the first 10 minutes any injury, collision, serious technical or security/cyber issue and written notification must be reporting within 6 hours of the incident;<br>• a full report on the incident including all relevant data and information outlined within the protocol must be provided to DIT within 7 days of the incident; and<br>• abide by existing crash reporting requirements under the *Australian Road Rules*. |
| Technical | Any technical fault of the vehicle or its systems, including;<br>• hardware or software capabilities of the vehicle are compromised;<br>• any technical issue that impacts on the safety of the vehicle; and<br>• any technical issue that impacts the service. | • report all serious technical or hardware issues or issues impacting safety to DIT within the first 24 hours of the incident; or<br>• report other technical issues that impact on service to DIT as soon as possible. |
| Other | • notable public comments or complaints;<br>• external events which are worthy of further discussion;<br>• when a human takes back control of the vehicle;<br>• e-stops used when not required;<br>• event related operator thoughts and feedback or safety items that are not serious incident or would not impact on service. | • report any notable public incident which may bring media or other exposure to DIT within 24 hours; and<br>• report all 'other' incidents to DIT within the month. |

Notification details for all type of incidents, at a minimum, must include;

- time;
- date;
- location;
- automation status (for example, automated system, vehicle supervisor transitioning, etc);
- traffic conditions (for example, empty road, in heavy traffic);
- road and weather conditions;
- vehicle information (speed, brake/throttle applications, vehicle fault condition description, etc);
- sensor information in relation to other road users and surrounding road environment;
- identity of the vehicle operator at the time of incident;
- driver and person in charge of the vehicle at the time of the incident;
- number of passengers, seating position and use of restraints by each passenger;
- description of the reported incident; and
- incident type as determined in accordance with the table above.

The collection of data on all autonomous vehicles must comply with the following:

- All vehicles undertaking autonomous vehicle trials in South Australia must be fitted with a black box data recorder or an equivalent system. The black box data recorder system must provide all data necessary to support incident reporting (outlined above), and capture all video footage.
- All captured data must be retained within a jurisdiction where it is readily available to DIT and/or SAPOL at all times if requested and should not be edited in anyway or form.
- All data must be maintained for the life of the trial and for 12 months following the completion of the trial.
- If required, the trial organisation must provide adequate assistance to interpret the data to ensure sufficient information is available to DIT and SAPOL if required.
- If requested, sharing of sensor data to DIT for safety and security certification, monitoring, inspection and investigation. As the safety of the AV to the passenger the surrounding depends highly on obtained sensor data and also the decisions made by the system, the sensor datasets therefore will be useful to exhibit safety and reliability of the system.

**Reporting incidents to DIT**

Trialling organisations must contact the following people, in the order provided, in accordance with the timeframes outlined above.

In the event the first person listed does not answer leave a message and email them and immediately contact the next person listed.

| | |
|---|---|
| Joanne Murray | E: joanne.murray@sa.gov.au |
| Olivia Hubbard | E: olivia.hubbard@sa.gov.au |

*Endorsed by Department of Infrastructure and Transport Autonomous Vehicle Trial Advisory Committee.*

# 7 APPENDIX D – AUTONMOUS VEHICLE TRIALS SAFETY GUIDELINES – SEATBELTS AND PASSENGER SAFETY

This document outlines the guidelines for safety, including seatbelt requirements, on autonomous vehicles trialled in South Australia. As written, this document only applies to shuttles and pods, which do not comply with Australia vehicle standards, particularly the Australian Design Rules.

### Seatbelt requirements for AV trials in pedestrian only areas

Autonomous vehicle trials in **pedestrian areas** must abide by the following:

1. maximum traveling speed of 10 km/h;
2. passengers may sit and stand, if the autonomous vehicle design permits;
3. seatbelts are not required;
4. handrails or comparable 'self-restraint' device must be fitted for standing passengers; and
5. the maximum passenger capacity must be confirmed and approved as part of the trial application.

Note: a **pedestrian area** must have no general access by other motor vehicles.

### Seatbelt requirements for AV trials on roads

Autonomous vehicle trials **on roads** must abide by the following:

1. maximum travelling speed of 20 km/h;
2. adjustable lap seatbelts must be fitted for all seating positions;
3. all passengers, excluding vehicle supervisors (chaperones/safety operators), are to remain seated and wear a seatbelt while the vehicle is in motion;
4. the vehicle supervisor may stand while the vehicle is in motion if it is required to ensure the safe operation of the vehicle; and
5. the maximum passenger capacity must be confirmed and approved as part of the trial application.

### Safety of passengers

Autonomous vehicle trials **carrying passengers under the age of 16** must abide by the following:

1. passenger under the age of twelve months old are not permitted to ride in the vehicle;
2. passengers over the age of twelve months, but less than four years old may only ride in the vehicle when;
    a. accompanied by a parent, guardian or supervisor;
    b. restrained in a stroller, pram or capsule which is secured at all times in a rearward facing position by a parent, guardian or supervisor whom is seated; and

    c. the vehicle supervisor is in the vehicle.
3. passengers over the age of four years old, but less than seven years old may only ride in the vehicle when;
    a. accompanied by a parent, guardian or supervisor;
    b. the passenger is seated in a rearward facing seat and wearing a seatbelt; and
    c. the vehicle supervisor is in the vehicle.
4. Passengers over the age of seven years old, but less than sixteen years old may only ride in the vehicle when;
    a. the passenger is seated and wearing a seatbelt; and
    b. the vehicle supervisor is in the vehicle.

Autonomous vehicle trials **carrying passengers in wheelchairs** must abide by the following:

1. provide a minimum floor space of 800mm x 1300mm for a single wheelchair;
2. ensure the wheelchair's brake/s are applied; and
3. the passenger is rearward facing.

**Responsibility of vehicle supervisors**

1. A vehicle supervisor (chaperone/safety operator) must hold as a minimum:
    a. a current Australian drivers licence Class C; and
    b. a valid working with children check from the South Australian Department of Human Services Screening Unit.
2. The vehicle supervisor is the driver of the vehicle when the vehicle is not in automated mode.
3. The vehicle supervisor is the person in charge of the vehicle in all modes of operation.
4. A vehicle supervisor must have zero blood alcohol and drug level while operating the vehicle. If required, the vehicle operator must undertake blood alcohol or drug testing as requested by the South Australian Police.

*Endorsed by Department of Infrastructure and Transport Autonomous Vehicle Trial Advisory Committee.*

# 8 APPENDIX F – SAFE WORK METHOD STATEMENT TEMPLATE

## SAFE WORK METHOD STATEMENT
## (SWMS)

| | | | |
|---|---|---|---|
| **Company:** | | **ABN:** | |
| **Contact Person:** | | **Phone:** | |
| **Area / Locations:** | | | |
| **Task Description:** | | | |
| **Author:** | | | |

| **Definition of Likelihood** | |
|---|---|
| **R**are | Event may only occur in exceptional circumstances.<br>Event is unlikely to occur within the next 5 years. |
| **U**nlikely | Event is unlikely to occur. The event has less than 25% chance of occurring.<br>Event may occur within the next 5 years. |
| **P**ossible | Event could occur at some time. The event has a 25-49% chance of occurring.<br>Event will occur within the next 30 months. |
| **L**ikely | Event will probably occur once per year. The event has a 50-74% chance of occurring.<br>Event will occur within the next 18 months. |

| **Consequence Level** | **Risk Legend** |
|---|---|
| **1 -** Critical | **E** – Extreme |
| **2 -** Major | **H** – High |
| **3 -** Medium | **M** – Moderate |
| **4 -** Minor | **L** – Low |
| **5 -** Insignificant | |

**Risk Matrix**

| | **R** | **U** | **P** | **L** | **A** |
|---|---|---|---|---|---|
| **1** | H | H | H | E | E |
| **2** | M | M | H | H | E |
| **3** | L | M | M | H | H |
| **4** | L | L | M | M | H |
| **5** | L | L | L | M | M |

| | CRITICAL STEPS IN TRIALS<br>List the steps relevant to the trial which will be carried out | POTENTIAL HAZARDS<br>Adjacent to each step list the potential hazards that could cause harm. | Likelihood | Consequence | Risk without | RISK CONTROL MEASURES<br>For each identified risk, list the control measures required to eliminate or minimise the risk of harm. | Likelihood | Consequence | Residual Risk | Risk Owner<br>Ultimately responsibility and acceptance for ensuring that the control measures are in place. |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | **Vehicle transit** | | | | | | | | | |
| | | | | | | • | | | | |
| **2** | **Demo sites** | | | | | | | | | |
| | | | | | | • | | | | |
| **3** | **Traffic management plan (TMP)** | | | | | | | | | |
| | | | | | | • | | | | |
| **4** | **Demo** | | | | | | | | | |
| | | | | | | • | | | | |
| | | | | | | • | | | | |
| | | | | | | • | | | | |
| | | | | | | • | | | | |
| | | | | | | • | | | | |

## Key Contact Officers for SWMS

**Notices required:** The following persons are authorised representatives of each nominated agency. Notices required by the SWMS are considered to be provided if provided to the officers below and * indicates primary officers that may provide agreement of that agency.

| | Officer | Title / Position | Phone | Email |
|---|---|---|---|---|
| *Applicant Name* | | | | |
| | | | | |
| | | | | |
| **DIT** | | | | |
| | | | | |

## Acknowledgements / Authorisations

| | Name | Signature | Date |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

* The above authorisations may be for a one-off task or they may be general approvals for the same task to be carried out on an ongoing basis (a generic SWMS), provided that the SWMS is reviewed in accordance with Cohda's Hazard Identification Risk assessment & Control procedure and the review does not identify an increase in the level of risk. Reviews shall be documented in Part 6 below.

**Acknowledgements / Authorisations:**
By signing this part, the person certifies that they have reviewed this SWMS to the best of their ability and they are satisfied that there are no significant deficiencies / errors.

## Record of Reviews - SWMS

The Cohda employee in charge of an activity (e.g. Fieldwork Supervisor) shall ensure the Safe Work Management Statement (SWMS) is periodically reviewed and revised as necessary to ensure that it remains applicable to the work at the actual workplace and continues to identify and address all of the associated hazards / risks as may arise during the trial. By signing this part, the person certifies that they have reviewed this SWMS in accordance with that requirement and determined that no amendments to the SWMS are required. If any amendments to the SWMS *are* required, the amended SWMS shall go through the entire review & certification process.

| **Reviewed by:** (Name) | **On** (Date) | **Title / Position** | **Signature** |
|---|---|---|---|
| | | | |
| | | | |