Australian Government Civil Aviation SafetyAuthority

SUMMARY OF PROPOSED CHANGE

Modernising Australia's Fatigue Rules

Draft Civil Aviation Order 48.1 Instrument 2019

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Introduction

This summary of proposed change (SPC) is issued by the Civil Aviation Safety Authority (CASA) to provide the rationale behind proposed Civil Aviation Order (CAO) 48.1 Instrument 2019 and to seek public feedback.

The proposed instrument applies to Air Operator's Certificate holders, Part 141 certificate holders and flight crew licence holders.

In 2017 the CASA Board commissioned an independent review of Australia's fatigue rules for operators and pilots to provide CASA with an informed basis to continue with a reform of the rules.

CASA's response to the independent review of fatigue rules identified 54 actions to address the review team's recommendations¹. The proposed CAO 48.1 Instrument 2019 aims to address 12 of these actions to support the transition of high capacity regular public transport operators to the new rules by 30 September 2019. A further amendment to the rules may be required in 2019 to support the transition of other operators to the new rules by 26 March 2020.

The proposed CAO 48.1 Instrument 2019 will repeal and replace CAO 48.1 Instrument 2013, CAO 48.1 Instrument 2016 and the older fatigue rules. The proposed instrument provides transitional provisions allowing operators to conduct operations in accordance with their current rules until the applicable transition date.

Key changes

Changes from the current rules (CAO 48.1 Instrument 2013 as amended by CAO 48.1 amendment instrument 2016 No 1) include:

- Revised prescriptive limits to more closely align with international averages.
- Removal of daily flight time limits for most operations.
- Revised augmented crew limits.
- Replacement of late-night operations restrictions with new restrictions based on infringement of the window of circadian low (WOCL).
- Incorporating standby limits based on US Federal Aviation Regulations short call reserve provisions.
- Replacing the prescriptive approach to re-assignment of flight duty with an outcomebased approach.
- Revising fatigue risk management system (FRMS) change management processes and other provisions to reflect an outcome-based approach.
- Permitting aerial application operators to operate in accordance with Subpart 137.Q of the Civil Aviation Safety Regulations (CASR).
- Incorporating all new fatigue rules into a single instrument.
- Updating provisions related to shared responsibility between operators and flight crew members in line with proposed Part 91 of Civil Aviation Safety Regulations (CASR).

¹ https://www.casa.gov.au/standard-page/independent-review-aviation-fatigue-rules-operators-and-pilots

There are no proposed changes for flight crew licence holders when operating in a private capacity. Paragraph 16.1 of the proposed instrument applies in this case.

Proposed changes are grouped by the related action in response to the independent review of fatigue rules.

Action 3-1 Amend prescriptive limits

CASA will amend the prescriptive flight duty period limits in Appendices 2 and 3 in accordance with <u>Table 1</u> and provide a single flight time limit for each Appendix in accordance with <u>Table 2</u>.

Flight Duty Period Limits

The independent review of fatigue rules identified that CAO 48.1 prescriptive limits are conservative when compared with similar international jurisdictions and that there are no unique aspects of the Australian operating environment that necessitate a more conservative approach.

We considered the recommendations of the independent review, the results of a survey of over 1,100 Australian pilots and feedback from industry. The proposed limits more closely align with international averages while continuing to address fatigue risks predicted by scientific research.

The flight duty period (FDP) limits have been modified since we released our response to the independent review. This reflects feedback from the industry technical working group and provides a more consistent approach to increasing numbers of sectors.

The limits for acclimatised flight crew members are based on the following:

- An acclimatised start time between 0700 and 1259 represents the optimal start time period to minimise fatigue whilst acknowledging a strong passenger demand for early departures. Flight duty periods of up to 13 hours are permitted in this start period.
- Once the start time reaches 1300 the maximum flight duty period is reduced to 12 hours because these flights may encroach the WOCL and the potential for prolonged wakefulness; this continues until a start time of 1559.
- For start times between 1600 and 2259 the maximum flight duty period is further reduced to 11 hours due to the compounding effects of WOCL encroachment, likely prolonged wakefulness and a reduced propensity, quality and quantity of sleep during the day.
- Flight duty periods commencing between 2300 and 0459 present the greatest fatigue risk due to increasing effects of WOCL encroachment, prolonged wakefulness and a reduced propensity, quality and quantity of sleep. These flight duty periods are limited to a maximum of 10 hours.
- Maximum flight duty period increases by one hour at 0500 and a further 30 minutes at 0600 due to the improving opportunity to achieve sleep prior to the duty.
- The maximum flight duty period reduces, for periods with more than 3 sectors, by 30 minutes per sector to address the additional physical and cognitive fatigue associated with multiple approaches and departures.

<u>Table 1</u> provides the maximum flight duty period according to acclimatised start time and sectors to be flown. This table has additional detail compared to the table in the draft CAO, including hour by hour detail showing the end of duty time for a maximum flight duty period, with shading

Maximum FDP according to sectors to be flown								
Acclimatised	1-2	3	4	5	6	7	8	Max FDP
Start time								end time
0000-0059	10	10	9.5	9	8.5	8	7.5	1000-1059
0100-0159	10	10	9.5	9	8.5	8	7.5	1100-1159
0200-0259	10	10	9.5	9	8.5	8	7.5	1200-1259
0300-0359	10	10	9.5	9	8.5	8	7.5	1300-1359
0400-0459	10	10	9.5	9	8.5	8	7.5	1400-1459
0500-0559	11.5	11.5	11	10.5	10	9.5	9	1630-1729
0600-0659	12	12	11.5	11	10.5	10	9.5	1800-1859
0700-0759	13	13	12.5	12	11.5	11	10.5	2000-2059
0800-0859	13	13	12.5	12	11.5	11	10.5	2100-2159
0900-0959	13	13	12.5	12	11.5	11	10.5	2200-2259
1000-1059	13	13	12.5	12	11.5	11	10.5	2300-2359
1100-1159	13	13	12.5	12	11.5	11	10.5	0000-0059
1200-1259	13	13	12.5	12	11.5	11	10.5	0100-0159
1300-1359	12	12	11.5	11	10.5	10	9.5	0100-0159
1400-1459	12	12	11.5	11	10.5	10	9.5	0200-0259
1500-1559	12	12	11.5	11	10.5	10	9.5	0300-0359
1600-1659	11	11	10.5	10	9.5	9	8.5	0300-0359
1700-1759	11	11	10.5	10	9.5	9	8.5	0400-0459
1800-1859	11	11	10.5	10	9.5	9	8.5	0500-0559
1900-1959	11	11	10.5	10	9.5	9	8.5	0600-0659
2000-2059	11	11	10.5	10	9.5	9	8.5	0700-0759
2100-2159	11	11	10.5	10	9.5	9	8.5	0800-0859
2200-2259	11	11	10.5	10	9.5	9	8.5	0900-0959
2300-2359	10	10	9.5	9	8.5	8	7.5	0900-0959

to demonstrate where the maximum duty would encroach the WOCL. The period commencing at 1300 is shaded because it would encroach the WOCL if the maximum FDP was 13 hours.

Table 1 – Flight Duty Periods Acclimatised Flight Crew

Comparison with previous limits

Figure 1 - Revised 1-2 Sector Flight Duty Periods compared with previous limitsFigure 1 - Revised 1-2 Sector Flight Duty Periods compared with previous limitsFigure 1 - Revised 1-2 Sector Flight Duty Periods compared with previous limitsshows the flight duty periods in proposed CAO 48.1 Instrument 2019 Appendix 2 compared to the standard industry exemption limits and CAO 48.1 Instrument 2013.

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Figure 1 - Revised 1-2 Sector Flight Duty Periods compared with previous limits

Comparison with other regulators

<u>Figure 2</u> shows the flight duty periods in proposed CAO 48.1 Instrument 2019 Appendix 2 compared to similar international jurisdictions.

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Figure 2 - Revised 1-2 Sector Flight Duty Periods compared with international limits

Unknown acclimatisation

Considering appropriate FDP periods for states of unknown acclimatisation is complex. It is widely acknowledged that aircrew deal with sleep irregularities and the consequences of circadian desynchrony caused by multiple time-zone transitions. The flight duty period limits for flight crew members in an unknown state of acclimatisation (as defined by subsection 7) have been updated to align with <u>Table 1</u>.

Proposed limits for crew members with less than 30 hours prior off-duty period, match the worstcase acclimatised limits (2300-0459) from Table 1, reflecting the additional fatigue risk associated with time zone change.

Proposed limits for crew members with more than 30 hours prior off-duty period, match the acclimatised limits for a start time of 0600-0659 limits from Table 1, to reflect an improved ability to optimise sleep during an extended off-duty period while still reflecting the fatigue risk associated with time zone changes.

Daily Flight Time Limits

We identified in our response to the independent review that we would simplify the management of flight time by removing flight time limits from the prescriptive limit tables and establish a single flight time for each appendix.

The research regarding daily flight time limits is scarce as most studies have focused on time at work or flight duty period. However, there is general consensus that flight time is the most fatiguing aspect of a flight duty period. Whilst EASA and Transport Canada have removed limits

for daily flight time, the FAA still prescribes daily limits for flight time. We identified in our response to the independent review, that we would simplify the management of flight time by removing flight time limits from the prescriptive limit tables and establishing a single flight time for each appendix.

After further consideration, we have determined that flight duty period limits do not need to be supplemented by daily flight time limits except in the following cases:

- Two pilot single sector 10.5 hours to mitigate the effect of prolonged attention and monitoring.
- Flight training 7 hours to reflect the additional task demands of flight training.

The two pilot single sector limit is further reduced, depending on start time as the flight duty period becomes the more limiting factor.

We have not included a single pilot, single sector limit, as aircraft endurance is more limiting in single pilot aircraft.

Augmented crew

Action 25-5 Review augmented crew limits

CASA will review augmented crew flight duty limits and seek Technical Working Group feedback. Following feedback, amendments to the augmented crew limits may be proposed.

CASA reviewed the augmented crew limits with an industry technical working group. Proposed CAO 48.1 Instrument 2019 Appendix 2 Tables 5.1 and 5.2 have been amended to reflect a revised approach to augmented crew operations.

Class 1 and 2

Class 1 and 2 crew rest facilities are intended to be fit-for-purpose to achieve sleep. This allows FCM to plan their sleep both pre-flight and in-flight to mitigate the effects of fatigue. Several studies have indicated that in-flight sleep will be most efficient when the rest period is taken during the normal night time sleep period from which the aircrew member is acclimatised. The impacts of FDP start time can be mitigated by the crew augmentation in conjunction with the related in-flight rest rules.

The revised flight duty period limits at Table 2, were derived by starting with a 13 hour maximum for two pilot operations and increasing the maximum duty period, depending on the class of rest facility and number of additional crew. This reflects research that the type of rest facility impacts both the quality and quantity of in-flight sleep. The class 1 and 2 augmented crew limits are the same for flight crew members in unknown states of acclimatisation.

This approach is similar to the approach of other regulators.

Flight duty periods in excess of 18 hours require specific risk mitigation within a CASA approved FRMS.

Class	Class 1		Class 2		
Additional FCM	+1 FCM	+2 FCM	+1 FCM	+2 FCM	
FDP limit	16	18	15	16.5	

Table 2 Augmented crew limits (Class 1 and 2)

Class 3

Studies have shown that sleep quality and quantity is reduced in class 3 crew rest facilities. Restorative rest can even be achieved in class 3 rest facilities or even in a cockpit environment resulting in significant improvements in alertness and psychomotor performance. The additional flight crew members help to offset the worst effects of start times and extended duty periods.

The revised FDP limits for Class 3 crew rest facilities are at <u>Table 3</u> and a comparison with unaugmented limits is at <u>Figure 3</u>.

Additional FCM/Start time (Class 3)	+1 FCM	+2 FCM	Max FDP end time (+2 FCM)
0000-0459	12	13	1300-1759
0500-0659	13	14	1900-2059
0700-1059	14	15	2200-0059
1100-1559	13	14	0100-0559
1600-2359	12	13	0500-1259

Table 3 Augmented crew limits (Class 3)

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Figure 3 Comparison of limits (Class 3)

Disruptive schedule management

Action 25-6 Review consecutive early starts

CASA will develop additional mitigations to deal with consecutive early starts using the approach in CAO 48.0 as a starting point and seek Technical Working Group feedback. Following feedback, amendments to the rules may be proposed.

Action 25-11 Window of circadian low definition

CASA will consider whether there is benefit in explicitly defining a window of circadian low and seek Technical Working Group feedback.

Some Technical Working Group members suggested a definition of 0200-0600. There was no consensus on the need for a definition, the associated time period or the additional mitigations that should be associated with the definition.

Surveys of pilots in Australia and internationally have identified consecutive early starts, night operations and alternating early/late schedules as the most fatiguing rosters. We reviewed the management of disruptive schedules with an industry technical working group and explored several potential solutions. Consensus was not achieved, and further industry input is sought to assist in resolving this issue.

Some members expressed concern that current rosters could not be achieved with the proposed rules and that the rules might drive schedule optimisers to generate alternating early / late patterns which are acknowledged as generating fatigue reports.

Other members expressed concern that the proposed rule does not adequately protect late night operations or alternating early / late patterns.

The current proposal replaces existing late-night operations provisions with restrictions on consecutive infringement on the window of circadian low. Duty periods conducted in the WOCL increase fatigue risk and cause circadian disruption so additional restrictions have been proposed for these duties.

The window of circadian low will be defined as 0200-0559 local acclimatised time to align with ICAO definitions.

If a flight duty period infringes the window of circadian low, the next flight duty period must not commence until at least 24 hours after commencement of the first flight duty period. This avoids compounding fatigue risk by compressing the circadian day. The effect of this rule is that a roster cannot rotate backwards e.g., Day 1 - 0530, Day 2 - 0500, Day 3 - 0430.

After three consecutive flight duty periods which infringe the window of circadian low, the maximum flight duty period is reduced for subsequent infringing flight duty periods with a maximum of five consecutive infringing flight duty periods.

Standby

Action 25-13 Standby

CASA will review the management of standby under CAO 48.1 and seek Technical Working Group feedback on any proposed changes to the rules.

We reviewed standby provisions with an industry working group and compared the approaches of other regulators. The US Federal Aviation Regulations short call reserve provisions provide a suitable basis to manage fatigue related to standby.

Re-assignment of flight duty

Action 12-1 FDP re-assignment (rules)

CASA will replace the 4-hour limit in subclause 7.1 of Appendix 2 with a requirement for explicit acknowledgement that flight crew are sufficiently rested before re-assigning a longer flight duty period.

Explicit acknowledgement that flight crew are sufficiently rested prior to re-assigning longer duty periods is preferable to the prescriptive limit in the current rules.

Fatigue risk management systems

Action 5-1 FRMS change management process

CASA will incorporate an FRMS change management process based on the draft Part 119 significant change process.

This proposed change provides operators enough flexibility to modify their FRMS in response to data while ensuring appropriate regulatory oversight for significant changes.

CASA approval will only be required for significant changes such as any proposed increase in maximum flight duty periods, any proposed decrease in minimum off-duty periods and any other change that is not likely to maintain or improve aviation safety.

Action 6-1 Tone and language

CASA will improve the distinction between legal requirements, guidance material and acceptable means of compliance in CAO 48.1 and supporting guidance material.

The distinction between legal requirements and guidance has been improved in several sections. Some material has been removed from the CAO and will be replaced with improved guidance material.

Feedback on specific ways to improve the tone and language is requested.

Aerial Application

Action 8-1 Aerial application limits

CASA intends to incorporate the intent of CASA EX92/16 – Exemption CAO 48.1 Instrument 2013 – aerial application operations (in aeroplanes) into an amended CAO 48.1.

This change permits aerial application (aeroplane) operators to continue operating in accordance with Subpart 137.Q of CASR.

Shared responsibility

Action 9-1 Shared responsibility (rules)

CASA will update the CAO to reflect the dual responsibility provisions in the consultation draft of Part 91 of CASR.

This change aligns the shared responsibility between flight crew and operators in line with proposed measures in Part 91 of CASR.

Action 25-14 Off-duty periods

CASA will seek feedback from Technical Working Group members regarding difficulty managing off-duty periods. Any proposed changes will be subject to further consultation.

We reviewed the complexity associated with management of off-duty periods in Appendix 2. Some of the complexity is only required where operators are seeking to reduce off-duty periods to minimise turnaround time. We have added headings within clause 10 to improve readability and will improve guidance and include sample calculations.

Consolidation

Action 18-1 Current status of CAO 48.1

CASA will update the website <https://www.casa.gov.au> to clearly explain which rules and guidance apply. The legislative changes from this review will be incorporated into a single instrument.

The proposed legislative instrument repeals existing fatigue rules to provide a single instrument and clarify which rules apply. Guidance versions of the previous rules will be available on the CASA website https://www.casa.gov.au to assist operators during the transitional period.

Other minor wording changes

The consultation draft includes other minor wording changes.

Additional industry feedback requested

CASA and the technical working group require feedback from industry to finalise policy positions for potential future changes to the fatigue rules.

Off-duty requirements when transitioning between appendices

Previous feedback has identified that the provisions in Clause 13 to permit transition from Appendix 4B, 5 or 5A are overly complex.

The cumulative off-duty periods for operations under appendices 4B, 5 and 5A are less restrictive than other appendices. A problem arises when a flight crew member has been operating under one of these appendices and then seeks to operate under Appendix 2 as they may not meet the cumulative off-duty requirements.

The simplest way to enable transitioning between appendices is to always meet the more restrictive cumulative off-duty requirements (ie 7 days off-duty in previous 28 days and 24 days off-duty in previous 84 days).

If this is not possible, Clause 13A provides a discounted method for meeting the 24 days off-duty in previous 84 days requirement.

Industry feedback has highlighted that this approach is overly complex. CASA is seeking industry input of alternative ways to meet this requirement.

These provisions are intended to manage cumulative fatigue for flight crew performing passenger transport operations after a period of operations with less protective cumulative fatigue provisions. Operators can avoid this complexity by maintaining the off-duty requirements of Appendix 2 Clause 10.6 regardless of operating appendix.

Some operators have suggested a simplified approach to permit a reduced flight duty period without the requirement for an extended number of days off. A potential approach is detailed below:

A flight crew member may conduct passenger transport operations following a period of operations under Subpart 137.Q or Appendices 4B, 5 or 5A if:

- a. the off-duty period undertaken immediately prior to the FDP was at least 12 hours including a local night
- b. the previous FDP was less than 8 hours
- c. the proposed FDP will be less than 8 hours.

CASA seeks feedback on this approach.

Split duty restrictions for charter

A TWG member identified that the 6 hour limit on flight duty period following split duty in Appendix 2 subclause 4.5 was overly restrictive for some charter operations.

CASA is seeking industry feedback on whether this is a broad issue and is asking for any proposed options for resolution.

Impact of casual day on future roster

A TWG member identified that the requirements for 28 day and 84 day off-duty requirements at clauses 10.5 and 10.6 may impact future operations when flight crew members accept a flight duty period on a rostered casual day.

The problem arises when the roster requires casual days to achieve the cumulative off-duty requirements. This means that the requirements are no longer met once a flight crew member accepts duty on a casual day.

Some TWG members suggested that flight crew members accepting duty on a casual day should permit operators to count that flight duty period as an off-duty period for the purposes of clauses 10.5 and 10.6. This approach was not broadly supported, CASA seeks industry feedback on this approach.

Timeline and implementation

On completion of the current consultation, we will review your feedback in consultation with the industry Technical Working Group and will seek feedback from the Aviation Safety Advisory Panel prior to finalising the instrument.

We expect to make the instrument in early 2019 and we will prioritise amendments to guidance material to support the transition of high capacity regular public transport operators.

In early 2019, we will propose further changes to the rules and guidance material to achieve the remainder of agreed actions in response to the fatigue review to support the transition of other operators .

Our response to the independent review included future actions to use surveys to establish a baseline and monitor changes in fatigue risk. Along with accident and incident reporting we will monitor developments in international fatigue regulations. This will inform future changes to fatigue rules for flight crew, cabin crew, maintenance organisations and air traffic controllers.

The proposed instrument would repeal all existing fatigue rules while providing transitional provisions for existing operators. The transitional provisions aim to allow operators to continue operating to their current rules until the relevant transition date:

- 30 September 2019 for high capacity regular public transport operators that have not transitioned to the new rules
- 26 March 2020 for other operators.

CASA will continue working with operators to transition to the new rules prior to the transition date.

Previous consultation

The independent review team, assembled by Dédale Asia Pacific, delivered its final report in March 2018. The report confirmed the need to modernise Australia's fatigue rules and provided 24 recommendations to improve the rules.

The recommendations were released by CASA for public consultation between 21 March and 22 April 2018. Twenty-six responses were received from industry, including major airlines, operator associations, pilot associations and individuals, and CASA staff. Where permission was granted, responses have been published on CASA's Consultation Hub².

The Aviation Safety Advisory Panel (ASAP) subsequently appointed a Technical Working Group (TWG) to review industry feedback and CASA's proposed responses in July 2018. The TWG comprised representatives of operators, pilot associations, industry associations and academia. Industry feedback and the TWG broadly supported the need to modernise Australia's fatigue rules along with the review team's recommendations and CASA's proposed response. However, there were dissenting views on some issues³.

CASA's response to the independent review of fatigue rules considered feedback from the public consultation, TWG and ASAP. This proposal seeks to achieve 12 of the actions planned in CASA's response.

The proposed CAO 48.1 Instrument 2019 has been reviewed by an industry Technical Working Group and feedback has been incorporated into the current draft.

<https://www.casa.gov.au/about-us/standard-page/cao-481-twg-fatigue-rules-operators-and-pilots>

² https://consultation.casa.gov.au/regulatory-program/fatigue-review-final-report/

³ https://www.casa.gov.au/about-us/standard-page/cao-481-twg-fatigue-rules-operators-and-pilots

Current rules

CAO Part 48⁴

Flight time limitations for operators were previously detailed in CAO Part 48. Existing operators (pre-April 2013 air operator certificate holders and Part 141 operators) can continue operating to the old rules until the relevant transition date. This includes relevant exemptions or instruments of direction in relation to those rules.

CAO 48.1 Instrument 2013⁵

In April 2013, CASA introduced new rules for the management of pilot fatigue set out in CAO 48.1 Instrument 2013. The rules were based on modern science, the latest research, and were made to suit modern flying conditions. The new rules include various amendments since 2013 to improve the rules and extend the transition deadlines.

CAO 48.1 Instrument 2013 adopts a tiered approach to managing fatigue, ranging from prescriptive requirements reflected by the basic limits in Appendix 1, to a mix or prescription and risk management (Appendices 2-6) to a fully developed FRMS which offers operators the most flexibility.

The new rules apply automatically for new operators. These rules also apply to operators that have elected to transition to the new rules prior to transition deadline.

CAO 48.1 Amendment Instrument 2016 (No 1)

In July 2016, CASA introduced improvements to the new rules including new appendices to cover ballooning, medical transport and emergency services, and daylight only aerial work operations including helicopter mustering. This amendment does not take effect until 26 March 2020 although operators are permitted to opt in to the amendment as part of their transition to the new rules.

CASA has developed a guidance document that incorporates this amendment into CAO 48.1 Instrument 2013⁶ to show the intended effect of the amendment.

CAO 48.1 Amendment Instrument 2018 (No 2)

The most recent amendment has been incorporated into CAO 48.1 Instrument 2013 and CAO 48.1 Amendment Instrument 2016 (No 1). The amendment achieved actions 20-1 and 21 - 1 from CASA's response to the independent review by removing the 31 October 2018 deadline. The new deadlines are 30 September 2019 for high capacity regular public transport (RPT) operators under CAO 82.5 and 26 March 2020 for all other operators completing Action 20-1 of CASA's response. CASA does not intend to make any further amendments to the transition deadlines for the fatigue rules.

⁴ https://www.legislation.gov.au/Details/F2015C00099

⁵ https://www.legislation.gov.au/Current/F2016C00083

⁶ https://www.casa.gov.au/files/cao48-1instrument-2013incorp-2016pdf

Regulation impact statement

CASA will submit a regulation impact statement (RIS) to the Office of Best Practice Regulation (OBPR) for their assessment once the feedback from this consultation has been assessed.

CASA expects that the proposed changes will reduce regulatory impact when compared to the extant rules in CAO 48.1 Instrument 2013, including amendments in CAO 48.1 Amendment Instrument 2016 (No 1).

The amendments are expected to allow more operators to comply with prescriptive limits rather than implement an FRMS. Additionally, these changes and related changes to guidance material and acceptable means of compliance are intended to reduce the costs of transitioning to an FRMS.

Closing date for comment

CASA will consider all comments received as part of this consultation process and incorporate changes as appropriate. Comments on the draft CAO 48.1 Instrument 2019 should be submitted through the online response form by close of business 10 February 2019.