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Avalon Airspace Review

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Forward comment

This Avalon Airspace Review was conducted before the impact of COVID-19 on the aviation industry. The downturn in all aviation activity across Australia and internationally will have a significant impact on the analysis, outcomes and projections used in this report.

The impact of COVID-19 has not altered the conclusions or recommendations contained within this review.

1 Executive Summary

The *Airspace Act 2007* (Act) provides the Civil Aviation Safety Authority (CASA) with authority to administer and regulate Australian-administered airspace and authorises CASA to undertake regular reviews of existing airspace arrangements. The Office of Airspace Regulation (OAR) has conducted an airspace review within a 15 nautical mile (NM) radius of Avalon Airport to determine if the airspace remains fit for purpose. The review examined the airspace architecture, air navigation services, procedures and infrastructure from the surface to 8,500 feet (FT) above mean sea level (AMSL). The previous aeronautical study specifically for Avalon was conducted in 2008.[1]

This airspace review applies CASA's regulatory philosophy which considers the primacy of air safety, whilst considering the environment, security, cost and is consistent with the Australian Airspace Policy Statement (2018) and the Minister's Statement of Expectations (2019).

This review included analysis of:

- Aerodrome traffic data;
- Airspace design;
- Australian Transport Safety Bureau (ATSB) incident data; and
- Stakeholder consultation.

1.1 Summary of Conclusions

The review determined:

- Changes to airspace classification around Avalon during tower hours would enhance aviation safety.
- The air traffic control (ATC) services at Avalon are consistent with other Class C Control Zone (CTR) services.
- Access to surveillance information by Avalon ATC staff would enhance the safety and efficiency of airspace users around Avalon.
- Performance based navigation (PBN) airspace design principles should be implemented to airspace around Avalon.
- Discrepancies between information in the Designated Airspace Handbook (DAH) and the actual Class E airspace at Avalon creates confusion for airspace users.
- Published instrument flight procedures at Avalon are not compliant with the International Civil Aviation Organization (ICAO) Doc 8168 Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS).

1.2 Recommendations

The following recommendations are made:

Recommendation 1 Airservices Australia should review the airspace design at Avalon and submit an Airspace Change Proposal (ACP) within 12 months to remove the Class E airspace and replace it with Class D or Class C airspace as appropriate, to optimise and enhance the level of air traffic services provided at Avalon.

[1] Aeronautical Study of Avalon – May 2008; Office of Airspace Regulation Canberra 2008

Recommendation 2 Airservices should review and update Avalon airspace architecture to align with PBN criteria. The ACP regarding the changes to Avalon airspace architecture should be submitted within 12 months of the publication of this final review.

Recommendation 3 Airservices should review the DAH information and submit amendments to remove inconsistencies with other published aeronautical information for Avalon.

Recommendation 4 Airservices should review published aeronautical navigation charts and identify any discrepancies between information published in DAH and other aeronautical publications.

Recommendation 5 Airservices is to ensure published instrument approach and landing procedures for Avalon are compliant with ICAO PANS-OPS.

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2 Introduction

The Office of Airspace Regulation (OAR) within the Civil Aviation Safety Authority (CASA) has conducted an airspace review within fifteen (15) nautical mile (NM) radius of Avalon Airport (Avalon) to determine if the airspace is still fit for purpose.[2] The review examined the airspace architecture, classifications, procedures and infrastructure from the surface to 8,500 feet (FT) above mean sea level (AMSL).

The OAR is responsible for the administration and regulation of Australian-administered airspace, in accordance with section 11 of the *Airspace Act 2007* (Act). Section 12 of the Act requires CASA to foster both the efficient use of Australian-administered airspace and equitable access to that airspace for all users. It requires that CASA must consider the capacity of Australian-administered airspace to accommodate changes to its use and national security. In exercising its powers and performing its functions, CASA must regard the safety of air navigation as the most important consideration.[3]

Section 3 of the Act states that 'the object of this Act is to ensure that Australian-administered airspace is administered and used safely, taking into account the following matters:

a. protection of the environment;
b. efficient use of that airspace;
c. equitable access to that airspace for all users of that airspace;
d. national security.'

2.1 Overview of Australian Airspace

Australian airspace classifications accord with Annex 11 of the International Civil Aviation Organization (ICAO) and are described in the Australian Airspace Policy Statement 2018 (AAPS). Airspace is classified as Class A, C, D, E and G depending on the level of Air Traffic Service (ATS) required to best manage the traffic safely and effectively. Government policy allows the use of Class B and Class F airspace, however these are not currently utilised in Australia. The airspace classification determines the category of flights permitted, aircraft equipment requirements and the level of ATS provided. 0 provides details of the classes of airspace used in Australia. Within this classification system aerodromes are either controlled, i.e. Class C or Class D or non-controlled airspace, i.e. Class G.

2.2 Purpose and Scope

The purpose of this review was to satisfy CASA that the airspace architecture, classification and the services within the airspace are safe and appropriate for all airspace users.

The scope of this Avalon Airspace Review includes:

- assessment of risks to airspace users within 15 NM of Avalon aerodrome from surface to 8,500 FT AMSL;
- consultation with stakeholders to obtain information related to airspace issues around Avalon aerodrome;
- an assessment of air routes and procedures to ensure they are efficient and fit for purpose;[4] and
- analysis of any risks that may impact the safety of airspace users to determine the need for any changes to existing airspace architecture, services or procedures.

The scope of the review did not include aircraft operations above 8,500 FT AMSL, aerodrome facilities or developments and surrounding infrastructure, unless a significant safety issue related the airspace operations is found.

Airspace related matters that occur outside the review area may be included, subject to the discretion of the OAR.

[2] A full list of acronyms and abbreviations used in this report can be found in Annex A.
[3] Civil Aviation Act 1988, section 9A – Performance of Functions
[4] The term 'fit for purpose' means the product or service is satisfactory for the purpose it was designed or created for.

2.3 Objective

The objective of this review was to analyse:

- the nature of aviation activity around Avalon;
- feedback from airport operators and airspace users;
- potential risks to the safety of passenger transport operations (PTO);
- any concerns about equitable access to the airspace by any airspace users;
- the appropriateness of the airspace architecture (includes classification);
- the services and facilities provided by the air navigation service provider (ANSP); and
- surveillance coverage and communication coverage in the review area.

2.4 Background

Avalon airport has undergone significant changes to its operations over the last 15 years. Avalon was a maintenance base for medium to heavy jet aircraft as well as military aircraft, including fighters and helicopters. Circuit and instrument approach training by Boeing's 737, 767 and 747 aircraft no longer occur. Avalon can accept Airbus A380 (A380) aircraft however, it is only used as an alternate for A380 aircraft at Melbourne.

Passenger and aircraft movements declined significantly during the last 15 years. Avalon changed in 2010 and a Class D control zone (CTR) with Class E airspace above the CTR was established.

Avalon airspace was reviewed in 2010 as part of the Melbourne basin aeronautical study.[5]

In 2013 the Australian Transport Safety Bureau (ATSB) published a report that involved a loss of separation incident that occurred at Avalon between a landing Airbus A320 which conducted a missed approach and a departing helicopter. That report included a comment that different classes of airspace at Avalon generated complexity for airspace users.

Analysis of statistical information at Avalon shows that between March 2014 and March 2019, air transport movements and passenger movements increased by 79% and 96% respectively. Passenger numbers exceeded 990,000 for the 12-month period to March 2019.

In December 2018, Air Asia X commenced international operations at Avalon and passenger movements now exceed 1,000,000. There is an expectation that the infrastructure created at Avalon will result in expansion of domestic and international operations at the aerodrome.

[5] Aeronautical Study of Melbourne, Office of Airspace Regulation, Canberra 2011.

3 Aerodromes

Avalon is the largest aerodrome located in the review area. Point Cook aerodrome (Point Cook) is a military aerodrome where the Royal Australian Air Force (RAAF) Museum operates historic aircraft and the Royal Melbourne Institute of Technology University (RMIT) conducts flight training. Avalon and Point Cook are the only locations where terminal instrument flight procedures (TIFPs) are available. Uncertified aerodromes located in the review area include:

- Barwon Heads;
- Ceres;
- Little River;
- Drysdale;
- St Leonards; and
- Wooloomanata.

See Attachment A for an overview map of the review area.

3.1 Avalon

Avalon is a certified aerodrome operated by Avalon Airport Australia Pty Ltd. In 1997 the Linfox Group acquired a 50-year lease agreement with an option to extend for a further 49 years from the Department of Defence. The Avalon international terminal became operational in December 2018 and is largely responsible for passenger growth.

Jetstar is the main domestic airline at Avalon with flights servicing Sydney, Gold Coast and Adelaide. In December 2018, Air Asia X commenced operations at Avalon with 2 flights daily to/from Kuala Lumpur using an Airbus A330 (A330).

Avalon has no facilities to support general aviation (GA). However, the airport and surrounding airspace is popular for flying training activity. This training extends from initial pilot training to pilots renewing endorsements or qualifications. All aircraft planning practice instrument approaches at Avalon are required to obtain ATC approval via the Airwork Online Booking System.[6]

International freight operations at Avalon increased from approximately 20 to 49 movements each year between 2008 to 2018. These international frieght flights were for special events such as Formula 1 Grand Prix, V8 Supercars, Moto GP, Melbourne Cup (horses) and concerts and usually involved Boeing 747 (B747) aircraft. Increased international freight movements occur in March and October which conincides with major motor sport events.[7]

Prior permission is required (PPR) for all non-training flights and operators wanting to nominate Avalon as an alternate. Avalon is capable of supporting A380 aircraft but no A380 operations are currently planned for Avalon.

Every two years for approximately ten (10) days between February and March, Avalon hosts the Avalon International Airshow (the airshow). This event attracts a large variety of domesitc aircraft and Australian and foreign military aircraft. During the airshow a temporary restricted area (TRA) is established to ensure the safety of all airspace users.

Avalon aerodrome facilities

Avalon has an aerodrome elevation of 35 FT AMSL and has one designated sealed runway 18/36 (RWY18/36) which has the following characteristics:

- Runway threshold elevation 32 FT AMSL (RWY18) and 34 FT AMSL (RWY36);
- Runway length is 3,048 metres (m);
- Runway width of 45m; and
- 300m runway strip width (RWS) (Graded 150m and gable markers at 150m).

Avalon navigation aids (navids) include Distance Measuring Equipment (DME), Very High Frequency Omnidirectional Range (VOR) and an Instrument Landing System (ILS).

[6] Airservices online booking system – Appendix 2
[7] Source: Avalon Airport Australia Pty Ltd

Aviation Rescue Fire Fighting (ARFF) services are provided by Airserveis Australia. A Notice to Airmen (NOTAM) advises Category 8 ARFF service are available for A330 arrivals and departures and a Category 6 service during other times.[8]

Avalon has an air traffic control (ATC) tower. The tower is active daily from 0700 hours (local) to 2300 hours (local).[9] A Common Traffic Advisory Frequency (CTAF) and Aerodrome Frequency Response Unit (AFRU) operate outside tower hours (see Chapter 4 for more details).

Refer to Attachment B for a diagram depicting the runway and facilities at Avalon.

3.2 Point Cook

Point Cook Airport (Point Cook) is a military aerodrome operated by the RAAF. Military aerodromes are not bound by the Civil Aviation Regulations (1988) and therefore are not defined as a certified or registered aerodrome or an aircraft landing area. Department of Defence may approve the use of military airfields by civilian aircraft.

The restricted areas around Point Cook (R330A and R330B) support display aircraft flights over the airfield each Tuesday, Thursday and Sunday at 1300 hours (local).

Point Cook has a number of additional military flights operating to and from the airfield. Military movement numbers are expected to increase in 2019 due to an increase of flying training at East Sale. Also, Point Cook experiences increased traffic movements due to the proximity of Avalon during the Avalon International Airshow every two years.

In relation to civilian aviation activity, RMIT conducts flight training at Point Cook. Training numbers increased by 25% in 2019 with the first semester fully booked and the second semester having 48 confirmed trainees (at the time of consultation).[10]

Gliding operations are conducted at Point Cook. The aerodrome has self-launch gliding operations during the day (sunrise to sunset). When gliding operations are in progress, a glider flying ground signal is displayed on the ground signals area adjacent to the RWY17 illuminated wind indicator (IWI).

Due to the intensive flying training (RMIT), gliding operations and military or museum aircraft activity special procedures have been established for Point Cook. These special procedures are detailed in the En Route Supplement Australia (ERSA). This includes all aircraft transitting Point Cook should, weather permitting, "*be no lower than 2,000 FT."*

Prior permission is required for all visiting civilian and military aircraft to use Point Cook. Notice must be given at least 24 hours before arrival during Monday to Friday and at least 48 hours for weekend movements.

Refer to Attachment C for details of Point Cook aerodrome facilities.

3.3 Barwon Heads

Barwon Heads Airport (Barwon Heads) is an aircraft landing area (ALA) operated by the Geelong Surfcoast Airpark and has been in continuous use for 54 years. The airfield is specifically for light aircraft and prior permission is required before using the airport.

Barwon Heads has a mix of commercial and private operations at the airfield including Skydive Australia with approximately 10,000 parachute descents during 2018, mostly from Flight Level 140 (FL140). Geelong Helicopters who operate three R44 helicopters had approximately 4,000 tourist flights between Geelong waterfront and Barwon Heads in 2018. Adventure Flight Co conduct warbird aerobatic flights, charter flights to King Island and Twelve Apostles and other local scenic and business flights, are also users of the airfield.

Barwon Heads is an important departure and arrival point for Bass Strait aircraft and is located outside the Class E 12 DME step south of Avalon. The lower limit (LL) of Class E airspace in this area is Flight Level 180 (FL180).

[8] An explanation of the ARFF levels of service is available from Airservices Australia website http://www.airservicesaustralia.com/services/about-our-aviation-fire-service/arff-levels-of-service/
[9] All times in this review are shown as Coordinated Universal Time (UTC) unless otherwise specified.
[10] Information supplied by RMIT Flight Training

Yearly, approximately 40,000 people attend Barwon Heads to fly, parachute, travel or watch others undertake activities at this location.

Barwon Heads has two runways: RWY18/36, an unrated sealed runway approximately 750 m long and RWY 09/27, a grass strip runway approximately 520m long.

Barwon Heads CTAF is 119.0 MHz.

Figure 1: Barwon Heads ALA[11]

[11] Google Earth V 7.3.1.4507 (6 February 2018) Barwon Heads, Victoria. 38° 15' 29.60" S 144° 25' 38.55" E, Eye Alt 3.00km. DigitalGlobe 2018. http://www.earth.google.com [9 January 2019]

3.4 Ceres

Ceres is an ALA, privately operated, located 11.6 NM south west of Avalon.

Ceres is located within Class G airspace, outside the Avalon Control Zone (CTR) and Class E steps. Prior permission is required for operating at Ceres. At Ceres, the lower limit of Class E airspace is FL180.

Ceres has one unmarked, unsealed, dirt and grass runway RWY18/36 which is approximately 850m long. Ceres is used by light aircraft and helicopters.

Ceres CTAF is 119.0 MHz.

Figure 2: Ceres ALA[12]

3.5 Little River

Little River ALA (Little River) is privately owned and located approximately 7.5 NM north of Avalon and approximately 0.5 NM inside the CTR. It is 2.5 NM north of the Little River township and 2.5 NM north-east of the You Yangs mountain range. Little River is positioned under the flight path for Avalon.

There are two unmarked natural surface runways, RWY16/34, approximately 725m in length and RWY09/27, approximately 900m in length. Ground communication at Little River with Melbourne Centre is limited and broken. Users at Little River do obtain clearances by telephone when radio communication is not effective.

Some runway medium intensity lighting has recently been installed at Little River and private aircraft movements occur on a regular basis. Total movement numbers are not recorded. There is no published aerodrome or facilities information in ERSA.

[12] Google Earth V 7.3.1.4507 (6 February 2018 Ceres, Victoria. 38° 08' 48.75" S 144° 15' 33.15" E, Eye Alt 3.00km. DigitalGlobe 2018. http://www.earth.google.com [9 January 2019]

Figure 3: Little River ALA[13]

3.6 Drysdale

Drysdale ALA (Drysdale) is privately operated and located approximately 11.9 NM south east of Avalon.

There are two unmarked natural surface runways RWY09/27, approximately 900m in length and is the preferred runway to use and RWY18/36, which is approximately 435m in length.

Drysdale is utilised by light, sports aviation type aircraft. Movement numbers are not recorded or known. There is no published aerodrome and facilities information in ERSA for Drysdale.

Figure 4: Drysdale ALA[14]

[13] Google Earth V 7.3.1.4507 (6 February 2018) Little River, Victoria. 37° 55' 04.68" S 144° 28' 56.50" E, Eye Alt 3.00km. DigitalGlobe 2018. http://www.earth.google.com [9 January 2019]
[14] Google Earth V 7.3.1.4507 (6 February 2018) Drysdale, Victoria. 38° 12' 00.36" S 144° 36' 59.86" E, Eye Alt 3.00km. DigitalGlobe 2018. http://www.earth.google.com [30 January 2019]

3.7 St Leonards

St Leonards ALA (St Leonards) is located approximately 13 NM south east of Avalon.

There are two unmarked natural surface runways RWY10/28, approximately 630m in length and RWY18/36, approximately 630m in length.

There is no published aerodrome and facilities information in ERSA for St Leonards.

St Leonards is utilised by light, sports aviation aircraft. The aerodrome is also used by Textron Systems Pty Ltd (Textron) for unmanned aerial vehicle (UAV) testing. Danger area D322A overlies St Leonards and has a 1.5 NM radius area based at St Leonards. This area is less than 1.5 NM to the north of the ALA where it borders the 30 DME Melbourne controlled airspace boundary.

East of D322A is D322B which overlies a large area in Port Phillip Bay. Textron is the contact for both areas which are used for UAV testing. Further information on Danger Areas are detailed in section 4.3.

Textron advised that UAV test flights conducted from St Leonards into D322A occur for a period of, on average, 1 week for each month. Most operations in D322A are conducted up to 4,500 FT AMSL. Textron has approval for operations up to 7,500 FT AMSL.

Figure 5: St Leonards ALA[15]

3.8 Wooloomanata

Wooloomanata ALA (Wooloomanata) is located 7 NM north west from Avalon, 2.5 NM west of the You Yangs and 6.2 NM west of Little River township.

Wooloomanata has three unmarked natural surface runways, RWY09/27 approximately 865m in length, RWY15/33 approximately 800m in length and RWY05/23 approximately 375m in length. There is no published aerodrome and facilities information in ERSA for Wooloomanata.

[15] Google Earth V 7.3.1.4507 (6 February 2018) St Leonards, Victoria. 38° 10' 09.50" S 144° 41' 17.93" E, Eye Alt 3.00km. DigitalGlobe 2018. http://www.earth.google.com [9 January 2019]

Figure 6: Wooloomanata ALA[16]

3.9 Terminal Instrument Flight Procedures

ICAO Doc 8168 Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) provides the standards used to design TIFPs. PANS-OPS surfaces are intended to safeguard an aircraft operating under Instrument Flight Rules (IFR) conditions from known obstacles. The design of TIFPs assumes normal operations and the surfaces created describe the critical areas and obstacle clearance requirements for the achievement of safe, regular instrument flight operations.

In Australia, the Civil Aviation Safety Regulations Part 173 (CASR Part 173) establishes the regulatory standards for designing TIFPs. The Manual of Standards Part 173 – Standards Applicable to Instrument Flight Procedure Design (MOS173) has additional design standards not included in PANS-OPS and reflect differences from ICAO that have been applied by Australia.

PANS-OPS procedures enable a pilot to rely on aircraft instruments for flying. The Obstacle Limitation Surface (OLS) is for aircraft operating under visual flight rules (VFR) and require visual meteorological conditions (VMC).

Avalon and Point Cook are the only locations within the review area with promulgated TIFPs.

Avalon TIFPs

The following observations were made points are noted regarding the Avalon TIFPs.

- The RNAV (GNSS) procedures are not compliant with PANS-OPS with regard to segment lengths required for minimum stabilisation distances. This does not mean the procedures are unsafe. There are no issues for aircraft arriving via AVVNE or AVVSB;
- All TIFPs are compliant with MOS173 except:
    - RNAV (GNSS) RWY 36 when Avalon is not active, aircraft may leave Class E into Class G and re-enter Class E during a missed approach;
    - RNAV (GNSS) RWY 36 initial approach fix AVVSA has less than 1 NM buffer from the Class E boundary;

[16] Google Earth V 7.3.1.4507 (6 February 2018) Little River, Victoria. 37° 56’ 15.34” S 144° 22’ 23.11” E, Eye Alt 3.00km. DigitalGlobe 2018. http://www.earth.google.com [9 January 2019

  - RNAV (GNSS) RWY 36 holding at waypoint AVVSB is not contained within control area (CTA) steps;
  - RNAV (GNSS) RWY 18 holding at waypoint AVVNE is not contained within CTA steps;
  - VOR RWY 36 holding overhead the VOR is not contained within CTA;
  - VOR RWY 18 holding overhead the VOR is not contained within CTA and the reversal procedure does not have a sufficient lateral buffer; and
  - ILS-Y or LOC-Y RWY 18 reversal through and holding at TEMPL are not contained within CTA steps.
- The current airspace architecture does not fully contain the TIFPs. The airspace would need to be redesigned to address containment issues.
- The TIFPs are unable to be redesigned to assure compliance with MOS173. The airspace would need to be redesigned to address containment issues.

The above issues have been forwarded to the relevant section within CASA, to review and address.

Required Navigation Performance – Authorisation Required (RNP-AR) instrument flight procedures are being designed for Avalon. These are proprietary procedures developed for aircraft within the Qantas Group i.e. these procedures will not be available for general public use.

The JAYBI STAR requires an aircraft to be vectored or receive tracking instructions for arrivals to RWY36. The STAR is appropriate for the RWY18 ILS or LOC procedures.

Aircraft planning practice instrument approaches are required to obtain ATC approval via the Online Airwork Booking System through the Network Coordination Centre (NCC) portal available on the Airservices website.[17] This process ensures ATC are able to efficiently accommodate the planned practice flights in sequence with other airspace users.

Point Cook TIFP

The following points are noted regarding the Point Cook TIFP and published chart.

- R330A and R330B are not indicated in the plan view diagram;
- There is no indication of a crossing grass runway on the chart;
- There is no information pertaining to the availability of the procedure when R330A or R330B are active;
- Danger areas (DA) are not indicated in the plan view diagram. D383 Point Cook flying training area and D322A St Leonards unmanned aerial vehicle testing could be included to assist with situational awareness; and
- A note on the Moorabbin (YMMB) NBD-A chart states ‘AV – MB track conflicts with Pt Cook RNAV APCH near 17AV.’ This note is not reciprocated on the Point Cook TIFP chart.

The above issues have been forwarded to the relevant section within CASA, to review and address.

3.10 Aeronautical Information

The review identified inconsistencies between promulgated aeronautical information publications (AIP) including charts and other aeronautical documents.

The Designated Airspace Handbook (DAH) details information pertinent to airspace including lateral and vertical limits, air routes, IFR waypoint names and positions and certified or registered aerodromes threshold data. With regard to the vertical limits, DAH provides *‘Except when stated as above ground level (AGL), Lower and Upper vertical limits are promulgated as Above Mean Sea Level when at or below the Transition Altitude or as a flight level when above the Transition Altitude.’*[18]

[17] Airservices Australia Network Coordination Centre Portal (12 December 2018) https://www.airservicesaustralia.com/noc/. Viewed 21 January 2019.
[18] Designated Airspace Handbook Introduction, effective 8 November 2018, Airservices Australia

However, the section relating to Class E airspace in DAH has promulgated Avalon CTA E1 vertical limits from 700 – 1500. There is no indication that 700 (FT) refers to AGL. This is consistent with other DAH Class E airspace entries for locations such at Mackay and Rockhampton. Furthermore, Mackay and Rockhampton aeronautical charts indicate Class E LL 700 FT AGL.[19]

An amendment proposal to change the Avalon airspace from Class E LL 700 FT AMSL to Class E LL 700 FT AGL occurred in 2011, but this change is not consistent throughout all aviation publications including maps, DAH and ERSA.

[19] Source: Mackay VTC, Mackay Terminal Area Chart (TAC), Rockhampton VTC, Rockhampton VNC, Rockhampton TAC effective 8 November 2018, Airservices Australia

4 Airspace

4.1 General

Avalon airspace architecture and ATC services were assessed as complex.

The airspace in the review area includes varying levels of Class D, Class E and Class G airspace overlaid by Class C airspace. The Avalon airspace classifications are linked to the Avalon ATC Tower hours of operation. The airspace architecture should be reviewed to deliver a less complex structure and reduce confusion or uncertainty by airspace users.

When considering the impact of a complex airspace structure, the ATSB report AO-2013-115 which related to the loss of separation between an aircraft conducting an approach to Avalon and a helicopter departing Avalon on 04 July 2013 [20] noted that, the complexity of the airspace structure may have been a contributing factor to the incident. There has been no change to the airspace design since the finalisation of this report in October 2013. A proposal was presented to the Victorian Regional Airspace and Procedures Advisory Committee (RAPAC) in November 2016 by Airservices Australia, however no further progress has been made since that presentation.

In 2018, Airservices Australia released details of an Airspace Modernisation Project that seeks to standardise the airspace architecture and ANSP services across Australia.

The airspace structure within 15 NM of Avalon is shown In Attachment A. Avalon airspace is created as a 'keyhole' design located adjacent to but separate from the Melbourne/Essendon airspace. Aircraft are generally vectored into Avalon from the north using surveillance radar. Aircraft operating in the review area can be detected at or above 200 FT AGL.

4.2 Airspace Structure

The Avalon CTR is promulgated as a racetrack shape with the northern and southern ends aligned with the 18/36 runway out to eight (8) NM from the Avalon aerodrome reference point (ARP). The CTR is approximately 11.5 NM in width. Class D airspace operates within the vertical limits from the surface to 2,500 FT AMSL and is indicated in the following diagram.

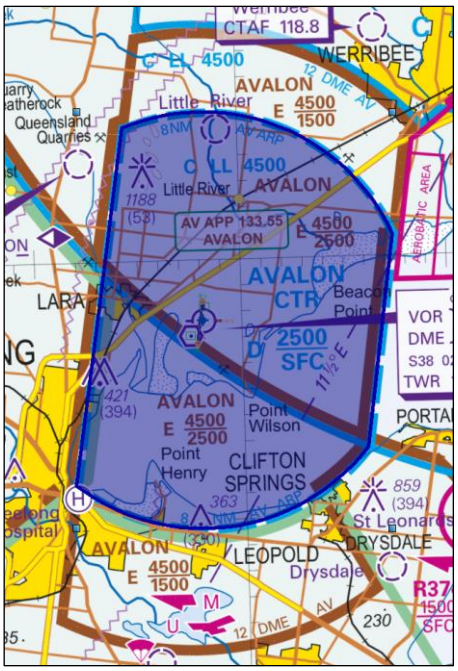


Figure 7: Avalon Class D CTR - surface to 2,500 FT AMSL [21]

When the Avalon CTR is active, Class E airspace extends above the CTR from 2,500 FT AMSL to 4,500 FT AMSL. When the CTR is not active, the airspace is promulgated as

[20] Loss of separation between an Airbus A320, VH-VFJ and a Bell 412, VH-VAO; Australian Transport Safety Bureau, Canberra 2013.
[21] Source: VNC Melbourne, effective 8 November 2018, Airservices Australia

Class E airspace from 700 FT AGL to 1,500 FT AMSL as identified in Figure 8. The airspace from the surface to 700 FT AGL is Class G airspace.

Extending beyond the CTR and within the airspace boundary inside the 12 Distance Measuring Equipment (DME) steps, Class E airspace extends from 1,500 FT AMSL to 4,500 FT AMSL (refer Figure 9). The airspace from the surface to 1,500 FT AMSL from the 12 DME step to 8 NM ARP is Class G.

Above Class E and within 30 DME of Melbourne airport (Melbourne), Class C airspace commences at 4,500 FT AMSL. Outside 30 DME Melbourne, there is no Class C airspace except for the area east of St Leonards, over Port Philip Bay where Class C operates from 8,500 FT AMSL. North of the 12 DME northern step Class C airspace with a LL of 2,500 FT AMSL extends to and beyond the 15 NM review area.

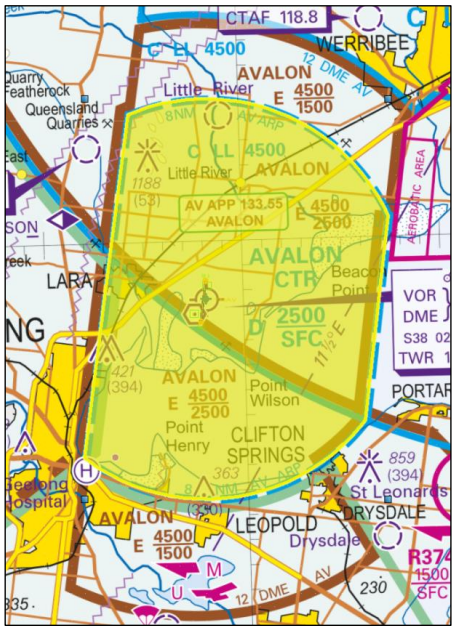


Figure 8: Avalon CTA E1 - 700 FT AGL to 1,500 FT AMSL [22]

Figure 9: Avalon CTA E2 - 1,500 FT AMSL to 4,500 FT AMSL [23]

[22] Source: VNC Melbourne, effective 8 November 2018; Airservices Australia
[23] Source: VNC Melbourne effective 8 November 2018, Airservices Australia

As detailed above, when the CTR is activated, Avalon airspace is a combination of Class D airspace and Class E airspace which is surrounded or overlaid by Class C airspace and Class G airspace.

The following profile diagrams illustrates the different classes of airspace and operational frequencies at Avalon.

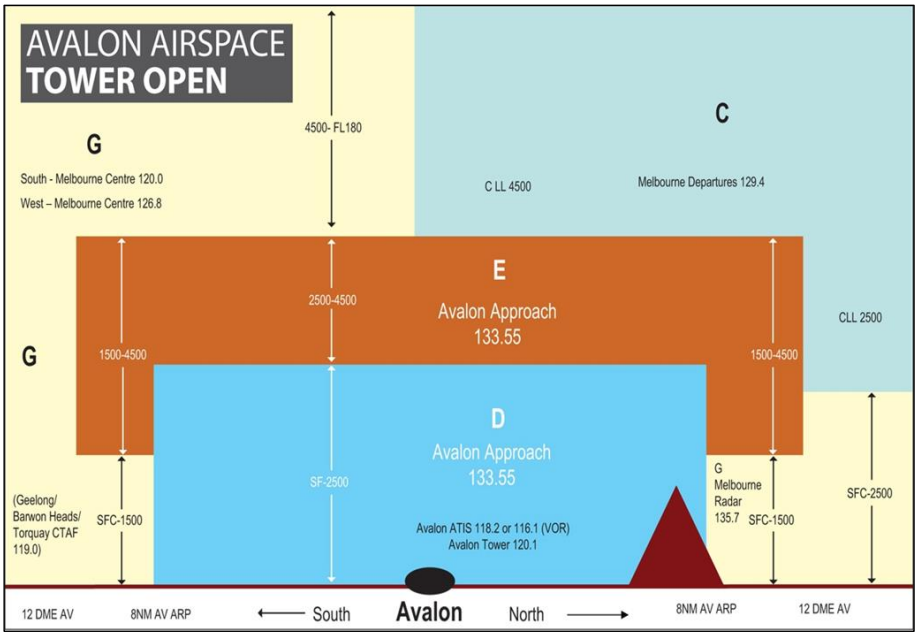


Figure 10: Side view Avalon airspace with Avalon Tower open[24]

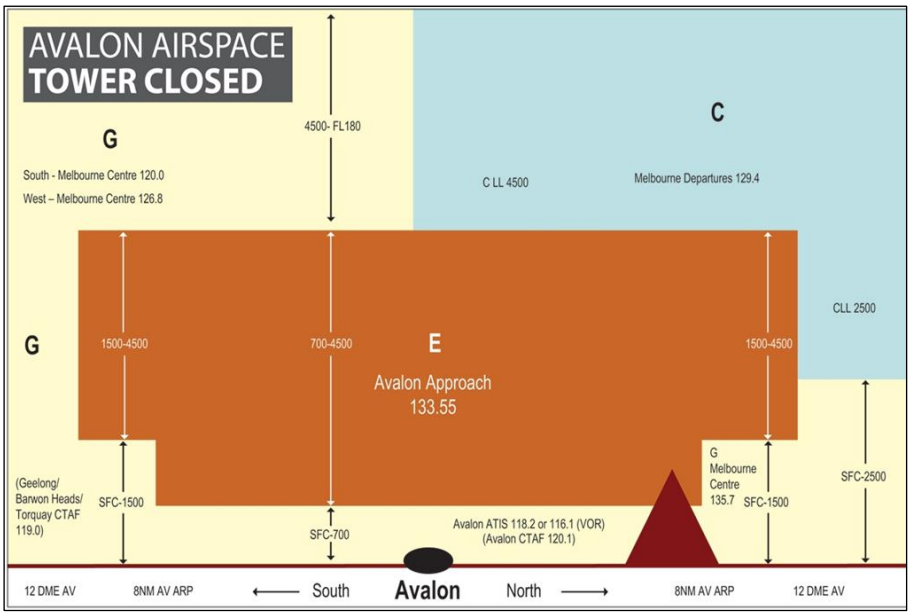


Figure 11: Side view Avalon airspace with Avalon Tower closed[25]

4.3 Restricted and Danger Areas

The declaration and architecture for Restricted Areas (RA) and Danger Areas (DA) are in Annex C. The RAs and DAs located within the review area are identified in Attachment A and Figure 12, and are described as follows:

> R330A and R330B are located over and within 3 NM around Point Cook aerodrome. Respectively, each area is from the surface to 2,500 FT AMSL and surface to 4,500 FT AMSL (the LL of Class C airspace above each RA). The RAs are controlled by the Point Cook aerodrome operator. The hours of activity for each RA are Tuesday, Thursday, Sunday; 0315-0345 Coordinated Universal Time (UTC) (1 hour earlier during hours of

[24] Source: Avalon Airspace Tower Open Airservices Australia 2016
[25] Source: Avalon Airspace Tower Open Airservices Australia 2016

daylight saving (HDS)) or as amended by NOTAM. These areas have a RA3 conditional status meaning clearance through the RA by the controlling authority is not available except in a declared emergency.

D383A is located at Point Cook and promulgated as a flying training area. Contained within this area is D383B which is an aerobatic area that borders the Avalon CTR. The vertical limitation is from the surface to the base of controlled airspace (BCTA). D383A and D383B are operated by the Point Cook aerodrome operator. The hours of activity are promulgated between sunrise to sunset (HJ) or as amended by NOTAM.

R374 Swan Island is a 1 NM radius area around Swan Island. The area is from the surface to 1,500 FT AMSL. The RA is controlled by the Army Range Control Officer (RCO) Swan Island and is active 24 hours each day. This area has a conditional status of RA3.

D322A is 1.5 NM radius area over St Leonards ALA. D322A is bordered by the 30 DME arc from Melbourne. D332B is an area extending east from D322A and over Port Phillip Bay. The areas are promulgated for the purpose of unmanned aerial vehicle testing. The vertical limitation for each is from the surface to the NOTAM elevation. The hours of activity are via NOTAM. The contact is Textron Pty Ltd[26]. D322B has been excluded from this review and will be included in a future review for the Moorabbin area and/or Melbourne basin.

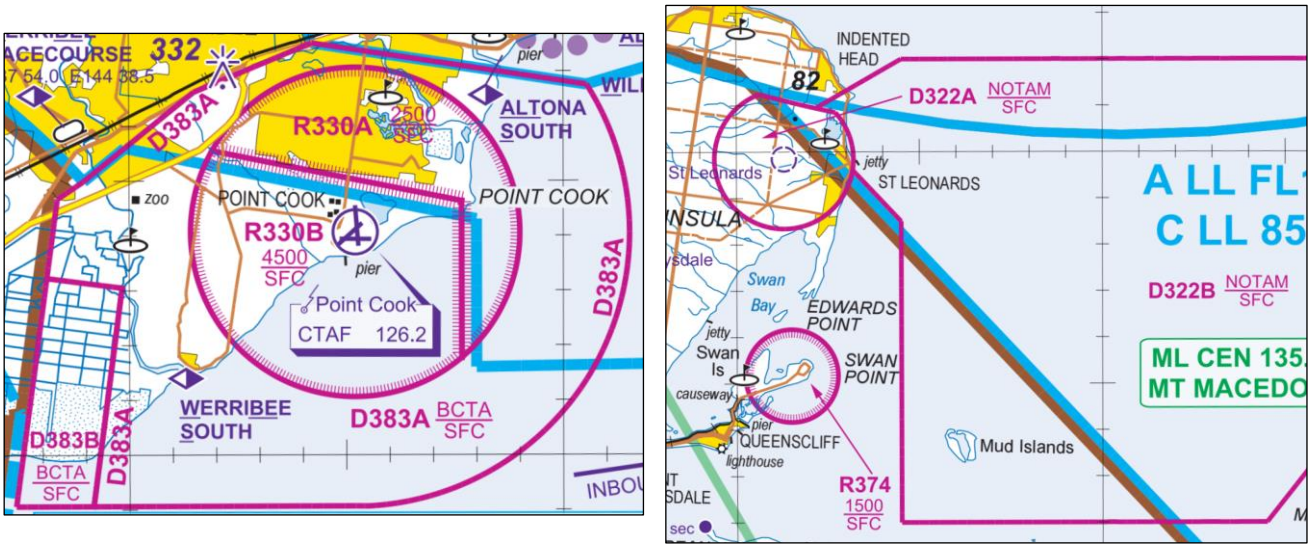


Figure 12: Review area Restricted and Danger Areas[27]

4.4 Air Routes

The air route structure in the Melbourne basin area, is primarily structured to support activity at Melbourne International Airport (Melbourne Airport). The air route structure will be reviewed by Airservices during development of new airspace and procedures to support the new parallel runway development at Melbourne Airport.

The air route structure around Avalon is such that most aircraft arrive from the north or east. There are limited air routes for aircraft travelling to or from west or south and aircraft are sequenced with aircraft operating to and from Melbourne and Essendon.

Air routes used by PTO and freight operations into Avalon enable aircraft to join an instrument approach via the JAYBI STAR. As previously identified, this STAR leads aircraft to join the ILS or LOC procedure to RWY18. Other instrument approach and landing (IAL) procedures, including those to RWY36 are disconnected from this STAR.

Instrument departure procedures are via the AVALON DEPARTURE. This omni-directional departure procedure provides applicable obstacle clearance to departing aircraft from

[26] DAH effective 8 November 2018 shows Aerosonde as the contact. This will be amended for DAH effective 23 May 2019.
[27] Melbourne VTC effective 8 November 2018, Airservices Australia

Avalon. Aircraft would then join an air Surveillance route as per their flight plan. Refer to Attachment D for charts depicting the air routes in the vicinity of Avalon.

ATC surveillance in the review area includes radar and Automatic Dependent Surveillance – Broadcast (ADS-B). ADS-B is a system whereby suitably equipped aircraft automatically broadcasts their location via a digital data link. The data is received by ATC ground stations and can be displayed on air traffic radar screens. This enables ATC to provide a radar-like surveillance service. The data can also be received by other suitably equipped aircraft to enable detect and avoid capability and situational awareness.

There are two radar sites and three ADS-B sites that provide surveillance coverage within the review area. These sites are located at:

- Gellibrand Hill – This site has Primary Surveillance Radar (PSR) and Secondary Surveillance Radar (SSR) units[28,29]. The PSR has a range of 50 NM and the SSR has a range of 255 NM;
- Mount Macedon – SSR unit with a range of 255 NM and an ADS-B ground station;
- Mount Tassie – ADS-B ground station; and
- Mount William – ADS-B ground station.

Air traffic services are provided by the Melbourne Terminal Control Unit (TCU).[30] Avalon Approach has responsibility for the Avalon CTR Class D and Avalon Class E CTA within the lateral boundary of the CTR. Additionally Avalon Approach is responsible for the Avalon Class E CTA steps outside Avalon tower hours.

Melbourne TCU controls Avalon airspace. This operation is similar to locations with a Class C control zone where tower controllers provide a service in support of runway and movement area operations. The review identified potential issues for departing aircraft when traffic information is relayed by the tower before the aircraft switches to the Approach frequency.

Avalon Tower has a Tower Situational Awareness Display (TSAD) that provides surveillance information sourced from the Eurocat system in Melbourne Centre. The TSAD cannot be used for aircraft separation purposes. OAR considered the possible use of TSAD information for separation by tower controllers as an enhanced level of safety. CASA considers the use of TSAD for separation to be matter for Airservices.

4.5 Environment

The airspace within 15 NM of Avalon was reviewed to examine if there are current aircraft environmental issues associated with:

- Noise;
- Gaseous emissions;
- Interactions with birds and wildlife; and
- Environment Protections and Biodiversity Conservation Act 1999 (EPBC Act) items.

There are no environmental issues that impact the reviewed airspace. Matters relating the interactions with birds and wildlife are the responsibility of the airport's wildlife management program and are normally detailed within the respective Aerodrome Operations Manual.

[28] PSR – also known as Terminal Area Radar (TAR) which relies on radio waves reflecting off metallic objects within a short range of the primary radar site. Therefore, regardless if an aircraft has a transponder the PSR will detect an aircraft's position, altitude and speed.
[29] SSR – also known as enroute radar and relies on aircraft having a transponder which transmits an encoded data signal. This signal is interrogated by a ground station determining the aircraft's position, altitude and speed.
[30] The TCU is responsible an area of controlled airspace surrounding a major airport where there is a high volume of air traffic e.g. Melbourne, Sydney, Perth.

4.6 Airspace Protection

The aim of airspace protection is to ensure aircraft are not exposed to obstacles or hazards in navigable airspace. Certified and registered aerodromes identify surfaces that need to be protected based on the OLS and the PANS-OPS where appropriate.

The Avalon Airport Master Plan 2015 identified the OLS for the existing runway at Avalon. This document identified the development of an Ultimate Design State OLS for existing and future runways that can be used in planning preparation.

The Avalon Corridor Strategy is a project being delivered by the City of Greater Geelong, Wyndham City Council and the State Government Department of Environment, Land, Water and Planning. This project sets the strategic land use direction for the land between Lara and Werribee and it supports the continued growth of Avalon Airport including protecting the airport from encroachment by non-compatible land uses. The Ultimate Design State OLS, should be updated to include current and future PANS-OPS surfaces, which would inform this project.

5 Traffic

The data provided by Airservices shows that during the 2017 to 2019 period, total aircraft movements increased on average by 6.25% yearly. During the 2014 to 2016 period the yearly average increase in total aircraft movements was greater than 49%. Passenger movements have exceeded 1 million during 2019 at Avalon.

The following table provides data about passenger and aircraft movement for Avalon from March 2011 to March 2019.

Figures for the 12 months ending					
Month/Year	**Total Movements**	**Air Transport Movements**	**Passengers**	**VFR Movements**	**IFR Movements**
March 2011	9,474	7,448	778,987	2,162	7,312
March 2012	7,150	6,099	684,708	1,117	6,033
March 2013	5,693	4,761	534,833	1,001	4,692
March 2014	6,327	4,697	504,766	1,714	4,613
March 2015	9,332	5,412	521,828	4,062	5,270
March 2016	12,626	6,880	606,432	6,013	6,613
March 2017	12,220	7,737	752,718	4,482	7,738
March 2018	11,611	7,472	822,714	4,002	7,609
March 2019	13,753	8,429	990,255	5,165	8,588

Table 1: Airservices Australia movement data for Avalon, March 2011 to March 2018[31]

5.1 Analysis of aircraft movements

Aircraft movement numbers in the review area are expected to increase over the next five years.

Avalon

Aircraft movement levels, specifically PTO, are expected to increase with the establishment of Air Asia operations at Avalon from December 2018. It is also reasonable to expect other airlines could expand the current operations at Avalon.

In 2018, there were 49 International freight movements at Avalon. Boeing 747 (B747) was the most common type of aircraft used in these operations. Other aircraft used for international freight operations include Antonov 124 (AN124), Airbus A330 (A330) and Boeing 777 (B777), Boeing 767 (B767) and Boeing 737 (B737).

The establishment of on-ground facilities at Avalon such as the international terminal, taxis or other ride sharing services and Skybus services operating to/from Melbourne support domestic and international passenger operations.

The Avalon Airport Master Plan Indicates total aircraft movements are expected to reach 62,000 by 2030/31 based on annual average growth rate of 17.8%.[32]

Point Cook

There is limited data available with regard to movements at Point Cook. The operator has advised that aircraft movements in 2018 were approximately 68,000. Movements are expected to increase10-15% in 2019 and this is primarily due to an increase in flying training that will be undertaken at Point Cook as civilian and military operations.

RMIT flying training have advised that in 2018, flying training increased 17% and will increase another 25% in 2019.

[31] Source: Airservices Australia Passenger and Aircraft movement data Avalon Aerodrome 2011-2019
[32] Avalon Airport Master Plan 2015; Avalon Airport

Barwon Heads

Barwon Heads airport supports a variety of fixed wing and rotary wing aircraft in operation at the airfield. Skydiving operations, warbird aerobatic flights, charter flights, flying training and emergency services operations are conducted from Barwon Heads. Geelong Helicopters had approximately 4,000 tourist flights in 2018 and Skydive Australia reported approximately 10,000 canopies over the 12 months, mostly from FL140.

Aircraft movements at other ALAs in the review area are not known and estimates were not available. However, these areas are used sufficiently given the condition of the landing surfaces as indicated by the diagrams in Section 3 – Aerodromes.

5.2 Analysis of passenger numbers

Passenger movement information was only available for Avalon.

The data shows a yearly average decrease in passenger numbers between 2011 and 2014 of 11.7% from 778,987 to 504,766 (total reduction – 35.2%). Between March 2014 to March 2019, average yearly growth in passenger numbers has been 19.2% from 504,766 to 990,255 (total increase 96.2%). This represents an overall increase of 27.1% between 2011 to 2019 and is attributed to Jetstar and recent Air Asia international operations.

Passenger movements are expected to increase by more than 10% each year for 2019 and 2020. Passenger numbers have exceeded 1,000,000 during 2019[33].

[33] Based on data for the 12-month period to 30 April 2019, passenger movements exceeded 1,000,000 at Avalon.

6 Aviation Occurrence Reports

The review of the aviation occurrence reports has identified that during tower hours, the operation of Class E airspace is not appropriate due to the diverse aircraft operations undertaken in the area. A change in classification will provide a risk mitigation to aircraft operating in this airspace to as low as reasonably practicable (ALARP) principles.

All aviation occurrences, consisting of incidents, serious incidents and accidents involving Australian registered aircraft, or foreign aircraft in Australian airspace, must be reported to the ATSB. The ATSB receives occurrence information via pilot reports, Airservices' Corporate Integrated Reporting and Risk Information System (CIRRIS) reports and the Australian Defence Forces' Aviation Safety Occurrence Reports.

The ATSB maintains its own database, the Safety Investigation Information Management System (SIIMS), in which all reported occurrences are logged, assessed, classified and recorded. The information contained within SIIMS is dynamic and subject to change based on additional and/or updated data. Each individual report is known as an Aviation Safety Incident Report (ASIR).

For identification purposes each ASIR is allocated its own serial number, detailed as an incident, serious incident or accident and is assigned one of the following Level 1 Descriptions:

- Airspace – includes airspace infringements, loss of separation (LoS), loss of separation assurance, breakdown of coordination/information error, error by ANSP instruction or pilot actions, encounter with a remotely piloted aircraft (RPA), Airborne Collision Alert System (ACAS) Warning
- Consequential Events – includes aircraft conducting missed approaches, fuel dumping, diverting or returning to aerodrome;
- Environment – most common description for a bird strike, evidence of bird strike after landing or locating animals during runway inspections but also includes lightning strikes and turbulence issues;
- Infrastructure – such as runway lighting, approach lighting and radio frequency failures;
- Operational – considers pilot actions and runway incursions (resulting in events including LoS), ground proximity warnings, terrain collisions, crew and cabin safety, smoke or fumes events, avionics and equipment issues; and
- Technical – includes airframe, systems such as landing gear indications and power plant matters e.g. engine running rough, engine failure.

A CIRRIS report is an electronically submitted air safety occurrence report which forms part of the risk information system maintained by Airservices Australia. Not all information in CIRRIS is required to be reported to the ATSB and there may be differences between the two reporting systems.

The airspace related incidents within 15 NM of Avalon from January 2013 to May 2019 were reviewed.

6.1 ATSB Aviation Safety Incident Reports

Type of Occurrence	Number of Occurrences						
	2013	2014	2015	2016	2017	2018	2019
Airspace	4	5	1	1	5	8	3
Consequential Events	2	3	6	4	4	6	0
Environment	11	16	22	29	28	20	21
Infrastructure	0	0	0	1	0	1	0
Operational	10	6	8	22	8	8	2
Technical	5	1	6	4	5	3	5
Total number of occurrences	**32**	**31**	**43**	**61**	**50**	**46**	**31**

Table 2: ASIR Occurrences Avalon Review area between Jan 2013 to May 2019

Airspace Occurrence	Number of Occurrences						
	2013	2014	2015	2016	2017	2018	2019
Loss of Separation	1	1				3	3
Airspace Infringement	1	1				3	
Near collision	1				2		
ACAS Warning		2					
Encounter with RPA					1		
Operational non-compliance	1	1				2	
Issues			1	1	2		
Total Airspace Incidents	**4**	**5**	**1**	**1**	**5**	**8**	**3**

Table 3: ATSB ASIR Airspace Occurrence Description Avalon review area 2013-2019

Although not a common occurrence, some of the reports included incidents where there was a loss of separation between high capacity IFR jet aircraft and smaller aircraft while operating in the Class E airspace around Avalon. The unpredictability of VFR aircraft operating in Class E airspace while IFR jet aircraft are in the critical phase of flight could lead to a serious event although the pilots from each respective aircraft are complying with airspace requirements.

An incident recorded on 4 July 2013, resulted from an A320 which was in an unstable configuration during an approach, conducted a missed approach. This resulted in a loss of separation with a departing Bell 412 (B412) helicopter as ATC had not protected the missed approach path for the A320. ATC attempted to maintain a vertical separation but the crew of the A320 could not comply with the initial instructions given by ATC. Separation reduced to 1.5 NM and 600 FT as the A320 was turned away from the B412.

ATSB report AO-2013-115 which followed this incident noted the comment from Airservices Australia that '*Of concern are the small layers of differing airspace classes with different service levels and frequency requirements.*'[34]

Other noted reported incidents occurring at Avalon involving Class E airspace are:

- 22 Feb 2014 – The Cessna 172 (C172), cruising at 2,000 FT AMSL, did not track in accordance with ATC instructions which resulted in the Airbus A330, which was conducting circuits at 1,500 FT AMSL receiving a Traffic Collision Avoidance System (TCAS) Resolution Advisory (TCAS RA)[35] on the C172. The controller had passed traffic information to the crew of the A330.
- 8 March 2014 –Passing 2,500 FT AMSL on climb, the crew of the Airbus A320 observed an aircraft on TCAS. The controller subsequently advised the crew of a VFR aircraft crossing their track in Class E airspace and the A320 turned to maintain separation. The crew subsequently received a TCAS Traffic Advisory (TCAS TA)[36] on the aircraft.
- 8 Dec 2018 – A330 aircraft was departing Avalon via RWY 18 JUSTY 2 SID and a VFR C172 was cleared to operate east of the RWY centerline at 2,000 FT AMSL. Both aircraft were in receipt of traffic information however as A330 passed 2,500 FT AMSL on climb the aircraft received a TCAS RA. C172 was at 2,000 FT AMSL and the range 2 NM.
- 19 Jan 2019 – During approach, the crew of the Airbus A320 received a TCAS RA on the C172. A320 aircraft did not observe C172 on TCAS until aircraft was within 5 NM. A320 received TA followed by RA alerts. A320 climbed back to 3,000 FT AMSL and

[34] Loss of separation between an Airbus A320, VH-VFJ and a Bell 412, VH-VAO; Australian Transport Safety Bureau, Canberra 2013.
[35] TCAS RA: an indication given to the flight crew recommending a manoeuvre or a manoeuvre restriction to avoid collision. RAs are nominally 15 to 35 seconds before the closest point of approach of the aircraft.
[36] TCAS TA: an indication given to the flight crew that a certain intruder/aircraft is a potential threat to the flight and potential RAs. Information conveyed in TAs is intended to assist flight crews in sighting nearby traffic and may generate up to 20 seconds in advance of an RA. This depends upon the sensitivity levels of the RA.

after clear of conflict, was able to continue approach. When questioned by the A320 crew, ATC advised them “It was Class E airspace.”

These incidents could have been avoided if there was a change to the airspace classification thereby providing an appropriate air traffic service to mitigate risk.

6.2 Airservices CIRRIS data

Primary Occurrence Type	Number of Occurrences						
	2013	2014	2015	2016	2017	2018	2019
ACAS Resolution Advisory	0	1	0	1	1	2	1
Aircraft Accident	1	0	0	0	0	0	0
Aircraft Confliction	1	0	0	0	0	0	0
Airspace Infringement	9	5	12	8	9	9	3
Emergency Ops: IFER & Aerodrome	3	2	4	0	1	1	0
Information Error	2	0	6	3	1	4	3
Laser	3	0	3	5	2	3	1
Loss of Separation	1	0	0	0	0	3	0
Operational Deviation	2	3	3	1	1	3	2
Other – Safety Related	2	1	0	2	0	0	2
All other occurrences	2	1	0	3	2	2	3
Total number of occurrences	**26**	**13**	**28**	**23**	**17**	**27**	**15**

Table 4: CIRRIS data reported by Airservices Australia Jan 2013 to May 2019.

The total number of CIRRIS incidents are less than the ATSB data however the types of incidents reported are similar. This indicates that both the ATSB and Airservices Australia reported a number of similar incidents although the CIRRIS indicates, on average one ACAS Resolution Advisory occurring each year.

7 Consultation and stakeholder feedback

Stakeholders were contacted and invited to provide comment or input to issues relating to Avalon airspace. Various on-site meetings were conducted with stakeholders during the consultation process and while issues outside the scope of the airspace review were discussed, these matters have been included for completeness. A list of stakeholders invited to contribute to this review can be found in 0.

7.1 Air Navigation Service Provider

A copy of the draft report was provided to Airservices. Feedback from Airservices has been incorporated into this draft report. Airservices had another opportunity to provide comment during the public consultation phase.

7.2 Airspace Users

There are number of users operating in the review area. Users range from large freight operators, international and domestic jet traffic, flight training, sports aviation and remotely piloted aircraft systems (RPAS). Feedback from these operators includes:

- VFR and IFR aircraft operating in Class E airspace. Problems range from minor increases in communications and coordination to issues with departure tracks for IFR jets departing Avalon.
- JUSTY SID jet departures enter Class E airspace during normal operations. The current SID takes aircraft close to the RWY18 final approach path and the preferred area for VFR training located north east of the airfield.
- Class E airspace should be replaced by Class D or Class C airspace.
- To assist with VFR transiting aircraft, a corridor for VFR aircraft should be established south of the highway and north of the coast. Eastbound aircraft could transit at 3,500 FT AMSL and westbound aircraft transit at 4,500 FT AMSL BCTA. This would keep VFR aircraft clear of the final and missed approach paths and allow ATC to tactically use 3,000 FT AMSL to keep IFR traffic clear of transiting aircraft.
- Class C airspace is unnecessarily restrictive based on the mix of traffic that use Avalon airspace.
- A view that Avalon tower should control the CTR airspace to reduce the workload on staff operating at Melbourne Centre/Avalon Approach.
- The use of the ASD would enable radar like surveillance to be used for separation Avalon tower instead of TSAD. This may increase the efficient use of and access to the airspace by users.
- Changes to the Avalon airspace design should enable the facilitation of departures towards Tasmania and aircraft travelling west.
- Operations at Avalon should align with like type operations conducted at Moorabbin i.e. Class D CTR.
- The overall airspace boundaries suit the north/south runway. An extension to the south east sector would facilitate more efficient airspace use.
- Large jet traffic operators support a review of the airspace classification with the replacement of Class E with Class C or D airspace.
- The mix of IFR and VFR traffic in Class E airspace at Avalon is briefed as a threat by their flight crews. Facilitating a higher level of service will provide a higher level of safety to operations.
- The airspace should support PBN operations and other efficiencies such as Continuous Climb Operations or Continuous Descent Operations (CCO/CDO).
- The current STAR at Avalon is only appropriate for the RWY 18 ILS or LOC procedure. Any other approach requires additional vectoring or tracking to conduct an approach.
- PBN procedures linking to instrument approaches or air routes would be supported by airlines.
- A narrowing of the current airspace would impact future instrument approach procedures and would not necessarily be supported by airlines.

- The current airspace in the review area is good however for training purposes there is limited space available.
- Urban developments around Point Cook and the fly neighbourly instructions for Werribee, prevents flying training being conducted in these areas. Training is conducted in the Avalon CTR, normally to the north east sector of the CTR while remaining clear of the runway centre. Changes to the airspace design and/or classification may 'box' flight training in a small area. This would result in congestion and an inefficient use of the airspace.
- Changes to the airspace may impact training where flights are required to transit further to undertake training. This is likely to be west of the Avalon CTR. This would unnecessarily increase costs and extend training times of students.
- R330A and R330B already limits the area available for flight training. D383B is the aerobatics area and generally used by one aircraft at a time.
- Flying training increased during 2018 and is expected to increase again in 2019.
- The current arrangement of Class E airspace on top of Class D airspace does result in non-standard practises by airspace users. Examples provided included some users making radio calls and some not.
- RPAS operators conduct complex manoeuvres within D322A and D332B.
- On average D322A is activated each month for a one-week period. Most operations are conducted up to 4,500 FT AMSL however CASA approval enables operations below 7,500 FT AMSL.
- RPAS activity will continue to grow in use and category of activity being conducted.
- RPAS integration of operation in controlled airspace using suitably equipped units should be considered. Operations within D322B would enable trials while complying with regulatory approvals i.e. operate below 7,500 FT AMSL and remain within the PSR area. This trial could identify practical issues for airspace that may not be identified during theoretical discussions.

7.3 Aerodrome Operators

Avalon Aerodrome

- There is continuing growth in passenger transport operations at Avalon.
- Additional international passenger flights are anticipated into and beyond 2019.
- Freight operations remain steady.
- The southern end of the Avalon airspace in the Leopold and Geelong area provides the highest number of noise complaints. The airport is aware of noise issues. Aircraft operating in these areas and generating these issues may be transiting VFR aircraft.
- Airservices Australia ARFF services are appropriate to the aircraft operating at the aerodrome.
- Emergency services, including Defence, are increasing activity at the airfield.
- Avalon Airshow in March 2021 will mark the centenary of the RAAF as an independent service. It is anticipated that there will be national celebrations for this event including the 2021 Avalon Airshow.

Point Cook Aerodrome

- In 2018 there were approximately 68,000 movements conducted at the airfield. This included military and flight training movements.
- It is estimated during 2019, a 10-15% increase will occur due to consolidation of assets and anticipated training flights from other military locations.
- Overfliers at Point Cook are not complying with the instructions in ERSA. Some users are operating below 2,000 FT AMSL and/or transiting over when the RAs are active.

Barwon Heads Aerodrome

- Barwon Heads is an important departure and arrival point for Bass Strait aircraft.
- Barwon Heads has been in continuous use for 54 years with a mix of commercial and private operations.
- Parachute operations mostly from 14,000 FT AMSL occur from the airfield.

- Three R44 helicopters operated approximately 4,000 tourist flights between Geelong waterfront and Barwon Heads in 2018.
- Adventure flight Co conducts warbird aerobatic flights, charter flights to King Island and the Twelve Apostles and other scenic or business flights.
- Flight training is conducted at the airfield.
- Approximately 400,000 people attend Barwon Heads each year to fly, parachute, travel or watch.
- Pilots find the airspace around Avalon difficult to understand. This is due to the number of calls received for PPR. However commercial pilots and local pilots who fly regularly have no issues with the Class E setup.
- Changes to the airspace design or classification may impede traffic travelling East or West and also parachuting operations. Changes could place more aircraft outside CTA but between Barwon Heads that the coast some 2 NM south of the airfield causing unnecessary congestion.
- If possible, no change to the 8 NM step south of Avalon.

Little River Aerodrome

- Avalon Approach ATCs are very accommodating to aircraft operating into and out of Little River and familiar pilots are patient relative to obtaining inbound clearances and accommodating priority traffic management with Avalon airport. The healthy relationship that exists between local pilots operating out of Little River and Avalon Approach is appreciated and would like to ensure this continues.
- Ground communications from Little River with Avalon Approach 133.55 MHz and / or Melbourne Radar 135.7 MHz are very limited or broken (depends on Aircraft type/radio/antenna position). Many of our departure calls have to be obtained by calling Avalon Approach on landline. Ground communications remain an ongoing issue that could be resolved through the installation of a local repeater.
- Low intensity runway and taxiway lights and medium intensity threshold lights have recently been installed at Little River Airfield. The lights are remote controlled (not pilot controlled) and are used infrequently for night departures and arrivals.
- An examination where aircraft departing from or arriving at Little River without the need for a clearance should be explored. The increase in jet traffic has resulted in delays at Little River. Perhaps a redesign could place Little River outside the CTR, enabling aircraft access to Class G airspace.

8 Key Issues, Recommendations and Observations

8.1 Avalon airspace classification

Issue: The classification of airspace in the review area should be reviewed.

Findings:

- PTO operators have stated that based on risk, Class E airspace during tower hours at Avalon does not provide the appropriate risk mitigation for air traffic operating in the area, particularly during tower hours. The increase in diverse air transport operations including additional PTO, flying training and freight operations could be mitigated by changing the airspace classification.
- High capacity domestic and international jet traffic as well as light aircraft operate in a surveillance coverage area.
- There have been TCAS TA/RA occurrences reported between high capacity jet traffic and light aircraft operating in different classes of airspace.
- Air traffic services are provided by Avalon Approach in the Melbourne ATC centre. Avalon Tower does not operate any airspace except on a circuit release, when required.
- ATC services do not align with the airspace classification.
- ATSB report AO-2013-115 noted comment from Airservices Australia that “Of concern are the small layers of differing airspace classes with different service levels and frequency requirements.”

Recommendation

Airservices Australia should review the airspace design at Avalon and submit an Airspace Change Proposal (ACP) within 12 months to remove the Class E airspace and replace it with Class D or Class C airspace as appropriate, to optimise and enhance the level of air traffic services provided at Avalon.

8.2 Avalon airspace design

Issue: The airspace design should be reviewed

Findings

- The current airspace is designed around ground-based aviation technology. Changes in technology, mandates, enhanced surveillance and new aircraft types provide an opportunity to enhance the airspace design and the air traffic services
- The current airspace architecture is inconsistent with regard to the current level of service. The Class D CTR at Avalon operates differently to other Class D CTRs in Australia.
- ATC services within the Avalon airspace are (mostly) provided by Avalon Approach in Melbourne ATC Centre. Avalon tower does not control the airspace, unless on circuit release. Operations at Avalon tower are similar to services provided at a major capital city Class C CTR.
- Avalon approach controllers over service the airspace according to the airspace classification.
- Underutilised surveillance capability at Avalon as the location is within radar coverage from Gellibrand Hill (Melbourne).
- Air traffic into Avalon is predominantly from the north of the aerodrome.
- Instrument flight procedures at Avalon are not compliant with MOS173 regarding airspace containment. Redesigning Avalon airspace can review containment of instrument flight procedures, extend/expand airspace boundaries to enable aircraft operations to the south east and north west of Avalon.
- Redesigning Avalon airspace should consider possible future changes to Melbourne Basin airspace.

Recommendation

Airservices should review and update Avalon airspace architecture to align with PBN criteria. The ACP regarding the changes to Avalon airspace architecture should be submitted within 12 months of the publication of this final review.

Observation/Opportunity for Improvement

Avalon tower does not control any airspace unless Approach releases specific airspace for circuit flying. The tower is staffed daily between 0700 hours to 2300 hours (local time). The airspace is controlled by Avalon Approach in Melbourne ATC Centre. This operation is consistent with a Class C CTR and not a Class D CTR.

Avalon tower currently has access to TSAD and is located within the limits of the Melbourne radar coverage. Access to this surveillance for Avalon tower staff will enhance the safety and efficiency of controlled airspace.

8.3 Aeronautical publications

Issue: There are discrepancies between the information published in aviation documents including aeronautical charts, departure and approach procedures and DAH.

Findings

- The description of Class E airspace at Avalon in DAH is not consistently displayed on aeronautical charts.
- The lower level of Class E airspace at Avalon in ERSA is not consistent with the information published in DAH.
- The lower levels of Class E airspace at Avalon and other locations in Australia, such as Mackay and Rockhampton, does not indicate the lower level is above ground level.
- Avalon RNAV (GNSS) approach procedures via the off-set initial waypoints are not compliant with PANS-OPS. Approaches via the straight initial waypoint are compliant with PANS-OPS.
- The Moorabbin NDB-A DAP chart notes that the Avalon-Moorabbin track conflicts with the Point Cook RNAV APCH, however there is no reference about this conflict on the Point Cook RNAV RWY 35 chart.

Recommendations

- Airservices should review the DAH information and submit amendments to remove inconsistencies with other published aeronautical information for Avalon.
- Airservices should review published aeronautical navigation charts and identify any discrepancies between information published in DAH and other aeronautical publications. Airservices is to ensure published instrument approach and landing procedures for Avalon are compliant with ICAO PANS-OPS.

Observation/Opportunity for Improvement

Avalon ERSA entry should include notification of the runway lighting at Little River to assist with pilot situational awareness.

8.4 Airspace Protection

Issue: Avalon is a major international airport and Point Cook is a central military aerodrome in the Melbourne basin and the airspace should be protected for aviation activity.

Findings

- Avalon is not included in the Airports Act or Airports Regulations, as it is a military airfield leased to Fox and not bound by civil regulations.
- Planned developments have or will occur in and around these aerodromes.
- Avalon aerodrome, in the context of Melbourne's second international airport, does not have a finalised diagram that identifies critical surfaces for airspace protection for the two planned runways identified in the Avalon Airport Masterplan 2015.

Observation/Opportunity for Improvement

To assist with the safeguarding of flight path protection, Avalon Airport should develop a prescribed airspace like diagram for this purpose.

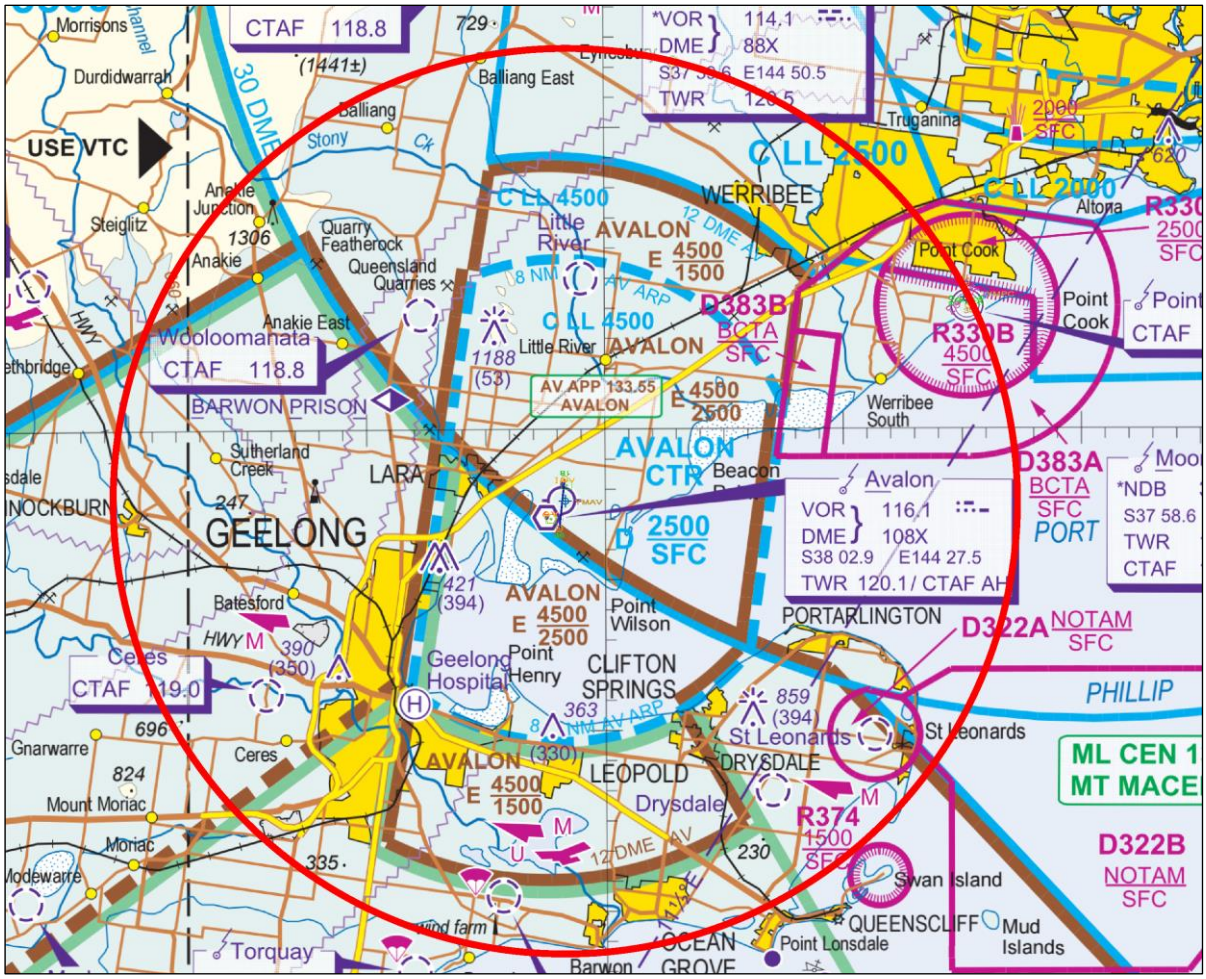
9 Conclusion

The OAR has conducted a review of the airspace within 15 NM of Avalon airport from the surface to 8,500 FT AMSL.

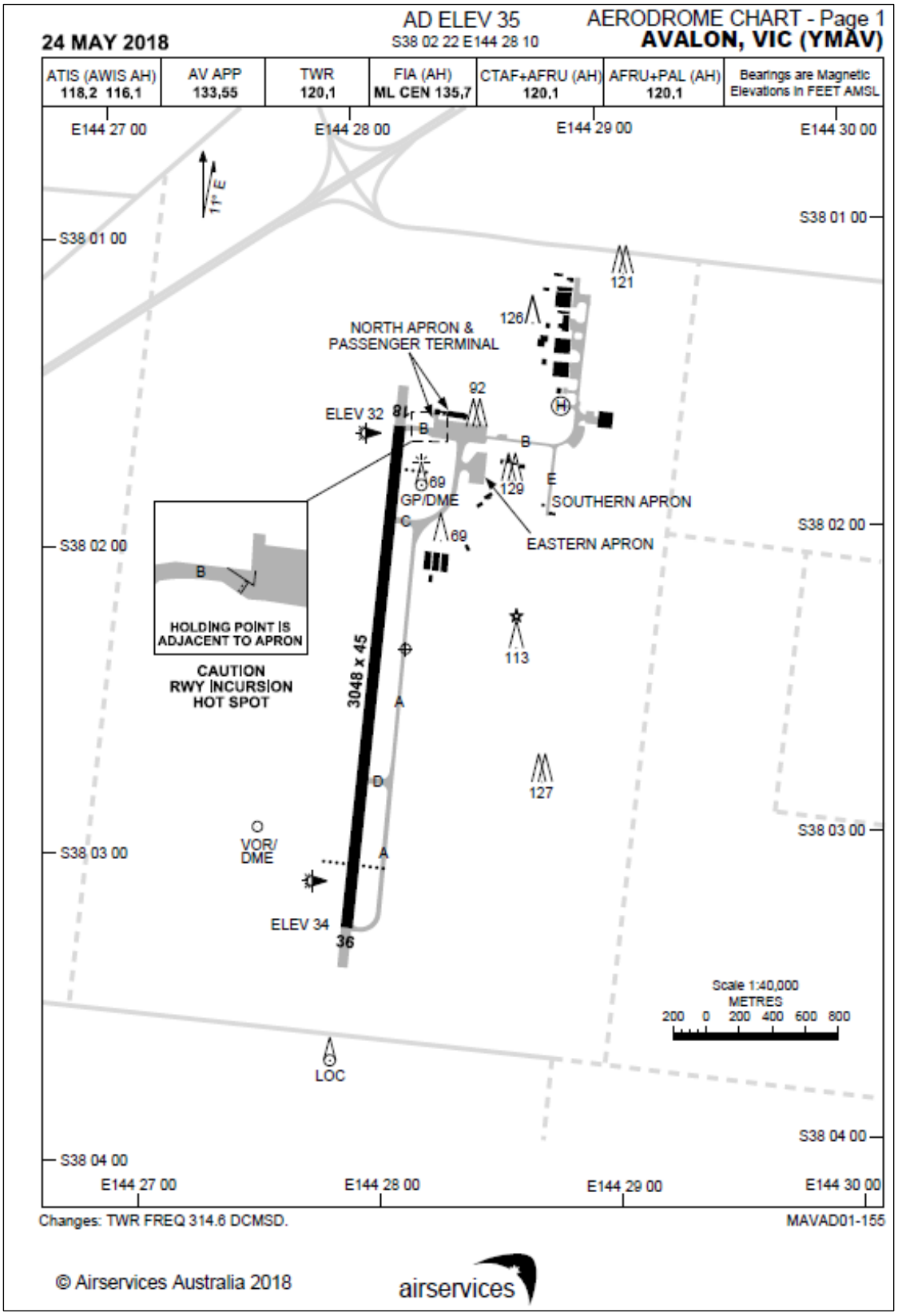
The review of the airspace complied with the requirements of the *Airspace Act (2007)*, Airspace Regulations (2007), the Australian Airspace Policy Statement (2018), the Minister's Statement of Expectation (2019) and CASA's Regulatory Philosophy.

The OAR will continue to monitor aircraft and passenger movement statistics, recorded incident data and other information sources to determine the appropriateness of the next airspace risk review.

Attachment A 15 NM Avalon airspace review area



Attachment B Avalon aerodrome chart



Attachment C Point Cook aerodrome facilities

Point Cook has an aerodrome elevation of 14 FT AMSL (4.27m) and three runways designated 17/35 (sealed), 04/22 (sealed) and 08/26 (grass). The following characteristics apply to each runway.

RWY 17/35

- Runway threshold elevation of 13 FT AMSL (RWY17) and 8 FT AMSL (RWY35);
- Runway length of 1,374m;
- Runway width of 45m; and
- 135m runway strip width.

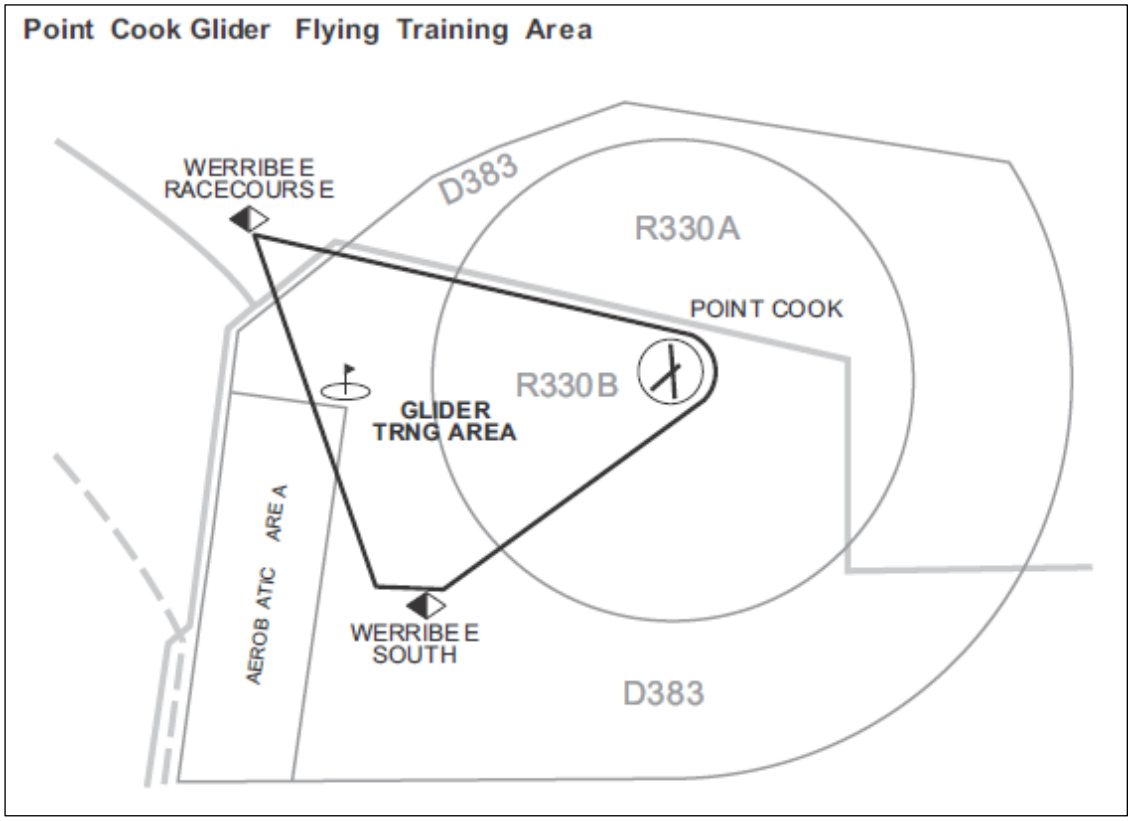
RWY 04/22

- Runway threshold elevation of 9 FT AMSL for each runway;
- Runway length of 1,137m;
- Runway width of 45m;
- 135m runway strip width.

RWY 08/26

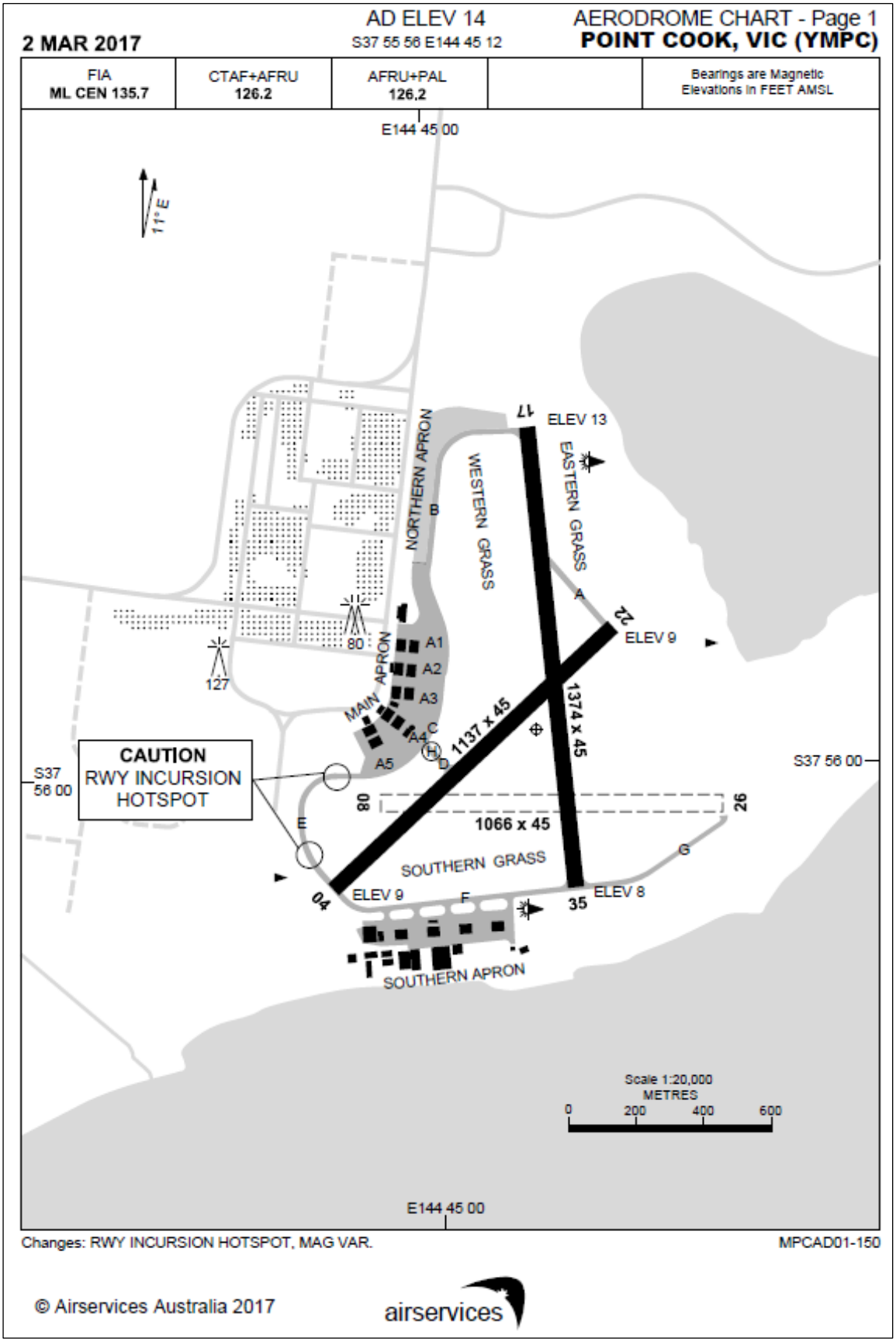
- Runway threshold elevation for either end are not recorded for this grass runway;
- Runway length of 1,066m;
- Runway width of 45m; and
- 135m runway strip width.

Other grassed areas are able to be used for other aviation activities such as gliding and are indicated on the published aerodrome chart. The following diagrams identify the glider flying training area and aerodrome facilities at Point Cook.



Point Cook Glider Flying Training Area[37]

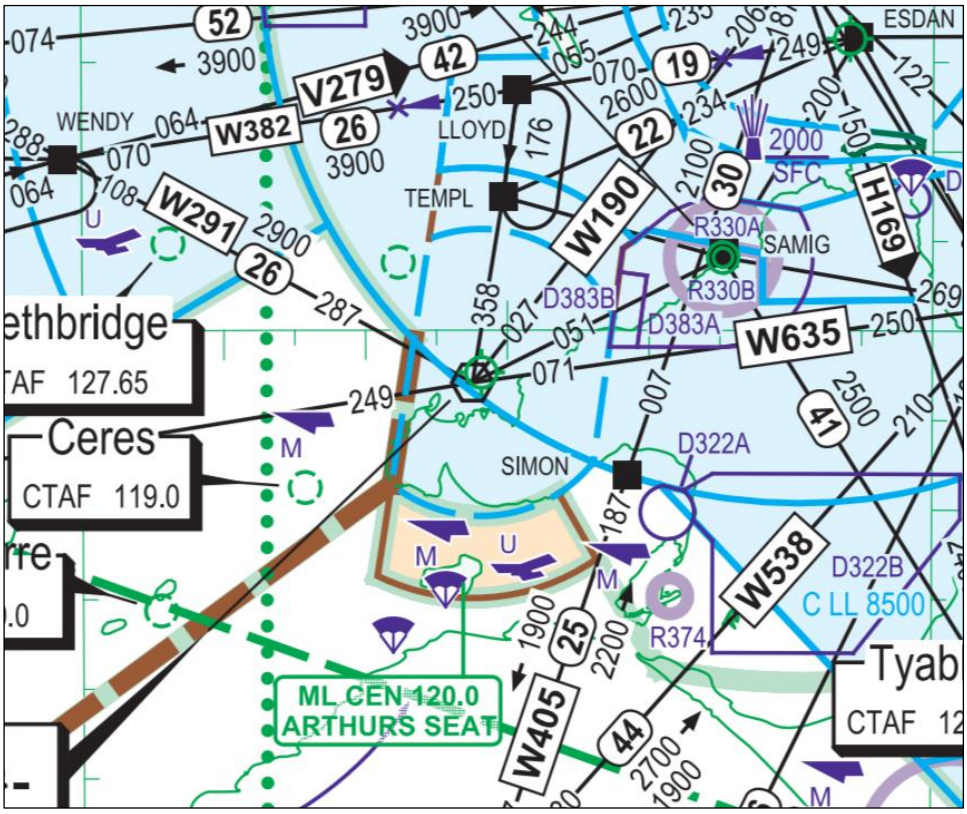
[37] Source: En Route Supplement Australia effective 8 November 2018, Airservices Australia



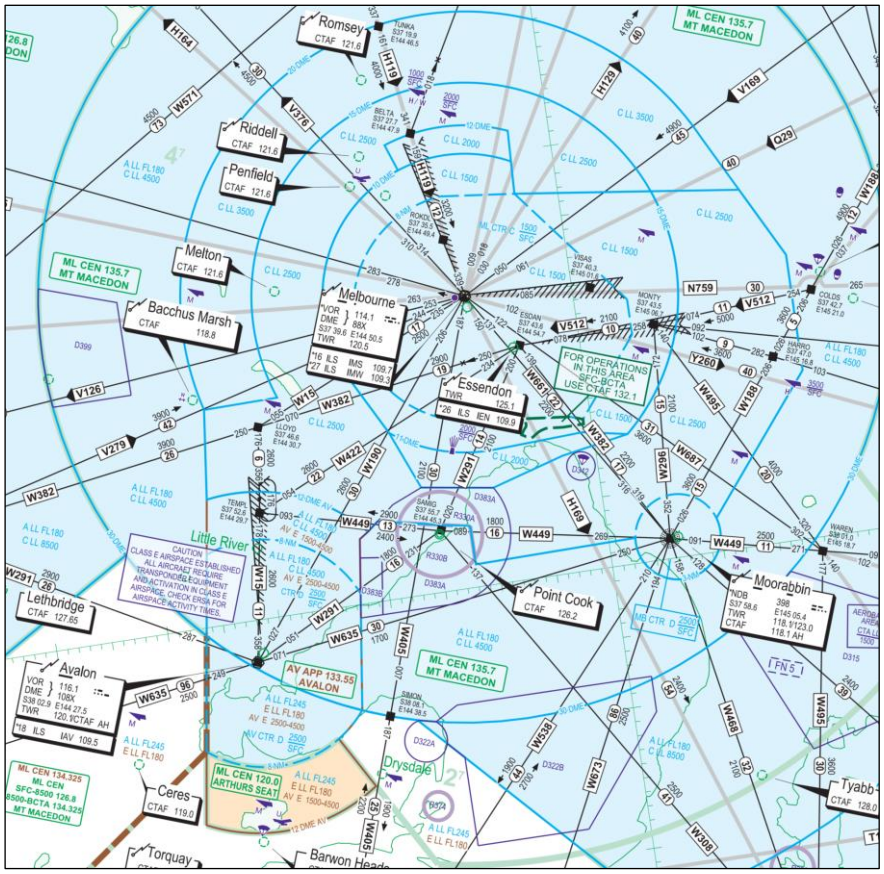
Point Cook aerodrome chart[38]

[38] Source: AIP DAP amendment 157 effective 8 November 2018, Airservices Australia

Attachment D Air routes in the vicinity of Avalon



Air routes used by aircraft operating at below FL200 AMSL [39]



Melbourne Terminal Area Chart[40]

[39] Enroute Chart Low (ERC-L) 2 effective 8 November 2018, Airservices Australia
[40] Terminal Area Chart (TAC) Melbourne, effective 8 November 2018, Airservices Australia

Appendix 1 Avalon Airspace Review Description

The airspace within 15 NM of Avalon as shown on **Error! Reference source not found.**.

- The Avalon Control Zone (CTR) is promulgated in a racetrack like shape with the northern and southern ends eight (8) nautical miles (NM) from the Avalon aerodrome reference point (ARP). The CTR is approximately 11.5 NM in width. The vertical limit is from the surface to 2,500 FT.[41]
- When the CTR is active, Class E airspace extends above the CTR from 2,500 FT to 4,500 FT.
- When the CTR is not active, the above area is promulgated as Class E airspace from 700 FT AGL to 1,500 FT. The airspace from the surface to 700 FT AGL is Class G airspace.
- Class E airspace steps to the north (N) and south (S), aligned with the 18/36 runway to 12 Distance Measuring Equipment (DME) with a lower limit (LL) of 1,500 FT to 4,500 FT.
- North of the 12 DME northern step Class C airspace with a LL of 2,500 FT extends to and beyond the 15 NM review area.
- 30 DME Melbourne arc extending from the north west (NW) to the south east (SE) of Avalon and above the CTR, Class C airspace with a LL of 4,500 FT.
- NW of Avalon, between 30 DME and 45 DME Melbourne, extending clockwise, N of the 230 radial (R-230) from Melbourne VOR to St Leonards aircraft landing area (ALA), Class C airspace with a LL of 8,500 FT. Only minor portions are included in the review.
- Between St Leonards ALA and moving in a clockwise direction to the NW areas mentioned above, Class G airspace extends from the surface to 18,000 FT (FL180).
- Restricted areas (RA) R330A and R330B are located over and within 3 NM around Point Cook aerodrome. Respectively, each area is from the surface to 2,500 FT and surface to 4,500 FT (the LL of Class C airspace above each RA). The RA are controlled by the Point Cook aerodrome operator. The hours of activity for each based on Coordinated Universal Time (UTC) are Tuesday, Thursday, Sunday; 0315-0345 (1 hour earlier during hours of daylight saving (HDS)) or as amended by NOTAM. These areas have a RA3 conditional status.
- Danger area (DA) D383 is located at Point Cook. D383 is promulgated as a flying training area and includes an aerobatic area which borders the Avalon CTR. The vertical limitation is from the surface to the base of controlled airspace (BCTA). D383 is operated by the Point Cook aerodrome operator. The hours of activity are promulgated between sunrise to sunset (HJ) or as amended by NOTAM.
- R374 Swan Island is a 1 NM radius area around Swan Island. The area is from the surface to 1,500 FT. The RA is controlled by the Army Range Control Officer (RCO) Swan Island and is active 24 hours each day. This area has a conditional status of RA3.
- D322A is 1.5 NM radius area over St Leonards ALA. D322A is bordered by the 30 DME arc from Melbourne. D332B is an area extending E from D322A and over Port Phillip Bay. The areas are promulgated for the purpose of unmanned aerial vehicle testing. The vertical limitation for each is from the surface to the NOTAM elevation. The hours of activity are via NOTAM. The contact is Textron Pty Ltd.

[41] All elevations in Appendix 1 are AMSL unless otherwise specified.

Appendix 2 Network Coordination Centre Airwork Booking System

Airservices Australia's Network Coordination Centre (NCC) is responsible for the maintenance of the online booking system in regard to availability of the airspace following advice from the Traffic Manager or Unit Tower Supervisor.

Practice instrument approach bookings can be taken from the current time up to 48 hours in advance, except for Essendon. Bookings for Essendon can only be taken from the present day and for the following day, after 0800 hours UTC.

Traffic Managers and Unit Tower Supervisors advise the NCC of variations to airwork bookings and availability. This could be due to emergencies, adjustments to available times or adhoc blackout periods.

Bookings numbers for the Melbourne basin vary dependent on the season however approximately 45-50 requests are submitted on average for each weekday. Bookings are generally approved within an hour, workload permitting. This timing is also dependent upon staffing levels for example, during nightshift periods, no approvals take place until staff resume operations in the morning.

The booking page for Avalon, Essendon and Moorabbin airports is located at https://vic.bookawk.com/.

- The system operates on a 'first in/first served' basis. This ensures that no priority or preference is given to any user on preferred timings.
- Users are required to log into the system and when in the portal are able to see available times at locations. The user is able to plan according to these times at these locations (which includes Essendon, Avalon and Moorabbin). Times when the airspace is not available are blocked out and clearly identifiable.
- Where users provide incorrect or insufficient information, the request is rejected and NCC staff explain to the user why their booking was denied. It is up to the user to resubmit and if done correctly the request is approved. If there is no resubmission of the request, the initial request is rejected with reason.

An example of what users may observe identifying block out periods, booked and available timings is available online[42].

[42] Instrument Training Airwork Bookings Victoria for 19 December 2018, accessed 14 February 2019, https://vic.bookawk.com/day.php?year=2018&month=12&day=19&area=5&room=8

Annex A Acronyms and Abbreviations

Acronym/abbreviation	Explanation
AAPS	Australian Airspace Policy Statement 2018
ACAS	Airborne Collision Avoidance System
ACP	Airspace Change Proposal
Act	Airspace Act 2007
ADS-B	Automatic Dependent Surveillance - Broadcast
AFRU	Aerodrome Frequency Response Unit
Airservices	Airservices Australia
ALA	Aircraft landing area
ALARP	As Low as Reasonably Practicable
AMSL	Above Mean Sea Level
ANSP	Air Navigation Service Provider
ARFF	Aviation Rescue Fire Fighting
ASA	Aviation Safety Advisor
ASIR	Aviation Safety Incident Report
ATC	Air Traffic Control
ATS	Air Traffic Services
ATSB	Australian Transport Safety Bureau
CASA	Civil Aviation Safety Authority
CCO	Continuous Climb Operations
CDO	Continuous Descent Operations
CTA	Control Area
CTAF	Common Traffic Advisory Frequency
CTR	Control Zone
DA	Danger Area
Defence	Department of Defence
DME	Distance Measuring Equipment
ERC	En Route Chart
ERSA	En Route Supplement Australia
FT	Feet
FL	Flight Level
GA	General Aviation
HJ	Sunrise to sunset
IAL	Instrument Approach and Landing
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions
IWI	Illuminated Wind Indicator
km	Kilometre
kt	Knot
LL	Lower Level
NCC	Network Coordination Centre (Airservices Australia)
NOTAM	Notice to air men
NM	Nautical Miles
OAR	Office of Airspace Regulation
PTO	Passenger Transport Operations
RA	Restricted Area
RAPAC	Regional Airspace and Procedures Advisory Committee
RFC	Request for Change
RNAV	Area Navigation

Acronym/abbreviation	Explanation
RPAS	Remotely Piloted Aircraft Systems
SID	Standard Instrument Departure
STAR	Standard Arrival Route
TAC	Terminal Area Chart
TCAS RA	Traffic Collision Avoidance System Resolution Advisory
TCAS TA	Traffic Collision Avoidance System Traffic Advisory
TIFP	Terminal Instrument Flight Procedure
TSAD	Tower Situational Awareness Display
UTC	Coordinated Universal Time
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VNC	Visual Navigation Chart
VTC	Visual Terminal Chart

Annex B Australian Airspace Structure

Class	Description	Summary of Services/Procedures/Rules
A	All airspace above Flight Level (FL) 180 (east coast) or FL245 elsewhere	Instrument Flight Rules (IFR) only. All aircraft require a clearance from Air Traffic Control (ATC) and are separated by ATC. Continuous two-way radio and transponder required. No speed limitation.
B	IFR and Visual Flight Rules (VFR) flights are permitted. All flights are provided with ATS and are separated from each other. Not currently used in Australia.	
C	In control zones (CTRs) of defined dimensions and control area steps generally associated with controlled aerodromes	• All aircraft require a clearance from ATC to enter airspace. All aircraft require continuous two-way radio and transponder. • IFR separated from IFR, VFR and Special VFR (SVFR) by ATC with no speed limitation for IFR operations. • VFR receives traffic information on other VFR but are not separated from each other by ATC. SVFR are separated from SVFR when visibility (VIS) is less than Visual Meteorological Conditions (VMC). • VFR and SVFR speed limited to 250 knots (kt) Indicated Air Speed (IAS) below 10,000 feet (FT) Above Mean Sea Level (AMSL)*.
D	Towered locations such as Bankstown, Jandakot, Archerfield, Parafield and Alice Springs.	• All aircraft require a clearance from ATC to enter airspace. For VFR flights this may be in an abbreviated form. • As in Class C airspace all aircraft are separated on take-off and landing. All aircraft require continuous two-way radio and are speed limited to 200 kt IAS at or below 2,500 FT AMSL within 4 NM of the primary Class D aerodrome and 250 kt IAS in the remaining Class D airspace**. • IFR are separated from IFR, SVFR, and provided with traffic information on all VFR. • VFR receives traffic on all other aircraft but is not separated by ATC. • SVFR are separated from SVFR when VIS is less than VMC.
E	Controlled airspace not covered in classifications above	• All aircraft require continuous two-way radio and transponder. All aircraft are speed limited to 250 kt IAS below 10,000 FT AMSL*, • IFR require a clearance from ATC to enter airspace and are separated from IFR by ATC and provided with traffic information as far as practicable on VFR. • VFR do not require a clearance from ATC to enter airspace and are provided with a Flight Information Service (FIS). On request and ATC workload permitting, a Surveillance Information Service (SIS) is available • within surveillance coverage.
F	IFR and VFR flights are permitted. All IFR flights receive an air traffic advisory service and all flights receive a flight information service if requested. Not currently used in Australia.	
G	Non-controlled	• Clearance from ATC to enter airspace not required. All aircraft are speed limited to 250 kt IAS below 10,000 FT AMSL*. • IFR require continuous two-way radio and receive a FIS, including traffic information on other IFR. • VFR receive a FIS. On request and ATC workload permitting, a SIS is available within surveillance coverage. VHF radio required above 5,000 FT AMSL and at aerodromes where carriage and use of radio is required.

* Not applicable to military aircraft

** If traffic conditions permit, ATC may approve a pilot's request to exceed the 200 kt speed limit to a maximum limit of 250 kt unless the pilot informs ATC a higher minimum speed is required.

Annex C Restricted Areas and Danger Areas Architecture

The declaration of a Restricted Area (RA) creates an airspace of defined dimensions within which the flight of aircraft is restricted in accordance with specified conditions. Clearances to fly through an active RA are generally only withheld when activities hazardous to the aircraft are taking place, or when Military activities require absolute priority.

RAs are generally promulgated at specified times and dates which are detailed in the Designated Airspace Handbook (DAH). However, a Temporary Restricted Area (TRA) may be declared for special events where there may be a public safety issue – such as the Avalon Air Show, the Olympic Games or a police activity that requires control access to airspace in a particular area.

TRAs may have different periods of activation that can occur over a day or multiple days. For example, an air display may require a TRA for a short period of time such as 30-60 minutes. However, an air show, sporting event or military exercise may require a number of hours each day, over a number of days in order for the activity to be completed.

In order to assist with shared use of airspace, all restricted areas have been allocated a "Restricted Area Conditional Status". This status will give an indication as to the likelihood of obtaining a clearance to fly through restricted airspace. NOTAMs may be issued to indicate changes to the RA Conditional Status.

The following definitions apply to the conditional status types of RAs:

- **Conditional Status RA 1**: Pilots may flight plan through the Restricted Area and upon request will be granted a clearance from ATC when the area is active unless a NOTAM indicates that a clearance is not available;
- **Conditional Status RA 2**: Pilots may not flight plan through the Restricted Area or expect a clearance from ATC. However, tracking may be offered through the Restricted Area on a tactical basis by ATC unless a NOTAM indicates that a clearance is not available; and
- **Conditional Status RA 3**: Clearance through the Restricted Area is not available except in a declared emergency.

RAs are mainly declared over areas where Military operations occur however, RAs also cater for communications and space tracking operations.

The declaration of a Danger Area (DA) defines airspace within which activities dangerous to the flight of aircraft may exist at specified times. Approval for flight through a DA outside controlled airspace is not required. The airspace remains available for other aircraft to use or operate within however, pilots are expected to maintain a high level of vigilance when transiting or operating within DAs.

DAs are primarily established to alert aircraft on the following:

- Flying training areas where student pilots are learning to fly and / or gather in large numbers;
- Parachute operations;
- Gliding areas where communications with airborne gliders might be difficult;
- Unmanned aerial vehicle testing or operations;
- Weapon firing and rifle ranges;
- Blasting at mine sites.

Annex D Stakeholders

The following stakeholders were contacted to contribute to this review/study. Amend as required

Organisation	Position
CASA	Various
Jetstar	Head Office
Avalon Airport	Operations Manager
Airservices Australia	Various
Victorian RAPAC	
Little River ALA	Operator
Barwon Heads ALA	Operator
Textron Pty Ltd	Operator
Point Cook Airport	Operator
RMIT Flying Training	Chief Flying Instructor
Torquay Airport	Operator
Geelong Council	
Wyndham Council	
Victorian State Government Department of Environment, Land, Water and Planning	Executive Director, Planning and Heritage

Annex E References

Aeronautical Study of Avalon, Office of Airspace Regulation, Canberra, 2008;

Aeronautical Study of Melbourne, Office of Airspace Regulation, Canberra, 2011;

Airservices Australia; Airwork Online Booking System User Guide Version 3 released on the 25th September 2018;

Airservices Australia; Australia En-Route Chart Low L1, L4 and L8 Effective 8 November 2018 Airservices Australia;

Airservices Australia; Australia Terminal Area Chart Melbourne Effective 8 November 2018 Airservices Australia;

Airservices Australia Visual Navigation Chart Melbourne Effective 8 November 2018 Airservices Australia;

Airservices Australia Visual Terminal Chart Melbourne Effective 8 November 2018 Airservices Australia;

Airservices Australia Departure and Approach Procedures (DAP) East Amendment 157 Effective 8 November 2018 Airservices Australia

Airservices Australia Designated Airspace Handbook Effective 8 November 2018 Airservices Australia

Airservices Australia En Route Supplement Australia (ERSA) Effective 8 November 2018 Airservices Australia

Airservices Australia, Projects (2019, January 10) retrieved 1 February 2019 from http://www.airservicesaustralia.com/projects

Airservices Corporate Plan 2015-2020, (2018, December 4) retrieved 1 February 2019 from http://www.airservicesaustralia.com/publications/corporate-publications/strategic-planning

Airservices Corporate Plan 2018-2019, (2018, December 4) retrieved 1 February 2019 from http://www.airservicesaustralia.com/publications/corporate-publications/strategic-planning

Airservices Instrument Training Airwork Bookings, Procedure, Version 8, effective 8 November 2018, Airservices Australia

Airspace Act 2007 Australian Government, Canberra

Airspace Regulations 2007, Australian Government, Canberra

Australian Airspace Policy Statement 2018, Australian Government, Canberra

Australian Transport Safety Bureau, Aviation safety investigations and report 2013-2018 retrieved 11 December 2018 from http://www.atsb.gov.au/publications/safety-investigation-reports/?mode=Aviation

Avalon Airport Australia Pty Ltd (AAA), Avalon Airport Master Plan 2015

Aviation Safety Incident Reports 2013-2018 Australian Transport Safety Bureau, Canberra

Civil Aviation Regulations 1988 from https://www.legislation.gov.au/Details/F2018C00826 (accessed 20 February 2019)

Civil Aviation Safety Authority, Office of Airspace Regulation (2008). Aeronautical Study of Avalon May 2008

Corporate Integrated Reporting and Risk Information System 2013-2018, Airservices Australia, Canberra

Department of Infrastructure, Regional Development and Cities 2018. Australian Airspace Policy Statement 2018, Canberra. https://www.legislation.gov.au/Details/F2018L01386

Google Earth V 7.3.1.4507. 2018. Victoria http://www.earth.google.com

Annex F Stakeholder Consultation / Feedback Register

The following sections are the consolidation of comments or responses received from the draft document, the OAR's response and disposition to actions to the Avalon Airspace Review.

Stakeholder and Reference

Airline Operator: Section 6.1 ATSB Aviation Safety Incident Reports

Comment

The report infers that the crew of the A320 advised "It was Class E airspace" when queried. It was ATC who provided that comment to the A320 crew and this should be clarified within the report.

CASA Response and disposition

The comment is noted and the reference in Section 6.1 has been amended to indicate that ATC provided the comment to the A320 crew.

Stakeholder and Reference

RMIT Flight Training: Section 3.1 Avalon aerodrome facilities, Section 4 Airspace, Section 5 Traffic, Section 8 Key Issues, Recommendations and Observations.

Comment

RMIT Flight Training would like to be involved in any ongoing reviews on alternative Airspace designs.

The recommendation to remove Class E airspace is of concern to us, as we expect that alternative Airspace Classes will limit our access to the airspace we currently use, and lead to an inequitable use of the AV Airspace.

At the moment we are able to operate within the AV Airspace, East of the RWY centreline up to 4500ft. This allows unrestricted use of Class E and D Airspace (unless ATC requires otherwise for a short period i.e. IFR Instrument Approach A/C). We currently operate 17 A/C from PCK and have committed to purchasing 29 new A/C in the next 18 months. We expect that the Fleet numbers will continue to grow over the next few years and expect to acquire a further 10 A/C in the second half of 2022.

The Airspace in the Melbourne Basin is congested and this will only be compounded in the next few years as we, and other organisations expand. We already have to schedule VFR Training sorties around Airspace availability, and do not want to see this anymore restricting than it currently is. RMIT uses the Airspace between PCK and AV, both in Class D, E and G between to two Aerodromes, which is not a large area. For IFR training we use all the Navaids in the ML area and would not like to be further restrictions in accessing Navaids for Training. The current system is limiting enough!.

It is not just Airspace that is an issue, it is availability/access to Nav aids for Training. With the last round of Navaid closures there is 1 NDB, 1 VOR, 3 ILS's (one of which is ML and is not available and EN ILS may not be available depending on the RWY configuration at ML). This leads to Airspace congestion as all the A/C are pushed to very few Aids, putting strains on ATC and Operators.

General Aviation needs Airspace in which to operate and it vital that the Regulators service the needs of the broader Aviation community, not just Airlines.

CASA Response and disposition

The comments are noted and no changes to the intent of the recommendations will be made. However, in relation to recommendations 1 and 2 regarding the airspace classification and airspace design, the OAR has added a 12-month period from the publication of this final report for the ACP to be submitted.

A proposal to change the airspace classification and architecture will require evidence of stakeholder consultation from the proponent.

Letters of agreement between airspace users and the ANSP have previously been established ensuring equitable access to the airspace, efficient use of the airspace and enhancing safety.

The availability of navigation aids for flying training purposes and the limitations within the current on the flying training organisation is noted. The expansion of the training fleet numbers and operations within the review area will be monitored by the OAR.

Stakeholder and Reference

Australian Airline Pilots' Association (AusALPA): Section 3.9 Terminal Instrument Flight Procedures; Section 4 Airspace; Section 8 Key Issues, Recommendations and Observations.

Comment

Full response from the stakeholder is held on record. Extracts from their submission follows.

AusALPA welcomes the opportunity to contribute feedback to the latest Avalon Airspace Review.

Broadly speaking, our members inform us that the Avalon airspace has been an inefficient and risk prone mix of airspace classifications that increase the potential for separation loss and that improvements are necessary and preferable.

AusALPA supports all 5 of the recommendations in the draft preliminary airspace review for Avalon airspace.

In considering our positions, we are cognisant of the existence of a wide variety of airspace user in the vicinity of Avalon.

Airspace Classification

AusALPA views Class E airspace as controlled airspace for IFR aircraft and uncontrolled airspace for VFR aircraft (akin to Class G airspace). Generally speaking, we do not favour Class E airspace when compared to Class C airspace. This is especially the case for lower level use of Class E, due to a greater prevalence of VFR aircraft in lower airspace.

Allowing VFR aircraft to put themselves into situations of closer proximity to IFR aircraft during higher workload phases of IFR flight is a measure of disregard towards the VFR aviation community, not a benefit to them. Of course, there is also no justification for increasing the collision risk to IFR traffic as well.

There exists a great variety of examples that demonstrate that Class E over D is an unsatisfactory airspace solution and how it enhances, rather than mitigates, unsafe circumstances. Furthermore, from a safety perspective, relying on "see and avoid" can never reduce collision risk to ALARP.

AusALPA strongly supports recommendation 1 from the draft airspace review report.

Airspace Containment & Continuous Descent Operations (CDO)

AusALPA is concerned that the Instrument Flight Procedures (IFPs) at Avalon are not compliant with MOS173 with regards to PBN and airspace containment. Containing approaches wholly within or wholly outside of controlled airspace creates direct safety benefits, particularly through reduction in pilot workload during the critical phases of flight. AusALPA understands that this is an underpinning philosophy to IFP airspace containment policies for MOS173.

We note that the review is proposing a recommendation to review and implement changes to Avalon airspace architecture based on PBN airspace criteria. However, whilst we strongly support this, we also want any such review to remain cognisant of the similar intent of Continuous Descent Operations (CDO) and apply such intent accordingly.

Any discussion of airspace containment must necessarily include consideration of operational techniques, most relevantly, continuous descent approaches (CDA) in Australian terminology or, more broadly, CDO. ICAO Doc 9931 Continuous Descent Operations provides extensive guidance on CDO, particularly in regard to stakeholder issues and the interface with ATS.

AusALPA strongly supports recommendation 2.

Recommendations 3 to 5

AusALPA recognises that standardisation can create safety benefits through reduced confusion and ease of expectation and that these benefits underpin safety initiatives such as the adoption of Standard Operating Procedures (SOPs).

AusALPA notes that recommendations 3, 4 and 5 (of the draft review) all ultimately seek to provide safety and efficiency benefits to the aviation community through the standardisation of the published aeronautical information for Avalon, and by ensuring that the published instrument approach and landing procedures for Avalon are compliant with ICAO PANS-OPS.

AusALPA supports recommendations 3, 4 and 5.

CASA Response and disposition

Class E airspace has been identified as an issue within this review. Changes to the airspace classification must follow the ACP process and involve stakeholder consultation. The does not specify which airspace classification is to be applied.

The identified instrument flight procedure matters have been forwarded to the appropriate section with CASA for their attention. A redesign of the airspace architecture must include PBN criteria which incorporates instrument flight procedures. The review states that the current non-compliance of published instrument flight procedures, does not mean the procedures are unsafe.

Comments regarding recommendations 3, 4 and 5 are noted.

Stakeholder and Reference

Recreational Aviation Australia (RAAus), Section 7.2 Airspace Users

Comment

The third dot point includes the comment to replace Class E airspace with Class D.

RAAus members can currently operate in Class E provided the aircraft are fitted with transponder or ADS-B, however this is not the case with Class D airspace, which requires a Pilot Certificate holder to also hold current CASA Licence and medical.

RAAus requests reconsideration of this decision, as this would force RAAus pilots to operate below the lower limit of the Class D step. possibly representing unsafe heights to operate.

This should also be considered in conjunction with the present VTC height requirements of:

Tracking Point Ormond - Laverton BoM Tower, cloud permitting of:

1. Fly eastbound at 1500FT.

2. Fly westbound at 2000FT.

CASA Response and disposition

The comments are noted. No additional change to the recommendations made.

For clarification, Section 7.2 of this review relates to the feedback received by the OAR from stakeholders who are airspace users. The views expressed are from these stakeholders and do not necessarily represent the airspace solution to be determined by the OAR. Changes to the airspace classification must follow the ACP process and include stakeholder engagement.

The review did find that there are risks associated with the current airspace classification and the recommendation was made for Airservices Australia to submit an ACP to remove Class E airspace and ensure the airspace classification aligns with the appropriate level of air traffic service.

Stakeholder and Reference

Details withheld as requested.

Comment

Regarding your recommendations about the DAH not being consistent on displaying Class E on aeronautical charts, recommendations 4, 3 and 1 would be most sufficient.

CASA Response and disposition

The comments are noted. No additional change to the recommendations made.

The recommendations 3 and 4 respectively made for issues within the review area (Avalon) and outside the review area (the rest of DAH). It was determined that these should be separated however the comment is noted.

Recommendation 5 relates to the design criteria of the published instrument approach and landing procedures at Avalon. This is a separate issue from DAH and the recommendation remains unchanged.

Stakeholder and Reference

Victorian SEF (formerly Victorian RAPAC). Report and recommendations.

Comment

Thank you for the extension of time to submit after the Victorian SEF (formerly RAPAC) meeting today.

The SEF in committee fully endorsed the 5 recommendations made at 1.2 of the Report, exactly as they stand.

The SEF also agrees that Class D is appropriate.

The SEF commends you on your work.

It was noted that there may be effects on the airspace boundaries and these could perhaps affect a glider route. Chris Thorpe will be providing me a brief which I will forward to you as early consideration.

CASA Response and disposition

The comments are noted.

The airspace change process will require consultation where matters such as gliding routes, can be raised and addressed. The OAR will look forward to receiving such information for consideration.

Recommendation 1 and recommendation 2 have been amended to include a 12-month period from the publication of the final report. No other changes to the recommendations have been made.