Australian Government
Civil Aviation Safety Authority

ADVISORY CIRCULAR
AC 139.C-15 v1.0

Safe planning and conduct of aerodrome works

Project number: AS 14/24 **File ref:** D19/145689

February 2026

Acknowledgement of Country

The Civil Aviation Safety Authority (CASA) respectfully acknowledges the Traditional Custodians of the lands on which our offices are located and their continuing connection to land, water and community, and pays respect to Elders past, present and emerging.

Artwork: James Baban.

Advisory circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.

Advisory circulars should always be read in conjunction with the relevant regulations.

Audience

This advisory circular (AC) applies to:

- aerodrome owners/operators
- aerodrome personnel involved in the planning and execution of aerodrome works
- appointed works safety officers (WSOs)
- consultants engaged in planning and conducting aerodrome works
- aircraft operators
- Air Traffic Control (ATC)
- instrument flight procedure designers

Purpose

The purpose of this AC is to assist aerodrome operators to plan and implement works to be carried out at an aerodrome and not create any hazard to aircraft operations or confusion to pilots.

Note: Nothing in this AC removes the aerodrome operator's requirement to ensure no harm is experienced because of aerodrome works. This includes the considerations of other forms of safety such as industrial safety or public safety requirements, in addition to aviation safety requirements.

For further information

For further information or to provide feedback on this AC, visit CASA's contact us page.

Status

This version of the AC is approved by the National Manager, Flight Standards Branch.

Table 1: Status

Version	Date	Details
v1.0	February 2026	This AC replaces AC 139-20(0) Safe planning and conduct of aerodrome works.

Unless specified otherwise, all subregulations, regulations, Divisions, Subparts and Parts referenced in this AC are references to the *Civil Aviation Safety Regulations 1998 (CASR)*.

Contents

1 Reference material

1.1 Acronyms

The acronyms and abbreviations used in this AC are listed in the table below.

Table 2: Acronyms

Acronym	Description
AC	advisory circular
ADO	aeronautical data originator
AFRU	aerodrome frequency response unit
AIC	aeronautical information circular
ARC	aerodrome reference code
ARFFS	aviation rescue fire-fighting service
ASDA	accelerated stopping distance
AROC	aeronautical radio operator certificate
ATC	air traffic control
ATIS	automated terminal information service
CAR	*Civil Aviation Regulations 1988*
CASA	Civil Aviation Safety Authority
CASR	*Civil Aviation Safety Regulations 1998*
CTAF	common traffic advisory frequency
FOD	foreign object debris
LDA	landing distance available
LVP	low visibility procedures
MATS	Manual of Air Traffic Services
MOS	Part 139 (Aerodromes) Manual of Standards
MOWP	method of working plan
OLS	obstacle limitation surfaces
PAL	pilot activated lighting
RESA	runway end safety area
RMP	risk management plan
RTAO	restrictions to aircraft operations

Acronym	Description
RTIL	runway threshold identification lights
SMS	safety management system
SOT	start of take-off run available
STODA	supplementary take-off distance available
TLW	time limited works
TODA	take-off distance available
TORA	take-off run available
WIP	works in progress
WSO	works safety officer

1.2 Definitions

Terms that have specific meaning within this AC are defined in the table below. Where definitions from the civil aviation legislation have been reproduced for ease of reference, these are identified by 'grey shading'. Should there be a discrepancy between a definition given in this AC and the civil aviation legislation, the definition in the legislation prevails.

Table 3: Definitions

Term	Definition
aerodrome facilities and equipment	means facilities and equipment, inside or outside the boundaries of an aerodrome, that are installed or maintained for use by aircraft operating at the aerodrome.
aerodrome facility	means any of the following physical things at an aerodrome as mentioned in this MOS for an aerodrome: a. the physical characteristics of any movement area including runways, taxiways, taxilanes, shoulders, aprons, primary and secondary parking positions, runway strips and taxiway strips; b. infrastructure; c. structures; d. equipment; e. earthing points; f. cables; g. lighting; h. signage; i. markings; j. visual approach slope indicators; k. any other similar thing that is physical matter and is used for the operation of aircraft at the aerodrome. **Note 1:** Aerodrome facilities are physical matter. For example, a safety management system is not an aerodrome facility. Management and administrative processes do not constitute an aerodrome facility. **Note 2:** The expression aerodrome facilities and equipment is defined in the CASR Dictionary. The different expression aerodrome facility is defined in this MOS and has a different meaning.

Term	Definition
aerodrome operator	means: (a) for a certified aerodrome—the person who holds the aerodrome certificate for the aerodrome; or (b) otherwise—the person who is responsible for the operation and maintenance of the aerodrome.
aerodrome works	means any construction or maintenance work on or near the movement area of an aerodrome that may create an obstacle or hazard, or restrict the normal take-off and landing of aircraft, at the aerodrome.
Aeronautical Information Circular (Refer PANS-AIM Doc 10066).	A notice containing information that does not qualify for the origination of a NOTAM or for inclusion in the AIP, but which relates to flight safety, air navigation, technical, administrative or legislative matters.
alternate aerodrome	has the same meaning as in Annex 2 to the Chicago Convention. **Notes:** 1. At the time of publishing this AC, Chapter 1 of Annex 2 to the Chicago Convention included the following definition: An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate aerodromes include the following: Take-off alternate. An alternate aerodrome at which an aircraft would be able to land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure. En-route alternate. An alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en-route. Destination alternate. An alternate aerodrome at which an aircraft would be able to land should it become either impossible or inadvisable to land at the aerodrome of intended landing. 2. The aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for that flight.
airside	means the following areas, access to which is restricted by the aerodrome operator, or by a Federal or State authority, to authorised persons only: a. the movement area of the aerodrome; b. where their purpose and use is to directly support aircraft operations — the terrain and buildings adjacent to the movement area, or particular portions of such adjacent terrain and buildings. **Note:** The word “landside” is used colloquially to denote areas of an aerodrome that are not airside, for example, passenger terminals.
air transport operation	Definition of air transport operation (1) An air transport operation is a passenger transport operation, a cargo transport operation, or a medical transport operation, that: (a) is conducted for hire or reward; or (b) is prescribed by an instrument issued under regulation 201.025.

Term	Definition
	(2) Despite subclause (1), an air transport operation does not include an aerial work operation.
controlled aerodrome	an aerodrome is a controlled aerodrome at a particular time if, at that time, an air traffic control service is provided to aerodrome traffic.
declared distances	means the following: a. take-off run available (TORA), being the length of runway declared available and suitable for the ground run of an aeroplane taking off; **Note:** TORA may include additional length available from a starter extension if provided. b. take-off distance available (TODA), being the length of the take-off run available plus the length of the clearway, if provided; c. accelerate-stop distance available (ASDA), being the length of the take-off run available plus the length of the stopway, if provided; d. landing distance available (LDA), being the length of runway which is declared available and suitable for the ground run of an aeroplane landing.
Department	has the meaning given in item 1 in subsection 19A (1) of the Acts Interpretation Act 1901. **Note:** "Department" means the Department of State of the Commonwealth that is administered by the Minister who, from time to time, administers CASR. At the date of making, this is the Department of Infrastructure, Regional Development, Cities and Arts but may change from time to time in accordance with Administrative Arrangements Orders made by the Governor-General.
manoeuvring area	means that part of the aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons. **Note:** This definition is from the Part 139 MOS, which for the purposes of requirements in the MOS, replaces the general definition of manoeuvring area contained in the Civil Aviation Act 1988.
method of working plan (MOWP)	means a plan to ensure that aerodrome works do not present a hazard to aircraft operations.
movement area	means that part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the aprons.
NOTAM	a notice distributed by means of telecommunications containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.
scheduled air transport operation	means an air transport operation, other than a medical transport operation, that is conducted: (a) in accordance with fixed schedules to and from fixed terminals over specific routes with or without intermediate stopping places between terminals; and (b) in circumstances in which the accommodation in the aircraft is available for use by persons generally.
start of take-off run available	The physical and operational beginning point of a runway length intended for the ground run of an aircraft in take-off procedures.

Term	Definition
time-limited works	means aerodrome works that may be carried out if normal aircraft operations are not disrupted and the movement area can be restored to normal safety standards in not more than 30 minutes.
Works Safety Officer	A person who has been suitably trained with necessary qualifications and is appointed with the function of ensuring the safe conduct of aerodrome works. aerodrome manual procedures and any applicable method of working plan during works on the movement area an aerodrome.

1.3 References

Legislation

Legislation is available on the Federal Register of Legislation website https://www.legislation.gov.au/

Table 4: Legislation references

Document	Title
Part 139 of CASR	Aerodromes
Part 139 (Aerodromes) Manual of Standards (MOS)	Aerodromes
Part 172 Manual of Standards (MOS)	Air Traffic Services
Airports (Protection of Airspace) Regulations 1996	Airports (Protection of Airspace) Regulations 1996

Advisory material

CASA's advisory materials are available at https://www.casa.gov.au/publications-and-resources/guidance-materials

Table 5: Advisory material references

Document	Title
AC 139.C-02	Aerodrome personnel
AC 139.C-03	Serviceability inspections
AC 139.A-04	Applying for aerodrome authorisations, exemptions and approvals
AC 139.C-09	Visual Aids, Markings, Signals and Signs.
AC 139.C-18	Aerodrome emergency planning
AC 139.C-20	Disabled aircraft removal
AC 139.C-22	Runway safety teams
AC 139.C-26	Safety management systems for aerodromes

Document	Title
AC 139.C-27	Risk management plans for aerodromes

International Civil Aviation Organization documents

International Civil Aviation Organization (ICAO) documents are available for purchase from http://store1.icao.int/

Many ICAO documents are also available for reading, but not purchase or downloading, from the ICAO eLibrary (https://elibrary.icao.int/home).

Table 6: ICAO references

Document	Title
ICAO International Standards and Recommended Practices	Annex 14 to the convention on International Civil Aviation - Aerodromes Volume I
Doc 9981	Procedures for air navigation services Aerodromes (PANS Aerodromes)

Other

Table 7: Other references

Document	Title
C-MAN0276	Airservices NOTAM Data Quality Requirements for Aerodrome Operators

2 Introduction

2.1 Aerodrome works

2.1.1 Under regulation 139.070 of the *Civil Aviation Safety Regulations 1998* (CASR) certified aerodrome operators must conduct work activities so they do not create hazards to aircraft or cause confusion to pilots.

2.1.2 Aerodromes can be complex environments where maintenance and construction activities can affect aircraft operations and safety. Although some disruption is unavoidable, careful planning, scheduling, and coordination can minimise operational impacts and maintain safe conditions at the aerodrome.

2.1.3 Every aerodrome is different. Layout, traffic type, infrastructure, and local weather all affect how works are planned and managed. To maintain serviceability and manage the introduction of new facilities with minimal disruption, aerodrome operator must assess the level of operational impact and select the most efficient way to complete work activities safely.

2.1.4 The types of aerodromes in Australia range from large international airports that support high frequency movements of large aircraft to small remote aerodromes that may be used infrequently by small aircraft. The contents of this AC need to be adapted to the circumstances at the aerodrome, and the nature of works to be performed.

2.1.5 Aerodrome works is any construction or maintenance on or near an aerodrome's movement area that could create hazards or restrict normal aircraft operations. Some works may make parts of the movement area unusable or require partial or full closure.

2.1.6 Works may involve constructing, upgrading or maintaining infrastructure and work activities[1] may be carried out by the aerodrome operator's personnel, familiar contractors or third-party contractors unfamiliar with aerodrome procedures.

2.1.7 Aerodrome works often change the aerodrome's physical characteristics and may affect aircraft operations, movement areas, or take-off and landing zones. Operators must understand how construction and flight operations interact to plan projects effectively.[2]

2.1.8 This AC provides guidance to help aerodrome operators plan and carry out works — including both major construction and routine maintenance — so that aircraft operations remain safe and efficient.

[1] Activities may also be referred to as ‘works’ or ‘works in progress’ (WIP). Planned works follow established procedures, while emergency works require a rapid response.

[2] Because of inherent risks, certified aerodrome operators should apply their Safety Management System (SMS) or risk management plan (RMP) to identify and control hazards, reducing risk to as low as reasonably practicable (ALARP).

3 Aerodrome works alternatives and considerations

3.1 Planning of aerodrome works

3.1.1 When planning aerodrome works, aerodrome operators, contractors, or third parties must clearly define what they want to achieve. The main objective of works planning is to avoid creating hazards to aircraft or confusion for pilots, especially when working on the movement area.

3.1.2 Operators should follow the procedures documented in the aerodrome manual to plan and carry out works safely.

3.2 Emergency works

3.2.1 Sometimes emergency works are needed to restore the aerodrome after damage or failure. This can include the repair of failed lighting, the repair of damaged pavement, or cleanup after incidents, accidents, or natural events.

3.2.2 Procedures for emergency works must be documented in the aerodrome manual, including details of who is responsible for arranging and notifying about the work.

3.2.3 If emergency works restricts the take-off, landing or movement of aircraft, a NOTAM must be issued.

Notes:

1. Emergency aerodrome works may be an element of returning the aerodrome to normal operations after an emergency (Refer to AC 139.C-18 v1.1 - Aerodrome emergency planning) or disabled aircraft removal event (Refer to AC 139.C-20 v1.0 - Disabled aircraft removal).
2. Planned upgrade and replacement aerodrome works are not to be considered emergency works.

3.3 Balancing safety, operations, and costs

3.3.1 Safety, ongoing aircraft operations, and construction costs are closely connected. Aerodrome operators must maintain safety while balancing costs and operational needs, coordinating early with stakeholders.

3.3.2 As the project design develops, operators identify construction locations, activities, and costs, assessing impacts on aerodrome operations. This may involve staging the project or adjusting operations to maintain safety. Affected areas may include taxiways, pavement, lighting upgrades, access routes, security zones, and work compounds.

3.3.3 The aerodrome operator needs to consider the areas of the airport to be affected by the work activities., Normally, the works location will be defined by the project, Variables such as worksite access routes, security requirements and worksite compound locations need to be considered.

Note: Nothing in this AC prevents the aerodrome operator including safety precautions intended to ensure the safety of people in the MOWP. The focus of this AC is on the aviation safety requirements under the aerodrome certificate.

3.4 Work management options

3.4.1 Operators can manage works in several ways:

- Full or Partial Closure:
  - Full closure - the entire aerodrome is closed temporarily.
  - Partial closure - only parts of the movement area are closed.
  - Closures may be:
    - » continuous (set start and end); or
    - » periodic (opening and closing around aircraft movements).

Note: A NOTAM[3] is required at least 14 days prior to the commencement of works.

- Time-Limited Works (TLW):
  - Areas restored to safe standards in:
    - » less than 10 minutes; or
    - » greater than 10 but less than 30 minutes
  - TLW may continue in areas not used for the manoeuvring of aircraft.

Notes:

1. A NOTAM should be requested prior to the commencement of TLW where a recall of greater than 10 mins is required. A NOTAM should be requested not less than 24 hrs[4] prior to the commencement of TLW activities.
2. TLW may continue where the work activity is in an area not intended to be used for the manoeuvring of aircraft.

3.4.2 Procedures for conducting TLW should be included in the aerodrome manual[5].

3.4.3 Operators of certified aerodromes should ensure changes to airside infrastructure:

- Planned in accordance with the Part 139 (Aerodromes) Manual of Standards (MOS) and aerodrome manual.
- Industry is given sufficient notice of planned aerodrome works that may impact their operations, including:

[3] NOTAM should be requested by the Aerodrome Operator's NOTAM Authorised Person in accordance with Airservices NOTAM Data Quality Requirements for Aerodrome Operators and aerodrome manual procedures. (*Hyperlink - NOTAM-Data-Quality-Requirements-for-Aerodrome-Operators.pdf (airservicesaustralia.com)*)

[4] Refer to Section 15.03(2) of the Part 139 MOS.

[5] Refer to Section 11.07 for the Part 139 MOS.

– when the aerodrome is temporarily closed

or

– when the movement area may be temporarily or permanently closed to facilitate works

or

– when published information about movement area is changed.

Note: This AC does not remove the need to observe the relevant regulatory standards specified in the Part 139 MOS.

3.5 Method of working plans (MOWP)

3.5.1 Subject to 3.4.2, aerodrome works on the manoeuvring area require a MOWP.

3.5.2 A MOWP is not required when:

- works are time-limited (TLW)
- the aerodrome is fully closed during works
- works are emergency in nature
- there are no restrictions to aircraft operations (RTAO).

3.5.3 Aerodrome operators should not allow aerodrome works without a MOWP, other than TLW, when the aerodrome:

- is used by scheduled air transport operations

  or

- has emergency services aircraft based at the aerodrome, and

work activities on or near the movement area could create an obstacle or hazard, or restrict the normal take-off and landing of aircraft, at the aerodrome.

Notes:

1. See definitions for meaning of *scheduled air transport operations*.
2. Emergency services aircraft include fixed-wing aeroplanes and helicopters used for: aeromedical services (air ambulance, medical evacuations, patient transport and urgent organ transport). For example, the Royal Flying Doctor Service (RFDS), fire-fighting response and support, search and rescue missions, and police air wing activities.
3. Although works on the aerodrome may not affect the safe operation of aircraft, other aerodrome users such as, emergency response and first responders, ground handling including refuelling and other agencies may need to be aware of change that could affect their normal operations.
4. Aerodrome operators may choose to develop and implement MOWP when otherwise not required. Nothing limits the aerodrome operator's choice to implement an MOWP for any aerodrome works.

3.5.4 A checklist of the matters to be dealt with and procedures for ensuring safety during aerodrome works is outlined in Appendix A - Aerodrome works safety considerations, of this AC.

3.5.5 Figure 1: Flowchart - aerodrome works planning summarises aerodrome works alternatives and considerations.

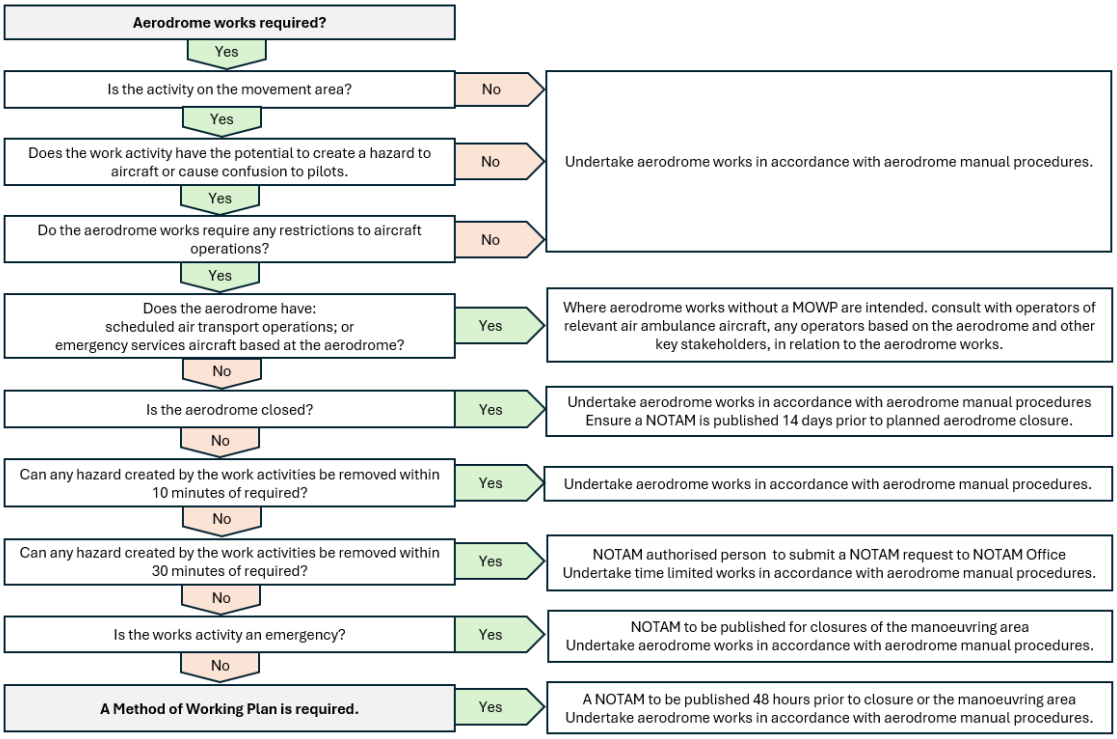


Figure 1: Flowchart - aerodrome works planning

3.6 Aerodrome capability

3.6.1 Aerodrome capability may be affected by restrictions or limitations caused by planned works. Weather, community events, airline schedule changes, or emergency operations may also affect capability.

3.6.2 Examples of activities that could impact the capability of the aerodrome, when planning aerodrome works include:

- activities that require the introduction of a temporary displaced threshold, which results in the instrument approach, including the instrument landing system (ILS) or instrument flight procedure (IFP), becoming unavailable during periods prone to fog and low visibility events
- pavement overlay works being performed in periods prone to rain that may impact the return to service or remarking of the surface prior to making the area serviceable for aircraft
- closing a runway to facilitate works that cannot be recalled in a reasonable timeframe in periods prone to cross wind or other events, where the runway is required, which may impact intended aircraft operations.
- environmental, community, and seasonal operational factors that are unique to the operating environment of the aerodrome.

3.6.3 This list is not exhaustive, and other activities could impact aerodrome capability. In determining aerodrome capability, the intended operation of aircraft should be considered. The range of intended operations may include details such as:

- **Type of operating aircraft** – the size and type of aircraft the facility will be used by (current or future use by fixed wing, helicopters or rotary aircraft, other forms of aircraft, turbine, piston, electric or other forms).
- **Mode of aircraft operations** – the nature of flights (e.g., take-off, landing, ground taxi, air-taxi, ground handling etc.).
- **Nature of aircraft operations** – air transport, emergency medical services, private, training or itinerant.
- **Flight schedules** – timetables for arrivals and departures, scheduled and unscheduled, of airlines and other aerodrome users.
- **Manoeuvring area use** – designated runways, landing site and taxi routes for specific departure and arrival operations.
- **Weight and performance limitations** – adhering to the limitations advised by the aerodrome operator based on aircraft weight and performance characteristics to ensure safety.
- **Regulatory compliance** – following of air traffic control (ATC) instructions or airport operating instructions.
- **Safety protocols** – implementing safety measures for all operations involving aircraft and the aerodrome.

3.6.4 Where aerodrome capability has the potential to impact the operation of other aerodrome users, such as fixed based operators should be engaged.

3.7 Consultation with aerodrome users

3.7.1 When work activities have the potential to impact aerodrome movement area the risk to aircraft operations increases if not managed properly.

3.7.2 The aerodrome operator should liaise with the aircraft operators during the planning of works programs.

3.7.3 Organisations such as airlines and ATC need sufficient time to plan for changes to their schedules or planned operations. It is prudent to initiate engagement with potentially affected organisations early in the works planning.

3.7.4 If the nature of work is likely to affect the regulatory compliance with a relevant aerodrome standard, the operator should liaise with a CASA during works planning so that any non-compliance can be properly assessed and managed.

3.7.5 Where aerodrome works may change the operations of a runway, such as temporary suspension of terminal instrument flight procedures, the aerodrome operator should liaise with users to understand the impact of the change. Seasonal weather patterns, and special events such as public holidays or school holiday periods may have significant impact on aerodrome users, and poor works planning may result in significant reputational impact.

Note: Aircraft performance capability is likely to be a factor in determining whether proposed minimum reduced length runway operations required to facilitate construction or maintenance activities may affect aircraft scheduling by aircraft operators.

Some aircraft can operate on reduced length runways in certain conditions. Aircraft operators may need to determine whether their aircraft are configured for that capability, or whether limitations to their intended operations can be sustained).

3.7.6 Safety committees, such as local runway safety teams (LRSTs), safety committees or working groups are forums to consider when planning aerodrome works. Aerodrome works and WIP have the potential to increase the risk of runway incursions. Safety assessments may reduce the risk of runway incursion. Refer to AC 139.C-22 Runway safety teams for further information.

3.7.7 At aerodromes that support low visibility operations (LVO) with low visibility procedures (LVP), may need works to be suspended. The aerodrome operator should consult with aerodrome users to determine whether portions of the movement area may remain closed. It is essential that the operators of controlled aerodromes engage with ATC during the planning of aerodrome works to ensure LVP are not adversely affected.

3.7.8 If aerodrome works include the temporary displacement of a threshold, the aerodrome operator should:

- assess the revised OLS
- recalculate the TODA, the critical obstacle gradient, and the STODA in the reciprocal direction from the displacement
- report any changes resulting from the recalculation to the AIS provider and request that a NOTAM be issued.

Note: When planning aerodrome works that requires a temporary displaced threshold, and there is a penetration of the OLS, CASA is to be advised in writing of any new obstacles in the revised OLS. When planning for aerodrome works, sufficient time should be included in the planning process for CASA to assesses the obstacle penetrations.

3.7.9 When planning aerodrome works that the full closure of the aerodrome, especially uncontrolled aerodromes, State Ambulance Services should be consulted early in the planning of aerodrome works.

3.8 Engagement with ATC, ARFFS and other on aerodrome stakeholders

3.8.1 The regulatory and safety requirements of other stakeholders such as ATC and Aerodrome Rescue Fire Fighting Service (ARFFS) need to be considered when determining MOWP stages.

3.8.2 Other agencies such as security, border control, biodiversity and ground handlers may be affected by works. Works planning should consider the safety of all participants and affected parties, as well as oversight of hazard mitigations and risk controls.

3.8.3 Where risk control includes the involvement of others to arrangements need to be accepted by the third party. Any works party use emergency assembly areas, or use of access gates require may require specific authorisation.

3.8.4 Where the aerodrome works could impact arrangements such as aerodrome emergency response plans, any impact should be considered during the planning phase of aerodrome works. Those potentially affected by the alternative arrangements should be engaged during the planning phase to ensure an acceptable level of safety can be guaranteed.

3.8.5 Where other agencies, such as the Bureau of Meteorology have facilities at the aerodrome, any actual or potential impact to their facilities and activities should be considered and consulted during the works planning process.

3.8.6 Aerodrome stakeholders may include, but not limited to:

- aerodrome owner and/or operator
- airlines and aircraft operators

- tenants and concessionaires
- security
- contractors and their employees and subcontractors
- staff or those who have access to airside
- Air Navigation Service Providers (ANSP)
  - Air Traffic Control
  - instrument flight designers
  - navigational aid operators and maintainers.
- regulators and government agencies
- facility managers and utility service providers
- off aerodrome emergency responders.

4 Planning of aerodrome works

4.1 Works activity planning

4.1.1 The MOWP serves multiple purposes, and those purposes may vary between aerodrome operators, and aerodrome works projects. The purpose of the MOWP may include, but not limited to, the following:

- Aerodrome works planning includes:
  - a register of RTAO for the works, or each stage of the works program
  - a register of NOTAMs for the works or each stage of the works program
  - aerodrome works risk management
  - a register of impacts to the movement area, the expected changes to aerodrome facilities or capability and the planned mitigation, including:
    - » temporary, short-term or permanent movement area reconfiguration
    - » the removal, obscuring and isolation of existing visual aids
    - » the introduction of temporary or short-term visual aids
    - » changes to published information.
- Promulgation of aerodrome works:
  - a means to communicate the works program to:
    - » airlines, aircraft operators and pilots
    - » ANSP including ATC, instrument flight procedure designers and navaid providers
    - » contractors and subcontractors for their planning and access requirements
    - » first responders and emergency services
    - » traffic management plans for normal airside operations, worksite access and aircraft routes.

4.1.2 To assist with developing an MOWP procedures documented in their aerodrome manual should be followed.

4.1.3 All potential risks and hazards related to the work should identified and managed through the aerodrome operator's SMS or RMP. If the aerodrome operator does not have an SMS or RMP, aerodrome works can follow the process in *Chapter 4 - Risk management process* of AC 139.C-27 v1.0 - Risk management plans for aerodromes.

Note: Risks and hazards associated with aerodrome works may extend beyond aviation safety requirements. Nothing in this AC limits risk assessments or hazard identification to aviation safety matters.

This AC focusses on aviation safety and the safe manoeuvring of aircraft on the movement area.

4.2 Method of working plan

4.2.1 If aerodrome works has the potential to create hazard to aircraft operations or confusion to pilots, an MOWP is required. The responsibility for ensuring safety during aerodrome works rests with the aerodrome operator.

4.2.2 The aerodrome manual should contain:

- procedures for preparing a MOWP
- procedures for planning, conducting and completing and works (including TLW or emergency works).

4.2.3 The MOWP must clearly include:

- introduction
- works information
- RTAO
- personnel and equipment
- aerodrome markers, markings, and lights
- special requirements
- administration
- authority
- drawings
- distribution list.

4.2.4 For routine and periodic maintenance, aerodrome operators may create a MOWP to cover ongoing activities that occur over a long period.

4.2.5 An MOWP is not required if the aerodrome is closed, and if emergency services operators based at the aerodrome temporarily relocate to other aerodromes when aerodrome works are being undertaken.

4.2.6 A MOWP is not needed if work is limited to an aircraft parking apron and there are no impacts on aircraft operations.

4.2.7 To avoid confusion, a MOWP is required when aerodrome works are intended on the movement area, the aerodrome is open for aircraft operations, and:

- work activities have could result in RTAO

  or

- the aerodrome supports scheduled air transport operations

  or

- emergency services aircraft are based at the aerodrome, and
- the works are not confined to:
  - aircraft parking positions

    or

  - an apron area that does not contain at taxi route from one part of the aerodrome to another.

4.2.8 If facilities (like lighting systems or instrument landing aids) must be turned off during works, the operator must assess the impact and notify affected users. Operators must also ensure enough

trained works safety officers (WSOs) are available to monitor safety during each stage of the project.

4.2.9 If aviation safety regulation compliance issues are identified in the preparation of the MOWP, operators should liaise with CASA to have issues resolved before finalising the MOWP. Initial contact with CASA should be through www.casa.gov.au/about-us/contact-us[6].

4.2.10 The MOWP should be distributed to those mentioned in section 15.02(2) and 15.02(3) of the Part 139 MOS. The MOWP, and any updates, is to be provided to CASA. MOWP distribution should include CASA (by email at aerodromes@casa.gov.au).

4.2.11 An important consideration in the planning of work is to ensure that at the end of each stage of the work, the aerodrome facility should be restored to a serviceable state. This may involve the repainting of markings or reinstatement of aerodrome lighting systems.

4.2.12 When drafting an MOWP, a critical activity is the development of NOTAM. See section 5.7 of this AC for further information.

4.3 Amendments to MOWP

4.3.1 If an MOWP is amended, the revised MOWP is to be provided to recipients of the original MOWP, less than 48 hours prior to the commencement of any activities not already covered in the original MOWP.

4.3.2 Amended MOWPs should clearly show the revision number on the title page of the document, and all amendments need to be clearly demonstrated to the reader.

4.3.3 When developing amendments to MOWP, changes to arrangements should be reaffirmed to ensure aerodrome users, service providers and responders are aware of the alternative arrangements.

4.3.4 Changes to published information should be completed not less than 24 hours prior to the commencement of work activities.

4.4 Restrictions to aircraft operations (RTAO)

4.4.1 Sometimes parts of the movement area must be closed or limited to allow works.

4.4.2 Operators can manage this by dividing the project into stages to maintain as much operational capability as possible. The range of activities to be completed may make the aerodrome unusable. Therefore, work activities may be reduced to stages to ensure some degree of aerodrome functionality is maintained.

4.4.3 Each stage should identify:

- what areas are affected
- what aircraft operations are restricted
- the associated NOTAMs.

4.4.4 The scale, timing and impact of individual stages may vary, depending on the nature and potential impact to aerodrome operations.

4.4.5 Where a works program has been divided into stages, the dependency and interdependency of each stage should be determined. A table with stage limitations or dependencies should be included in the MOWP[7].

[6] Refer to https://www.casa.gov.au/about-us/contact-us

[7] Refer to Section 16.02 of the Part 139 MOS.

4.4.6 The MOWP should include a table that identifies the RTAO of each stage, and the full text of all planned NOTAMs.

4.4.7 The range of circumstances where aircraft operations may be affected by the planned closure, limited serviceability or reduction of capacity of aerodrome infrastructure and facilities varies considerably.

4.4.8 A MOWP is a planning tool that ensures any RTAO is considered, hazards to aircraft operations due to the undertaking of works are identified, and risks related to those works are appropriately mitigated.

4.4.9 Examples of RTAO include:

- **Planned closure** - the runway or taxiway is closed for an appropriate period to undertake planned activities.
- **Limited serviceability** - the threshold of a runway is displaced, and the length of the reciprocating runway is reduced to allow an obstacle at one end of the runway.
- **Reduction of capacity** - the width of a taxiway strip is reduced, resulting in the taxiway is only useable by smaller aircraft.

This is a small range of examples where RTAO may be planned by the aerodrome operator.

Note: The identification and inclusion of the geographical coordinate and elevation of any displaced threshold, or temporary runway end, should be included where temporary reduced length runway operations are intended to be conducted.

4.4.10 The early involvement of airlines, aircraft operators and pilot representatives when determining RTAO is critical to effective engagement.

4.4.11 Providing stakeholders with information on RTAO in a completed MOWP may not allow sufficient lead time for them for contingency planning or undertake necessary actions.

Forums such as LRST meetings, SMS meetings, and any other forum where operational impacts to stakeholders are discussed, provide useful opportunities for early engagement.

4.4.12 Aerodromes with an SMS, or RMP, should consider the ranges of hazards and risks associated with the proposed or planned works, and each stage should be risk assessed, as well as the dependencies and interdependencies to ensure the intended range of aircraft operations, and other aerodrome operations, can be achieved safely.

4.5 Works safety officer (WSO)

4.5.1 A WSO is a person appointed by the aerodrome operator with the function of ensuring the safe conduct of aerodrome works.

Note: The person appointed under Part 139 as a WSO has the responsibility of ensuring aerodrome works are being carried out in accordance with the aerodrome manual, standard operating procedures or the MOWP. Other forms of industrial safety and public safety are not a function of the WSO under Part 139, unless the person is otherwise appointed for that function.

4.5.2 Prior to appointing a WSO, the aerodrome operator must be satisfied the person can perform the functions of a WSO. The WSO is to be suitably trained and deemed competent in accordance with aerodrome manual procedures.

4.5.3 The aerodrome operator is to record the name of each person performing the duties of WSO in the aerodrome manual, except where the person is nominated in the Administration section of any applicable MOWP[8].

4.5.4 The competence of persons appointed as a WSO should be checked periodically, for instance, as part of Aerodrome Technical Inspections or annual aerodrome manual validation programs.

4.5.5 An adequate number of WSOs should be provided to monitor the works activities. The aerodrome operator should determine what number of WSO is adequate based on the nature of work being undertaken. The rostering of work activities and associated workforce should ensure sufficient WSO are available.

4.5.6 If the WSO is required to operate an airside vehicle and required to use an air band radio, the person should be certified under Part 64 of CASR to use the radiocommunication equipment, unless the person is otherwise qualified under regulation 91.625 of CASR.

Note: Persons approved to transmit on an aviation safety radio frequency under Part 61 of CASR are not required to also hold an aeronautical radio operator certificate under Part 64 of CASR.

4.5.7 A WSO is to always be present in the vicinity of the work area when aerodrome works are being carried out at an aerodrome while the aerodrome is open and available for any aircraft operations.

4.5.8 All personnel engaged in aerodrome works activities should comply with reasonable directions issued by the WSO or aerodrome reporting officer.

4.5.9 Where the WSO is provided by the works contractor, the aerodrome operator should establish a line of communication and ensure a reporting system is available to the WSO. The aerodrome operator remains responsible for the compliance of the externally provided WSO and needs to maintain oversight over their conduct.

4.5.10 The respective roles of the works project manager(s) and WSO need to be clearly defined. the WSO should not be placed directly under a line manager controlling the work. This is to avoid the potential of work expediency being given a higher priority than aerodrome safety.

4.5.11 The WSO should be made aware of the planning of the works, particularly hazard assessments and risk mitigating measures. The WSO should have sufficient knowledge of the work arrangements to be able to identify any deviations to the work arrangements.

4.5.12 The aerodrome operator should ensure competence checks of any externally provided WSO are made available, and any knowledge gap of local practices, aerodrome manual procedures and MOWP requirements are satisfied prior to appointing the person.

4.5.13 Where external WSOs are provided as part of a works program, the aerodrome operator should induct the persons to the aerodrome manual and any appropriate standard operating procedure, and provide education that are specific to that aerodrome, including:

- the aerodrome and its terrain
- local hazards, for example, visual and radio blind spots.

4.5.14 The accountable person (or their delegate) should ensure that WSO, irrespective of their organisation, is made aware that they are representative of the aerodrome operator.

[8] Refer to Sections 13.01, 15.01(9) and 16.07(2) of the Part 139 MOS for further information on appointing a WSO in the MOWP.

5 Communicating information on aerodrome works

5.1 When aerodrome works are properly planned and consultation has occurred, airlines and other users should never be surprised by the works.

5.2 Once the method of working plan (MOWP) is finalised, the aerodrome operator must share information about the works through official and local channels to keep everyone informed and ensure safety.

5.3 The channels include the Aeronautical Information System[9] (AIS):

a. An Aeronautical Information Circular (AIC) provides early information about aerodrome works that do not change published operational data in the Aeronautical Information Publication (AIP).

   i. It can describe general arrangements such as:

      A dates of upcoming works

      B areas affected

      C expected impact on operations

   Further information on AICs can be found on the Airservices website.

   or

b. An AIP Supplement (SUP) is used to publish temporary changes to facilities, services, or procedures, for example:

   i. runway closures

   ii. major construction works

   iii. large events affecting aircraft operations

   iv. AIP Supplements (SUPs) are used for temporary changes that last longer than a typical NOTAM period.

   Further information on AIP SUPs can be found on the Airservices website. at

[9] Refer to Airservices for more detail - Document and Chart Descriptions - Airservices (airservicesaustralia.com) - https://www.airservicesaustralia.com/aip/document_charts.asp.

Notes:

1. AICs and AIP SUPs must be submitted at least 28-56 days before their effective date, which must align with an Aeronautical Information Regulation and Control (AIRAC) cycle date. Each AIC or SUP must include clear information about the works, staging, and which facilities are affected.

   A trigger NOTAM' must also be issued to alert pilots to the new information.

2. When issuing AIC or AIP SUPs, timing with the AIRAC cycle **needs** to be considered. Details about the AIRAC cycle and submission dates are available on the Airservices Australia website.

and

c. Local Communication:

   i. Aerodrome operators should also provide direct information about the works to:

      A Pilots and aircraft operators.

      B Aerodrome tenants and contractors.

      C Ground handlers, emergency services, and ATC.

   This local communication is in addition to any official notices (AIC, SUP, or NOTAM).

   Operators may publish notices on their websites, distribute bulletins, or hold briefings to ensure users understand what the works mean for their operations.

   By initiating NOTAM before carrying out work activities. One NOTAM may suffice for simple work. However, if the works are carried out in stages, multiple NOTAMs may be required.

   The volume and complexity of NOTAM published for aerodromes works may result in pilot information overload. To enhance understanding of NOTAM, information in the NOTAM information should be carefully considered by the NOTAM authorised person,

d. for drafting and publishing NOTAM:

   i. Keep NOTAMs short and clear.

   ii. Avoid combining unrelated information.

   iii. Issue NOTAMs at the right time:

      A Too early, and they may be ignored.

      B Too late, and users may not have time to prepare.

Note: Too many or overly long NOTAMs can overwhelm pilots, so each should focus on one key subject. For example, one NOTAM for runway changes and another for taxiway changes.

5.4 For works with an MOWP, NOTAMs must be issued at least 48 hours before the works or stage begins (as required by the Part 139 MOS).

5.5 To allow for orderly processing of the NOTAM, aerodrome operator's NOTAM authorised person should initiate NOTAM action in accordance with the Airservices NOTAM Data Quality Requirements for Aerodrome Operators[10] and aerodrome and manual procedures.

5.6 Each NOTAM should clearly set out what has changed, such as:

a. Sections of the manoeuvring area that are closed or restricted.

b. Any affected aerodrome equipment (i.e., AFRU or AWIS).

c. Permanent or temporary amendment of changes to declared distances (TORA, TODA, ASDA or LDA).

d. The presence of obstacles penetrating the obstacle limitation surface (permanent, temporary or transient).

e. Removal or change of markings, lighting, or visual aids such as PAPI or wind direction indicators.

5.6.1 Visual aids

5.6.1.1 Drawings in the MOWP can help illustrate stages of work and show the exact areas affected. These should be clear, labelled, and easy to interpret. Drawings included in the MOWP should be clearly legible and provide sufficient detail for the reader to be able to interpret information included, including any text.

5.7 Drafting NOTAM for aerodrome works

5.7.1 This section should be read with Section 7 - Reduced length runway operations and temporarily displaced thresholds.

5.7.2 Pilots must read and interpret multiple NOTAMs before each flight. Complicated or unclear NOTAMs can lead to mistakes or missed information.

5.7.3 When drafting a NOTAM:

- use simple, standard language
- avoid excessive abbreviations or long sentences
- separate major topics into different NOTAMs.

5.7.4 The NOTAM aeronautical data originator (ADO) is to ensure NOTAM are based on a single subject only. Omnibus type NOTAM reduce the pilot's ability to identify and interpret information necessary for their intended operation.

5.7.5 A key consideration when composing NOTAM is the ability by the reader to understand and interpret the information contained within the NOTAM.

5.7.6 Some airlines and flight planning systems use automated tools to process NOTAMs. Poorly written or overly complex notices can lead to missed details. Recommended good practice:

- Confirm all NOTAM details before submission to avoid errors.
- Check that times, dates, and coordinates are correct.
- Make sure information in NOTAMs matches that in the MOWP.
- Review active NOTAMs regularly during long projects and cancel them as soon as they are no longer valid.

[10] Refer to https://www.airservicesaustralia.com/wp-content/uploads/NOTAM-Data-Quality-Requirements-for-Aerodrome-Operators.pdf

5.7.7 The simplification of NOTAM not only assists airlines, aircraft operators and pilots, it also assists the NOTAM Office code the NOTAM correctly.

5.7.8 Where the information in NOTAM is about a runway, the detail in the NOTAM should focus on the one topic only. Variations to runway length may include:

- all of runway closed
- the landing distance available is changed:
  - threshold is displaced
  - runway end is relocated and landing distance available is reduced.
- the take-off distance is changed:
  - the take-off threshold is relocated and take-off distance available (TORA) is reduced
  - the end of take-off run is relocated, and length of TORA is reduced.
- landing not available
- landing (i.e., 01) and take-off (i.e., 19) (the reciprocating end) not available.

5.7.9 NOTAM examples

5.7.9.1 The following NOTAM examples demonstrate the format of NOTAM that meet international conventions. The format of these NOTAMs is necessary to ensure pilots can readily identify information critical to their intended flight operations.

Note: The practice of including multiple topics into omnibus type NOTAM could contribute to a pilot not readily identifying necessary information. Although single topic NOTAM may increase the quantity of published NOTAM, information necessary for operation of the aircraft should be separated from NOTAM that provides situational awareness, such as changes to visual aids.

5.7.9.2 The reasons for temporarily changing the configuration vary considerably. To simplify this, the following examples are separated into 3 sets of example NOTAM. This section should be read in conjunction with the Airservices Australia NOTAM Data Quality Requirements (as amended), using the details determined in accordance with Section 7 of this document.

5.7.9.3 The example NOTAM sets demonstrate:

- A temporary displaced threshold - no other changes to runway configuration.
- A temporary displaced threshold and reduced length runway - the runway reduction aligns with the displaced threshold.
- A temporary displaced threshold and reduced length runway - the runway reduction and displaced threshold do not align.

NOTAM Example 1

5.7.9.4 Table 8: Example NOTAM for the displacement of the threshold of a runway demonstrates circumstances where a single approach threshold is temporarily displaced. This NOTAM does not include information about visual aids, including markers, markings and lighting. This information should be in a separate NOTAM.

5.7.9.5 Under no circumstances should both approach thresholds of a runway be temporarily displaced at the same time.

Table 8: Example NOTAM for the displacement of the threshold of a runway

Field	Description
Field A - Location	This is the location under which the NOTAM will be issue.
Field B - Start period	Specifies the beginning of the occurrence or activity in a ten-digit date-time group (YYMMDDHHMM).
Field C - End period	Specifies the end of the occurrence or activity in a ten-digit date-time group (YYMMDDHHMM).
Field D - Hours of Activation	Used if the NOTAM will not be active continuously from the start period to the end period. For example, if the NOTAM will only apply during daylight hours.
Field E:	
Subject and status	RWY (designation) THR DISPLACED DUE WIP
NOTAM Text	RWY (runway designation) THR DISP (distance in metres between the extremity of the runway and the displaced threshold) M **RWY** **TORA** **TODA** **ASDA** **LDA** XX (runway direction) length length(slope) length length YY (runway direction) length length(slope) length length REFER METHOD OF WORKING PLAN (*MOWP* number) AND AIP-SUP (number) **Note:** Information in this NOTAM should be limited to the displaced threshold and changes to declared distances only.

NOTAM Example 2

5.7.9.6 Table 9 - NOTAM Example 2 - A temporary displaced threshold and reduced length runway - the runway reduction aligns with the displaced threshold demonstrates circumstances where the length of a runway is reduced, and a single approach threshold is temporarily displaced. This NOTAM discusses both directions of the reduced length runway, including where the approach threshold has been temporarily displaced.

Fundamentals when drafting a NOTAM for reduced length runway operations

- The NOTAM is not to include information about visual aids, including markers, markings and lighting. This information should be in a separate NOTAM.
- The NOTAM is not to include information about taxiway closures, exit taxiways or entry taxiways. This information should be in a separate NOTAM.

5.7.9.7 The above NOTAM examples have the potential to result in at least 3 NOTAM being published. The multiple NOTAM should not be filtered into a single omnibus type NOTAM.

Table 9 - NOTAM Example 2 - A temporary displaced threshold and reduced length runway - the runway reduction aligns with the displaced threshold

Field	Description
Field A - Location	This is the location under which the NOTAM will be issue.
Field B - Start period	Specifies the beginning of the occurrence or activity in a ten-digit date-time group (YYMMDDHHMM).
Field C - End period	Specifies the end of the occurrence or activity in a ten-digit date-time group (YYMMDDHHMM).
Field D - Hours of Activation	Used if the NOTAM will not be active continuously from the start period to the end period. For example, if the NOTAM will only apply during daylight hours.
Note: Text in black must not be changed. Field E - Subject and status	RWY designation REDUCED LENGTH DUE WIP
NOTAM Text	RWY (runway designation) THR DISP (distance in metres between the extremity of the runway and the displaced threshold)M RWY (designation of the runway direction opposite the runway direction with the displaced threshold) xM (N/E/W/S) END CLSD RWY TORA TODA ASDA LDA *XX* (runway direction) length length*(*slope*)* length length *YY* (runway direction) length length*(*slope*)* length length SUPPLEMENTARY TKOF DISTANCES RWY XX xx(1.6) xx(1.9) xx(2.2) xx(2.5) xx(3.3) xx(5) RWY YY xx(1.6) xx(1.9) xx(2.2) xx(2.5) xx(3.3) xx(5) REFER METHOD OF WORKING PLAN (MOWP number) AND AIP-SUP (number) **Note:** Information in this NOTAM should be limited to runway length reductions, displaced threshold information and changes to declared distances only.

5.7.9.8 Refer to section 7.5 for further information on determining declared distances for various runway configurations.

5.7.9.9 Examples of completed NOTAM are in Appendix F - Sample NOTAM.

Note: The sample demonstrates a need to keep the NOTAM to a singular topic. A separate NOTAM may provide information on amendments to aerodrome lighting configuration; taxiway closures related to the reduced length of the runway with a displaced threshold.

5.7.9.10 If the MOWP includes RTAO that is divided into stages, each stage may have a NOTAM, or multiple NOTAMs.

5.7.9.11 NOTAM developed for MOWP should be drafted by NOTAM Authorised Persons, or any drafted NOTAM, checked by a NOTAM Authorised Person.

5.8 Broadcasted information

5.8.1 The primary source of information required for pilot situational awareness is the NOTAM. MOWP, AIP SUPs. AIC and any other form of information intended to inform the airline, aircraft operator or pilot of planned activities at an aerodrome, and the RTAO that can be expected.

5.8.2 For work activities not covered by a NOTAM, ATC (where present) may be responsible for providing details of the hazard when on, or immediately adjacent, the movement area. For instance, where TLW such as when 'workers with hand tools' are operating.

5.8.3 To enhance pilot situational awareness of changes to the take-off or landing runway or other parts of the manoeuvring area, the following may be considered:

- Controlled aerodromes (Class C airspace) with 24-hour coverage:
  - Request ATC to include information about essential aerodrome information, such as works in progress, on the ATIS in accordance with MATS.

> **Note**: Inclusion of alternative runway configurations including displaced thresholds should be arranged with ATC during the planning stages of aerodrome works.

- Controlled aerodromes (Class D airspace) without 24-hour coverage:
  - Request ATC to include information about changes to the runway configuration or other parts of the manoeuvring area or essential aerodrome information, such as works in progress, on the ATIS, and
  - When ATC is not operating, coordinate inclusion of relevant information, such as works in progress, on ATIS ZULU

  or

> **Note:** Inclusion of alternative runway configurations including displaced thresholds should be arranged with ATC during the planning stages of aerodrome works.

  - Include information about changes to the runway configuration on Aerodrome Frequency Unit (AFRU) (where available)
- Uncontrolled aerodromes (Class G airspace):
  - Include information about changes to the runway configuration on Aerodrome Frequency Unit (AFRU) (where available).

6 Aerodrome markings, markers and lighting

6.1 Aerodrome markers, markings and lighting provide pilots essential information about aircraft movement area. During works, temporary markings or lights may be needed to clearly show which parts of the aerodrome are open, closed, or restricted.

6.2 Aerodrome operators must ensure markings and lighting are always clear and unambiguous to pilots. Any incorrect or confusing signals can create serious safety hazards.

Notes:

1. This Chapter should be read in conjunction with AC 139.C-09 v1.0 - Visual Aids, Markings, Signals and Signs.
2. Use of markings, markers and lighting in relation aerodrome works and movement area closures should be considered in accordance with an aerodrome's SMS, RMP or risk management strategies.

6.3 Existing markings do not need to be completely obliterated when there is short term temporarily displacement of the threshold or during reduced length runway operations. Using additional markers and lights may be necessary to make the runway or taxiway closure or alternative arrangements more obvious, especially where pilots have become accustomed to landing and taxiing via standard routes.

6.4 Visual aids (markings, markers, lighting and signage) need to be clearly visible to pilots, not misleading or confusing.

Notes:

1. Compliance with the MOS may not be sufficient to ensure compliance with regulation 139.070 CASR. The aerodrome operator's determination to use temporary markings, markers and lights, although in compliance with the MOS, may not be sufficient to ensure that aerodrome works are carried out in a manner that is not a hazard to aircraft or cause confusion to pilots.

   This risk is elevated where permanent and temporary markings and markings may be visible.
2. The primary purpose of the Part 139 MOS and this AC is to ensure aerodrome works do not create a hazard or cause confusion.

   The aerodrome operator needs to ensure other forms of safety and security are appropriately considered. Nothing in this AC intends to limit the management of other forms or safety, or security, subject to aviation safety considerations being appropriately considered.

6.5 Chapter 8 of the Part 139 MOS specifies the standards on the treatment of existing markings. Where an existing threshold is to be displaced to facilitate aerodrome works, the main concern is with the existing threshold markings.

6.6 Where the existing threshold markings needs to be obliterated, aerodrome operators should choose the most effective method to carry out the task.

Note: Temporary displacement of runway thresholds should be avoided as far as reasonably practical. The displacement of runway thresholds may introduce risk to aircraft operators, aerodrome operators and persons operating on the unserviceable portion of the runway.

6.7 Runway threshold identification lights (RTIL) are strobe lights that can provide a very effective visual cue to pilots. RTIL are require for aerodromes used in international operations where a threshold has been permanently displaced and is required for temporarily displaced thresholds, but operators of other aerodromes are encouraged to use the strobe lights to enhance the sighting of the new threshold location.

6.8 It should be noted that markings and markers provide visual cues to pilots that may not be provided by RTIL. For instance, pilots may not be able to readily identify the landing threshold or temporary runway end when backtracking on the runway. For this reason, when determining whether to replace or supplement markings and markers with lights should be carefully considered and discussed in forums such as LRSTs.

6.9 Works on a runway end may result in changed declared distances and are likely to require the provision of new markings and markers to delineate the works area. An example on how to calculate the position of the displaced threshold and revised declared distances is outlined in Appendix B of this AC. See Chapter 7 of this AC for further information on displaced thresholds.

6.10 Extinguishing of aerodrome lighting

6.10.1 If a runway or taxiway, or a portion of a runway or taxiway, is closed, all aerodrome lighting on the closed facility, and any visual aids leading a pilot into the closed facility, must be extinguished or obscured except the lighting for visual aids used to warn pilots of the closed facility.

6.10.2 As far as reasonably possible, aerodrome lighting should be extinguished by electrical isolation, unless maintenance of the lighting system requires the lights to be energised. Where assessed to be operationally satisfactory, and providing works activities are not otherwise put at risk by the lighting system remaining energised, lights may be obscured for a period not exceeding 5 consecutive days, providing the lights cannot be seen by pilots, or can cause misleading visual cues or confusion.

Note: When used, any covers used to extinguish lights should be sufficiently sturdy to block out light and not be blown away by wind, jet blast or propellor wash. A process should be instituted to ensure all covers used to cover lights are accounted for at the completion of works, or when the lights are reinstated.

6.10.3 Where aerodrome lighting systems are pilot activated, consideration should include the deactivation of the pilot activation systems.

6.10.4 In all cases where aerodrome lights have been deactivated, a process should be established to ensure all lights display the correct colour and intensity once reinstated, or any deactivated pilot activation system is functioning correctly.

6.10.5 Refer to section 9.127 Lighting associated with closed and unserviceable areas in the Part 139 MOS.

6.11 Unserviceability lights

6.11.1 If a closed runway or taxiway, or a portion of a closed runway or taxiway is intersected by a runway or taxiway which is used at night. Unserviceability lights must be placed across the entrance to the closed area at intervals not exceeding 3 m.

6.11.2 The actual number of lights to be used depend on the width of the entrance to be closed. Table 10: Number of unserviceability markers required for temporary taxiway closure provides information on the minimum number of unserviceability lights that could be used, unless otherwise determined through a risk assessment that more, or less lights are required. The entrance to a taxiway or apron is the space between the edge lines. Where the paved surface is wider due to sealed shoulders, additional lights may need further consideration.

6.11.3 The intensity of the lights must be sufficient to ensure conspicuity considering the intensity of the adjacent lights and the general level of illumination i.e. background lighting.

6.12 Unserviceability Markings

6.12.1 Unserviceability markings may be used to delineate the boundary of work area beyond which aircraft are not to enter. Unserviceability marking must be:

- white, when displayed on a runway
- yellow, when displayed on a taxiway.

Unserviceability markings are not required when lighted visual aids are used in place of unserviceability markings.

6.12.2 When used on a closed runway, white unserviceability markings should be placed

- on the centreline of the runway
- at each end of the closed runway, or closed portion of the runway
- at intervals not exceeding 300^{o}m.

6.12.3 Where WIP is intended to take place on the surface of the runway, and the work area is where an unserviceability marking should be, the marking should be moved to the shoulder or side of the runway, while maintaining the required interval between markings.

6.12.4 When used on a closed runway, except where unserviceability markers are used, a yellow unserviceability marking should be placed:

- at each end or the unserviceable taxiway

  or

- for taxiways that serve a closed runway or portion of a runway, at the taxiway intersection at which aircraft and vehicles can take alternative routes to intended destinations.

6.12.5 When a runway may be covered in snow or other contaminant, the aerodrome operator should choose a more conspicuous colour other than white for the unserviceability markings. Details of any alternative colour should be recorded in the aerodrome manual.

6.12.6 Where the aerodrome operator chooses to use unserviceability markings that are not applied to the pavement surface, the markings need to be secured to ensure they cannot become a hazard to aircraft, and any person within the vicinity or the marking.

6.13 Use of markers

6.13.1 Unserviceability markers

6.13.1.1 Unserviceability markers must be placed at the entrance to, and across any part of the movement area of an aerodrome (including a runway) that is not to be used by aircraft. A minimum of 3 unserviceability markers must be displayed across the centreline of any portion of a taxiway, apron or holding bay that is unserviceable. On wide taxiways, or where multiple taxiways intersect, additional markers are required.

Note: The purpose of markers is to provide pilots with situational awareness of changes to the condition of the movement area. Notwithstanding the need to comply with the Part 139 MOS, the placement of markers should not introduce a hazard to aircraft or cause confusion to pilots.

6.13.1.2 Markers must be light weight and frangible. If the markers need to be located where they may be subjected to jet blast or prop wash, securing them firmly can be a problem. Markers must not be held down by weighty objects such as steel cage, length of steel rods, or other non-frangible weights as these can present a hazard to aircraft running over the markers.

6.13.1.3 Materials that have been found suitable to hold down markers include sandbags, tent pegs and other forms of weigh down devices.

6.13.1.4 Each marker must be clearly visible against the background in which it is placed.

Note: CASA recommends that unserviceability markers are displayed across the entire width of the runway, taxiway, apron or holding bay.

Table 10: Number of unserviceability markers required for temporary taxiway closures

Taxiway width	Number of markers/lights	Location
7.5m	3[1]	One unit on centreline, and one unit each side of centreline and spaced 3 m apart.
10.5 m	3[1]	One unit on centreline, and one unit each side of centreline and spaced 3 m apart.
15 m	5[1]	One unit on centreline, and two units each of centreline side and spaced 3 m apart.
23 m	7[1]	One unit on centreline, and three units each of centreline side and spaced 3m apart.

Notes:

1. [1] Where the width of the taxiway exceeds the minimum width, such as intersections with other taxiways, additional markers, and lights for night closures, should be considered.
2. The Part 139 MOS does not differentiate between the use of markers during daylight hours or night therefore markers should be used at night as well as unserviceability lights. Additional consideration may be given to using reflective bands or stripes which are visible at night if determined necessary through a risk assessment.

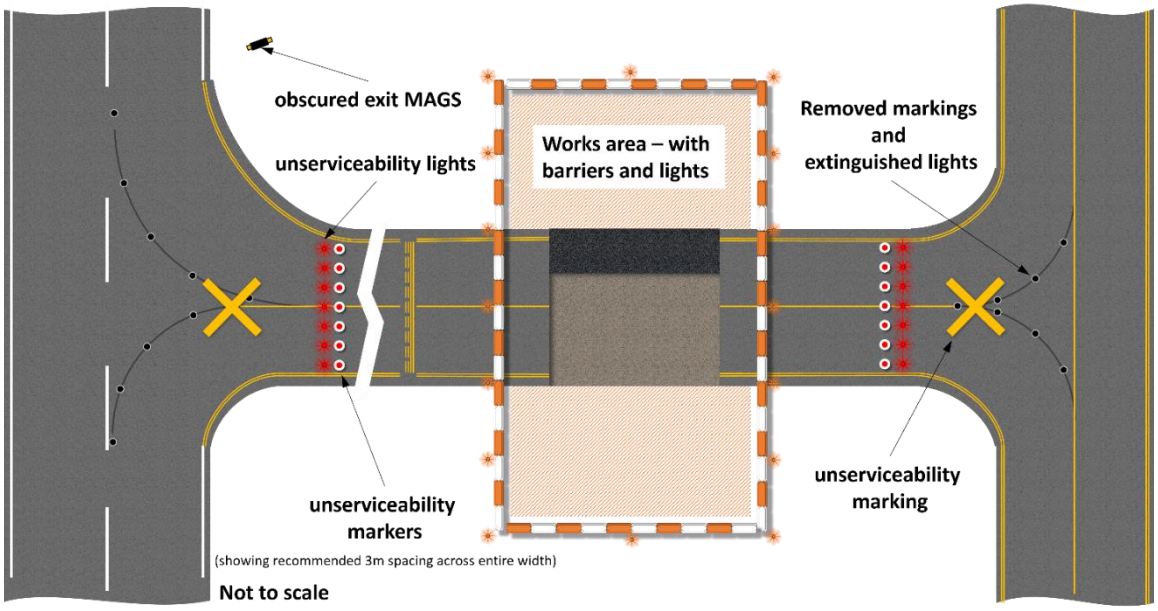


Figure 2: Example of visual aids for a taxiway closure using markings

Source: CASA

Example of visual aids for a taxiway closure using markings

6.13.1.5 Section 8.106 of the Part 139 MOS requires an unserviceability marking on a taxiway, or portion of a runway or taxiway, which is unserviceable.

6.13.1.6 An unserviceability marking must be yellow when displayed on a taxiway.

6.13.1.7 For temporary taxiway closures, taxiway unserviceability markings may be used If used they must have the form and proportions shown in Figure 8.106 (9)-1.

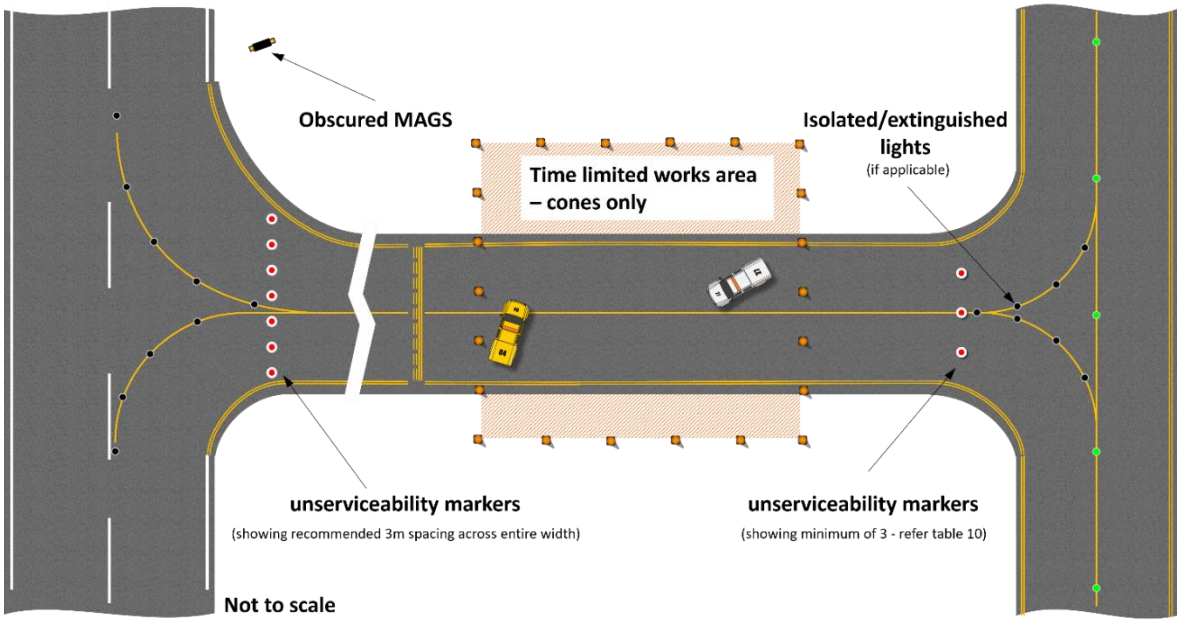


Figure 3: Example of visual aids for a taxiway closure using markers

Source: CASA

Example of visual aids for a taxiway closure using markers

6.13.2 Section 8.108 of the Part 139 MOS requires unserviceability markers be placed at the entrance to, and across, any parts of the movement area of an aerodrome (including a runway) that are not to be used by aircraft.

6.13.3 Subject to Table 10 Unserviceability markers and lights for temporary taxiway closure, at least 3 unserviceability markers must be displayed across the centreline of any portion of the area that is unserviceable.

6.13.4 Works limit markers and lights

6.13.4.1 Works limit markers and lights should be used to define the boundary of the allocated work area. Works limit lights should be clearly visible to a pilot approach the works area but not so great that it creates a hazard. Works limit markers and lights should not be used to convey information to pilots about changes to the movement area. See Figure 7: Example taxiway closure for aerodrome works, using markings, lights and barriers and Figure 6: Sample taxiway closure for aerodrome works, using markings and lights for further information.

6.13.4.2 To ensure certainty, the works limits markers should be located at the boundary of the works area, to define the extent of area available to those within the works area.

6.13.4.3 Works limit markers and lights may be used to define access paths to the works areas.

6.14 Use of temporary lights

6.14.1 Occasionally, temporary lights may need to be used to delineate new locations, such as a temporary runway holding position locations, or intermediate holding positions. Lighting units selected for specific functions should be as close as possible to the specifications of the permanent lights used at the aerodrome.

6.14.2 Where a section of a taxiway centreline lights are unserviceable, temporary taxiway edge lights are to overlap with the serviceable taxiway centreline lights for 2 light spacings within each end of the unserviceable area.

6.14.3 In all cases where temporary lights are used, and the lights are powered by battery or other source including solar power, a process should be introduced to ensure the lights remain operational and remain visible when in use.

6.15 Lighted visual aid to indicate a temporary complete runway closure

6.15.1 Where the full length of a runway is temporarily closed at a controlled aerodrome, and ATC is operating, X-shaped crosses with 2 lit arms may be used in lieu of day markings. Specifications for lighted visual aids is included in sections 9.128 and 9.129 of the Part 139 MOS. A lighted visual aid cannot used on a partially closed runway or a runway with a displaced threshold.

6.15.2 If the aerodrome operator intends to use lighted visual aids in lieu of markings for runway closures of more than 24 hours duration, arrangements should be made with CASA during the planning stages of works. Refer to AC 139.A-04 Applying for aerodrome authorisations, exemptions and approvals for further information.

6.15.3 When in use, lighted visual aids should be positioned at the extremity of the runway, or within the permanent threshold of the runway at each end and aligned with the centreline of the runway.

Note: Although the full length of the runway is closed, crossing or taxi along a portion of the closed runway by aircraft and vehicles is permissible, subject to appropriate markings being installed. Unserviceability markers may be used to limit the limits where aircraft may operate.

6.16 Ground signals in signal areas

6.16.1 If the aerodrome operator has chosen to maintain a signal area, and the aerodrome is closed, a total unserviceability signal should be displayed in the signal area.

6.16.2 The use of a total unserviceability signal would require a NOTAM to be issued.

6.17 Visual approach slope indicator systems

6.17.1 Where a runway is equipped with visual approach slope indicator systems (VASIS), and the runway threshold is displaced, the VASIS is to be extinguished if the runway is not available for landing, or the threshold is displaced.

Note: At aerodromes where the runway is intended to be used by aircraft that require a VASIS, and the permanent VASIS has been extinguished, a temporary VASIS should be provided at the displaced threshold.

6.17.2 Whenever a VASIS has been extinguished or not otherwise operational, a NOTAM should be published in accordance with 3.1 of the NOTAM Data Quality Requirements for Aerodrome Operators.

6.17.3 If a runway is used at least once a week in air transport operations by non-propeller driven turbine-engine aeroplanes or as instructed by CASA, a PAPI is required.

6.18 Temporary runway end markings, markers and lights

6.18.1 In instances where the normal end of the runway has been temporarily relocated, the relocated end of runway should be marked. The preferred way to mark the runway end is with a 1.2 m wide marking that extends the full width the runway.

6.18.2 If a painted marking is not practical (i.e., the change is not for more than 5 days) markers may be used. Markers such as white cones or white gable markers may be used. The number of markers used to mark the temporary runway end should be sufficient to ensure a pilot is aware of the closed portion on of the movement area.

6.18.3 In instances where the normal end of the runway has been temporarily relocated, and the temporary runway end is not collocated with the temporary displaced threshold, additional consideration of visual aids is required. The use of runway markers may assist the pilot's awareness of the end of the reduced length runway.

6.18.4 In instances where the start of take-off run available on a reduced length runway is not clearly visible, the addition of markers and, for night operations, lights should be considered. Temporary runway end lights and changes to runway edge lights may be required. If an instrument precision approach runway's lighting is reconfigured to facilitate reduced length runway operations, the colour coding of the lights needs to be considered.

6.18.5 Markers may be used to mark the temporary end of a runway, or temporary start to take-off run available, and the surface of the runway is required for aircraft to manoeuver, or the risk of markers being subject to excessive blast, the markers may be moved outside the edge lines of the runway.

6.18.6 Where the end of runway includes a relocated start of take-off run available, and the runway is intended to be used at night, the addition of a single green elevated omnidirectional green threshold light may be required on each side of the runway.

6.18.7 Approval to use markers and green lights mentioned in sections 8.5 and 8.6 is required from CASA in accordance with CASA AC 139.A-04 Applying for aerodrome authorisations, exemptions and approvals.

6.18.8 Markers used to mark a temporary runway end will need to be tethered to withstand the effect of jet blast or propellor wash.

6.18.9 If the red runway end lights are available, temporary markings and markers are not required, providing the lit lights are visible to pilots, and the lights are checked periodically to ensure ongoing serviceability.

6.19 Other markers, markings and lighting

6.19.1 The aerodrome operator is responsible for ensuring the safety of people, aircraft operations, and aerodrome operations. To achieve this, other markers, markings and lighting may be required.

6.19.2 Barriers may be considered outside the boundary of the manoeuvring area, or to isolate aircraft parking positions. Barriers should not be located within the runway strip or taxiway strip unless that runway or taxiway is closed.

6.19.3 Barriers may be used to protect those within the work area, or define the edge of areas that are excavated, or where a fall could occur. Where used, the barriers should be red and white, orange or white or some other colour that is conspicuous. Barriers may be positioned outside the boundary of the manoeuvring area. When used on an apron, barriers may be used to isolate aircraft parking positions from the remaining apron area.

6.19.4 Where barriers are used on parking aprons to delineate the closure of one or more aircraft parking positions, the barrier cannot disrupt aircraft or ground servicing operations of any adjacent aircraft parking position that is available for use. Aerodrome operators can choose downgrade aircraft parking areas limiting the parking position to use by smaller aircraft. The downsizing use of the parking position can be achieved by other means, such as tow-on, tow-off operations.

6.19.5 Where barriers are used, permanent markings such as lead in lines should be obscured and lighting deenergised to reduce the potential for inadvertent use of the closed runway or taxiway.

Figure 4: Example of barriers used adjacent to a taxiway

Source: CASA

6.19.6 Barriers should not be located within the runway strip or taxiway strip unless that runway or taxiway is closed. The use of barriers to protect those within the work area should be considered when undertaking risk analysis.

6.19.7 Where used, the barriers should be alternating white and a conspicuous and contrasting colour such as red or orange.

6.19.8 Depending on the type of works being undertaken, types of barriers may include frangible gable markers, or barriers typically used in routine construction activities such as water filled barriers, or flexible fencing.

6.19.9 Where the use of more durable fencing is required for the protection of people or to reduce the likelihood of foreign object debris, such barriers outside the movement area, or within the closed portion of the movement area may be used providing a risk assessment ensures that the risk to aviation safety is appropriately considered.

6.19.10 Where such barriers are used, the barrier should be marked with low intensity steady red lights. Where the barriers are intended to be used for extended periods, the lights should, where possible be hardwired. See Figure 7: Example taxiway closure for aerodrome works, using markings, lights and barriers for more information.

6.20 Movement area guidance signs

6.20.1 At aerodromes equipped with mandatory and advisory movement area guidance (MAG) signs, information provided by the signs needs to be carefully considered. MAG signs may need to be

treated by obscuring the sign, or, where MAG signs are illuminated, extinguishing the sign at night.

6.20.2 Where information on the sign continues to provide necessary information, but some of that information is not correct, the sign should be partially obscured. The method of obscuring the sign will vary depending on the location of the sign, and product used to obscure the information.

6.20.3 Where new signs are installed as part of the works program, or the information on the sign is changed, the messaging on the sign needs to ensure pilots with provided accurate information so any-potential of confusion is minimised.

6.20.4 When planning works, information signs that contain information that could provide incorrect information need to be identified. To ensure pilot situational awareness, Information on signs could be amended to show the correct information. This could include changing information on the existing MAG sign or using temporary MAG signs. Where MAG sign information is amended during area works, a process should be established to ensure the information correctly reverts at the completion of works.

6.20.5 Information on MAG signs must correlate with published information.

6.21 Other information signs

6.21.1 Where other information signs are installed, such as distance to run signs, the information provided on the sign needs to be maintained as accurate. Where information becomes temporarily or permanently inaccurate, treatment of the sign as outlined in this section is required.

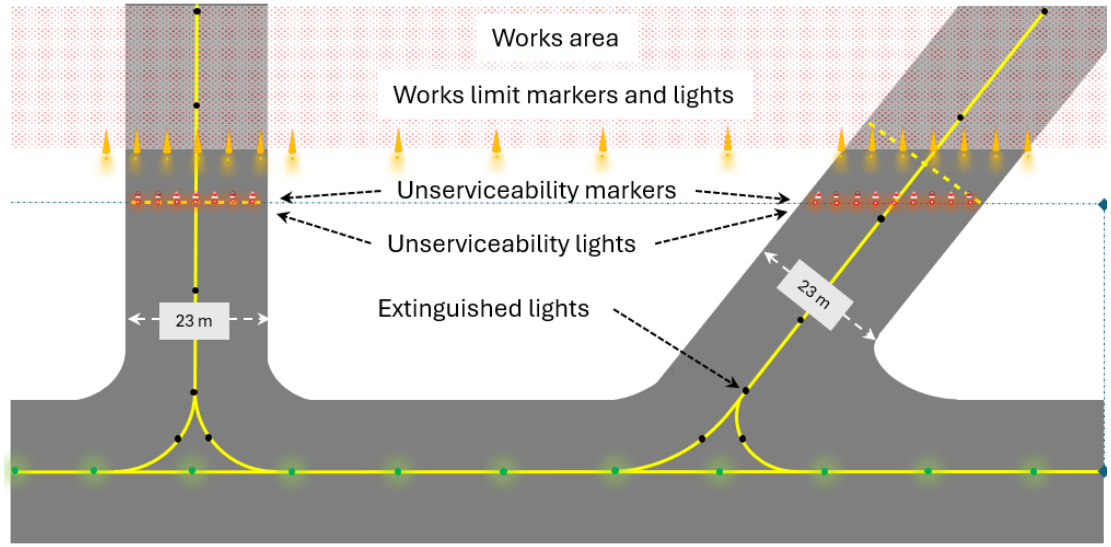


Figure 5: Typical taxiway closure for aerodrome works, using markers and lights

Source: CASA

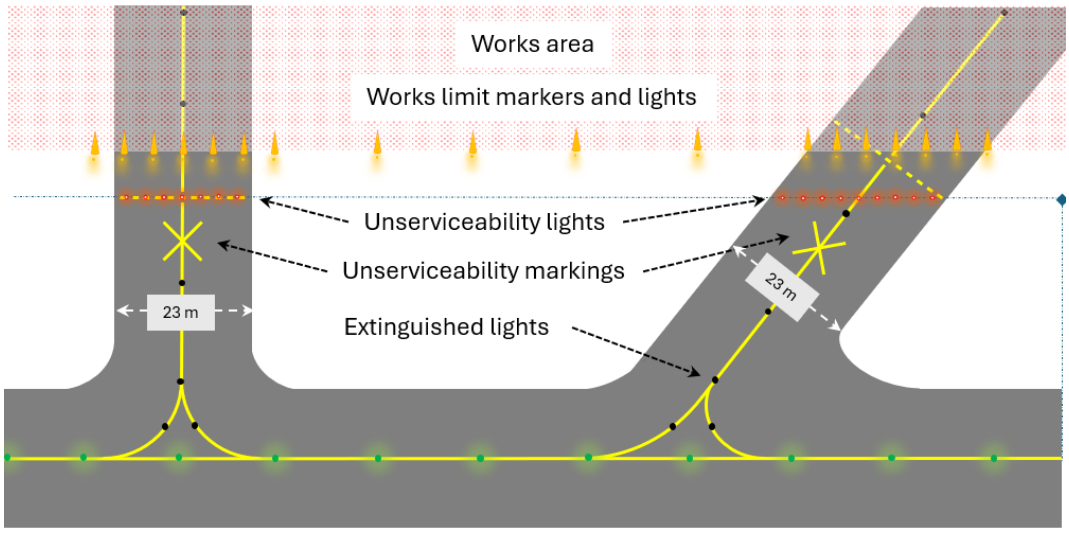


Figure 6: Sample taxiway closure for aerodrome works, using markings and lights

Source: CASA

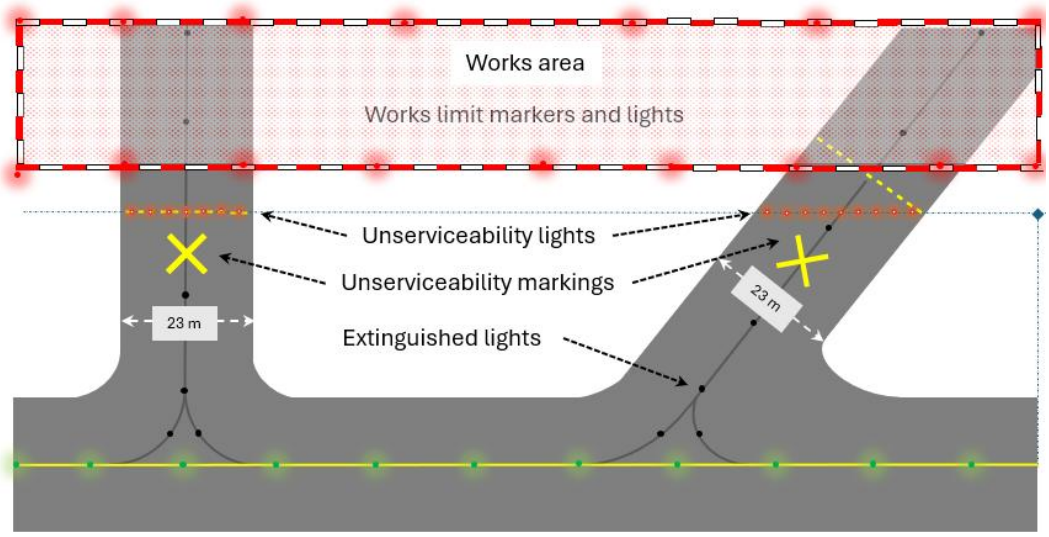


Figure 7: Example taxiway closure for aerodrome works, using markings, lights and barriers

Source: CASA

7 Reduced length runway operations and temporarily displaced thresholds

7.1 A runway's length may be reduced permanently, or temporarily for various reasons that may include damage to the runway, to facilitate aerodrome works, or due to a disabled aircraft. The focus of this AC is for planned events, such as aerodrome works.

7.2 Any temporary reduction of runway length of an instrument runway should be avoided as far a reasonably practical. This is due to the range of aerodrome charts, published information, instrument flight procedures and aircraft operator needs that will be impacted by the temporary reduction of runway length. It may be more practical and offer less risk to close the runway.

7.3 Reduced length runway operations may result in one of more of the following:

- the need to temporarily displace a landing threshold
- temporary change to the start of take-off run available (TORA) (SOT) to one or both directions of the runway
- temporary change of the end of take-off distance available (TODA) to one or both directions of the runway
- temporary reduction of landing distance available (LDA) to one or both directions of the runway.

7.4 A single runway can be considered the sum of two runway directions and 4 separate runway functions. Runways are normally used in two directions orientated 180 degrees from each other. If the runway is intended to be used for landing from both directions, there are 2 landing runways. If the runway is intended for take-off from both directions, there are 2 take-off runways. In some cases, a runway may not be useable for landing and/or take off in a specific direction.

7.5 The characteristics of the approach or take-off do not need to be consistent on the same runway. The approach surface to one end of the runway may be instrument precision approach and non-instrument from the reciprocal end. A take-off runway may also have an extended clearway and the reciprocating runway end a minimum length clearway. The 4 different runways operate independently of each other.

7.6 The characteristic of a runway is the amalgamation of the characteristics of the most demanding characteristic of each subpart.

7.7 Determining the origin of each published distance is critical. To determine declared distances, the aerodrome operator needs to determine the:

- extremities of each end of the runway
- location of each landing threshold
- location of the end of LDA for each runway (including any stopway)
- location of each runway's end of TODA (including any clearway)
- location of the SOT for each runway (excluding any runway starter extension).

Note: The threshold of a runway is normally located at the extremity the runway. The extremity of a runway is defined as the physical ends of the paved runway surface, regardless of where the landing threshold is located. For unsealed runways, the extremity of the runway is the boundaries of the prepared runway surface.

Refer to Division 1 of Chapter 6 of the Part 139 MOS.

7.8 For instrument approach runways, the aerodrome operator should identify the:

- geographic location coordinates of each landing threshold
- elevation of the midpoint of the runway threshold.

This is equally applicable to any temporary runway configurations.

7.9 Declared distances are the measurement between two defined locations, in context with the information to be published. This information includes the TORA, TODA, ASDA, LDA. Distances shall be calculated to the nearest meter for each runway direction and reported to AIS.

7.10 Where any change in declared distances affects any supplementary take-off distance available (STODA), changes to STODA need to be published.

7.11 Information onto be included in the AIP is based on declared distances, as shown in Figure 8, Figure 9, Figure 10 and Figure 11.

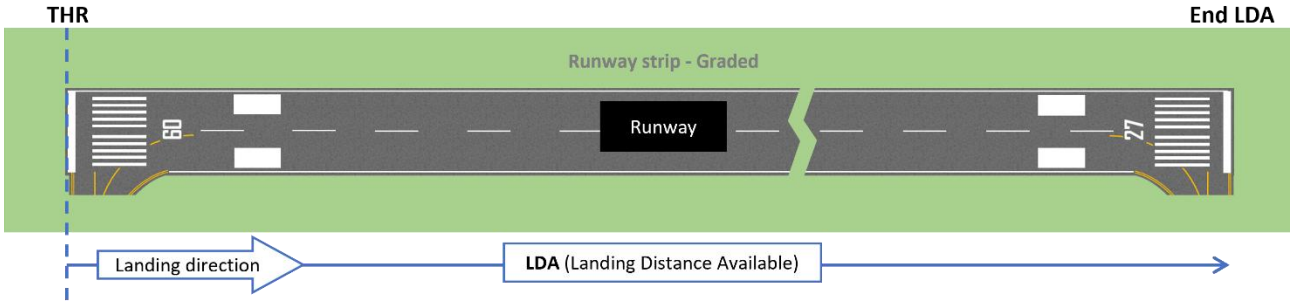


Figure 8 - Example of landing runway (09)

Source: CASA

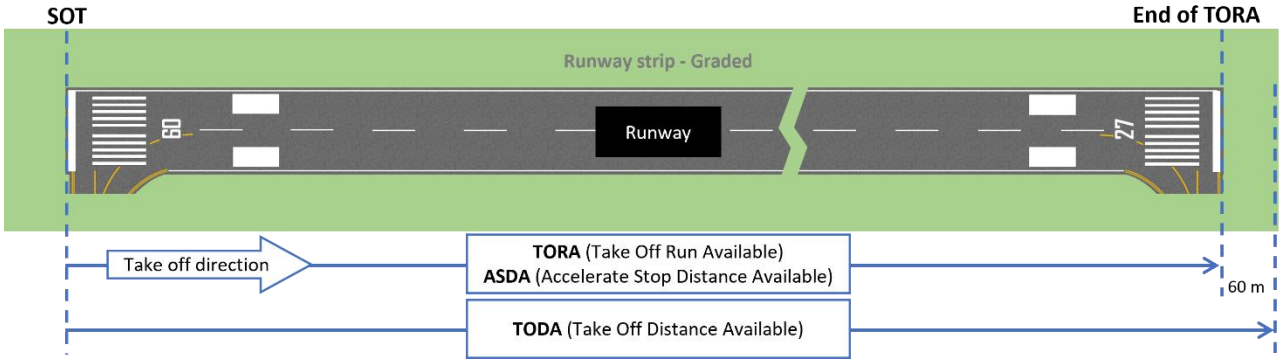


Figure 9 - Example of take-off runway (09)

Source: CASA

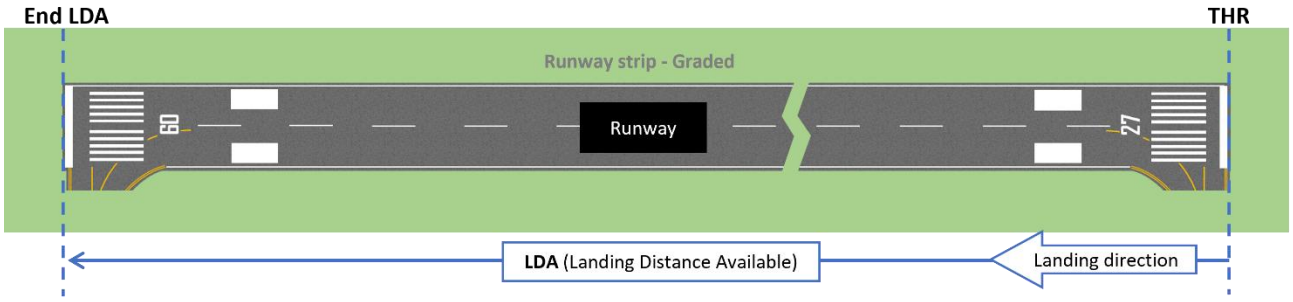


Figure 10 - Example of landing runway (27)

Source: CASA

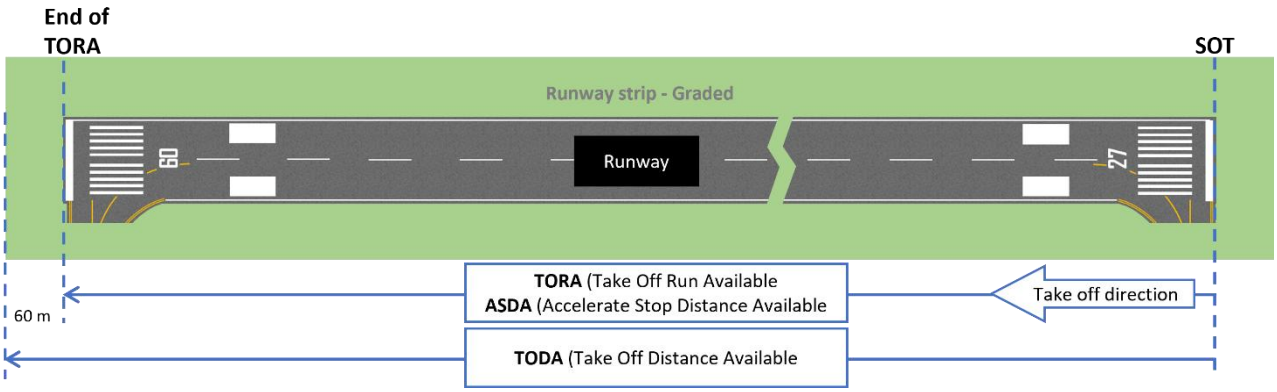


Figure 11 - Example of take-off runway (27)

Source: CASA

7.12 The Part 139 MOS requires the threshold of a runway to be located at the extremity of a runway. A runway threshold may be permanently or temporarily displaced from the extremity of a runway as necessary, but subject to conditions.

7.13 Figure 8 and Figure 9 demonstrate the typical arrangements for a runway where the landing threshold is located at the extremity of the runway and the end of LDA is at the opposite extremity of the runway.

7.14 Figure 9 and Figure 11 demonstrate the typical arrangements for a runway where the SOT is located at the extremity of the runway, and the end of TORA is at the opposite end of the runway, and end of TODA is located 60m beyond the end of the runway, at the end of runway strip.

7.15 A runway surface may have slopes which may include variations in runway surface elevation and grade. This introduces complexity when determining declared distances. Changes in runway elevation may result in signification variations in take-off distances, supplementary distances, and landing distances, which could impact the useability of the remaining runway, or the ability of an aircraft to use the runway.

7.16 The safe operation of aircraft is dependent on accurate published aeronautical information. If the aerodrome operator is not confident in revising published information, CASA recommends the accountable person seeks appropriate advice from a suitably qualified or knowledgeable person prior to changing published information.

7.17 The obstacle limitation surfaces (OLS) approach surface gradients, and take-off climb surface gradients used when calculating declared distances for displaced threshold should be determined using Tables 7.15(1) Physical dimensions of the OLS for an approach runway and Table 7.16(2) Physical dimensions of the OLS for a take-off runway of the Part 139 MOS. In

accordance with section 4.01 of the Part 139 MOS, the aerodrome reference code (ARC) of the reduced length runway shall be chosen by the aerodrome operator.

7.18 Changes to published information of temporary displaced thresholds

7.18.1 The temporary reduction of the length or a runway, displacement of a landing threshold, relocation of SOT or change of SOT may:

a. extend for a period in a single day (or night)

b. for an extended period, for the duration of the works.

Additional hazards arise when WIP includes a reduction in one or more declared distance.

7.18.2 Frequent and short period changes to published runway distances increase the level of risk of aircraft operators and pilots having time to adjust to change, misinterpret change, overlook necessary information or where the change impacts intended flight operations.

7.19 Temporary displacement of the landing threshold

7.19.1 The temporary displacement of a threshold or reduction in overall runway length is a change to the characteristics of the movement area is therefore an impact to aerodrome users and a RTAO. The temporary change may impact aircraft operator's ability to continue their use of the runway, or the aerodrome. This may have effect on the community if the movement of people or freight is negatively impacted.

7.19.2 Ineffectual visual aids or published information on displaced thresholds may be a hazard to safe operations of aircraft or may cause confusion to pilots. The development of MOWP to facilitate works in progress (WIP), including displaced thresholds, will require the support of specialists, including survey consultants and those undertaking the works activities.

Notes:

1. Temporarily displaced thresholds or runway length reductions have the potential to increase the risk of an aircraft experiencing a runway incursion, undershoot or runway excursion during landing or take-off. A thorough hazard identification and risk assessment process should be undertaken when considering the displacement of a threshold or reduction of runway length in accordance with the SMS or RMP.
2. When considering a temporary displaced threshold or runway length reduction, aerodrome operators should engage airlines, aircraft operators or pilot groups to determine whether the runway can remain useable for landing and/ or take-off.

7.19.3 Visual aids are likely to need altering to facilitate displaced threshold operations. When enacting a displaced threshold, and returning the threshold to its normal location, the aerodrome operator should consider developing a robust checklist or checking process to ensure all actions have been completed as per the planning process.

7.19.4 Temporarily displaced thresholds should include a runway end safety area (RESA). The dimensions of the RESA may vary depending on the intended use of the runway when the threshold is displaced. Specifications for RESA are included in section 6.26 of the Part 139 MOS.

Note: If aerodrome works includes the displacement of a runway threshold, objects that may penetrate the revised approach surface and take-off climb surface should be reported to CASA. Refer to sections 6.01(5)(a) and 7.19 of the Part 139 MOS for further information. Subject to paragraph 8.18 of the Part 139 MOS, the aerodrome operator must recalculate the TODA, the critical obstacle gradient, and the STODA in the reciprocal direction from the displaced threshold.

7.19.5 Temporary markings, markers and lights used to identify the displaced threshold along with temporary markers, markings, and lights necessary to mark the runway starter extension has a likelihood to create a hazard to aircraft or cause confusion to pilots. Runway starter extensions with temporarily displaced thresholds should be avoided due to the complexity of temporary visual aid arrangements.

Note: Despite the comments in 8.1.9, operators of Leased Federal Aerodromes subject to the Airports (Protection of Airspace) Regulations 1996 should consider liaising with the Department responsible for the administration of the *Airports Act* 1996 and the associated regulations when planning work activities requiring amendments to the aerodrome's OLS.

7.20 Displaced thresholds and instrument flight procedures

7.20.1 Published terminal instrument flight procedures (TIFP) are likely to be impacted by any threshold displacement. The planning of aerodrome works should include engagement with the applicable instrument procedure designer. Information of the procedure designer of each procedure is included in Departure and Approach Procedures, available through Airservices Aeronautical Information Package.[11]

7.20.2 The procedure designer will need to determine whether it necessary to suspend the procedure or amend details of the procedure. The impact of procedure suspension or amendment may be significant to aerodrome users and RTAO. Engagement and consideration of work programs must include time necessary to consider any impact to flight procedures and facilitate appropriate stakeholder engagement.

7.20.3 The suspension of an IFP does not change the classification of a runway. Instrument runways do not become non-instrument runways if an IFP is suspended.

7.20.4 Runways that provide landing from each end may be classified differently. There is no requirement for a runway to provide the same level of service to each approach end. Table 11: Approach runway configuration alternatives (where the runway is used for approach operations) demonstrates the range of alternatives possible. The temporary displacement of a runway needs to be coordinated with the relevant IFP designer to determine the potential impact of any permanent or temporary change, and the impact to any published IFP.

Table 11: Approach runway configuration alternatives (where the runway is used for approach operations)

Approach category to a runway	'Reciprocal approach category to a runway
Instrument – precision approach	Instrument – precision approach

[11] Refer: https://www.airservicesaustralia.com/aip/aip.asp

Approach category to a runway	'Reciprocal approach category to a runway
Instrument – precision approach	Instrument – non-precision approach
Instrument – non-precision approach	Instrument – non-precision approach
Instrument – non-precision approach	Non instrument
Non instrument	Non instrument

7.21 Determining declared distances

7.21.1 Declared distances are the specific lengths of each runway published for aircraft operators and are define allowable take-off and landing weights and speeds.

Note: Due to the technical expertise involved in determining declared distances, reduced runway lengths and inclusion of runway slopes, it is highly recommended that specialists in survey with experience and knowledge of runway calculations are engaged by the aerodrome operator.

7.21.2 Where a runway direction is intended for take-off operations, the following information is published in the ERSA RDS:

a. TORA

b. TODA

c. ASDA.

7.21.3 Where a runway direction is intended for landing operations, the following information is published in the ERSA RDS:

a. LDA.

7.21.4 Where a runway is available for landing or take-off operations in both directions, the above information is to be published for each direction. However, where the runway is limited in its use, declared distances for that runway direction is either not published in ERSA RDS, or a NOTAM is published to temporarily amend permanent information.

Note: Where the gradient subtends from its origin, calculating the gradient always starts from a 0% (horizontal) surface.

7.21.5 Where WIP involves a reduction of runway length, less than the distance published in the ERDA RDS, the aerodrome operator should:

- identify and assess the associated risk and mitigate as necessary the potential hazards before, during, and on cessation of operations with reduced runway length available and/or WIP in order to ensure the safety of aircraft operations and works personnel.

Note: Risks to the safe operation of aircraft may result from inappropriate or potentially misleading displays of visual aids; inappropriate or potentially misleading navigational aids; adverse environmental conditions; or unusual meteorological conditions; and from restricted obstacle clearance and wingtip separation distances. It is important to recognise that the identified hazards may cover a wide range of topics, including those that do not pose a risk only to aircraft but also to personnel. For example, the potential risk from jet blast.

7.21.6 Monitoring of aircraft operations in proximity of the WIP should be conducted by the aerodrome operator. Timely and effective corrective action should be implemented when necessary for continued safe operation of aircraft and people. This is particularly important when operational changes or unprecedented or unpredicted events occur.

7.22 Examples of determining declared distances

Example 1 - Temporarily displaced threshold

7.22.1 Where a threshold is temporarily displaced, the length of the displacement is to be measured from the extremity of the runway. This includes instances where a runway has an existing permanently displaced threshold.

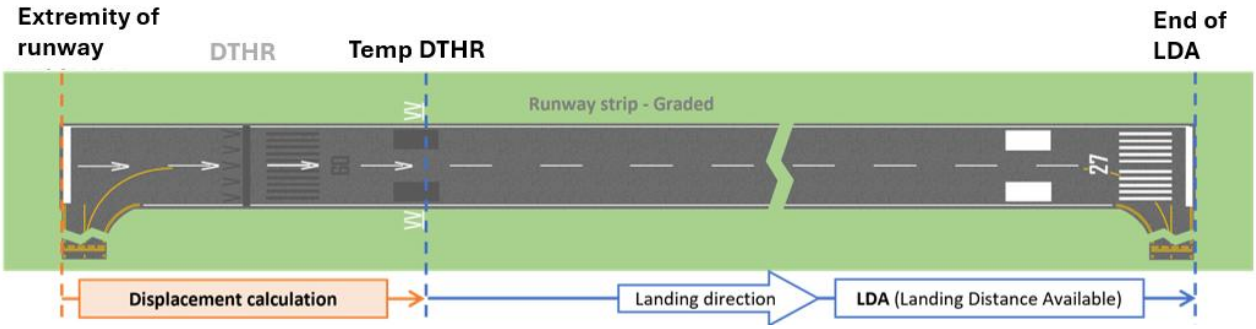


Figure 12: Determining declared distances for landing to a temporary displaced threshold

Source: CASA

7.22.2 In this example, the information published in the ERSA-RDS, except for the LDA for Runway 09, is not changed. The detail in the NOTAM publishes the reduced length of the landing distance based on the location of the temporarily displaced threshold.

Example 2 - temporarily displaced threshold and reduced length runway

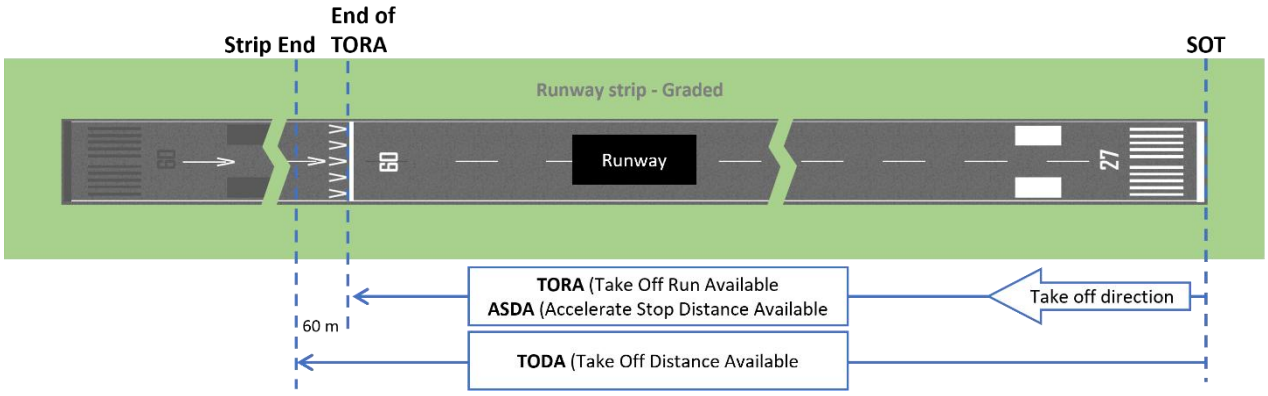
7.22.3 Where a threshold is temporarily displaced, and the length of the runway is also reduced, the information in the ERSA-RDS needs to be considered.

7.22.4 Details of the temporarily displaced threshold and the residual landing distance available should be in accordance with Example 1.

7.22.5 In addition, where the start of take-off is coincidental with the displaced threshold, the TORA, ASDA and TODA for that runway direction needs to be considered. Any existing stopway or clearway should be considered when considering ASDA and TODA.

7.22.6 For the reciprocating runway, the published distances are likely to need adjustment. In most cases, the LDA, TORA and ASDA are the same, unless there is a permanently displaced threshold. It is unlike that a stopway will be provided. The TODA should be longer than the

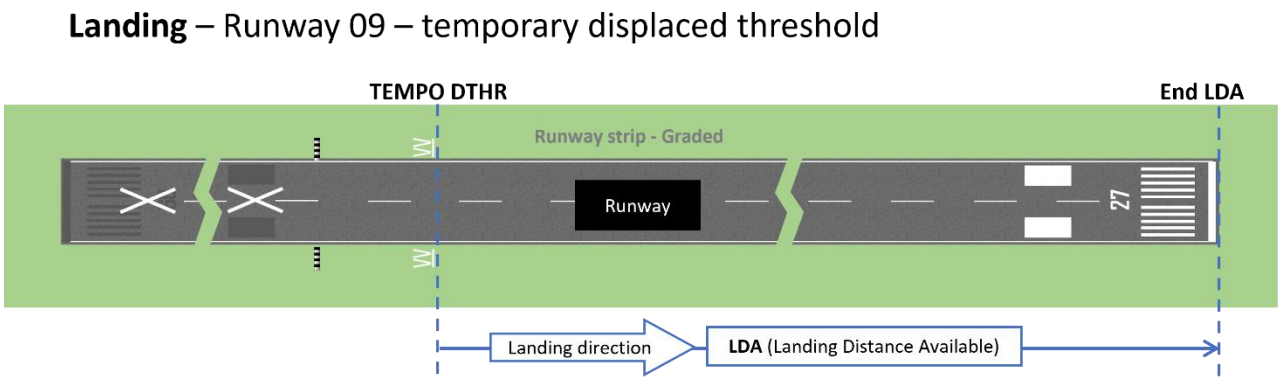
TORA. The end of TODA should be cognisant of the purpose of the closed portion of the runway and objects within the closed portion.

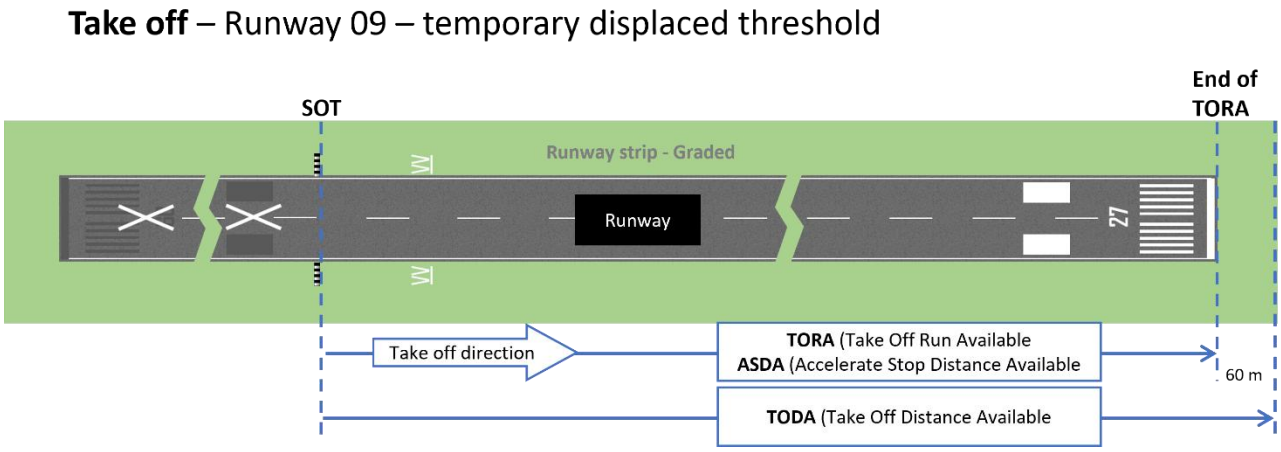


In this example, the difference between TORA and TODA assumes a 60m clearway.

Figure 13: Determining declared distances for take-off towards a temporary displaced threshold (temporary runway ends aligned)

Source: CASA





In this example, the difference between TORA and TODA assumes a 60m clearway.

Figure 14: Determining declared distances from a temporary displaced threshold (temporary runway ends not aligned)

Source: CASA

7.23 Reduced runway length operations - Marking temporary displaced thresholds and runway ends

7.23.1 The marking of temporarily displaced thresholds is based on the type of aircraft operations intended at the aerodrome. Different markings may be used in different circumstances, and for different timeframes.

7.23.2 Table 12 - Markings, markers and lights for temporary displaced thresholds - day summarises matters to be considered when contemplating the implementation of reduced length runway operations through a temporarily displaced threshold.

7.23.3 The following information is the minimum requirements to implement a temporarily displaced threshold:

- Intended aircraft operations
- local traffic arrangements
- seasonal change
- feedback from aircraft operators, airlines, or pilots
- where present, air traffic control
- any additional factor that may has the potential to become a risk, on a case-by-case basis.

7.23.4 The standard for the marking of temporarily relocated runway ends is not the same as permanent runway ends. However, the marking of a temporary runway end for short period runway length reductions to facilitate activities such as WIP may be difficult.

7.23.5 Temporary runway ends may or may not be co-located with temporary displaced thresholds.

7.23.6 When determining whether to introduce temporary displaced thresholds, and runway ends, for short-term change, medium-term change or long-term change, hazards and risks specific to the aerodrome and users of the runway may vary. The transition between normal runway operations and temporary runway operations introduces hazards and risk.

7.23.7 The operational configuration of a runway, visual aids and published information align to ensure that the potential for pilot confusion is fully considered.

Table 12 - Markings, markers and lights for temporary displaced thresholds - day

<table>
<tr><th>Aerodromes with scheduled international</th><th>Other aerodromes</th><th>Aerodrome lighting for day operations</th></tr>
<tr><td colspan="2">8.27 (1) Subject to subsection (2), if a permanent runway threshold is temporarily displaced, then temporarily displaced threshold markings must be provided.</td><td rowspan="3">9.59(3) RTIL must be used aerodromes with scheduled international aircraft operations with temporarily displaced threshold markings under sections 8.27 and 8.30, and subsection 8.29 (3).</td></tr>
<tr><td>8.27(3) For an aerodrome with scheduled international air transport operations, if a threshold is temporarily displaced then RTIL must be provided at the displaced location (except for an emergency).</td><td></td></tr>
<tr><td>8.29(3) RTIL must be provided.</td><td></td></tr>
<tr><td colspan="3">8.28 Temporarily displaced threshold markings — more than 30 days</td></tr>
</table>

<table>
<tr><th>Aerodromes with scheduled international</th><th>Other aerodromes</th><th>Aerodrome lighting for day operations</th></tr>
<tr><td colspan="3">If a permanent runway threshold is to be displaced for more than 30 days, the temporarily displaced threshold markings must comply with the following:
a. a white line, that is 1.2 m wide, must be marked across the full width of the runway at the line of the new threshold, together with adjacent 10 m long white arrowheads, whose lines are 1 m wide
b. existing centreline markings between the reciprocal runway end and the displaced threshold must be converted into arrows as shown in Figure 8.28 of the Part 139 MOS.
c. the permanent threshold marking and associated runway designation number must be obscured, and a temporary runway designation number provided 12 m beyond the new threshold.</td></tr>
<tr><td colspan="3">8.29 Temporarily displaced threshold markings — more than 5 days to 30 days or less</td></tr>
<tr><td>8.29(2) The existing threshold markings must be obscured.</td><td>8.29(4)(d) the temporarily displaced threshold markings must consist of “Vee-bar” markers.</td><td rowspan="3">9.59(3) RTIL must be used with temporarily displaced threshold markings under sections 8.27 and 8.30, and subsection 8.29 (3).</td></tr>
<tr><td>8.27 (1) temporarily displaced threshold markings must be provided.</td><td>9.59(4)(c) RTIL may be used in lieu of temporarily displaced threshold Vee-bar markings required by section 8.29.</td></tr>
<tr><td>8.29(2) The existing threshold markings must be obscured 8.27(3) RTIL must be provided.</td><td>8.29(2) The existing threshold markings must be obscured.</td></tr>
<tr><td colspan="3">8.30 Temporarily displaced threshold markings — 5 days or less</td></tr>
<tr><td>Permanent threshold markings may be retained.</td><td>8.30(1)(b) temporarily displaced threshold markings must consist of “Vee-bar” markers.</td><td rowspan="3">9.59(3) RTIL must be used with temporarily displaced threshold markings under sections 8.27 and 8.30, and subsection 8.29 (3).</td></tr>
<tr><td rowspan="2">8.27(3) RTIL must be provided.</td><td>8.30(1)(b) RTIL only.</td></tr>
<tr><td>Permanent threshold markings may be retained.</td></tr>
<tr><td colspan="3">8.31 Temporarily displaced threshold markings — large displacements for 30 days or less the displacement is by more than 450 m</td></tr>
<tr><td colspan="2">If RTIL is not provided:
a. a runway threshold is temporarily displaced for not more than 30 days
b. the displacement is by more than 450 m
c. RTIL are not provided.

then temporarily displaced threshold markings must be provided in accordance with section 8.28 of the Part 139 MOS.

If 24-hour ATC services are provided:
a. a threshold is temporarily displaced for not more than 5 days</td><td>9.60 temporarily displaced threshold lights must be provided at night to identify the new threshold location if the runway is to be used at night.</td></tr>
</table>

Aerodromes with scheduled international	Other aerodromes	Aerodrome lighting for day operations
b. the displacement is by more than 450 m c. 24-hour ATC services are provided then the permanent threshold markings may be retained if RTIL are provided.		

8 Control of works on the movement area

8.1 It is important that all personnel engaged in WIP are made aware of the safety procedures under which the WIP are to be conducted. A good way is to include a safety message in the briefing such as toolbox talks[12] at the commencement of each day's work.

8.2 As necessary, access routes to and from each worksite should be carefully planned and sign posted. Where vehicles are used to move material, the condition of the vehicles need to be checked to avoid spillage. Where vehicles are allowed to cross or travel on taxiways or runways, dedicated clean up resources need to be available to remove any spilled material from the pavement and adjacent areas.

8.3 If there are aircraft operations at night, the lights from vehicles should be sufficiently managed so they do not affect pilot night vision. Vehicle lights and any auxiliary lights should be checked to ensure that the lights are not directed unduly upwards. Drivers should be instructed that high beam headlights should not be used unless required for the function they are performing (i.e., during movement area serviceability inspections).

8.4 The parking and storage areas of vehicles, equipment and building material should be carefully chosen to ensure no infringement of the runway or taxiway strip, aircraft parking positions or penetrate OLS surfaces.

8.5 Excavation work along the runway or taxiway strips should be planned if the area needs to be restored before the next aircraft operation. See Paragraph 15.06 of the Part 139 MOS, regarding restrictions when carrying out WIP on a runway strip.

8.6 There should be a contingency plan to cover equipment breakdown, rain stoppages, or other forms of inclement weather and occurrences which may disrupt the work.

8.7 Workers with hand tools may carry out work on the runway strip of an active runway providing the work activity does not present a RTAO. There are certain restrictions governing the conduct of workers with hand tools carrying out WIP on the graded runway strip of an active runway. A NOTAM is required if the work area requires more than 10 mins to be restored. At a controlled aerodrome, the ATC would normally only permit such WIP when the:

- a WSO has control of the WIP
- cross wind component does not exceed 20 kts
- visibility is equal to or greater than 5 000 m
- ceiling is equal to or greater than 1 000 ft
- runway surface is dry
- working party can be visually monitored by the ATC.

WIP by workers with hand tools will be suspended during the arrival or departure of super and heavy aircraft operations.

8.8 When activities with 'workers with hand tools operating to the edge of the runway[13]' are being performed, a WSO is to be present. The role of the WSO is to ensure the safe conduct of WIP, and where avoidable, not be part of the work activity.

[12] Refer Safe Work Australia – Consultation (https://www.safeworkaustralia.gov.au/safety-topic/managing-health-and-safety/consultation).

[13] Refer to Section 3.1.1.6 Runways, supplementary information of the Manual of Air Traffic Services.

8.9 Although a dedicated WSO is not required if one of the persons carrying out the TLW has been trained and is appointed as a WSO to perform the function, the person performing the task must ensure their continuous situational awareness of aircraft operations.

8.10 At controlled aerodromes when ATC is operating, the WSO is required to maintain a communication link with the ATC when on the manoeuvring area. WIP by workers with hand tools must be carried out on one side of the runway only and may be suspended during period of heavy aircraft operations.

8.11 At aerodromes where ATC is not operating, or at non-controlled aerodromes, similar restrictions on WIP activities should be followed, except a WSO should monitor aircraft operations, and ensure the WIP are not a hazard to aircraft or cause confusion to pilots.

8.12 Jet aircraft are susceptible to foreign object damage (FOD). This means that loose material must not be left on or adjacent to runways and taxiways as they can be blown away and be a hazard or be ingested by in aircraft engines. An important aspect of restoring the work site to an operational state is to remove any loose material at the end of each work period.

8.13 The WSO is responsible for assuring the movement area is serviceable at the completion of each work period, or the overall completion of the project.

8.14 Where aerodrome markers, marking and lighting are removed or taken out of service, a check of each facility is to be considered prior to the completion of WIP. Depending on the complexity of work, a checklist may be considered, developed in context to the nature of WIP being undertaken. Sample checklists for the closing and reopening of the movement area are included in Appendix 3 of this AC.

8.15 Conditions or triggers to which WIP may be suspended, or delayed, should be considered during planning, with contingencies predetermined. Ad-hoc localised reactive response to address foreseeable aerodrome conditions may be avoided by risk analysis and contingency development based on local knowledge.

8.16 Necessary equipment should be available as required to ensure movement surface cleanliness, and aerodrome facility serviceability.

8.17 The painting of pavement surfaces, or the application of pavement surface conditioners should include the assessment of forecast weather, and the time of year to avoid excessively cold weather. The time for paint or surface conditioners to cure may impact the serviceability of the aerodrome facility and any intended return to service.

8.18 Lighting used to illuminate work areas should be shielded or directed away from the active portion of the movement area to protect the night vision of pilots, air traffic controllers and airside drivers.

8.19 Where the closed portion of the movement area is to be reopened at the completion of each work session after WIP, a check of FOD and other hazards should be completed.

8.20 Prior to portions of the movement area being returned to service, it should be confirmed that all markings, markers and lights are present and in a serviceable condition.

8.21 Assessing feedback to proposed aerodrome works

8.21.1 Informing organisations about aerodrome works is only one aspect of ensuring aerodrome safety.

8.21.2 As part of its SMS, or RMP, aerodrome operators should check to ensure WIP do not create new risk.

8.21.3 The impact of WIP should not affect the procedures of aerodrome users or aerodrome operations, including emergency response.

8.21.4 A safety assessment of all planned works, and contingency planning for unplanned works, should be completed before the WIP to ensure hazards to the safe operation of aircraft have been identified by the aerodrome operator. Planning and coordination should be with interested or affected parties.

8.21.5 Appropriate hazard mitigation measures should be introduced during WIP to keeps risks at an acceptable level.

8.21.6 When a safety concern, change or a deviation has the potential to impact on several aerodrome stakeholders, consideration shall be given to the involvement of all stakeholders affected in the safety assessment process.

8.21.7 In some cases, the stakeholders impacted by the change will need to conduct a separate safety assessment themselves to fulfil the requirements of their SMSs and coordinate with other relevant stakeholders.

8.21.8 When a change has an impact on multiple stakeholders, a collaborative safety assessment may be conducted to ensure compatibility of the solutions. Feedback on any instance where a stakeholder has been impacted by the WIP activities should be provided to the aerodrome operator for a post event analysis.

8.21.9 At the completion of works programs and where the WIP included significant RTAO, a post event analysis should be completed and any lessons learned captured for consideration in future works programs.

8.21.10 The following flowcharts, Figure 15 and Figure 16, demonstrate stakeholder engagement and feedback assessment when planning aerodrome works, and after the completion of aerodrome works.

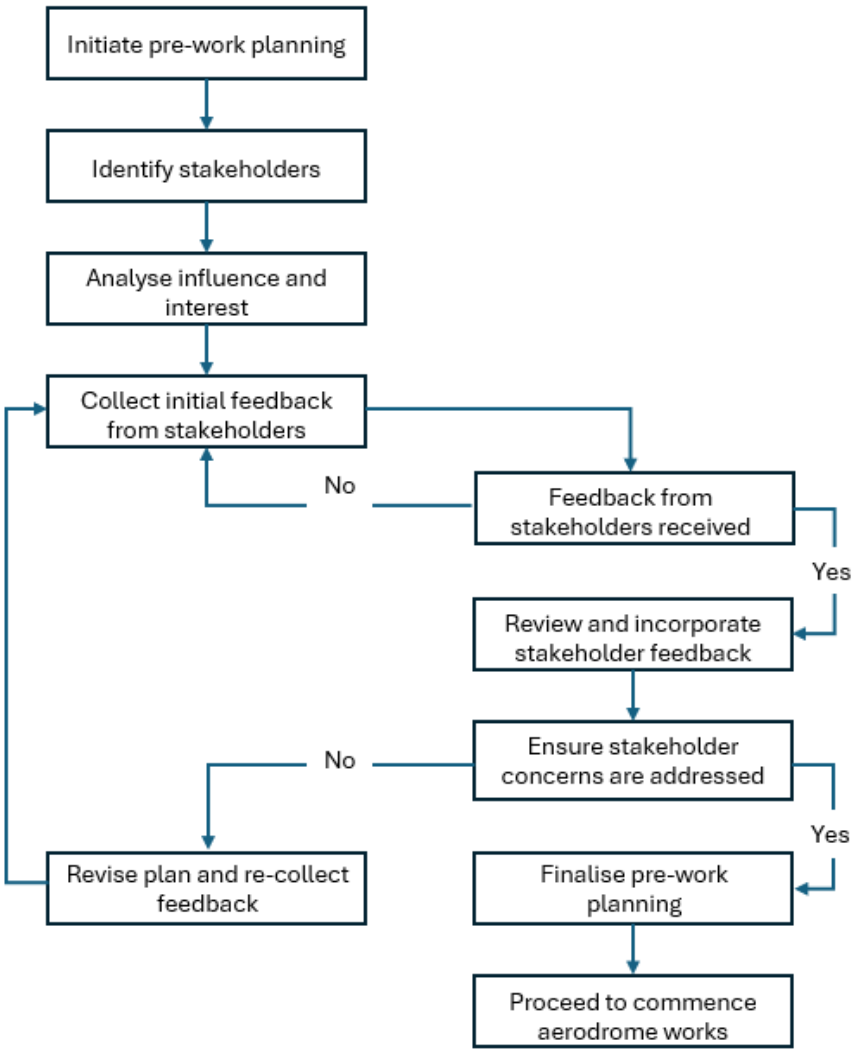


Figure 15: Pre-work activity stakeholder engagement and feedback flowchart

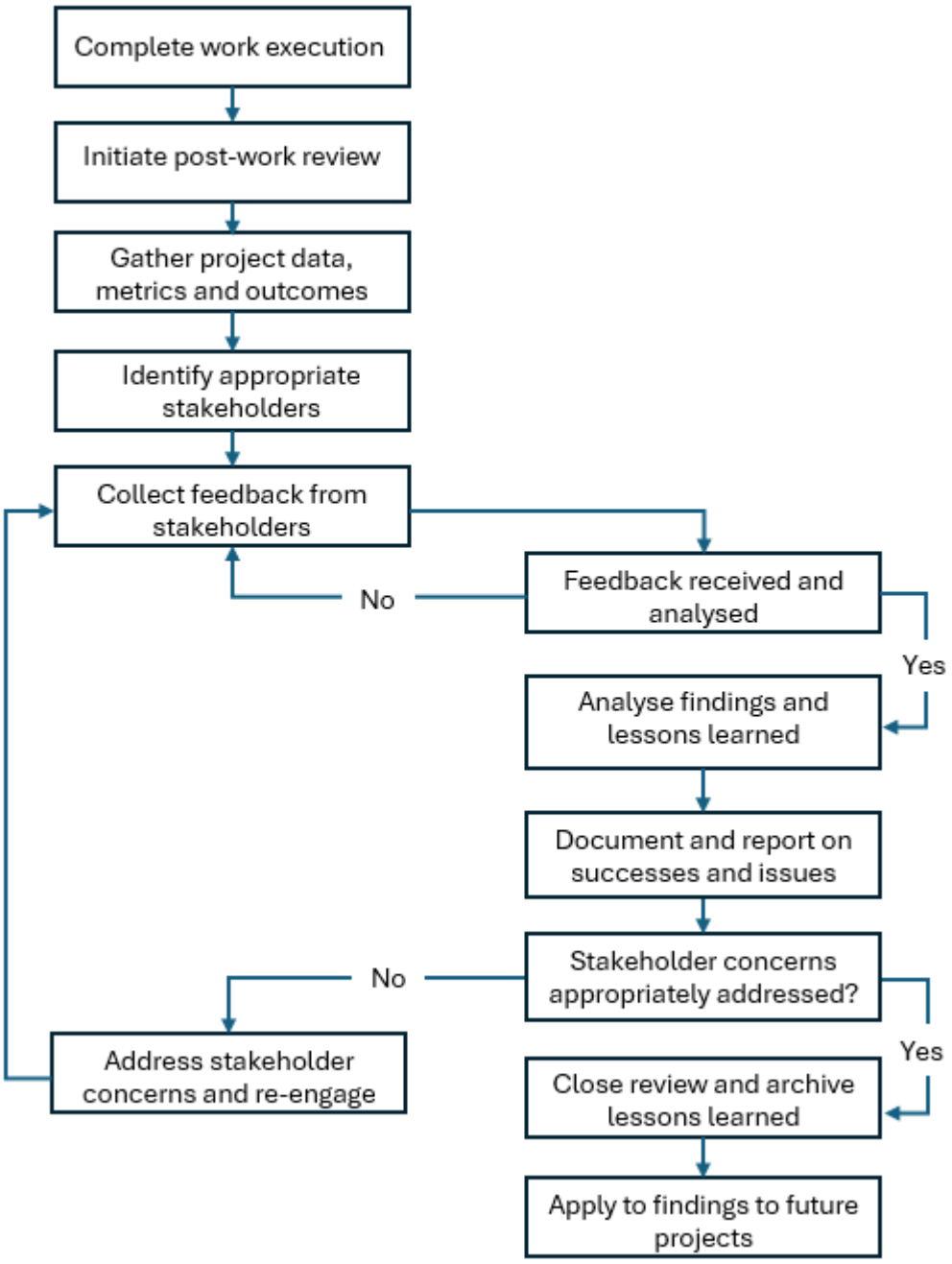


Figure 16: Post work activity stakeholder engagement and feedback flowchart

Appendix A
Aerodrome works safety considerations

The purpose of this list of safety considerations is to allow the works planners and works supervisors to systematically ensure that safety matters, risk mitigation or necessary safety procedures are not overlooked.

Note: This list of considerations is general in nature and may not address unique local situations.

A.1 SMS/RMP assessment considerations

The following information is compiled of information included in the aerodrome manual, and information published in the aeronautical information package and other documents such as the master plan (where applicable). This information is used to develop an understanding of the current state of the aerodrome:

a. aerodrome layout, including runway configurations; runway length; taxiway, taxilane and apron configurations, such as gates; jet bridges; visual aids; and the RFF services infrastructure and capabilities.

b. types of aircraft, and their dimensions and performance characteristics, intended to operate at the aerodrome

c. traffic density and distribution

d. aerodrome ground services

e. air-ground communications and time parameters for voice and data link communications

f. type and capabilities of surveillance systems and the availability of systems providing controller support and alert functions

g. flight instrument procedures and related aerodrome equipment

h. complex operational procedures, such as collaborative decision-making (CDM)

i. aerodrome technical installations, such as advanced surface movement guidance and control systems (A-SMGCS) or other air navigation aids

j. obstacles or hazardous activities at or in the vicinity of the aerodrome

k. planned construction or maintenance works at or in the vicinity of the aerodrome.

The following information is used to determined existing aircraft operations, and services provided to industry and any impact change may have to routine operations:

a. Aerodrome layout, including runway configurations; runway length; taxiway, taxilane and apron configurations.

b. Aircraft parking positions; passenger boarding bridges; visual aids; and the RFF services infrastructure and capabilities.

c. Types of aircraft, and their dimensions and performance characteristics, intended to operate at the aerodrome.

d. Aircraft traffic density and distribution.

e. Aerodrome ground services.

f. Air-ground communications and time parameters for voice and data link communications.

g. Type and capabilities of surveillance systems and the availability of systems providing controller support and alert functions.

h. Flight instrument procedures and related aerodrome equipment.

i. Complex operational procedures, such as collaborative decision-making (CDM).

j. Aerodrome technical installations, such as advanced surface movement guidance and control systems (A-SMGCS) or other air navigation aids.

k. Obstacles or hazardous activities at or in the vicinity of the aerodrome.

l. Other planned construction or maintenance works at or in the vicinity of the aerodrome.

m. Any local or regional hazardous meteorological conditions (such as wind shear).

n. Airspace complexity, ATS route structure and classification of the airspace, which may change the pattern of operations or the capacity of the same airspace.

o. Feedback from persons with experience from previous projects.

A.2 Planning of aerodrome works

In preparing for works on an aerodrome, be it for Method of Working Plan works or TLW, ensure that all of the following are considered and appropriately recorded:

- Clear identification of the scope of works.
- Clear identification of all of the facilities affected.
- Clear identification of the different stages of works.
- Clear identification of the hours of work.
- Clear identification of what happens during inclement weather.
- Clear identification of the closure times of the affected areas.
- Clear identification of the operational restrictions.
- Clear identification of the access routes to the work site.
- Clear identification of the markings required at the work site.
- Clear identification of the arrangements for protecting electrical services and control cables.
- Clear provision for airside security.
- Clear identification of the arrangements for airport emergencies.
- Clear identification of what happens in poor visibility.
- Clear identification of the limit of the works area.
- Clear identification of conditions for the marking and lighting of vehicles.
- Clear identification of the arrangements for keeping pavements clean.
- Clear identification of the maximum height of vehicles allowed on site.
- Clear identification of the conditions for excavations on site.
- Clear identification of conditions for filling of trenches.
- Clear identification of conditions for hot cutting and welding.
- Clear identification of conditions for the use of explosives on site.
- Clear identification of conditions for smoking on site.

- Clear identification of conditions for parking of vehicles on site.
- Clear identification of conditions for waste control.
- Clear identification of conditions for the control of works personnel.
- Clear identification of conditions that apply at the end of the works.
- Clear identification of any obstacles created by the works.
- Clear identification of the markings to be used for marking the unserviceable areas.
- Clear identification of the contractor carrying out the work.
- Clear identification of the project manager.
- Clear identification of the WSO.
- Clear identification of the responsibilities of the WSO.
- Clear identification of the works organiser.
- Clear identification of the safety co-ordinator.
- Clear identification of the conditions under which the MOWP can be varied.
- Clear identification of the person who has approved the MOWP.
- Clear identification of potential sources of wildlife attractants.
- A set of clear and easy to read drawings setting out the impact of the works.
- Do the drawings clearly show the limit of works?
- Do the drawings show the planned set out of temporary markers and markings?
- Do the drawings show the access routes to and from the works?

A.3 Conduct of works

In the conduct of the works, have the following been considered:

- Is there a system to audit the works to ensure MOS compliance?
- Does the system include a process for investigating incidents and accidents?
- Are the works being conducted so that there is minimal disruption to the normal operations at the aerodrome?
- Are the access routes being followed to and from the work site?
- Are the access routes adequately supervised?
- Are the markings for the work site obvious?
- Are the markings for electrical services and control cables adequate?
- Are the provisions for airside security enough?
- Are staff aware of what happens in reduced visibility?
- Are the markings and lighting of vehicles adequate?
- Are pavements used or crossed during the work being kept clean?
- Are the controls on the maximum height of vehicles on site adequate?
- Are there adequate controls over excavations on site?

- Are trenches being filled correctly?
- Are the controls on hot cutting and welding adequate?
- Are the controls over smoking on site working?
- Are the controls of parking of vehicles on site enough?
- Do the waste control methods prevent FOD?
- Are the controls over works personnel adequate?

A.4 Works safety officer

In terms of the aviation safety management of the work site, are the following requirements for works supervision being met:

- Has a works aviation safety officer been trained to the requirements of the Part 139 MOS?
- Have the aviation WSO/s been formally appointed?
- Are there adequate numbers of aviation WSO to cover all aspects of the works: i.e. access gates, access routes, escorts, site supervision?
- Do the aviation WSO have a radio to communicate with ATC and/or aircraft?
- Does the works organiser understand the role of the WSO?
- Do the aviation WSO have communication facilities between each other (where there is more than one WSO)?
- Where there is two or more aviation WSO on duty, has a person been allocated as a responsible person?
- Does the WSO have a formal reporting process?
  - A reporting system may include:
    - » safety incident on the worksite
    - » safety incident outside the worksite
    - » emergency activations on the worksite
    - » non-compliance to procedures
    - » activation, cancellation or deviation of agents engaged in the works
    - » aviation incident that elevated risk or hazard to the work activities or those engaged in the works
    - » any incident of damage to facilities and anything that may affect the safety of aircraft operations.

Note: To avoid confusion between various forms of safety requirements, the function of the aviation WSO relates to their function under Part 139 of the CASR, and the Part 139 MOS, unless otherwise appointed by the aerodrome operator for those other functions.

Appendix B
Revised declared distances

B.1 Example 1: Calculation of declared distances – STODA example - Landing for works in progress on a runway

Figure 17: Calculation of declared distances – Approach surface to a temporary displace threshold demonstrates the threshold of Runway 9 displaced to ensure a slope of 3.3%. The approach surface must be 60 m from the threshold (30 m for non-instrument Code 1 runways).

If the length of the runway has been reduced, and the origin of the reciprocating take-off climb surface is changed, the TORA and TODA should be amended. Figure 18: Calculation of declared distances – STODA example – due to a closed portion of runway demonstrates the establishment of a temporary take-off climb surface of 3.3%. The origin of the take-off climb surface must be 60 m from the end of the runway (30 m for Code 1 runways) unless an extended clearway is established.

In this example the user has determined a 3.3% take-off climb surface. If the unobstructed slope over the obstacle is 3.3%, supplementary slopes and associated runway lengths should also be determined.

Note: For a TODA having an obstacle clear gradient of more than 1.6%, the STODA must be reported for obstacle clear take-off gradients of 1.6%, 1.9%, 2.2%, 2.5%, 3.3% and 5%, up to the gradient associated with the TODA, unless the corresponding STODA for a particular gradient is less than 800 m. In calculating the STODA, care must be taken to ensure that a shielded object does not become critical for the lesser take-off distances, and that the slope of the runway is considered.

B.2 Example 2: Calculation of declared distances – STODA examples - works in progress on a runway

As demonstrated in Figure 18: Calculation of declared distances – STODA example – due to , supplementary take-off distances should be established for the gradients of 1.6%, 1.9%, 2.2%, 2.5% and 3.3%, nothing that if the length of the runway is 800 m or less, that gradient should be excluded. In this example, a gradient of 1.6% would result in a runway length of less than 800 m.

Any changes to permanently published TODA and STODA for each runway will require a NOTAM to be current for the period of runway displacement and changes to runway declared distances.

Note: If the start of take-off run has been temporarily relocated, and STODA for that take-off direction should be assessed. It is likely the length of STODA will need to be reduced, and some slopes suspended if the remaining runway length available for take-off operations is less than 800 m.

Example 1

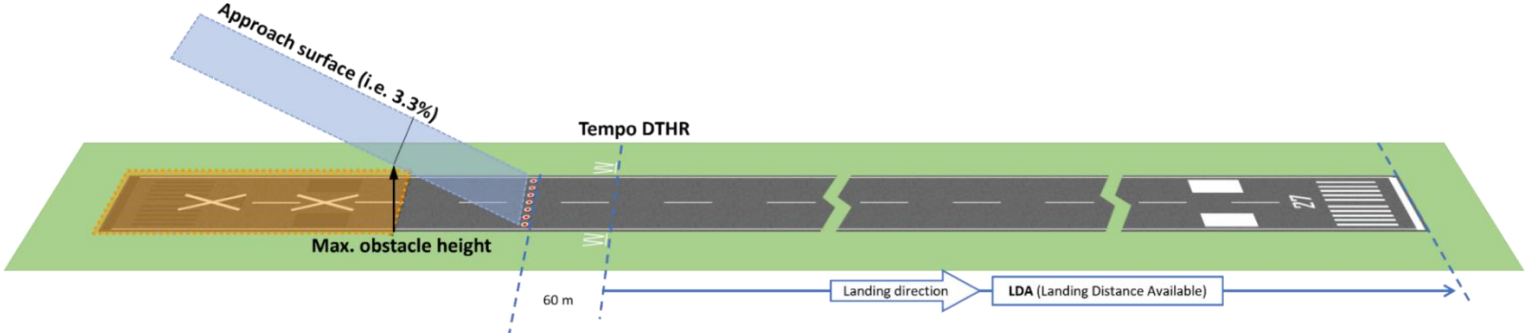


Figure 17: Calculation of declared distances – Approach surface to a temporary displace threshold due to a closed portion of runway

Source: CASA

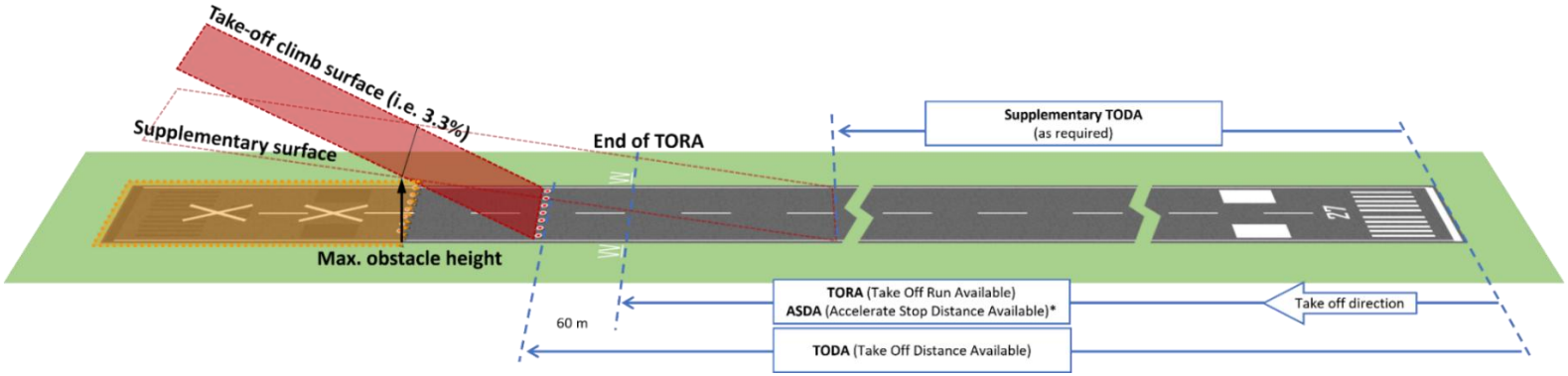


Figure 18: Calculation of declared distances – STODA example – due to a closed portion of runway

Source: CASA

> **Note:** Drawings are not to scale – these drawings are indicative examples.

Example 2

Figure 19 demonstrates the calculation of temporary STODA based on the runway being reduced in length, and a temporary take-off surface being introduced. In this example, the 1.6% slope is excluded as it would result in a runway length of less than 800m.

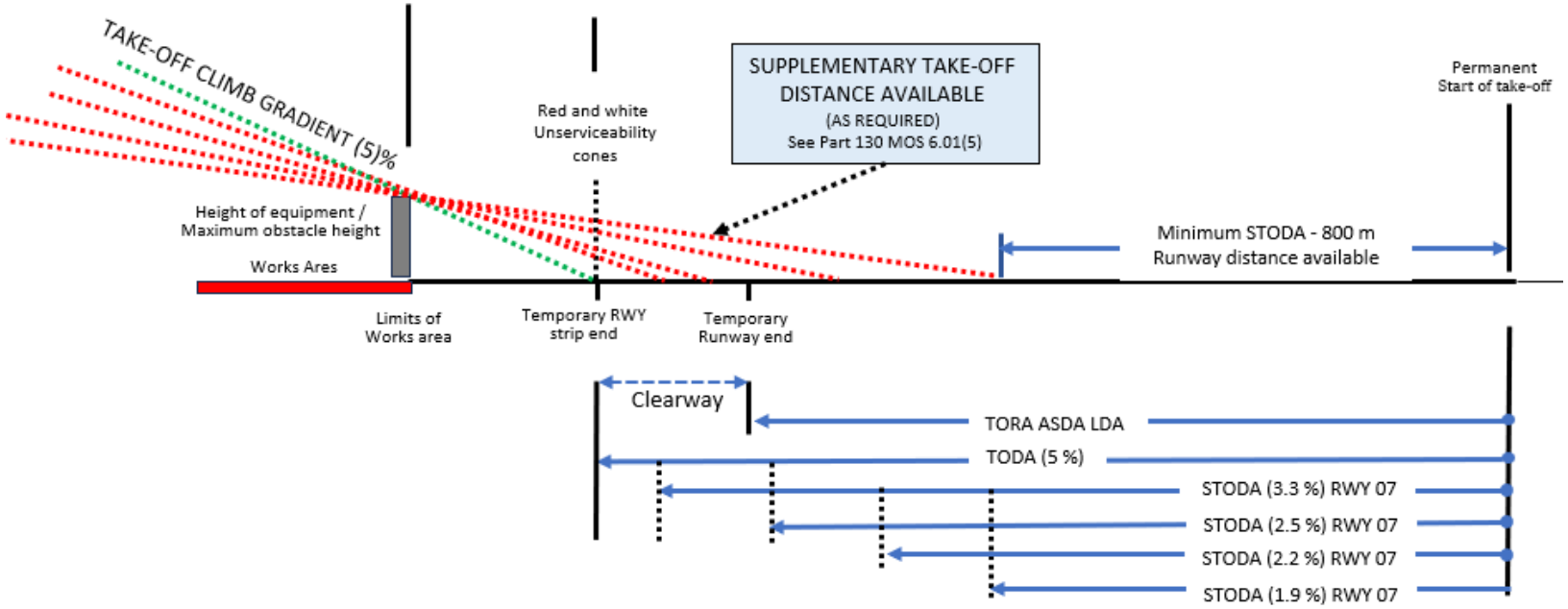


Figure 19: Calculation of declared distances – STODA example

Source: CASA

> **Note:** Drawings are not to scale – these drawings are indicative examples.

Appendix C
Sample worksite checklist

C.1 Worksite checklist: Worksite setup/Movement area closure

MOWP No: (or other works identifier)	
NOTAM No:	
WSO name:	
Date:	
Time:	
Location:	
Work activities:	

Table 13: Sample worksite checklist

Task	Sample only	Task completed
1	Participate in pre works toolbox talks or briefing sessions.	
2	Ensure work clearance with ATC (if applicable), and apron users advised of parking positions(s) affected.	
3	Close area with ATS ATC (if applicable) – either ground or tower frequency.	
4	Inform fire service (if applicable) and aerodrome users affected by movement areas impact.	
5	Isolate the works area with markers/barriers/lights.	
6	Mask movement area guidance signs (as necessary and if applicable).	
7	Ensure runway/taxiway centre lines lights or edge lights are blacked out (for night work).	
8	Check clearances from runway, taxiway or taxilane centrelines to worksite fencing and height of fence or hoarding.	
9	Verify worksite lighting is not a hazard to aircraft operations (for night work).	
10	Ensure or verify safe route for works party / contractor to and from site.	

C.2 Worksite checklist: Worksite setup / Movement area reopening

MOWP No: (or other works identifier)	
NOTAM No:	
WSO name:	
Date:	
Time:	
Location:	
Work activities:	

Table 14: Sample worksite checklist

Task	Sample only	Task completed
1	Verify that pavement surface is sound and clean and clear of FOD.	
2	Verify that light fittings are secure and clean.	
3	Ensure all pit lids are closed.	
4	Verify grass areas are clear of FOD.	
5	Verify that grass areas are reinstated and secure from aircraft blast.	
6	Inspect reinstated runway/taxiway lighting routes.	
7	Ensure runway/taxiway centre lines are reinstated.	
8	Final sweep of area.	
9	Remove barriers and reopen area with ATC (if applicable).	
10	Inform operators of the reopening of the movement area.	
11	Confirm status of NOTAM.	

Appendix D
Safety assessment methodologies for aerodromes

The aerodrome operator's SMS or RMP will include a safety assessment methodology. Where the aerodrome operator is not required to have an SMS or RMS, the aerodrome operator should ensure an appropriate safety assessment methodology is considered.

Once each hazard has been identified and analysed in terms of causes and potential consequences, the associated risk(s) must be assessed for severity and likelihood of its occurrence. Appropriate controls should then be identified and applied to reduce any unacceptable risks to an acceptable level, and residual risk documented.

All risk mitigation measures, whether currently being applied or still under development, should evaluated for the effectiveness of their risk management capabilities.

Note: Further guidance on safety risk probability, severity, tolerability and assessment matrix can be found in Doc 9859 — Safety Management Manual (SMM) or CASA AC 139.C-26 v1.0 - Safety management systems for aerodromes.

Appendix E
Sample NOTAM request form for temporarily reduced length runway distances

This example demonstrates a NOTAM for reduced length runway operations, in this instance due to a displaced threshold. The information requested in this example is the only information that should submitted to the Notam Office.

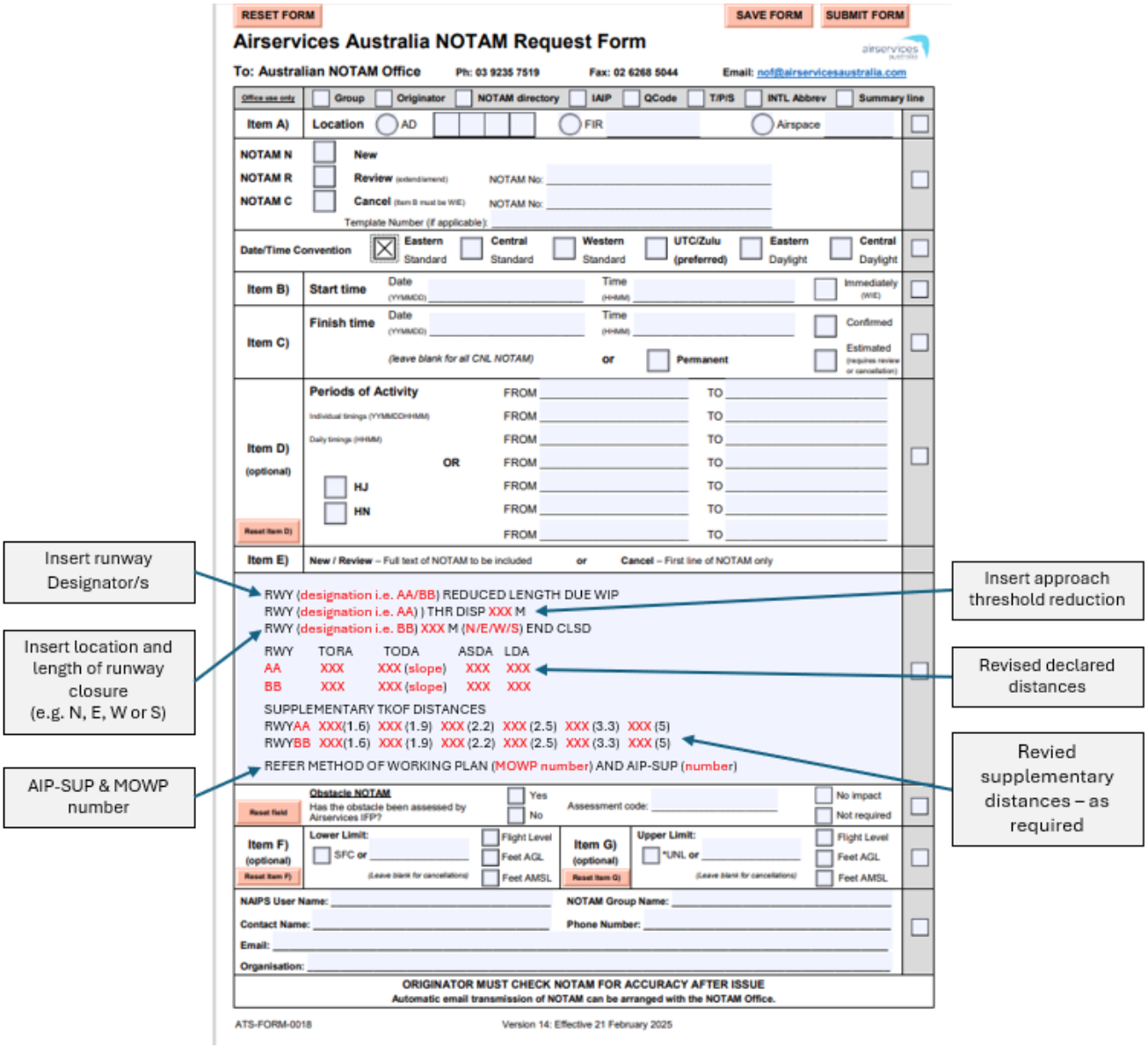


Figure 20: Sample NOTAM request form for temporarily reduced length runway distances

Source: Airservices Australia

Appendix F
Sample NOTAM

F.1 Example 1 - A temporary displaced threshold - no other changes to runway configuration

In this example, the threshold of Runway 09 is temporarily displaced by 500 m.

The full length of Runway 09/27 is otherwise available. Therefore, no other declared distances published in ERSA-RDS are amended. A single NOTAM is required.

A separate NOTAM is required for visual aids.

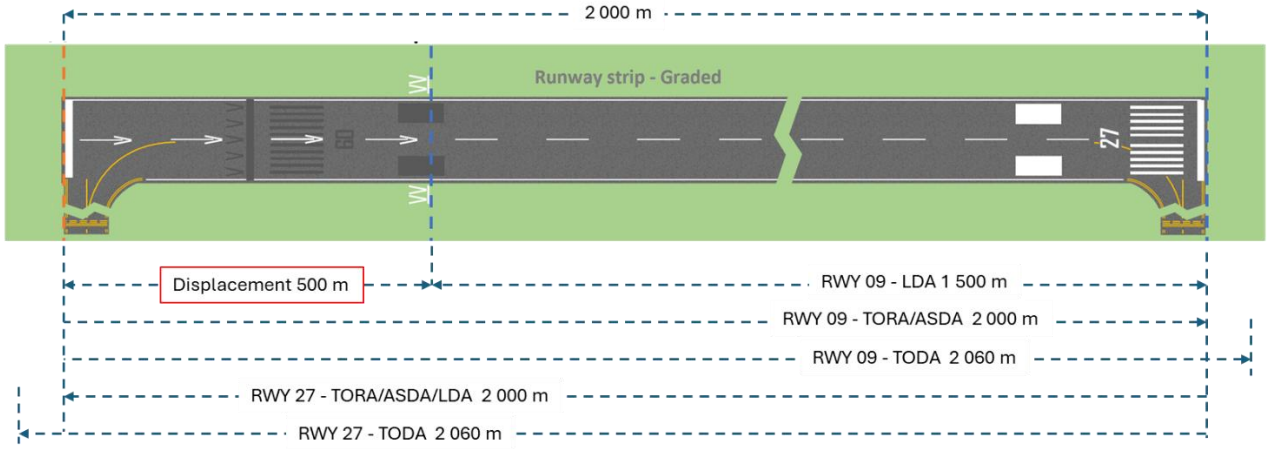


Figure 21: Illustration of a Runway 09/27 with the threshold of 09 landing threshold displaced by 500 m

Source: CASA

The following examples demonstrate the details to be published in NOTAM for the above runway configuration:

Table 15: Example 1 - NOTAM

Field	Description
Field A - Location	Aerodrome code - i.e., YXXX
Field B - Start period	For example: 2602020300 - commences 1300 on 2 February 2026
Field C - End period	For example: 2602150300 - ends 1300 on 15 February 2026.
Field D - Hours of Activation	Nil - the closure is for the entire period.
Field E - Subject and status	RWY 09 DISPLACED DUE WIP

Field	Description
NOTAM Text	RWY 09 THR DISP 500M RWY TORA ASDA LDA 09 2000 2060 (1.9) 1500 27 2000 2060 (2.1) 2000 REFER METHOD OF WORKING PLAN MOWP YXXX-01 AND AIP-SUP HXX/26 **Note:** Information in this NOTAM should be limited to the displaced threshold and changes to declared distances only.

The information in the above example is fictitious and provided as a guide only.

F.2 Example 2: A temporary displaced threshold and reduced length runway - the runway reduction aligns with the displaced threshold

In this example, the threshold of Runway 09 is temporarily displaced by 500 m, and the length of Runway 09/27 is temporarily reduced by 440 m. All distances are different to those in ERSA-RDS.

The LDA and SOT for Runway 09 are co-located. The LDA and TORA for Runway 27 are co-located with the LDA and SOT for Runway 09.

Separate NOTAMs are required to advise pilots of changes to visual aids, and another NOTAM may be required if there are changes to the taxiway network. For instance, taxiway closures, entry taxiways and exit taxiways should be published in a separate NOTAM.

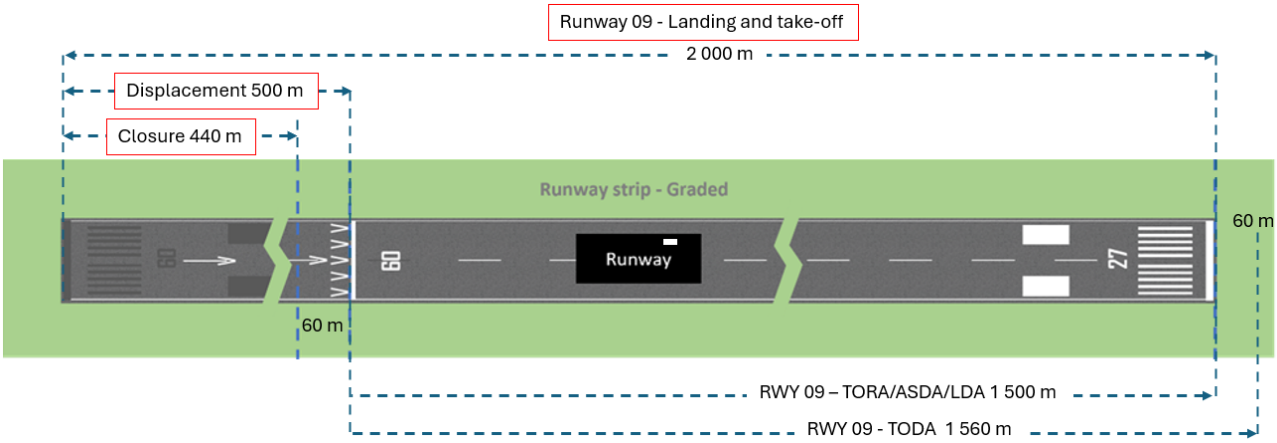


Figure 22: Temporarily displaced threshold and reduced length runway - the landing runway reduction aligns

Source: CASA

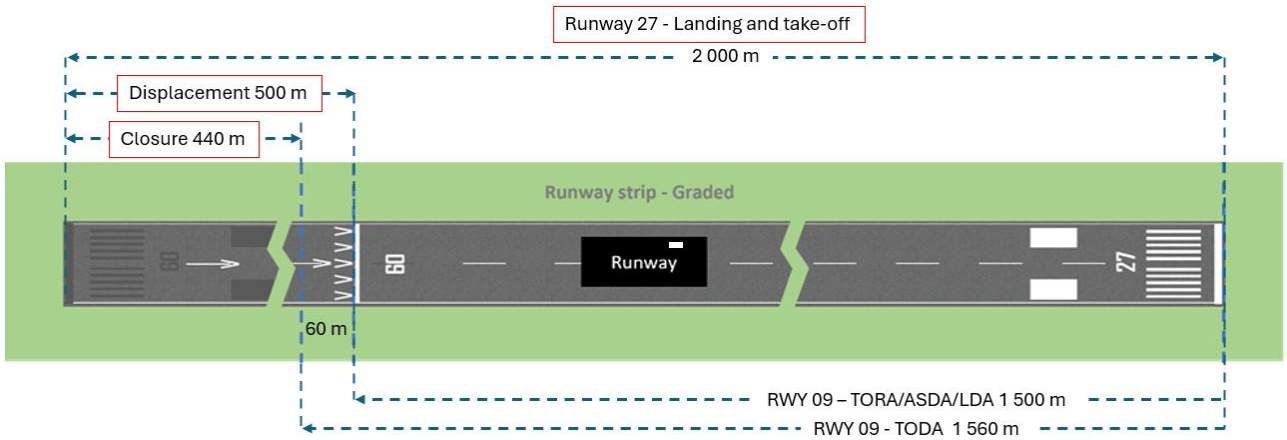


Figure 23: Temporarily displaced threshold and reduced length runway - the take-off runway reduction aligns with the displaced threshold

Source: CASA

The following examples demonstrate the details to be published in NOTAM for the above runway configurations:

Table 16: Example NOTAM 2

Field	Description
Field A - Location	Aerodrome code - i.e., YXXX
Field B - Start period	For example: 2602020300 - commences 1300 on 2 February 2026
Field C - End period	For example: 2602150300 - ends 1300 on 15 February 2026.
Field D - Hours of Activation	Nil - the closure is for the entire period.
Field E: Subject and status	RWY 09/27 REDUCED LENGTH DUE WIP
NOTAM Text	RWY 09 THR DISP 500M RWY 27 440M W END CLOSED RWY TORA TODA ASDA LDA 09 1500 1560(1.9) 1500 1500 27 1500 1560(2.1) 1500 1500 SUPPLEMENTARY TKOF DISTANCES RWY 09 1400(1.6) RWY 27 1410(1.6) 1500(1.9) REFER METHOD OF WORKING PLAN MOWP YXXX-01 AND AIP-SUP HXX/26 **Note:** Information in this NOTAM should be limited to the displaced threshold and changes to declared distances only.

The information in the above example is fictitious and provided as a guide only.

F.3 Example 3: A temporary displaced threshold and reduced length runway - the runway reduction and displaced threshold do not align

In this example, the threshold of Runway 09 is temporarily displaced by 500 m, and the length of Runway 09/27 is temporarily reduced by 300 m. All distances are different to those in ERSA-RDS.

The LDA and SOT for Runway 09 are co-located. The LDA and TORA for Runway 27 are co-located with the LDA and SOT for Runway 09.

Separate NOTAMs are required to advise pilots of changes to visual aids, and another NOTAM may be required if there are changes to the taxiway network. For instance, taxiway closures, entry taxiways and exit taxiways should be published in a separate NOTAM.

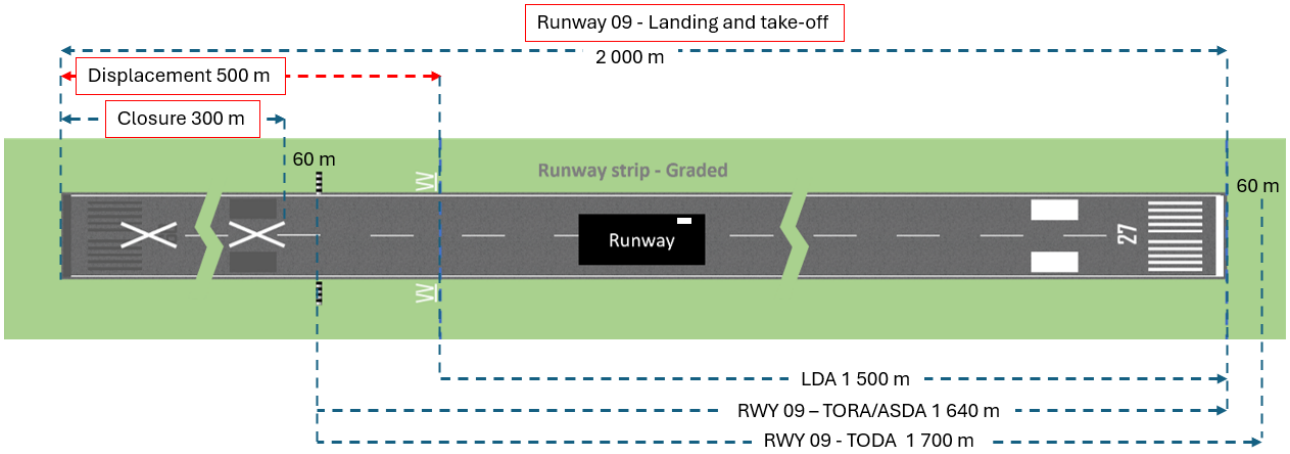


Figure 24: Temporarily displaced threshold and reduced length runway - the landing runway reduction and displaced threshold do not align

Source: CASA

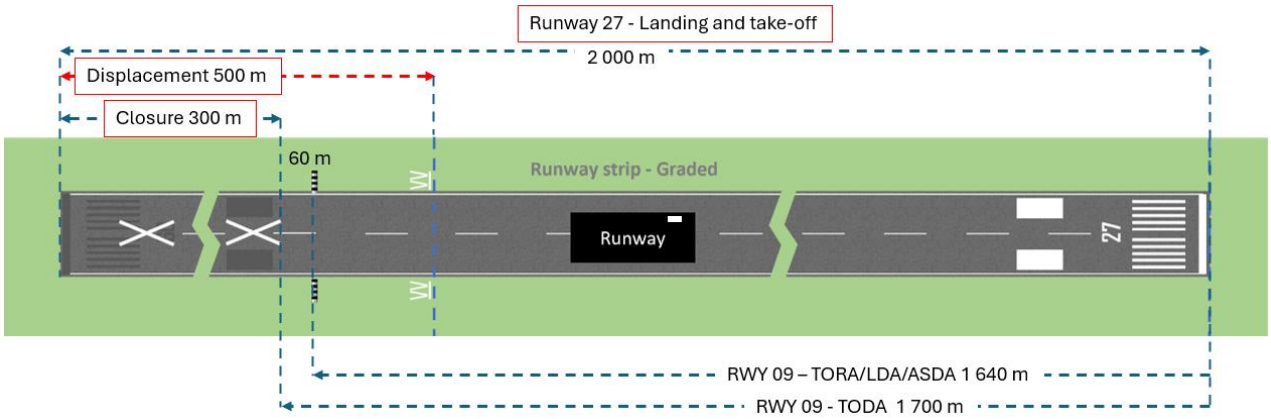


Figure 25: Temporarily displaced threshold and reduced length runway - the take-off runway reduction and reciprocating displaced threshold do not align

Source: CASA

The following examples demonstrate the details to be published in NOTAM for the above runway configurations:

Table 17: Example NOTAM 3

Field	Description
Field A - Location	Aerodrome code - i.e., YXXX
Field B - Start period	For example: 2602020300 - commences 1300 on 2 February 2026
Field C - End period	For example: 2602150300 - ends 1300 on 15 February 2026.
Field D - Hours of Activation	Nil - the closure is for the entire period.
Field E - Subject and status	RWY 09/27 REDUCED LENGTH DUE WIP
NOTAM Text	RWY 09 THR DISP 500M RWY 27 440M W END CLOSED RWY TORA TODA ASDA LDA 09 1640 1700(1.9) 1640 1500 27 1640 1700(2.1) 1640 1640 SUPPLEMENTARY TKOF DISTANCES RWY 09 1400(1.6) RWY 27 1410(1.6) 1500(1.9) REFER METHOD OF WORKING PLAN MOWP YXXX-01 AND AIP-SUP HXX/26 **Note:** Information in this NOTAM should be limited to the displaced threshold and changes to declared distances only.

The information in the above example is fictitious and provided as a guide only.