

Australian Government
Civil Aviation Safety Authority

ADVISORY CIRCULAR
AC 139.F-01 v2.1

Design and operation of Australian water aerodromes for air transport operations

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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:

- persons involved in the design, construction and operation of established water aerodromes
- proponents of established water aerodromes
- seaplane operators intending to utilise established water aerodromes
- planning authorities
- aerodrome and aircraft landing area operators
- the Civil Aviation Safety Authority (CASA).

Purpose

The purpose of this AC is to provide guidance and advice about CASA's recommendations for the design and operation of water aerodromes that facilitate air transport operations.

For further information

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

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

Status

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

> **Note:** Changes made in the current version are annotated with change bars.

Table 1: Status

Version	Date	Details
v2.1	June 2026	• New note added in Chapter 2 that refers to maritime requirements for seaplanes when operating on the water. • New section 7.5 added to expand on maritime requirements when a seaplane is manoeuvring on water.
v2.0	June 2026	• Updated background to the purpose of this AC in Chapter 0. • Linkage to the ICAO APAC regional guidance for water aerodromes in Chapter 3. • Addition of water taxi channels and turning basins in Chapter 3. • Updated linkage to ICAO APAC guidance in Section 3.1.3.2. • Introduction of the IALA Maritime Buoyage System in new Section 4.1. • A new section about published information added in Chapter 5. • Information on obstacle restriction and removal in Chapter 6. • Updated guidance on emergency planning in Chapter 8. • New CASA style template applied.
v1.0	November 2020	Initial AC.

Contents

1	**Reference material**	**6**
1.1	Acronyms	6
1.2	Definitions	6
1.3	References	9
2	**Background**	**11**
3	**Recommended water aerodrome physical characteristics**	**13**
3.1	Water runways	13
3.2	Taxi channels	13
3.3	Turning basins	13
3.4	Mooring areas	14
3.5	Shore facilities	14
3.6	Site surveys	15
4	**Visual aids**	**16**
4.1	Visual aids for denoting obstacles	16
4.2	Water runway markers	16
4.3	Displaced threshold markers	16
4.4	Markings and signage	16
4.5	Movement area lighting	17
4.6	Objects to be marked and/or lighted	18
5	**Published information**	**20**
5.1	Information to be published in the Aeronautical Information Package (AIP)	20
5.2	Operationally significant information	22
6	**Obstacle restriction and removal**	**23**
6.5	Obstacle limitation surfaces	23
7	**Operational considerations**	**26**
7.1	Wildlife strike hazard	26
7.2	Safety management system	26
7.3	Operational procedures	26
7.4	Environment	27
7.5	Application of marine regulations and orders to waterborne seaplanes	27
8	**Water aerodrome emergency planning**	**28**

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
AIP	aeronautical information publication
AHJ	authority having jurisdiction
CASA	Civil Aviation Safety Authority
CASR	*Civil Aviation Safety Regulations 1998*
IALA	International Organization for Marine Aids to Navigation (formerly International Association of Lighthouse Authorities)
ICAO	International Civil Aviation Organization
LEMC	local emergency management committee
MOS	Manual of Standards
PIC	pilot in command

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
aerial work operation	1. An aerial work operation means one or more of the following (and each of the following is a kind of aerial work operation): a. an external load operation; b. a dispensing operation; c. a task specialist operation; d. an operation of a kind prescribed by the Part 138 Manual of Standards for the purposes of this paragraph. **Note:** A *fireground personnel carriage operation* is prescribed to be a kind of aerial work operation in section 3.01AA of the Part 138 MOS. 2. Despite subregulation (1), an aerial work operation does not include the

Term	Definition
	following: a. a medical transport operation; b. an external load operation involving winching a person, if the operation is conducted as part of an air transport operation; c. glider towing; d. a person undertaking a parachute descent; e. an aerial application operation (including any external load operation undertaken as part of that operation) to apply fire retardants (including water), or oil or chemical dispersants, if the operation is conducted by a person holding a civil aviation authorisation under Part 137 to undertake the operation; f. any other aerial application operation; g. any other operation of a kind prescribed by the Part 138 Manual of Standards for the purposes of this paragraph. **Note:** Multiple operations are prescribed to not be an aerial work operation in section 3.01 of the Part 138 MOS. These operations include an aircraft towing a thing where the requirement in paragraph 91.210(2)(a) of CASR is met, the flight test of an experimental aircraft conducted under an experimental certificate, a maintenance test flight, a thing dropped by a person undertaking a parachute descent under Part 105 of CASR, and aerial spotting carried out in a weight-shift-controlled aeroplane type certificated in the primary category where the operation is administered by a sport aviation body.
aerodrome	means an area of land or water (including any buildings, installations and equipment), the use of which as an aerodrome is authorised under the regulations, being such an area intended for use wholly or partly for the arrival, departure or movement of aircraft.
aeroplane	means a power-driven heavier-than-air aircraft deriving its lift in flight chiefly from aerodynamic reactions on surfaces remaining fixed under given conditions of flight, but does not include a power-assisted sailplane.
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. 2. Despite subclause (1), an air transport operation does not include an aerial work operation or a balloon transport operation. **Note:** As of publishing v2.0 of this AC document, no instrument under regulation 201.025 for the purposes of this definition had been created.
established water aerodrome	An area of water intended for the arrival, departure or movement of aircraft which is published in the Australian Aeronautical Information Publication (AIP) or other published source of Australian water aerodromes. **Note:** See the definition of water aerodrome later in this section.
fixed platform	A platform extending from the shore, on water and supported by pillars to hold it in position, intended to align alongside seaplanes for the purposes of embarkation and disembarkation of passengers, loading and unloading of cargo, or refuelling or parking of seaplanes.

Term	Definition
floating platform	A platform placed on open water intended for the purpose of embarkation and disembarkation of passengers, loading and unloading of cargo by seaplane.
gangway	A movable walkway where people board and disembark such as platforms, and piers.
low water level	The average low level during that month of the year when levels are lowest or, in the case of tidal waters, the average level of low water springs or lower low waters, depending on the type of tide.
mooring	A fixed permanent installation on the water surface used to secure seaplanes. The seaplane may be moored to a floating buoy, a pier, platforms, etc.
mooring buoy	A buoy connected by chain or cable to a permanent unmovable anchor sunk deeply into the bottom of a body of water.
movement area	The part of an aerodrome to be used for the take-off, landing and taxiing of seaplanes, consisting of the manoeuvring area and platforms. **Note:** This definition is a 'modified for seaplanes' version of the CASR Dictionary definition of movement area, as that definition focuses on land-based aircraft.
protected area	An area which is protected from large waves. The structure providing protection can be natural or constructed.
seaplane	An aeroplane on floats (amphibious or non-amphibious) or a flying boat (water-only or amphibious). **Note:** This definition is a more descriptive version of the CASR Dictionary definition of seaplane, with the intent of being useful for this AC.
taxi channel	A defined path on a water aerodrome, intended for the use of taxiing seaplanes.
turning basin	A water area used for the water taxi manoeuvring of seaplanes along shoreline facilities and at the ends of a narrow water runway.
waterways	A river, canal or other waterbody serving as a route or way of travel or transport.
water aerodrome	A defined area, primarily on water, including any building and equipment on ground or water, the use of which as an aerodrome is authorised under the regulations and intended for use wholly or partly for the arrival, departure or movement of seaplanes. **Note:** This definition is a 'modified for seaplanes' version of the CASR Dictionary definition of aerodrome, intended to be more useful for this AC.
water aerodrome operator	Any organization or person in charge of a water aerodrome.
water current	The rate of flow of the water.
water runway (channel)	A defined rectangular area on a water aerodrome, intended for the landing and take-off of seaplanes along its length.

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 Manual of Standards	Part 139 (Aerodromes) Manual of Standards
ICAO Annex 14 Aerodromes Vol 1	Aerodrome Design and Operations

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 1-01	Understanding the legislative framework
AC 91-02	Guidelines for aeroplanes with MTOW not exceeding 5 700kg - suitable places to take-off and land
AC 139.A-03	Application aerodrome standards
AC 139.C-02	Aerodrome personnel
AC 139.C-03	Serviceability inspections
AC 139.C-05	Aeronautical information reporting and validation
AC 139.C-16	Wildlife hazard management
AC 139.C-18	Aerodrome emergency planning
AC 139.C-27	Risk management plans-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 Asia Pacific Guidance on Requirements for the Design and Operations of Water Aerodromes for Seaplane Operations

Other reference material

Table 7: Marine legislation and guidance material

Document	Title
COLREGs	International Regulations for Preventing Collisions at Sea, 1972
Marine Orders	Marine Order 30 (Prevention of Collisions) 2016
Marine Safety	Marine Safety (Domestic Commercial Vessel) National Law Act 2012
Navigation Act 2012	Navigation Act 2012

2 Background

Note: Advisory Circular (AC) 1-01 Understanding the legislative framework discusses the relationship between Australia's aviation legislation and the rules of the International Civil Aviation Organization (ICAO), and how Australia's legislation is overseen. It describes the differences between supporting material and the legislation and includes general descriptions of legal concepts used in the development of the legislation.

2.1 Under the *Civil Aviation Act 1988* an aerodrome is defined as any area of land or water (including any buildings, installations and equipment) that a pilot in command (PIC) may use under applicable regulations.

2.2 Water aerodromes are uncertified aerodromes. An uncertified aerodrome is any site suitable for aircraft to safely land and take-off that is not regulated under Part 139 of the *Civil Aviation Safety Regulations 1998* (CASR).

2.3 Water aerodromes may be established for the use of aircraft such as floatplanes, flying boats, amphibious aircraft, and float-equipped helicopters. Irrespective of the nature of aircraft being used, when an aircraft is being navigated on water, the aircraft is subject to maritime rules. They may be permanently established, or be long term already established facilities, or routinely used ad-hoc landing sites, or single use ad-hoc landing sites.

2.4 The objective of this advisory circular (AC) is to assist the development and operation of established water aerodromes. Nothing in this AC specifically authorises an operator and PIC to use an uncertified aerodrome. Authorisation may be regulated by any combination of the following mechanisms:

- local land use planning provisions
- marine safety and navigation rules and waterway-management rules
- environmental limitations or approval requirements
- approval requirements, or aviation limitations and restrictions, associated with using a particular waterway or harbour
- aviation regulation obligations on operators and PIC to determine a place is suitable for the landing and take-off of aircraft.

2.5 This AC outlines physical characteristics such as dimensions, visual aids, services and operating procedures that should be considered when establishing a water aerodrome, intended to be used by seaplanes.

2.6 Regulation 91.410(3) of CASR authorises the use of an aerodrome if, amongst other things, the aerodrome is certified under Part 139 of CASR, or the place is suitable for the landing and take-off of aircraft and the aircraft can land at, or take-off from, the place safely having regard to all the circumstances of the proposed landing or take-off (including the prevailing weather conditions).

2.7 Water aerodromes are not governed by a single entity through a singular regulatory framework. Federal, state, territory and local government authorities, and agency regulations, standards and policies may be applicable to the aerodrome and its operations.

2.8 Regulations, standards and processes in Part 139 of CASR may be used by operators of uncertified aerodromes during the design and operation of uncertified aerodromes. AC 139.A-03 application of aerodrome standards provides guidance to all aerodrome operators on the application of aerodrome certification under Part 139 of CASR and its supporting Manual of Standards (MOS). Information in this AC may be adapted, where appropriate, for use at water aerodromes.

2.9 Annex 14 Volume I to the Convention on International Civil Aviation (the Chicago Convention) does not differentiate between land and water as a surface from which aircraft can operate and states that an aerodrome can be an area of land or water. However, operations by seaplanes on water may differ significantly from those conducted on land.

2.10 It is recommended that appropriate signage visible to other users of the waterway be installed to indicate the presence of seaplane take-off and landing areas.

2.11 It is recommended that water aerodrome operators include relevant aerodrome information in the Aeronautical Information Publication (AIP) and maritime charts where possible.

Note: Application of maritime rules

In Australian waters, Marine Order 30 (Prevention of Collisions) 2016, under the *Navigation Act 2012* is Commonwealth law. Through Marine Order 30 and corresponding State and Territory marine safety legislation applicable to coastal waters, seaplanes are considered vessels when operating on the water.

3 Recommended water aerodrome physical characteristics

3.1 Water runways

3.1.1 The landing or take-off direction of a water runway will vary with the physical environment. The PIC will determine the most suitable direction of landing or take-off at the time of take-off or landing depending on the prevailing conditions.

3.1.2 Dimensions and limits of water runways

3.1.2.1 When determining the length and other dimensions of a water runway, the water aerodrome operator, in conjunction with any relevant authorities (such as, but not limited to, water authorities and local land-use planning authorities), should consider intended aircraft operations and provide the necessary runway dimensions determined in consultation with seaplane operators.

3.1.2.2 Runway dimension determinations should take into consideration local conditions, seasonal adjustments and performance characteristics of the relevant aircraft.

3.1.3 Number and orientation of water runways

3.1.3.1 Water runways and their orientation should be such that, for as large a percentage of time as practicable, crosswinds do not preclude landing or taking off on at least one water runway.

3.1.3.2 The ICAO APAC regional guidance on requirements for the design and operation of water aerodromes for seaplane operations recommends that the number and orientation of water runways enable the landing and take-off by seaplanes at least 95% of the time.

3.2 Taxi channels

3.2.1 Taxi channels should be provided to permit the safe and expeditious handling of water aerodrome traffic.

3.2.2 It is recommended that:

- wherever practicable, taxi channels have a width of 45 m (150 ft)
- wingtip to wingtip clearance for passing seaplanes (dual directional taxi channels) be not less than 15 m (50 ft)
- the depth of water measured at low water level in the taxi channel be not less than 1.8 m (6 ft) or less than 0.3 m below the hull or floats when the seaplane is stationary and loaded to maximum take-off weight (unless an aircraft operator has determined they can tolerate a shallower clearance).

3.3 Turning basins

3.3.1 If a turning basin is considered necessary, it is recommended that it:

- be located at the end of the water runway
- have a diameter, measured at low water level, at least twice the minimum width of the designated water runway.

3.3.2 Where turning basins are not provided, it is recommended that there be sufficient space for aircraft to be manoeuvred without creating unnecessary risks or hazards to the aircraft or other water users.

3.4 Mooring areas

3.4.1 Depending on the physical constraints of the water aerodrome, mooring areas are recommended to facilitate the embarkation and disembarkation of passengers, or loading and unloading of cargo, without interfering with other aircraft or water traffic.

3.4.2 If a mooring area is provided, it is recommended that:

- it be adequate to permit expeditious handling of peak periods of water aerodrome traffic
- the depth of water at the mooring area, measured at low water level, be at least that of the corresponding taxi channel
- depending on the water level, there be a minimum clearance of 15 m between any part of the aircraft and any object with which the aircraft could come into contact.

3.4.3 Where fuel, oils or other hazardous material could become a hazard to the environment or others, the water aerodrome operator and aircraft operator should engage with appropriate stakeholders and regulators.

3.5 Shore facilities

3.5.1 When determining the shore facilities for a water aerodrome, the water aerodrome operator, in conjunction with any relevant authorities (such as, but not limited to, water authorities and local land-use planning authorities), should consider intended aircraft operations and provide the necessary facilities determined in consultation with seaplane operators.

3.5.2 Shore facilities provided for a water aerodrome might include a platform (fixed or floating), boat ramp or beach to permit the embarking and disembarking of passengers and crew, and the loading and unloading of cargo and refuelling, or other facilities.

3.5.3 Where platforms are used, they should:

- be in a condition that permits constant use without causing injury to persons or damage to aircraft
- be attached or anchored in a manner that prevents it from shifting position or becoming detached
- have access from the shore that provides for the safe movement of crew and passengers
- have at least two bull rails or provision for appropriate number of tie-down cleats at each seaplane parking position to secure the seaplane.

3.5.4 If an aircraft is normally secured in a position where an aircraft component overhangs the platform and may constitute a hazard to the movement of crew and passengers, the hazard should be clearly indicated by cones and/or hashed red and white markings, and in a manner easily identifiable to crew and passengers.

3.5.5 Where a boat ramp or beach is intended for aircraft operations it should preferably:

- be one and a half times the width of floats or landing gear of the largest seaplane intended to use the facility
- provide a minimum clearance of 1.8 m between a seaplane wing and any object which it could come into contact.

3.5.6 Notwithstanding the above, if other safety regulations require specific safety values, the water aerodrome operator should consider the requirement in context and apply the most appropriate value to their intended aircraft operations.

3.6 Site surveys

3.6.1 It is recommended that water runways be periodically surveyed to ensure the physical characteristics continue to be suitable for the type of aircraft and intended operations. This should include marine and aviation surveys, with marine site surveys focusing on underwater and coastal features, and aeronautical site surveys focusing on above-ground obstacles and land-based infrastructure.

3.6.2 The frequency of surveys for marine and aeronautical could differ, such as every 5 years for marine and every 2 years for aeronautical, depending on the rate of change in the relevant environments (such as above ground/water obstacles for aeronautical and silt build-up for marine). Water aerodrome operators should seek appropriate regular feedback from water aerodrome users to inform their decisions regarding when to conduct a new survey.

3.6.3 The marine survey should consider:

- direction of current (river)
- depth of waterway at low tide
- any evidence of regular use by other water users
- location of any buoys or markers required under marine requirements
- review waterway maps which might indicate position and extent of any hazards such as rocks, waterweeds which might foul water rudders
- intensity of use by other water users and potential for clash in use
- local waterway regulations
- location of a potential docking/mooring site
- potential regulations or restrictions which may have been imposed by local authorities.

3.6.4 The aeronautical survey should consider:

- direction of prevailing winds and known weather impacts
- surrounding terrain (hills, trees, beaches, houses etc)
- location of any buoys or markers required for aviation purposes
- location of any towers, cranes, powerlines and ship or boat mooring locations
- sufficient width for aircraft to manoeuvre prior to and after landing
- an instrument survey of the approach, take-off and transitional surfaces
- a check of all information published in the AIP.

3.6.5 Additional reviews should be conducted to confirm continuing suitability of the site for operations if there is a known significant change to any relevant conditions that could become a hazard to intended aircraft operations.

4 Visual aids

4.1 Visual aids for denoting obstacles

4.1.1 The IALA Maritime Buoyage System A is the international standard for maritime navigation aids used in Australia. This system standardises buoys, beacons, and marks by colour, shape, top-marks, and lights to guide vessels safely around hazards and through channels.

4.1.2 Care should be taken when implementing aviation visual aids to ensure they do not cause confusion with marine requirements. Where confliction arise between aviation and marine visual aids, marine requirements take precedence.

4.1.3 If it is not possible to colour the fixed objects, then markers or flags should be displayed on or above the objects, or the aircraft operator may choose to identify the hazard in a suitably recorded format which can be made available to pilots using the water aerodrome.

4.1.4 Any objects that are conspicuous by their shape, size or colour need not be marked.

4.2 Water runway markers

4.2.1 Where there is no conflict with marine traffic or marine regulations, water runways at water aerodromes should meet the following marker requirements:

a. mark both ends of the take-off and landing area with floating markers

b. markers should be visible from a distance greater than 2 nautical miles

c. each marker should be:

i. orange in colour

or

i. alternating international orange and white.

4.2.2 Where it is impracticable to mark the water runway as specified in 4.3.1 of this AC:

- guidance such as geographical points and/or other visual references should be provided to designate the take-off and landing area
- these visual references should be identified and published.

4.3 Displaced threshold markers

4.3.1 Where a threshold is displaced permanently or temporarily:

- the threshold displacement should be marked with floating markers
- the markers should be visible from a distance of at least 2 nautical miles
- each marker should be international orange, or the markers should be alternating international orange and white.

4.4 Markings and signage

4.4.1 Dock identification marking

4.4.1.1 Where it is preferable for the dock to be clearly visible to pilots in the circuit area of the aerodrome, a suitable method of dock identification should be used. This could consist of the

dock being painted in a conspicuous colour, a conspicuous marking being used on the deck of the dock, such as a painted triangle, or some other form of suitable marking.

4.4.2 Bull rails

4.4.2.1 Where bull rails are installed on platforms, they should be painted in a conspicuous colour to increase their visibility to the pilot when docking the aircraft.

4.4.3 Gangways

4.4.3.1 Gangways should have signage provided indicating 'seaplane access only' to deter other water users from accessing the mooring point and restricting aircraft operations.

4.4.4 Marker buoys

4.4.4.1 Any marker buoys that may be in use in the waterway should be visible to aircraft manoeuvring on the surface of water and by aircraft 300 m above the water runway.

4.4.5 Prohibition signs

4.4.5.1 A sign should be provided and displayed on any dock dedicated to seaplane operations only.

4.4.5.2 A sign should be displayed on the dock restricting passengers from the docking area until all seaplanes and propellers have come to a complete stop.

4.4.6 Hazardous areas

4.4.6.1 If hazards such as shoals, rocks and shallow points could endanger a seaplane, the hazards should be identified and marked to clearly indicate the hazardous area. Any marker buoys and other forms of marking should be visible to pilots using the water aerodrome.

4.5 Movement area lighting

4.5.1 Movement area lighting is only recommended where considered necessary. Water aerodrome operators are recommended to engage with air operators using the water aerodrome and local waterway users to determine whether such lighting is required.

4.5.2 If movement area lighting is used, water aerodrome operators need to ensure that **ALL** local users - both marine and aviation - are aware of such lighting and understand its purpose and safety message.

4.5.3 The ICAO Asia Pacific Guidance on Requirements for the Design and Operations of Water Aerodromes for Seaplane Operations mentions the following kinds of movement area lighting :

- a beacon alternating white and yellow flashes at the rate of 12 to 30 flashes per minute
- in water traffic congested areas, a radio activated strobe beacon which alerts mariners and other pilots that a seaplane will be arriving or departing within a short time
- floodlights or spotlights on the shore to illuminate aprons, floats, ramps, and piers.

> **Note:** Care must be taken in locating and aiming floodlights to avoid affecting the vision of pilots landing or taking off or creating distracting reflections.

4.6 Objects to be marked and/or lighted

4.6.1 Fixed objects

4.6.1.1 Objects that are conspicuous by their shape, size or colour need not be marked.

4.6.1.2 Except as covered under the IALA Maritime Buoyage System A, objects should be marked in accordance with section 6.2 of this AC.

4.6.2 Marking of objects

4.6.2.1 Except as specified in paragraph 4.6.1.1 of this AC, all fixed objects should be marked in a conspicuous colour.

4.6.2.2 Where it is not possible to colour the objects, markers or flags should be displayed on or above the objects.

4.6.3 Obstacle lighting

4.6.3.1 The following types of obstacle lights should be used to light hazardous obstacles if the water aerodrome is intended to be used at night:

- low-intensity
- medium-intensity
- high-intensity
- a combination of low, medium or high-intensity.

4.6.3.2 Low-intensity obstacle lights:

- are steady red lights
- used on non-extensive objects or structures whose height above the surrounding ground is less than 45 m.

4.6.3.3 Medium-intensity obstacle lights should be any of the following:

- flashing white lights
- flashing red lights
- steady red lights.

4.6.3.4 Medium-intensity obstacle lights should be used if any of the following circumstances apply:

- the object or structure is an extensive one
- the top of the object or structure is at least 45 m but not more than 150 m above the surrounding ground
- an aeronautical study determines that early warning to pilots of the presence of the object or structure is desirable in the interests of aviation safety.

4.6.3.5 High-intensity obstacle lights must be used on objects or structures whose height exceeds 150 m and be flashing white lights, but a medium-intensity flashing red light may be used if necessary to avoid an adverse environmental impact on the local community.

4.6.3.6 Low-intensity and medium-intensity obstacle lights may be used in combination.

4.6.4 Markers

4.6.4.1 Markers displayed on or adjacent to objects should be:

a. located in conspicuous positions so as to retain the general definition of the object; and

b. recognizable in clear weather from a distance of:

   i. 1,000 m for an object to be viewed from the air

   ii. 300 m for an object to be viewed from the ground in all directions in which a seaplane is likely to approach the object.

4.6.4.2 The shape of the markers should be:

- distinctive to the extent necessary to ensure that they are not mistaken for markers employed to convey other information
- such that the hazard presented by the object they mark is not increased.

4.6.4.3 The colour selected should contrast with the background against which it will be seen.

5 Published information

5.1 Information to be published in the Aeronautical Information Package (AIP)

5.1.1 Airservices Australia (Airservices) holds and maintains contact details of some uncertified aerodrome owners/operators under Part 175 of CASR. Part 175 of CASR establishes standards and legislative requirements for the quality and integrity of data and information used in air navigation.

5.1.2 The owner/operators (otherwise referred to as an Aeronautical Data Originator or ADO) of uncertified aerodromes are required to register a nominated AIP Responsible Person with Airservices. The ADO is responsible for informing Airservices of this information, carrying out regular reviews and updating this information with any changes. Further information is available from Airservices at Civil Aviation Safety Regulation Part 175 — Airservices and You - Airservices.

5.1.3 To submit/request changes to the Integrated Aeronautical Information Package and the aeronautical charts, an ADO must obtain a Data Product Specification (DPS) from Airservices.

5.1.4 Operators of uncertified aerodromes may choose to publish information of their aerodrome in the En Route Supplement Australia (ERSA) Facility and Aerodrome Directory (FAC) as follows:

- where operators choose to publish a FAC page, information should be provided to pilots through the ADO: Aerodromes, Aircraft Landing Areas and Helicopter Landing Sites with ERSA FAC page
- where operators choose not to publish a FAC page, information should be provided to pilots through the Uncertified ALA or HLS: No ERSA FAC page.

5.1.5 Water aerodrome operators are recommended to publish the information outlined in sections 5.1.6 to 5.1.11, so that aircraft operators are provided with the information they need to determine the level of suitability of the water aerodrome for their intended operations.

5.1.6 Water aerodrome - published data quality requirements[1]

5.1.6.1 The determination and reporting of water aerodrome-related aeronautical data should be in accordance with the accuracy requirements set below[2]:

a. the water aerodrome elevation should be measured to the accuracy and rounded up to the next higher of one half metre or foot

b. linear dimensions should be measured to the nearest one-half metre

c. aeronautical geographical co-ordinates (indicating latitude and longitude) should be expressed in terms of the WGS-84 reference datum

d. true bearings should be measured to the nearest degree

e. water depths should be measured and rounded down to the nearest one tenth of metre

f. tides should be measured with respect to lowest tides recorded for the location

g. information must be kept up to date.

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1 Data quality requirements can be found in the Airservices Data Product Specification – Aerodromes, Aircraft Landing Areas and Helicopter Landing Sites with ERSA FAC at https://www.airservicesaustralia.com/.

2 The recommendations in paragraph 5.1.6.1 are in addition to those in the Airservices Data Product Specification – Aerodromes, Aircraft Landing Areas and Helicopter Landing Sites with ERSA FAC.

5.1.7 Geometric centre

5.1.7.1 The geometric centre of a water aerodrome should be determined and given to the nearest 1/10th of a second.

5.1.8 Water aerodrome elevation

5.1.8.1 Average highest elevation of the water runway should be measured with reference to mean sea level.

5.1.9 Water aerodrome magnetic variation

5.1.9.1 The magnetic variation for the water aerodrome geometric centre should be determined and given to the nearest degree from magnetic north.

5.1.10 Navigation aids

5.1.10.1 Where navigation aids are installed for use at water aerodromes, the following information should be determined and given:

a. the bearing, geographic co-ordinates of the antenna or radiating centre to the nearest 1/10th second

b. the elevation of the antenna or radiating centre.

5.1.11 Water aerodrome dimensions and related information

5.1.11.1 The following data should be measured or described, and given for each facility provided on a water aerodrome:

a. water aerodrome general information:
   i. the tidal range
   ii. the times of high and low tide
   iii. the approximate speed and direction of the water current

b. water runway(s):
   i. true bearing
   ii. length
   iii. width
   iv. depth of water

c. turning basins:
   i. location
   ii. dimension
   iii. depth of water

d. taxi channel:
   i. width
   ii. depth of water

e. shore facility:
   i. type
   ii. depth at shore

f. significant obstacles on and in the vicinity of the water aerodrome:
   i. location
   ii. top elevation to the nearest (next higher) foot
   iii. type
g. marking:
   i. water runways;
   ii. taxi channels; and
   iii. hazardous areas.

5.1.11.2 Where information cannot be published by Airservices, the information may be provided directly by the water aerodrome operator to aircraft operators or pilots. Where operational information is provided to pilots and aircraft operators, such information needs to be current and accurate.

5.1.11.3 To ensure operational information is accurate, operators of uncertified water aerodromes should establish a process to ensure information integrity. AC 139.C-05 Aeronautical information reporting and validation may be adapted by the operators of water aerodromes to support information management.

5.2 Operationally significant information

5.2.1 The condition of the movement area and the operational status of related facilities should be monitored.

5.2.2 Matters of operational significance or which affect seaplane performance should be reported to the appropriate aeronautical data service or air traffic service[3]. Examples of matters recommended to be reported include:

- damage to shore facilities
- floating debris in the movement area
- temporary hazards such as log booms, surface vessels, or any other surface or below surface hazard
- abnormally high/low water depth
- abnormal water currents.

[3] For further information refer to the Airservices Data Product Specification – Aerodromes, Aircraft Landing Areas and Helicopter Landing Sites with ERSA FAC at https://www.airservicesaustralia.com/.

6 Obstacle restriction and removal

6.1 Aircraft operators and pilots are recommended to identify and assess the impact on their operations of fixed objects on a water aerodrome before using the water aerodrome.

6.2 If a permanent object on the movement area, or in the air in the immediate vicinity of the water aerodrome, is assessed to be hazardous or potentially hazardous to seaplane operations, it is recommended to be removed, marked and/or lighted in accordance with applicable maritime standards and rules.

6.3 If it is not possible to remove or mark an obstacle, aircraft operators are recommended to identify the hazard in a suitably recorded format available to pilots using the water aerodrome.

6.4 On waterways with significant water activity, aircraft operators are recommended to base a staff member at the water aerodrome to monitor shipping movements and other waterborne activities prior to the expected arrival of an aircraft. It is recommended the employee be able to provide information to pilots which assists with their determination of the most appropriate landing area and landing direction.

6.5 Obstacle limitation surfaces

6.5.1 The following obstacle limitation surfaces (OLS) should be established for non-instrument approach water aerodromes:

- a take-off climb and approach surfaces
- a transitional surface
- an inner horizontal surface.

6.5.2 Take-off climb/approach surface

6.5.2.1 The take-off climb and approach surfaces may be either straight or curved and established at the end and beginning of the water runway strip.

6.5.2.2 Recommended limits of take-off climb/approach surfaces are:

a. width of the inner edge: not less than that of the associated water runway strip

b. inner edge:

   i. start at 60 m from threshold of water runway

   ii. elevation to be the same as the water aerodrome elevation

c. length of the take-off climb/approach surface: not less than 2,500 m (8,200 ft.) from the inner edge

d. slope of the take-off climb/approach surface: a minimum of 4% (1:25)

e. centre line of the take-off climb/approach surface: define the approach path and be:

   i. a straight line

   or

   ii. an arc of constant radius

   or

   iii. a combination of a straight line and an arc of constant radius.

6.5.3 Straight-in take-off climb/approach surface

6.5.3.1 Where the slope is designed for a straight-in approach the divergence of the take-off climb/approach surface should be set at 10% starting from the inner edge.

6.5.4 Curved take-off climb/approach surfaces

6.5.4.1 Where established, a curved take-off climb/approach surface should not contain more than one curved portion.

6.5.4.2 A curved portion of a take-off climb/approach surface should not allow a change of direction greater than 90 degrees.

6.5.4.3 Where a curved portion of take-off climb/approach surface is provided:

a. the straight portion originating at the inner edge should not be less than 1,300 m (4,265 ft.)

b. the radius of arc defining the centre line of the take-off climb and approach surface should not in any portion of the take-off climb/approach surface be less than 736 m (2,415 ft.).

6.5.4.4 A take-off climb/approach surface incorporating a curved portion should be established only where guidance, such as, geographical points or other visual references are available.

Note: A curved approach is normally established at a non-instrument water runway where it is necessary to avoid obstacles, terrain, noise sensitive areas, or to utilise the airspace above public lands, such as freeways, rivers, golf courses.

6.5.5 Displaced threshold

6.5.5.1 Where the integrity of the approach surface cannot be maintained due to fixed or mobile obstacles, a landing threshold may be displaced from the normal threshold.

6.5.5.2 This displacement should be established so that the new approach surface, starting at the displacement, will clear all obstacles.

6.5.5.3 Where a threshold has been displaced, the inner edge of approach surface should be located at 60 m from the point of displacement.

6.5.6 Objects and obstacles

6.5.6.1 Fixed objects or structures that are located within the water aerodrome boundary should not penetrate an OLS unless they are one of the following:

- for air navigation purposes
- essential to the safety of aircraft operations
- frangible
- suitably marked.

6.5.6.2 A mobile object should not penetrate take-off climb/approach surfaces unless procedures are in place to ensure the object is removed during approach and departure operations.

6.5.7 Other objects

6.5.7.1 Where an aeronautical study (safety risk assessment) indicates that an object located on the movement area, or in the air in the immediate vicinity of the water aerodrome, is hazardous to seaplane operations then it should be removed or marked and/or lighted.

6.5.7.2 Water aerodrome operators should conduct a safety risk assessment to establish the required clearances to be used above waterways, lagoons, or harbour.

6.5.8 Transient and mobile objects

6.5.8.1 The activities of mobile objects, such as boats, that could operate on or near the water runway when an aircraft is on take-off or approach should be monitored and controlled. Where such activities may occur, the water aerodrome operator should consider how uninvolved persons can be managed to ensure the safe operation of the aircraft as uninvolved persons at or near water aerodromes can unknowingly enter water runways or movement areas.

6.5.8.2 Uninvolved persons (in the context of water aerodrome operations) are individuals or groups of people who are:

- not, in any way, participating in the water aerodrome aircraft operations

or

- bystanders near aircraft operating at the water aerodrome.

6.5.8.3 It is difficult to monitor and control the presence of mobile and transient objects when an aircraft is on approach to the runway or preparing to depart when there are no boundaries identifying the extent of the runway. However, unlike land-based aerodromes, marking water aerodrome movement areas is difficult.

6.5.8.4 It is recommended that water aerodrome operators consider the following methods to provide advice and warnings about aircraft operations to uninvolved persons:

- using marker buoys (see section 4.6 of this AC)
- arranging with appropriate authorities to include details of the water aerodrome and its intended aircraft operations in marine charts and boating guides
- broadcast information about the landing and take-off by aircraft on marine radio frequencies.

7 Operational considerations

7.1 Wildlife strike hazard

7.1.1 The presence of wildlife (birds) on and in the vicinity of a water aerodrome can pose serious threats to seaplane operational safety. It is recommended that water aerodrome operators decrease the risk to seaplane operations by adopting measures which minimize the likelihood of collisions between wildlife and seaplane.

7.1.2 AC 139.C-16 - Wildlife hazard management provides general information and guidance for the management of wildlife hazards at land-based aerodromes. Information in this AC may be adapted to reduce the risk of bird and animal strikes at water aerodromes.

7.2 Safety management system

7.2.1 It is recommended that water aerodrome operators use a safety management system or risk management plan which is appropriate to the water aerodrome operating environment complexity and the volume of seaplane operations.

7.2.2 The following AC's provide information relevant to land-based aerodromes which can be adapted for use at water aerodromes:

- Multi-Part AC 139.H-06, AC 143-01, AC 171-06, AC 172-06, AC 173-07 and AC 175-01 - Guidelines for preparing a safety management system
- AC 139.C-27 - Risk management plans for aerodromes.

7.3 Operational procedures

7.3.1 It is recommended that water aerodrome operators:

- have a maintenance program which ensures all markers, signs, lighting and other infrastructure that support the operation of seaplanes remain fit for purpose and suitably visible
- conduct serviceability inspections before the use of a water aerodrome to locate and remove hazards to aircraft operations such as marine debris or floating debris
- have and maintain appropriate procedures and processes in an aerodrome manual (AC 139.C-01 - Aerodrome manual provides guidance on developing an aerodrome manual for a land-based certified aerodrome and information from this AC may be adapted for use at water aerodromes).

7.3.2 Persons responsible for undertaking tasks, such as obstacle monitoring, undertaking serviceability inspections, managing wildlife hazard management, passenger facilitation and any other task documented in a manual, should be appropriately trained and deemed competent by an appropriate person.

7.3.3 AC 139.C-02 - Aerodrome personnel may assist the operator of a water aerodrome in developing an understanding of the knowledge, skills and abilities of those responsible for ensuring the water aerodrome is safe for intended aircraft operation. Information from this AC may be adapted to assist with developing skills and knowledge requirements for those operating water aerodromes.

7.4 Environment

7.4.1 If approval for establishment of a water aerodrome is required, water aerodrome operators should approach the relevant land use and/or maritime authority for advice and information on the scope and extent of any required evaluation or assessment.

7.4.2 Where aviation fuel is provided at a water aerodrome, care should be taken to ensure that the storage and delivery systems are safe and that precautions are taken to minimize the possibility of spills and the resulting adverse environmental effects of a fuel spillage.

7.4.3 The design of fuelling facilities and storage areas should comply with national, state and local regulations.

7.5 Application of marine regulations and orders to waterborne seaplanes

7.5.1 A seaplane (including an amphibious aircraft) is regarded as a vessel under the Convention on the International Regulations for Preventing Collisions at Sea 1972 (COLREGs) when operating on water. The Australian Commonwealth (federal government) *Navigation Act 2012* and its subordinate legislation (Marine Orders), plus relevant State and Territory marine safety legislation, give effect to COLREGs in Australia.

7.5.2 Accordingly, when manoeuvring on the water, the pilot in command must comply with applicable maritime navigation rules, including lookout, safe speed, and collision avoidance requirements. This is particularly relevant in environments where water aerodrome operations interact with other marine traffic.

7.5.3 The operator of a water aerodrome should consider the effect of the COLREGs to seaplanes using the water aerodrome when:

- taxiing
- manoeuvring
- holding on water
- moored or anchored (where relevant).

Note: Maritime regulations and orders do not apply when a seaplane is airborne.

7.5.4 When considering the risk to seaplanes using water aerodromes, the water aerodrome operator should consider mixed traffic arrangements between seaplanes and the following other vessels:

- powered vessels
- sailing vessels
- personal watercraft
- fishing vessels.

7.5.5 Water aerodrome operators should consider the potential conflict between seaplanes and other vessels based on:

- aviation separation concepts
- maritime right-of-way hierarchy.

8 Water aerodrome emergency planning

8.1 State and Territory governments have the primary responsibility and authority for emergency management within their jurisdiction. Specific roles and responsibilities, and therefore emergency responses, vary depending on the nature of services available.

8.2 Water aerodromes need to consider emergency planning that blends aviation-based aerodrome emergency planning with marine/water search and rescue arrangements. When planning and preparing an emergency response plan, water aerodrome operators should engage with:

- local agencies, including local emergency management committees[4] (LEMC), to ensure each authority having jurisdiction[5] (AHJ) and other relevant stakeholders are appropriately represented. Established procedures should be developed and incorporated into any existing local emergency response plan
- aircraft operators to identify hazards associated with seaplane operations, including passenger evacuation.

8.3 Consideration should be given to:

- number of persons that the largest aircraft can carry
- local hazards (water depth and temperature, including the onset of hypothermia and its associated effects, during and following prolonged immersion in cold water)
- the immediate toxicity and respiratory effects on survivors in the water following the ingestion of floating fuel and oils and their associated vapours
- the effect of fire suppressant foams, powders and gases
- availability of rescue boats (shallow water/surface considerations)
- flotation equipment such as rafts
- thermal blankets
- adequate two-way radio equipment in all rescue boats to maintain communication
- flood lighting availability for night operations
- establishing command post and casualty areas at a safe location on adjacent land
- risks and hazards generated by uninvolved persons.

8.4 To ensure effective emergency response, local responders should be familiar with the operating environment and emergency response arrangements. This includes periodic testing of any plans to the satisfaction of the AHJ and LEMC.

8.5 AC 139.C-18 - Aerodrome emergency planning provides more detailed information for the planning of emergency management at land-based aerodromes and the information in this AC can be adapted for water aerodromes.

4 LEMCs coordinate emergency planning between agencies at a local level. To find your LEMC, contact your state or territory emergency management authority.

5 The AHJ is the government body responsible for enforcing regulations in a given area — this may be a state or territory authority, a port authority, or a local council.