Williamtown SAP

Aeronautical Limitations and Bird Strike Report

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Contents

Executive Summary **1**
1 Introduction **2**
1.1 Background and Context 2
1.2 Williamtown SAP Purpose 2
1.2.1 Objectives 2
1.3 Limitations 2
1.4 Williamtown Special Activation Precinct Background 3
1.5 Williamtown Special Activation Precinct Location 4
1.5.1 SAP Investigation Area 5
1.6 Williamtown Aeronautical Limitations Context 5

2 Legislative Framework **7**
2.1.1 Williamtown Airport Precinct Governance 7
2.1.2 National Planning Framework 7
2.1.3 National Airport Safeguarding Framework 7
2.1.4 Civil Aviation Act 1998 & Civil Aviation Safety Regulations 1998 8
2.1.5 Airports Act 1996 8
2.1.6 Defence Act 1903 (Cth) and Defence Regulation 2016 9
2.1.7 State Planning Framework 9
2.1.8 Local Planning Framework 9
2.2 NASF Implementation - RAAF Base Williamtown 10
2.2.1 Bird Strike 11
2.2.2 Extraneous Lighting 12
2.2.3 Limitation or Operations Surface Map / Height Trigger Map 14
2.2.4 Managing the Risk of Building Generated Windshear and Turbulence at Airports 15
2.3 Constraints and opportunities 16
2.3.1 Constraints 17
2.3.2 Opportunities 17

3 Williamtown SAP Structure Plan **18**
3.1 Proposed Structure Plan 18
3.2 Aeronautical assessment of the structure plan 19
3.2.1 Bird Strike 19
3.2.2 Extraneous Lighting 20
3.2.3 Limitation or Operations Surface Map / Height Trigger Map 22
3.2.4 Managing the Risk of Building Generated Windshear and Turbulence at Airports 23
3.3 Discussion 24
3.4 Recommendations for the Williamtown SAP planning framework 25
3.4.1 Planning approval pathway 25
3.4.2 Planning controls 25

4 Conclusion **29**

Appendices

Appendix A - Aviation Figures

Figures

Figure 1 - Williamtown Special Activation Precinct Visions
Figure 2 - Williamtown Special Activation Precinct Investigation Area
Figure 3 - Bird Strike Zone Map (Source: Port Stephens DCP 2014–B6, overlaid with SAP boundary and investigation area boundary)
Figure 4 - Extraneous Lighting Map 1 (Source: Port Stephens DCP 2014–B6, overlaid with SAP boundary and investigation area boundary)
Figure 5 - Extraneous Lighting Map 2 (Source: Port Stephens DCP 2014–B6, overlaid with SAP boundary and investigation area boundary)
Figure 6 – Obstacle Limitation Map (Source: Port Stephens DCP 2014–B6, overlaid with SAP area and investigation area boundary)
Figure 7 - Windshear Assessment Trigger Zones Map (Source: Aurecon 2020, overlaid with SAP boundary and study area boundary)
Figure 8 - Elevation View of generic Windshear Assessment Trigger Zone 1:35 surface (looking down a runway centreline) (Source: Aurecon 2020)
Figure 9 - The 7 SAP Principles which governed the master plan
Figure 10 – Williamtown Special Activation Precinct Structure Plan (Source: Hatch Roberts Day (2022) Williamtown SAP - Structure Plan)
Figure 11 – Zoomed in Bird Strike Zones Map (Source: Port Stephens DCP 2014–B6, overlaid with SAP Structure Plan Boundary)
Figure 12 – Zoomed in Extraneous Lighting Map 1 (Source: Port Stephens DCP 2014–B6, overlaid with SAP Structure Plan Boundary)
Figure 13 – Zoomed in Extraneous Lighting Map 2 (Source: Department of Defence, overlaid with SAP Structure Plan Boundary)
Figure 14 – Zoomed in Obstacle Limitation Map (Source: Port Stephens DCP 2014–B6, overlaid with SAP Structure Plan Boundary)
Figure 15 – Zoomed in Windshear Assessment Trigger Zones Map (Source: Aurecon 2020, overlaid with SAP Structure Plan Boundary)

Tables

Table 3-1 Aviation Planning Controls Williamtown SAP 26

Executive Summary

NSW Department of Planning and Environment (DPE) has engaged Aurecon to participate in a strategic planning process to support the Williamtown Special Activation Precinct (SAP) Master Plan. The project has involved the preparation of numerous engineering technical studies to inform the future planning and development of the precinct.

A structure plan is being progressed, centred around the existing Williamtown Airport Precinct, which includes Newcastle Airport, Williamtown RAAF base and Astra Aero lab. The precinct incorporates a core development area south of the existing airport. Initial stages of the SAP development are to incorporate aerospace, defence, freight and logistics and research and development industries around the Northern Precinct. During later stages of the development, the Southern Precinct will focus on commercial centres, advanced manufacturing, light industrial and research and development.

This report outlines the key aeronautical constraints that are set to influence land use and future development within the Williamtown SAP. It provides a high-level analysis of these constraints as they apply to the structure plan, including illustrative maps and overlays.

The report concludes with recommendations for adoption in the Williamtown SAP planning framework, which will replace local planning instruments to allow for streamlined development approval pathways across the site. Aviation planning controls and safeguards are driven by the National Airports Safeguarding Framework (NASF), existing controls within the local planning instruments and have been informed by the precedents set in Western Sydney at the Aerotropolis.

The recommendations outlined at Section 4 would ensure that the relevant aeronautical safety considerations are addressed during more detailed land use and development planning of the SAP area, including ongoing stakeholder engagement. The Activation Precincts State Environmental Planning Policy and Master Plan and Delivery Plan will reflect all such aviation safeguarding controls, ensuring compatibility between the SAP and airport operations into the future.

1 Introduction

1.1 Background and Context

DPE has engaged Aurecon to prepare a suite of engineering technical studies, including an Aeronautical Limitations & Bird Strike Assessment (this report), to support the Williamtown SAP within Williamtown NSW. The study has included a review of the existing aviation data, aviation policy review and identification of high-level constraints and opportunities arising for Williamtown SAP. These have informed the finalisation of the preferred structure plan and recommendations for the Williamtown SAP Master Plan performance criteria.

1.2 Williamtown SAP Purpose

This report outlines the aviation constraints and aeronautical safety considerations that apply to the Williamtown SAP. It has been produced as part of a strategic and master planning process for the precinct led by DPE, supported by a team of technical, engineering and environmental specialists. Due to Williamtown SAP's proximity to the Williamtown Airport Precinct, including Newcastle Airport, Williamtown RAAF base and Astra Aerolab, aviation safety and the protection of airport operations are key considerations for the SAP.

The purpose of this report is to:

- Outline the relevant national policies that guide aviation and airport operations safeguarding, and any other applicable planning legislation that applies to the Williamtown SAP
- Explain the current management and governance arrangements in place for the Williamtown Airport Precinct
- Outline opportunities and constraints arising for the Williamtown SAP out of the National Airports Safeguarding Framework (NASF) and any relevant legislative requirements
- Provide recommendations to inform future land use and planning decisions on SAP lands impacted by aviation safeguarding controls
- Support future streamlined planning processes for the Williamtown SAP under the Activation Precincts SEPP, master plan and delivery plan

1.2.1 Objectives

The objectives of the Williamtown Special Activation Precinct are as follows:

- To grow Williamtown's established strength as a national and international defence hub and support expansion and clustering of the emerging aerospace industry.
- To attract footloose defence, aerospace and advanced manufacturing businesses.
- To focus on employment and investment opportunities associated with its strategic location to the Williamtown Aerospace Precinct.
- To provide a coordinated approach to site constraints, including flooding, drainage and Per-polyfluoroalkyl substances (PFAS) contamination.
- To coordinate precinct planning to resolve land use conflicts and ensure highest and best use.
- To protect the natural environment and encourage sustainable use of land for the benefit of the community.

1.3 Limitations

The limitations associated with this report are detailed below:

- This assessment has drawn from previously prepared aeronautical constraints mapping prepared by Port Stephens Council (2015).
- No aviation modelling has been undertaken for the purpose of this assessment.
- Aircraft noise is addressed in a separate report (Williamtown SAP Planning Considerations for Noise Report by ERM Consulting).

1.4 Williamtown Special Activation Precinct Background

DPE, Department of Regional NSW (DRNSW) and Regional Growth NSW Development Corporation (RGDC) have worked together to establish Special Activation Precincts (SAPs) across the state. This joint government agency initiative is an innovative approach to plan and deliver infrastructure projects in strategic regional locations in NSW. These SAP programs are funded by the $4.2b Snowy Hydro Legacy Fund (SHLF), which is managed by DRNSW. Investment in these specific areas of Regional NSW is aimed to drive significant economic development and jobs creation in regional areas. It is part of the NSW government's 20-Year Economic Vision for the state. Once of the core drivers is that there is limited amount of readily developable land in NSW. To resolve this, each SAP is designed to resolve environmental, drainage and other development constraints in a coordinated precinct scale approach as opposed to a site by site basis.

The Williamtown SAP's vision is based on six key visions as shown in **Figure 1**. The strategic need for growth in the Hunter Region involves:

- **The Place** – leveraging the vicinity of the RAAF and civil aviation operators attract local employment and commercial investment;
- **Economy and Industry** - facilitate development of additional employment land for Defence and aerospace industries;
- **Environment and Sustainability**– regionally coordinated approach to flooding, water cycle management and contamination while preserving and enhancing the natural environment;
- **Infrastructure and Connectivity** – providing infrastructure to resolve development constraints to reduce investment barriers to entry and enable effective connections to nearby Hunter Region infrastructure;
- **Connection to Country** – To preserve, respect and integrate Aboriginal cultural heritage, particularly the Worimi people; and
- **Social and Community Infrastructure** – Enabling high skill employment, innovation, education and skill training opportunities.

Figure 1 - Williamtown Special Activation Precinct Visions

1.5 Williamtown Special Activation Precinct Location

Williamtown is located approximately 13.5km north of the Newcastle CBD in New South Wales, within the Hunter Region.

The Hunter Region has the largest share of both regional population growth and regional employment and is in the state's fastest growing corridor (Sydney to Newcastle) (*Hunter Regional Plan 2036*, Department of Planning & Environment 2016). Greater Newcastle is the centrepiece of the Hunter Region with 95% of residents living within 30 minutes of the strategic centre.

Newcastle Airport and the Port of Newcastle are recognised as global gateways targeted to enable the region and the state to satisfy the demand from growing Asian economies for products and services associated with education, health agriculture, resources and tourism (Hunter Regional Plan, 2036). The Hunter Regional Plan 2036 identifies that the region's ongoing economic prosperity will depend on its ability to capitalise on its global gateway assets and as such cites a need to expand the capacity of Newcastle Airport and the Port of Newcastle.

The Williamtown SAP is focused on leveraging employment and investment opportunities associated with its strategic location to the Williamtown Aerospace Precinct (WAP) which includes:

- RAAF Base Williamtown which F35 Australia Joint Strike Fighter (JSF) fleet is based in. The area has also been affected by Per- and Polyfluoroalkyl Substances (PFAS) contamination associated with past activities conducted at the Williamtown RAAF Base;
- Newcastle Airport which is jointly owned by Port Stephens Council and Newcastle City Council, leased from the Department of Defence and shares their airport runway with RAAF Base Williamtown;
- The Defence and Aerospace Related Employment Zone (DAREZ) which is intended for the development of aerospace and defence specific industries in close proximity to the adjoining Newcastle Airport;

- Bushland vegetation is prominent in the area with some areas containing threatened flora and fauna species as well as important wetland areas;
- Rural and agricultural lands;
- Small rural and low density residential clusters including the township of Salt Ash, Williamtown and Fullerton Cove;
- Commercial and light industrial clusters associated with the airport and RAAF Base along key road corridors;
- The Tillgery State Conservation Area;
- The Grahamstown Dam is located to the north of Fullerton Cove; and
- The study area is also crossed by several transport infrastructure assets including roadways.

1.5.1 SAP Investigation Area

The broader Williamtown SAP investigation area covered an area of approximately 11,408ha. The natural environment of the area comprises low-lying coastal land on the edge of Fullerton Cove and Stockton Beach of land within Port Stephens local government area (LGA). It is centred around the WAP including Newcastle Airport and Williamtown RAAF Base.

The SAP investigation area boundary and key features within the investigation area are shown in **Figure 2**.

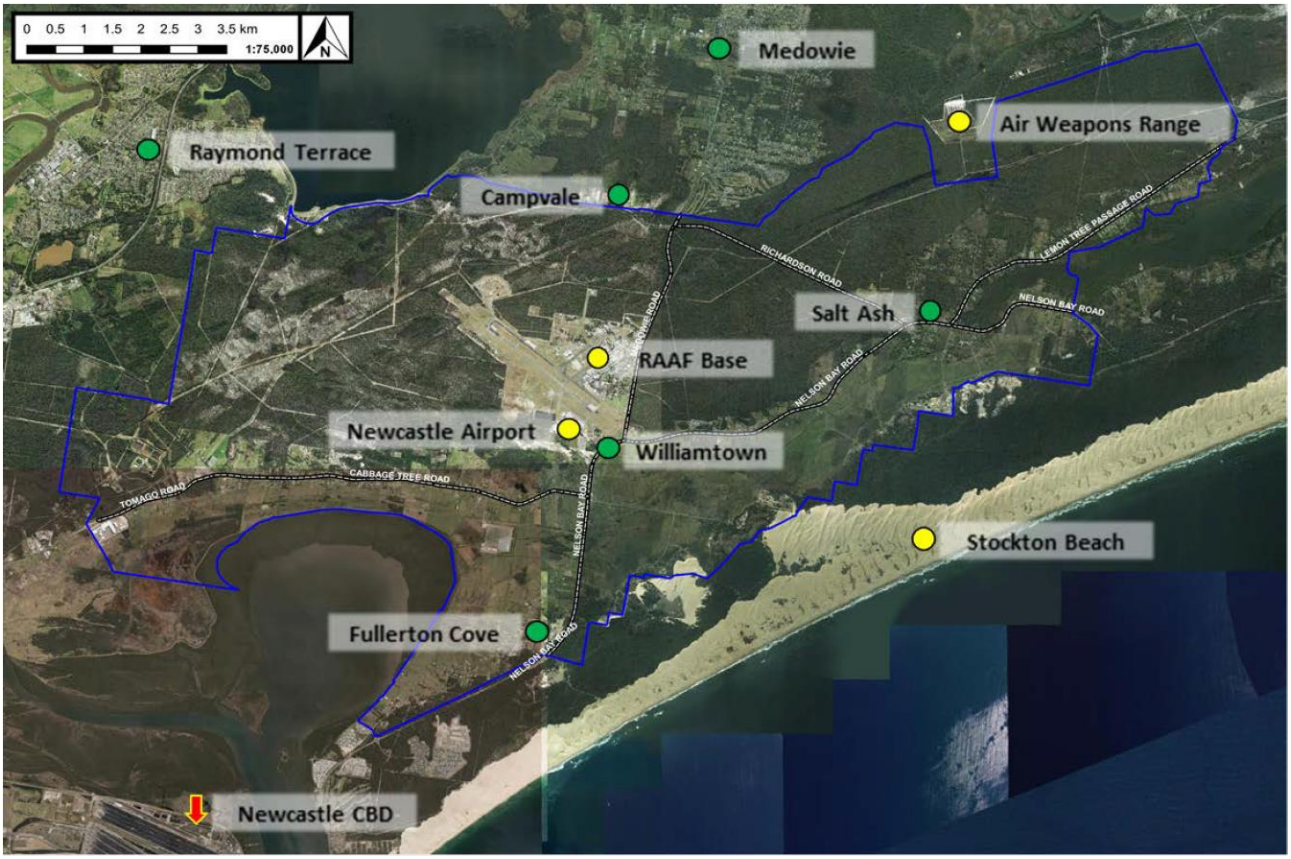

Figure 2 - Williamtown Special Activation Precinct Investigation Area

1.6 Williamtown Aeronautical Limitations Context

The protection of airport operations is an important consideration in future land use planning in close proximity to active airfields. The Williamtown SAP has specific aeronautical constraints related to the operation of WAP. Future development must support compliance with airspace protection requirements and

off-airport development activity must not compromise aviation operations or safety. This study will identify the aviation constraints associated with the joint military and civil airbase and help optimise the highest and best use of the developable land contained within the SAP.

There are a number of activities that can limit or prevent the airport's use, such as penetration of airspace, but other examples include incompatible land uses, activities, and related hazards. The National Airports Safeguarding Framework (NASF) was developed in 2012 to govern aviation safety throughout Australia. The NASF consists of a set of guidelines with nine policy subjects outlined at 2.1.3 and addressed in Section 4. The NASF guidelines drive specific aeronautical constraints relevant to the Williamtown SAP.

At the local level, Port Stephens Council local environmental planning instruments (EPIs) – the Local Environment Plan 2013 and Development Control Plan 2014 – contain local land use planning and development controls that pertain to the WAP and surrounds, notwithstanding that these EPIs will be superseded by new site-specific controls under the Activation Precincts SEPP. Pre-existing planning and development controls apply to development that is situated within defined areas as outlined at 2.2

2 Legislative Framework

Section 2 explains the current management and governance arrangements in place for the WAP and details the relevant national policies that guide aviation and airport operations safeguarding. It also considers other applicable planning legislation relevant to the Williamtown SAP

The NASF is applicable to WAP and the SAP, and is a key driver to the constraints, opportunities and recommended controls for consideration in future land use planning of the SAP. The policies discussed in this section highlight the importance of safeguarding the ongoing operations of WAP in the SAP planning framework.

2.1.1 Williamtown Airport Precinct Governance

Newcastle Airport is jointly owned by Port Stephens Council and Newcastle City Council. The airport is leased from the Commonwealth Department of Defence (Defence) and shares an airport runway with RAAF Base Williamtown, a military base owned and operated by Defence.

Newcastle Airport does not fall within the provisions of the federal *Airports Act 1996* as it operates under a direct lease agreement from the Department of Defence. Newcastle Airport has a Master Plan in place and some development applications require the consent of the Department of Defence, as well as the necessary statutory local and state approvals.

Department of Defence, as a key Commonwealth Government Agency are able to self-assess and self-determine their own development activities in accordance with stringent environmental assessment and management requirements under the *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)* (EPBC Act). This process at times involves the Federal Department of Environment (Department of Agriculture, Water and the Environment or DAWE) when required via referrals and controlled activities under the EPBC Act.

2.1.2 National Planning Framework

2.1.3 National Airport Safeguarding Framework

The NASF, developed by the National Airports Safeguarding Advisory Group (NASAG), was first considered by all Australian governments at the Standing Council on Transport and Infrastructure meeting on 18 May 2012. The NASF offers a nationally consistent approach to ensure an appropriate balance is maintained between the social, economic and environmental needs of the community and the effective use of airports.

The NASF is a national land-use planning framework that aims to:

- Improve community amenity by minimising aircraft noise-sensitive developments near airports; and
- Improve safety outcomes by ensuring aviation safety requirements are recognised in land-use planning decisions.

The NASF applies at all airports in Australia and affects planning and development around airports, including development activity that might affect windshear, lighting, penetrate operational airspace or affect navigational procedures for aircraft. The purpose of the NASF is to enhance the current and future safety, viability and growth of aviation operations, by supporting and enabling:

- The implementation of best practice in relation to land use assessment and decision making in the vicinity of airports and strategic helicopter landing sites;
- Assurance of community safety and amenity near airports and strategic helicopter landing sites;

- Better understanding and recognition of aviation safety requirements and aircraft noise impacts in land use and related planning decisions;
- The provision of greater certainty and clarity for developers and land owners;
- Improvements to regulatory certainty and efficiency; and
- The publication and dissemination of information on best practice in land use and related planning that supports the safe and efficient operation of airports and strategic helicopter landing sites.

The NASF currently comprises nine guidelines which have been approved by NASAG:

- Guideline A: Measures for Managing Impacts of Aircraft Noise;
- Guideline B: Managing Risks of Building Windshear and Turbulence at Airports;
- Guideline C: Managing Risks of Wildlife Strike in the Vicinity of Airports;
- Guideline D: Managing Risks Associated with Wind Turbines;
- Guideline E: Managing Risks of Distractive Lighting in Vicinity of Airports;
- Guideline F: Managing Risks of Intrusion into Protected Airspace;
- Guideline G: Protecting Aviation Facilities – Communications, Navigation and Surveillance;
- Guideline H: Protecting Strategically Important Helicopter Landing Sites; and
- Guideline I: Managing the Risks in Public Safety Areas at the ends of Runways.

Guidelines D, H and I have not been discussed for the Williamtown SAP for the following reasons:

- **Guideline D:** Wind Turbines will not be a permissible development type for Williamtown SAP
- **Guideline H:** There are no Strategically Important Helicopter Landing Sites within Williamtown SAP lands
- **Guideline I:** There is currently no Public Safety Area mapped for Williamtown Airport Precinct. An area could be identified in future and any such area would need to be defined in close consultation with Defence.

Importantly, it is the responsibility of each jurisdiction to implement the NASF into their respective planning systems. Each state and territory will align their respective planning processes with the NASF principles and guidelines, as appropriate.

2.1.4 Civil Aviation Act 1998 & Civil Aviation Safety Regulations 1998

National aviation safety rules are contained within the *Civil Aviation Act 1988, Civil Aviation Regulations 1988* (CAR)*, Civil Aviation Safety Regulations 1998* (CASR) and associated legislative instruments. These legislative instruments are administered by the Civil Aviation Safety Authority (CASA), a government body that regulates Australian aviation safety. CASA was established as an independent statutory authority in July 1995 and works with the Department of Infrastructure, Transport, Regional Development and Communications and Airservices Australia to achieve safe skies for all.

This federal framework continues to apply in order to maintain, enhance and promote safety for civil aviation for the RAAF Base Williamtown and Newcastle Airport. Under this legislation referral may still be required if development cannot demonstrate compliance with the recommended aviation specific planning controls detailed in Section 4 of this report.

2.1.5 Airports Act 1996

Leased federal airports are subject to a planning framework in the *Airports Act 1996* (the Airports Act). As part of the planning framework, airports are required to prepare a Master Plan that incorporates an Environment Strategy. Airport lease requirements which subjects leased federal airports to rules and procedures regarding their leases with the Commonwealth. Provisions relating to airport leases are located within Part 2, Divisions 2–8 of the Airports Act 1996.

2.1.6 Defence Act 1903 (Cth) and Defence Regulation 2016

The Defence Act provides for the Naval and Military Defence and Protection of the Commonwealth and of the States. The Act prescribes the control, administration, constitution and service of the Australian Defence Force. The Defence Regulation 2016 (the Regulation) is made under the Act. The Regulation enables the declaration of a defence aviation area.

> *(1) The Minister may, by legislative instrument, declare an area of land, sea or airspace in or adjacent to Australia to be a defence area for use for a defence purpose.*

Part 11A of the Defence Regulations, 2016 provides a legal framework for controlling activities which may be dangerous to aviation around twelve declared Defence Aviation Areas (DAA).

RAAF Base Williamtown is planned to become a DAA. As such, regulations will apply to permanent structures such as buildings and communication towers, and temporary structures such as cranes within approximately 15 kilometres of DAA. Vegetation, including trees and plants used for landscaping, and gas plumes emanating from an exhaust stack will also be governed by the DAA. The DAA regulations will also apply to any object hazardous to aircraft or aviation-related communications, navigation or surveillance regardless of whether the DAA height controls are triggered.

2.1.7 State Planning Framework

NSW Ministerial Direction 3.5 Development Near Regulated Airports and Defence Airfields

Under Section 9.1 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) the Minister for Planning may direct a public authority or person having functions under the EP&A Act or an environmental planning instrument to exercise those functions at or within such times as are specified in the direction. In the NSW these are known as Ministerial Directions.

Ministerial Direction 3.5 applies to all relevant planning authorities to ensure the effective and safe operation of regulated airports and defence airfields, specifically to ensure that operations are not compromised by development that constitutes an obstruction, hazard or potential hazard to aircraft flying in the vicinity. If development does occur on noise sensitive land, appropriate noise mitigation measures are to be incorporated so that the development is not adversely affected by aircraft noise.

The direction also specifies requirements that planning proposals must;

- consult with the relevant airport lessee/operator;
- take into consideration the operational airspace and any advice from the lessee/operator of that airport;
- for land affected by the operational airspace, prepare appropriate development standards, such as height controls; and
- not allow development types that are incompatible with the current and future operation of that airport.

The above requirements are applicable to both Commonwealth leased airports and Department of Defence. The direction contains noise requirements that a planning proposal must include a provision to ensure that development meets Australian Standard 2021 – 2015, Acoustic- Aircraft Noise Intrusion – Building siting and construction with respect to interior noise levels. This is discussed in detail in the Noise Assessment (ERM).

2.1.8 Local Planning Framework

Newcastle Airport Master Plan 2036

Newcastle Airport's Master Plan 2018 details the 2036 Newcastle Airport Vision and outlines expansion plans and proposed developments. The Master Plan describes the airfield, terminal, landside, ground transport and aviation support facilities needed to cater for increased passenger growth. It also details

operational considerations relevant to this report such as bird strike, extraneous lighting and airspace height restrictions to ensure the ongoing safety and operation of both the military and civil airbase.

Port Stephens Council Development Control Plan (DCP) 2014

The Port Stephens DCP guides development in accordance with the Port Stephens Local Environmental Plan and with other development standards as applied throughout the LGA. Section B of the DCP provides general controls whilst Section D provides site specific controls for specific areas.

Section B6 of the DCP (Williamtown RAAF Base – Aircraft Noise and Safety) outlines overarching controls relating to aircraft operations, aircraft noise, bird strike, extraneous lighting and airspace height limitations. The DCP includes mapping relevant to each aviation safeguarding issue. These maps have been included in this report and are to be adopted in the Williamtown SAP Master Plan following consultation with Defence.

Section D15 of the DCP relates solely to development within the Williamtown Defence and Airport Related Employment Zone (DAREZ). The DAREZ is located within the Williamtown SAP and applies to land zoned B6 Business Park, south of the Newcastle Airport terminal. D15 includes development controls relating to Lodgement requirements, Setbacks, Street layout, Drainage and water quality, Flooding and Parking (D15.A-D15.F). These controls will be considered in the detailed design of the SAP.

Section D15.G of the DCP relates specifically to Airport operational requirements. The objective of controls under D15.G is to:

- Ensure that the operational needs of the Williamtown RAAF Base are provided consideration in the development of adjoining DAREZ lands.

The controls given by D15 are:

  - D15.11 – **General Requirements:** DCP B6 provides general requirements relating to the aircraft noise planning area, bird strike zone and the Williamtown RAAF Base Obstacle Limitations or Surface Map and Height Trigger Map
  - D15.12 – **Radio Emitting Devices:** Electromagnetic radiation or radio emitting devices are not to interfere with airspace operations. Note: B6 – Williamtown RAAF Base – Aircraft Noise and Safety requires consideration to RAAF Operations
  - D15.13 – **Navigational Markers:** Development provides consideration to navigational markers by not interfering with their intended purpose. Note: B6 – Williamtown RAAF Base – Aircraft Noise and Safety requires consideration to RAAF Operations
  - D15.14 **– Lighting**: External lighting considers aircraft/control tower Note: B6 – Williamtown RAAF Base – Aircraft Noise and Safety requires consideration to RAAF Operations

Port Stephens Local Environmental Plan 2013

The Port Stephens Local Environmental Plan (PSLEP 2013) applies to the SAP and is the principal planning instrument governing development for land within the Port Stephens LGA.

The Williamtown SAP is currently zoned for a mix of purposes under PSLEP 2013 including:

- B7 – Business Park
- RU2 – Rural Landscape and
- SP2 – Special Purpose zone.

2.2 NASF Implementation - RAAF Base Williamtown

Current NASF implementation has been achieved for a number of the guidelines, as discussed in this section of the report. The guidelines are represented in planning legislation in the Port Stephens Council Development Control Plan 2014. A summary of the requirements are discussed below.

2.2.1 Bird Strike

Wildlife strikes can cause major damage to aircraft and reduction of safety. The consequences of wildlife strike can be influenced by the number and size of wildlife involved, phase of flight and the aircraft part hit by the wildlife. Land use planning decisions and the way in which existing land use is managed in the vicinity of airports can significantly influence the risk of wildlife hazards.

NASF Guideline C provides guidance for actions for existing developments, and actions for proposed, or changes to existing developments, based on the land use (agriculture, conservation, recreation, etc.) and the buffer zone category, as detailed below.

The current Port Stephens Council DCP in B6 includes an objective “to ensure that the operational needs of the Williamtown RAAF Base are considered”.

The DCP details the three birdstrike zones which are at varying distance from the airport runway as shown in **Figure 3**, which includes the Williamtown SAP boundary. Section B6.6 of the DCP (Figure BN) includes the three groups of land uses for each birdstrike zone that are to be avoided, and these are listed below:

- Group A - 3km radius. The following development types are avoided within 3km from airport runways:
  - Intensive plant agriculture (turf farm)
  - Horticulture (fruit tree farm)
  - Livestock produce industry (fish processing / packing plant)
  - Intensive livestock agriculture (piggery)
  - Environmental protection works (wildlife sanctuary-wetland)
  - Recreation facility - major (showground)
  - Agricultural produce industry (food processing plant)
  - Waste or resource management facility (food / organic waste facility)
  - Waste disposal facility (putrescible waste facility – landfill /transfer station)
- Group B – 3-8km radius. The following development types require a waste management report which demonstrates that the development will not increase the risk of bird strike if they are located within 3-8km of an airport runway:
  - All Group A uses (above)
  - Intensive livestock agriculture (cattle, dairy or poultry farm)
  - Environmental protection works (wildlife sanctuary - dryland)
  - Recreation facility - major (racecourse, sports stadium, theme park)
  - Recreation facility – outdoor (golf course, park, playground, sports)
  - Camping Ground
  - Waste disposal facility (Non-putrescible waste – landfill /transfer station)
  - Sewage treatment plant (Sewage / waste water treatment facility)
- Group C – 8-13km radius. For Group C all developments need to demonstrate compliance with B6.7 and should limit, cover and/or enclose any organic waste and/or the storage of bins on site.

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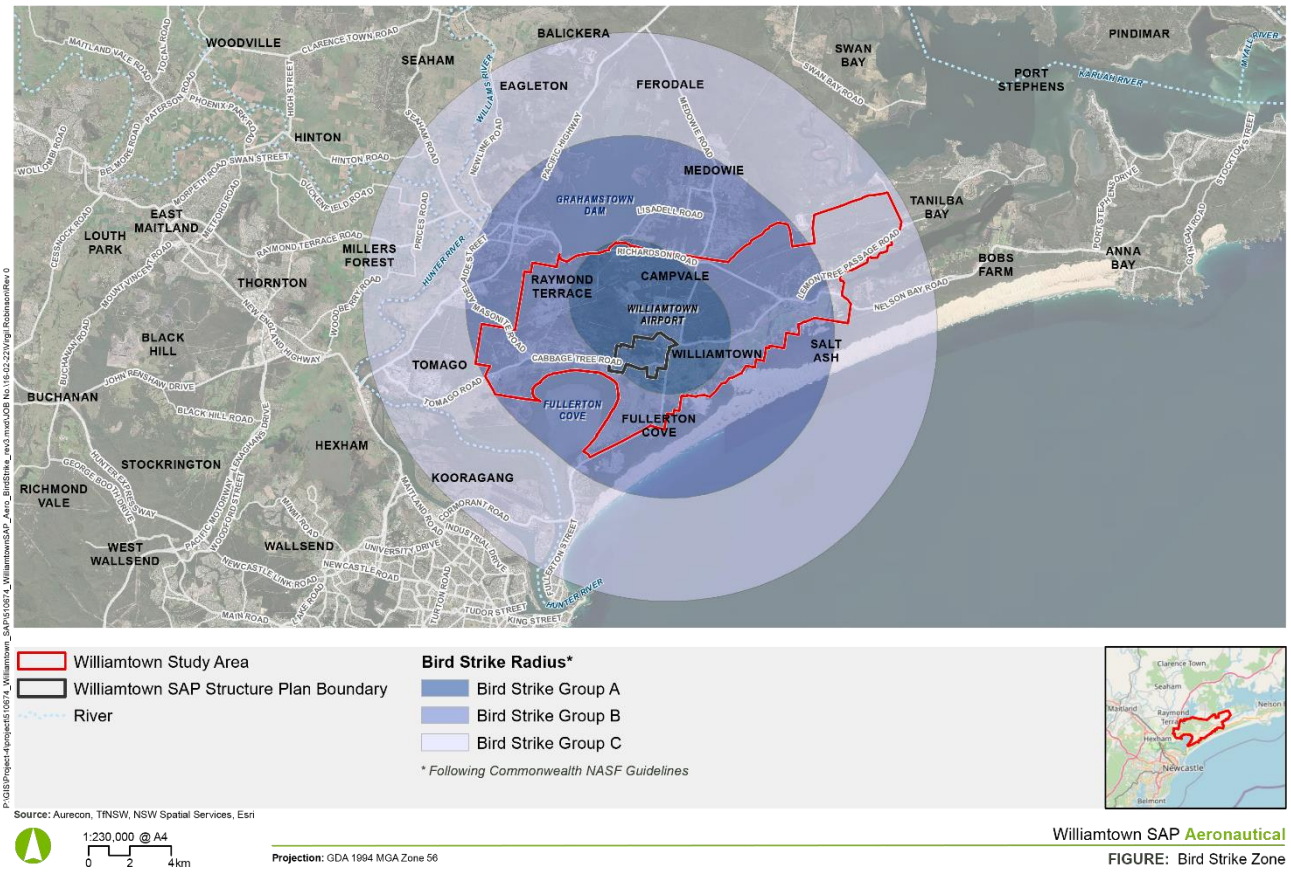

Figure 3 - Bird Strike Zone Map (Source: Port Stephens DCP 2014–B6, overlaid with SAP boundary and investigation area boundary)

2.2.2 Extraneous Lighting

Aeronautical ground lights, such as runway lights and approach lights, play a vital role in enabling pilots to align their aircraft with the runway in use. Pilots are reliant on the specific patterns of aeronautical ground lights during inclement weather and outside daylight hours. They also enable the pilot to land the aircraft at the appropriate part of the runway.

It is extremely important that lighting in the vicinity of airports does not compromise any airport operations and does not affect pilots by being distracted or mistake off-airport lighting as ground lighting from the airport. It is therefore important that lighting in the vicinity of airports is not configured or is of such a pattern that pilots could either be distracted or mistake such lighting as being ground lighting from the airport.

The DCP and NASF Guideline E detail lighting lux levels around airports, to manage off-airport lighting accordingly to minimise any potential pilot distraction. The lighting lux levels are specified as:

- Maximum intensity of light sources (candella) measured at 3^{o} above the horizontal:
  - Zone A = 0cd
  - Zone B = 50cd
  - Zone C = 150cd
  - Zone D = 450cd

Refer to for the extraneous lighting NASF guidelines for RAAF Base Williamtown and Newcastle Airport as administered by CASA. It should be noted that these are guidelines only. Any planning applications that involve significant lighting should be assessed using these guidelines first and then where required, referred to CASA for further assessment. The 6km radius shown in **Figure 4** below and Appendix A outlines the

controlled light installation area monitored by CASA. The lux level zones identify areas where lighting interference is likely and should therefore be closely examined.

NASF Guideline E provides examples of lighting developments that are likely to cause interference, which include the following:

- Motorway/freeway lighting;
- Sea container yards;
- Wharves;
- Refinery flare plumes;
- Stadium flood lighting; and
- Construction lighting.

The *Civil Aviation Act 1988* grants CASA the power to regulate any potentially dangerous extraneous lighting, by having it extinguished or modified.

The Department of Defence also requires consultation for any significant developments that include lighting, generally they will recommend adherence to CASA requirements. Department of Defence have their own Extraneous Lighting Requirements (Refer **Figure 5** and Appendix A). These requirements should be adhered to in conjunction with the previously mentioned CASA guidelines.

Additionally, reflectivity is not covered in this guideline specifically, but Department of Defence may comment on planning applications that have significant reflective materials such as solar panels etc.

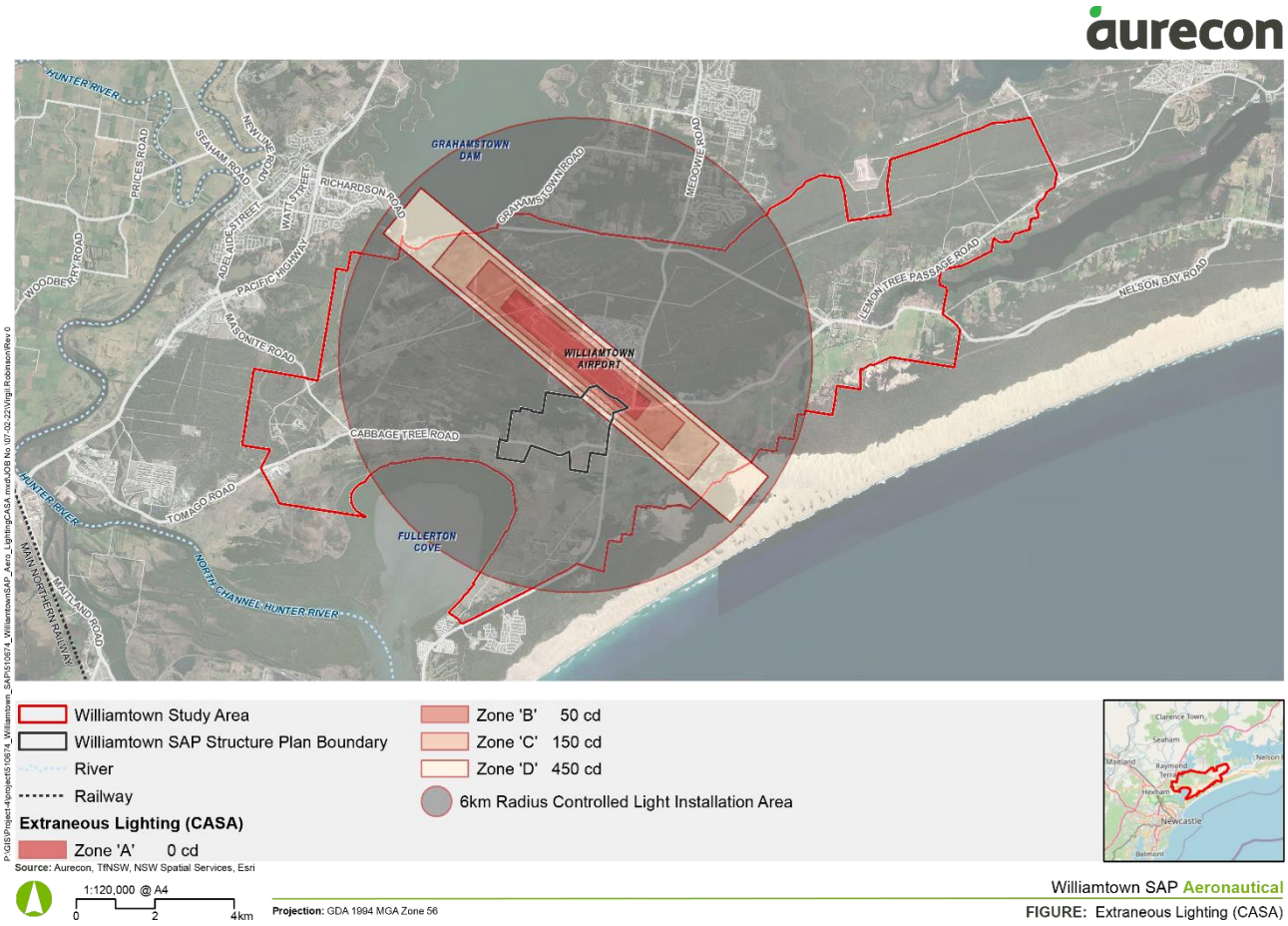

Figure 4 - Extraneous Lighting Map 1 (Source: Port Stephens DCP 2014–B6, overlaid with SAP boundary and investigation area boundary)

Figure 5 - Extraneous Lighting Map 2 (Source: Port Stephens DCP 2014–B6, overlaid with SAP boundary and investigation area boundary)

2.2.3 Limitation or Operations Surface Map / Height Trigger Map

The airport operational airspace is the volume of airspace above a set of imaginary surfaces, the requirements are set by criteria established by the International Civil Aviation Organisation. These surfaces are to protect aircraft from obstacles or activities that could be a threat to safety—in particular, high-rise buildings.

Guideline F provides advice for working within and around protected airspace, including OLS [Obstacle Limitation Surface] and PANS-OPS [Procedures for Air Navigational Services – Aircraft Operations] intrusions, and how these can be integrated into local planning processes.

The Defence Height Trigger Map for RAAF Base Williamtown identifies height limit constraints and was developed using the OLS and PANSOps surfaces. The mapping identifies categories of structures and structure height that needs review and approval. The height trigger categories are shown in **Figure 6**, and include:

- Refer all structures
- Refer all structures above 7.5 metres
- Refer structures higher than 15 metres
- Refer structures higher than 45 metres

The current Port Stephens Council DCP identifies when development seeks to penetrate the RAAF Base Williamtown Height Trigger Map. The heights refer to the airspace requirements and ensure that no structures, either permanent or temporary protrude the airspace. The Department of Defence is notified and provided with an opportunity for comment. As the study area contains both OLS and PANSOps surfaces,

development may be permissible, but certain conditions may apply, such as adequate lighting of structures etc. Refer to **Figure 6** and Appendix A for the surface areas for RAAF Base Williamtown and impacts in the study area.

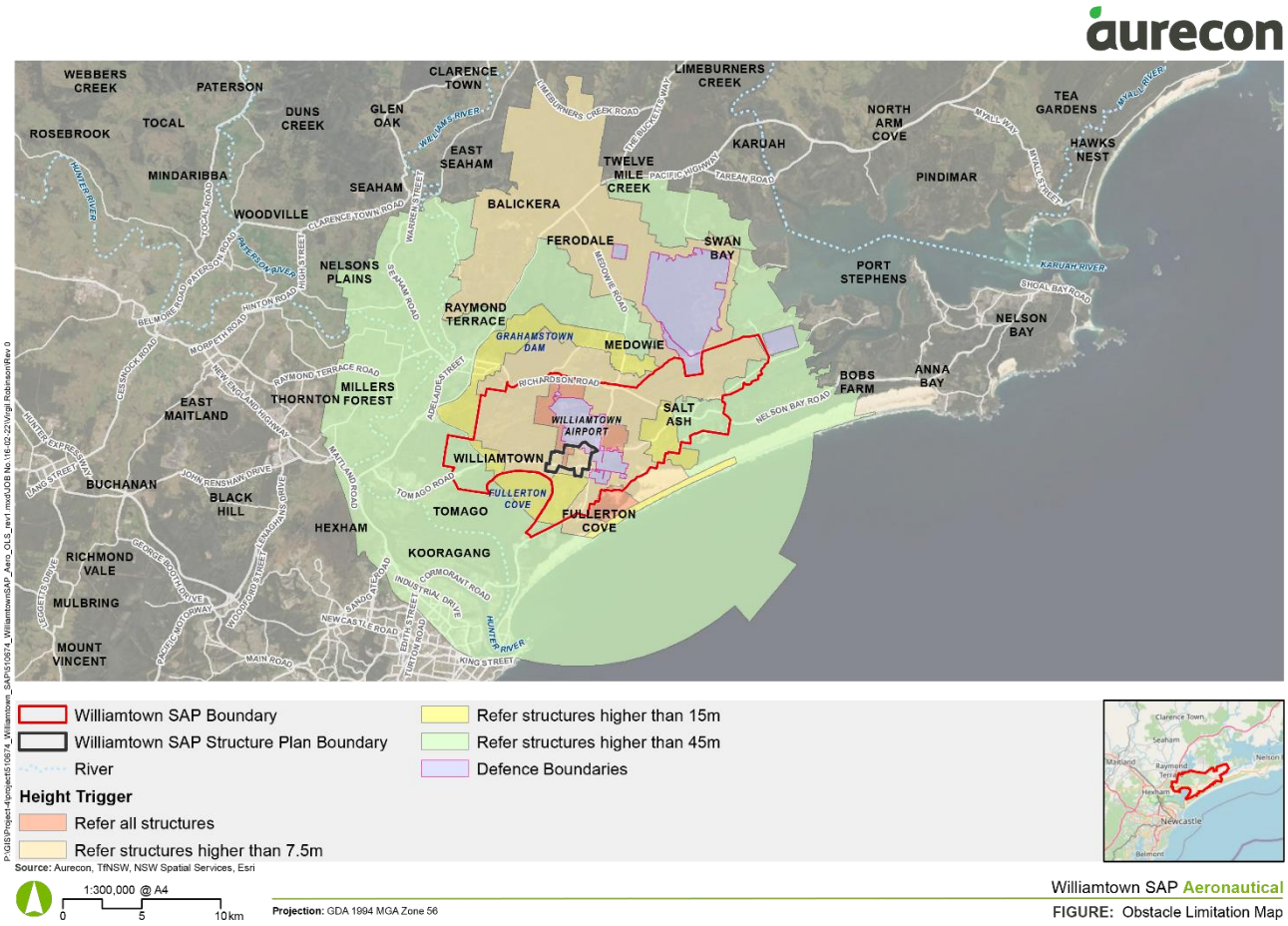

Figure 6 – Obstacle Limitation Map (Source: Port Stephens DCP 2014–B6, overlaid with SAP area and investigation area boundary)

2.2.4 Managing the Risk of Building Generated Windshear and Turbulence at Airports

Building-induced windshear can be a problem for aviation operations, where structures are situated close to airport runways. When a significant building obstacle is located in the path of a crosswind to an operational runway, the wind flow will be diverted around and over the building and can cause the crosswind speed to vary along the runway.

NASF Guideline B presents a layered risk approach to the siting and design of buildings near airport runways to assist land use planners and airport operators to reduce the risk of building-generated windshear and turbulence. Design considerations of buildings that fall within the windshear envelope primarily are related to the building height and footprint.

The windshear considerations for RAAF Base Williamtown has been shown in **Figure 7** below and Appendix A. The windshear assessment zone is at each runway end and extends beyond the base and airport boundary.

The elevation shown in **Figure 8** illustrates the 1:35 surface that makes up the windshear assessment trigger zones. This surface extends from the runway centreline at a 1:35 gradient for 1,200m, reaching a final height of 34.28m above the corresponding point of runway centreline.

Figure 7 - Windshear Assessment Trigger Zones Map (Source: Aurecon 2020, overlaid with SAP boundary and study area boundary)

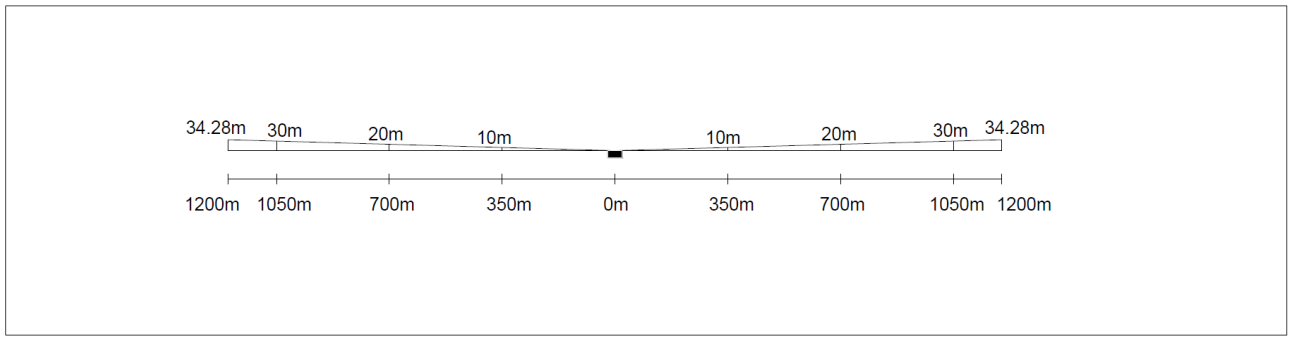

Figure 8 - Elevation View of generic Windshear Assessment Trigger Zone 1:35 surface (looking down a runway centreline) (Source: Aurecon 2020)

2.3 Constraints and opportunities

A summary of the constraints and opportunities that aviation safety present for the future development of the SAP area is provided in this section of the report.

The NASF guidelines provide the framework for considerations that will help maintain, protect and support Williamtown Airport Precinct operations, as well as balancing the needs of communities and future development surrounding the airport. Proximity to the Williamtown Airport Precinct also presents future development opportunities that can leverage off airport operations and connectivity.

2.3.1 Constraints

Existing known constraints of the study area affected by aviation safety and operation requirements are:

- Birdstrike
  - Development types to be avoided or where impacts can be mitigated in a bird strike zone are detailed in the DCP (listed in section 3.2.1).
  - The birdstrike planning overlay requires assessment and management of any development that may attract wildlife in the vicinity of the airport
  - Birdstrike risk within the SAP may result in proposed developments being referred to the Department of Defence/Newcastle Airport for further assessment. Approval of certain land uses may be subject to conditions, management and site-specific mitigation measures
- Extraneous Lighting
  - Developments intersecting with the extraneous lighting overlay within the SAP may result in referral to the Department of Defence/Newcastle Airport for further assessment.
  - land uses and developments intersecting with the extraneous SAP lighting overlay must be designed with consideration for the safety of aircraft, and not interfere with clear visuals of airport lights, signals, and outlines of air routes or airway facilities
- Prescribed airspace heights
  - SAP lands are covered by the Height Trigger Map (incorporating both the OLS and PANSOps). The airspace heights do not preclude development however do necessitate appropriate assessment and referral to the Department of Defence/Newcastle Airport and in some cases CASA.
- Windshear
  - Airport operations need to be safeguarded from the risk of building generated windshear and building generated turbulence

2.3.2 Opportunities

Safeguarding the airport is an ongoing and shared responsibility between all levels of government, Department of Defence and the Newcastle Airport. It is important that safeguarding measures are considered for future land use planning and associated development applications to ensure the ongoing safe operation of the Williamtown Airport Precinct. For the planning and development of the SAP study area, it is recommended to engage early with Department of Defence and Newcastle Airport to understand potential land uses that could be agreed upon to streamline future planning approvals in a timely manner.

The safeguarding guidelines as specified in NASF and adopted in the DCP are current and appropriate to guide land use and development in the vicinity of the airport.

There are considerable opportunities for planning land use and development in the Williamtown SAP. The constraints outlined in this report listed above do not necessarily prohibit particular land use or development. Rather, they should be considered in the context of airport operations and may be possible with mitigation measures or conditions to ensure the ongoing safe operations of RAAF Base Williamtown. There is also an opportunity to employ a similar approach to Western Sydney Aerotropolis via a digital aviation safeguarding mapping tool which could incorporate a 3D model of the OLS for WAP as applied to the SAP.

3 Williamtown SAP Structure Plan

3.1 Proposed Structure Plan

This section summarises the structure plan refined in the second EbD workshop held on 27 to 30 April 2021. The structure plan collates land use, transport, aeronautical and aviation constraints, infrastructure, PFAS, environmental, social, aboriginal heritage and economic matters in conjunction with the SAP vision.

Figure 9 provides an outline of the key Williamtown SAP principles which were incorporated into the structure plan.

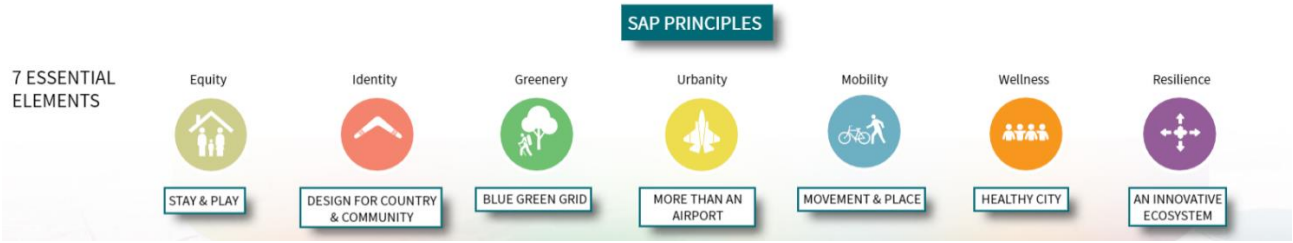

Figure 9 - The 7 SAP Principles which governed the master plan

The structure plan leverages the preferred elements of all the tested scenarios developed, further explores the items under investigation and avoids the earmarked no-go zones. The previously identified strengths and opportunities of each scenario were pursed while weaknesses and threats mitigated. This approach was taken to maximise the positive development outcomes rather than considering the previous scenarios as options and adopting one as the preferred structure plan.

The Structure Plan refined by Roberts Day is centred around the existing WAP. The precinct incorporates a core development area south of the existing airport. Initial stages of the SAP development are to incorporate aerospace and defence contractor industries around the southern airside boundary of the airport. The land uses within the SAP's northern precinct focuses on defence and aerospace, commercial centres, freight and logistics and research and development. The later stages of the SAP, which includes the Western and Eastern Precincts, prioritise a more flexible land use application with complimentary industries such as commercial centres, advanced manufacturing, light industry and research and development. The structure plan shown in **Figure 10** adheres to the existing drainage and flooding characteristics and incorporates the inclusion of the Dawson's and Leary's drain reserve. Additionally, it maintains hydrological regime for the biodiversity corridor, facilitates controlled flooding throughout the SAP precinct and utilises floodplains South of Cabbage Tree Road to offset impacts.

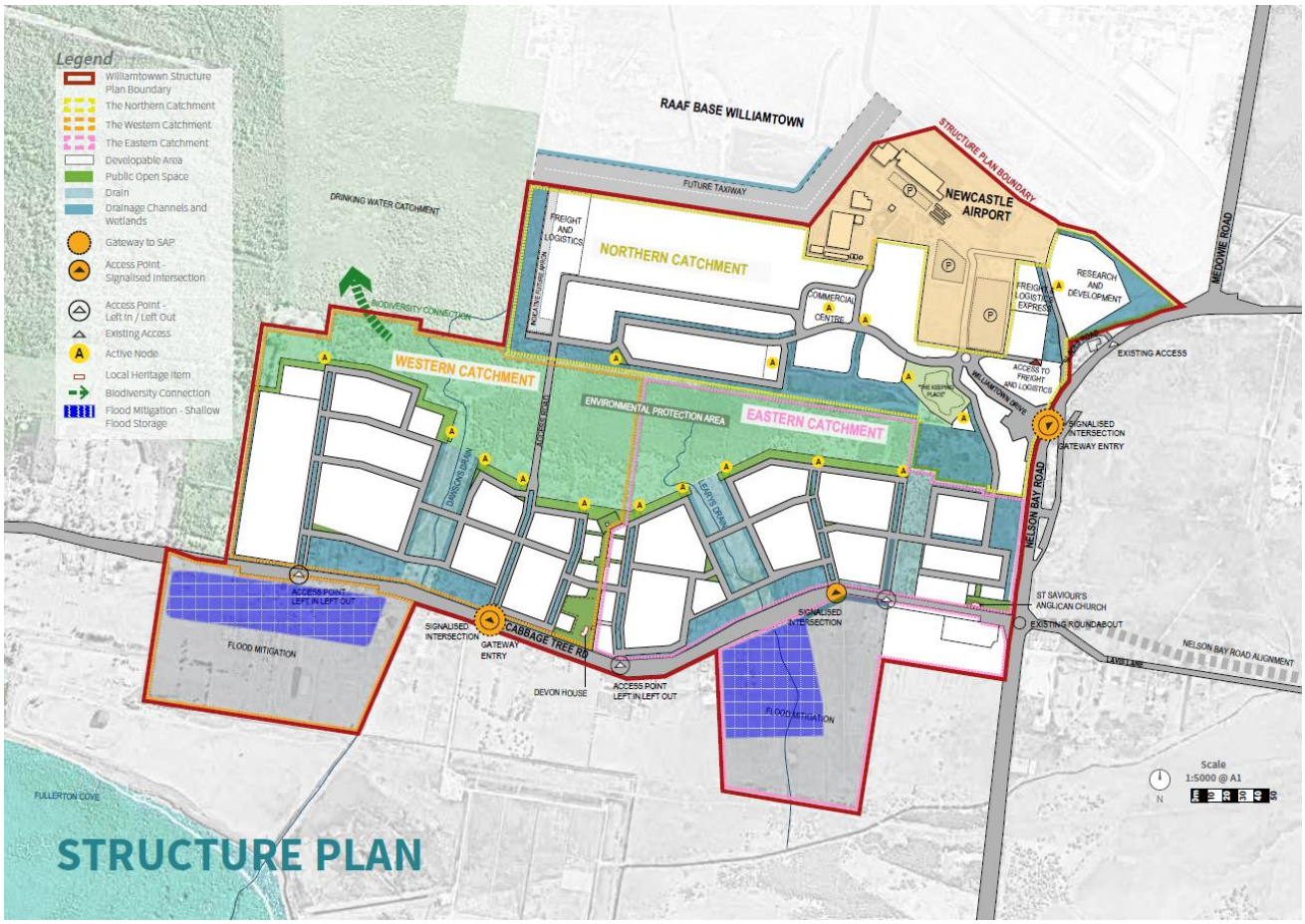

Figure 10 – Williamtown Special Activation Precinct Structure Plan (Source: Hatch Roberts Day (2022) Williamtown SAP - Structure Plan)

3.2 Aeronautical assessment of the structure plan

There are three (3) NASF policy areas already implemented through the Port Stephens DCP 2014 B6 and illustrated with mapping. In addition to the DCP constraints, a preliminary indication of the windshear assessment trigger area was prepared by Aurecon as part of aviation specialist investigations. These aviation hazards are discussed below with specific reference to the preferred structure plan. Illustrative figures are provided to display the SAP structure plan boundary with the DCP mapping overlays.

3.2.1 Bird Strike

The structure plan boundary includes only Group A and Group B bird strike zones (see **Figure 11**). The SAP is predominantly within Group A (within 3km of the airport) with the exception of a small triangular portion in the south western corner.

- For developments within the Group A zone (3km radius), certain development types should be avoided
- For developments within Group B zone (8km radius), some development types are subject to relevant waste management measures (see 2.2.1)

Appropriate land uses in Group A and B bird strike zones will be outlined within the Williamtown SAP Master Plan to comply with NASF Guideline C: Managing the Risk of Wildlife Strike in the Vicinity of Airports (Wildlife Strike Guidelines).

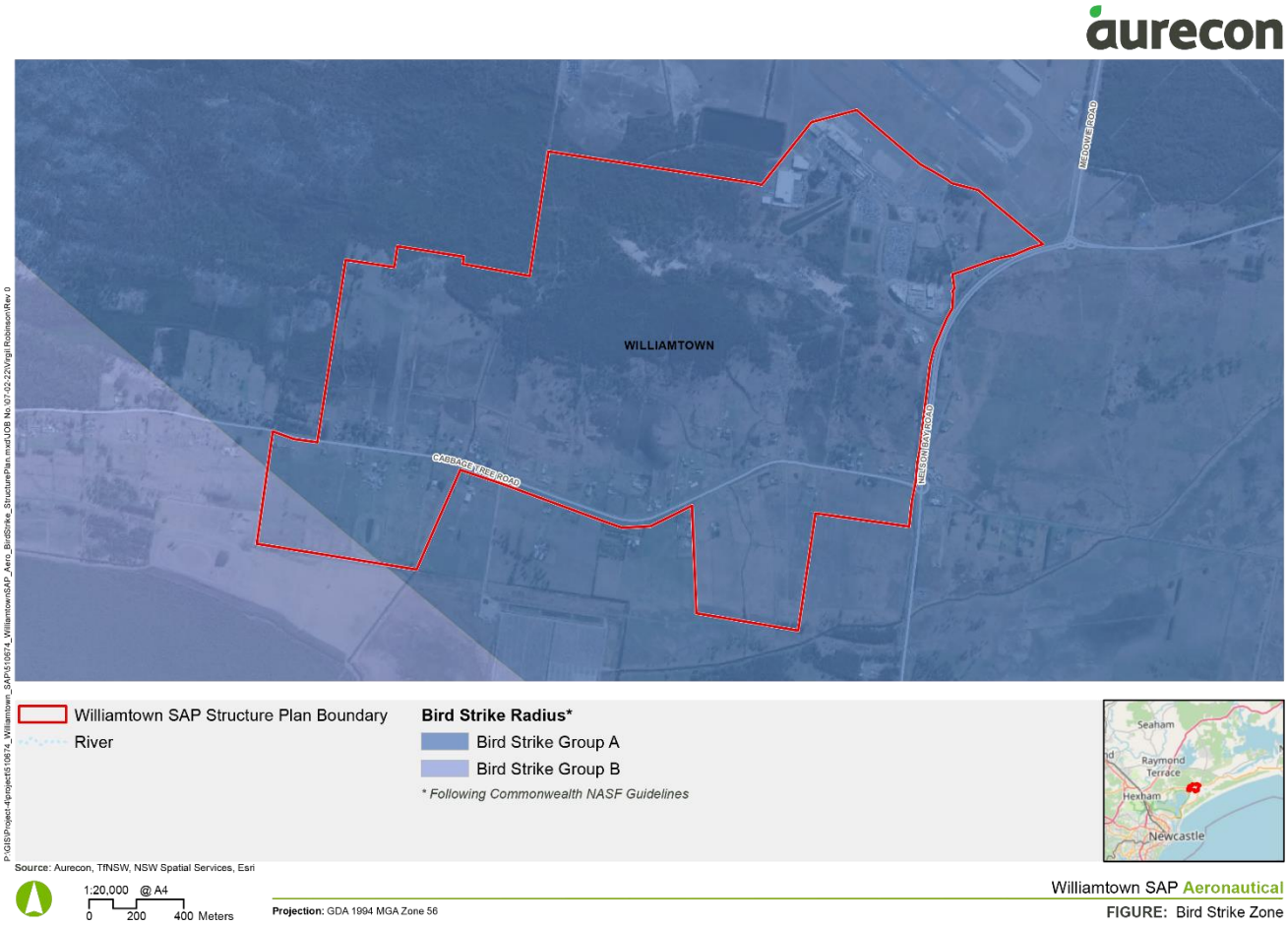

Figure 11 – Zoomed in Bird Strike Zones Map (Source: Port Stephens DCP 2014–B6, overlaid with SAP Structure Plan Boundary)

3.2.2 Extraneous Lighting

The structure plan boundary includes four lux level zones (referred to as Zones A to D) (see **Figure 12**) also adopted in the Port Stephens DCP 2014. The Zones intersect with the north eastern portion of the SAP, nearest the runway. These are the areas where lighting interference is of greatest risk to airport operations. In this area of the SAP, the installation and operation of certain lighting types and levels is restricted per zone in order to manage off-airport lighting and to minimise any potential pilot distraction.

The maximum intensity of light sources (candella) for each zone, to be measured at 3^{o} above the horizontal, is restricted to:

- Zone A = 0cd
- Zone B = 50cd
- Zone C = 150cd
- Zone D = 450cd

In addition to the above zones, the entire structure plan boundary falls within the controlled light installation area, that covers a 6km radius shown in **Figure 12** above and at Appendix A. This area is monitored by CASA. Any development applications that involve significant lighting may need to be assessed against NASF Guideline E and consideration given to any further detailed controls developed in the Activation Precincts SEPP in response to this issue.

Defence have their own Extraneous Lighting Requirements control for WAP (Refer **Figure 13** and Appendix A). These requirements should be adhered to in conjunction the DCP Zones and NASF Guideline E, as implemented in the SAP planning framework.

For further information, see Lighting under 5.3.3 Aircraft operations in Mecone *Williamtown Special Activation Precinct –Statutory Planning Considerations Paper, February 2022.*

Figure 12 – Zoomed in Extraneous Lighting Map 1 (Source: Port Stephens DCP 2014–B6, overlaid with SAP Structure Plan Boundary)

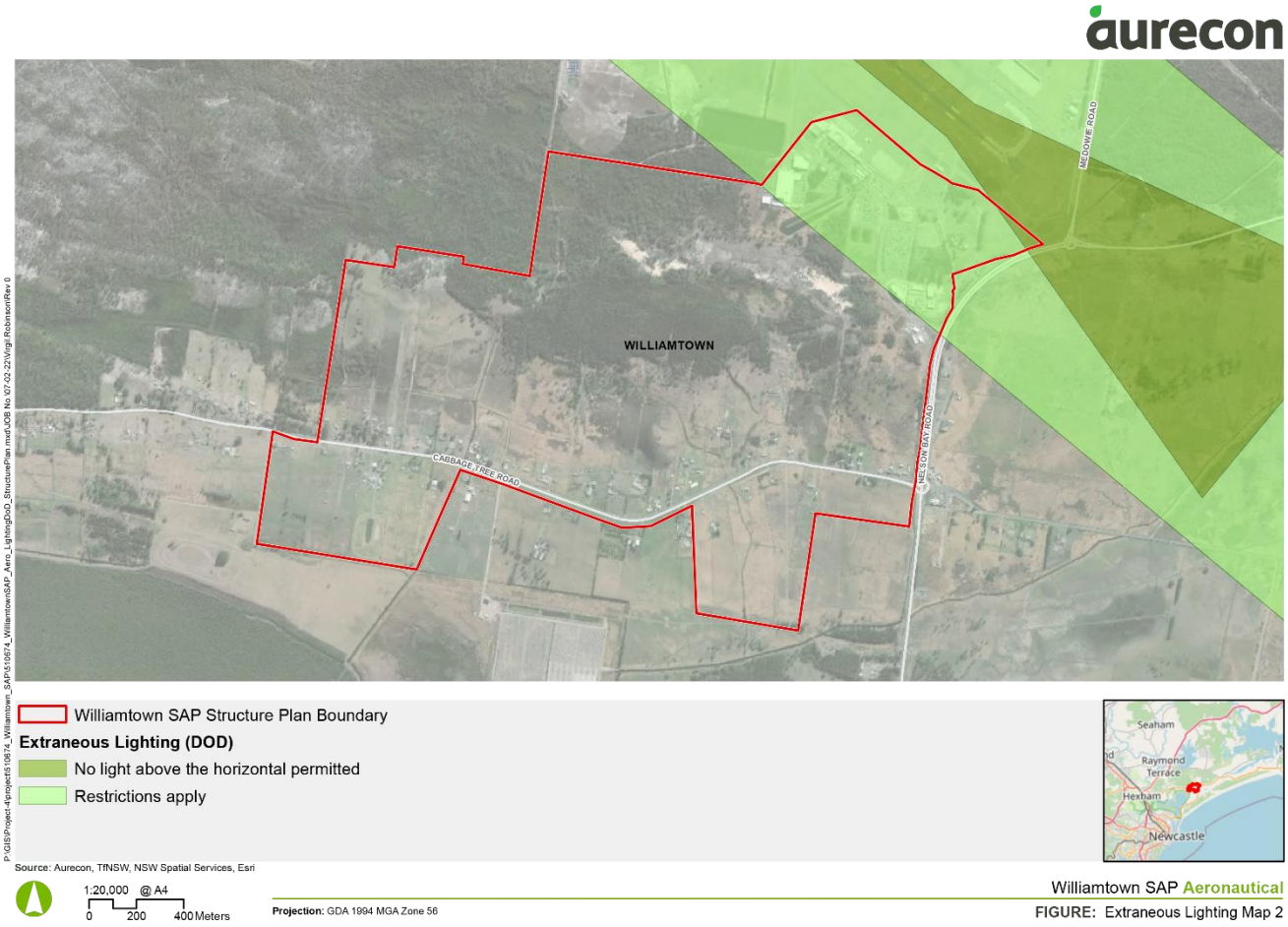

Figure 13 – Zoomed in Extraneous Lighting Map 2 (Source: Department of Defence, overlaid with SAP Structure Plan Boundary)

3.2.3 Limitation or Operations Surface Map / Height Trigger Map

The Port Stephens DCP 2014 includes provisions relating to NASF Guideline F, including mapped obstacle limitations (OLS) which guide land use planning decisions and development assessment within the SAP. **Figure 14** illustrates the three categories of land prescribed by the OLS map as it pertains to the structure plan boundary.

These are:

- Refer structures higher than 7.5m to the east and west of the structure plan
- Refer all structures, in the middle of the structure plan, and
- Defence Boundaries, to the north east of the boundary of the structure plan

The first and second categories cover the majority of the SAP and in accordance with the current controls, development would need to be subject to a referral to the Department of Defence. There is an opportunity for further detailed OLS modelling and mapping to occur as part of the new SAP planning framework, with a view to reducing referrals and upholding a streamlined planning pathway. There is also an opportunity to employ a similar approach to Western Sydney Aerotropolis via a digital aviation safeguarding mapping tool which could incorporate a 3D model of the OLS for WAP as applied to the SAP.

For further information, see Airspace Operations under 5.3.3 in Mecone *Williamtown Special Activation Precinct –Statutory Planning Considerations Paper, February 2022.*

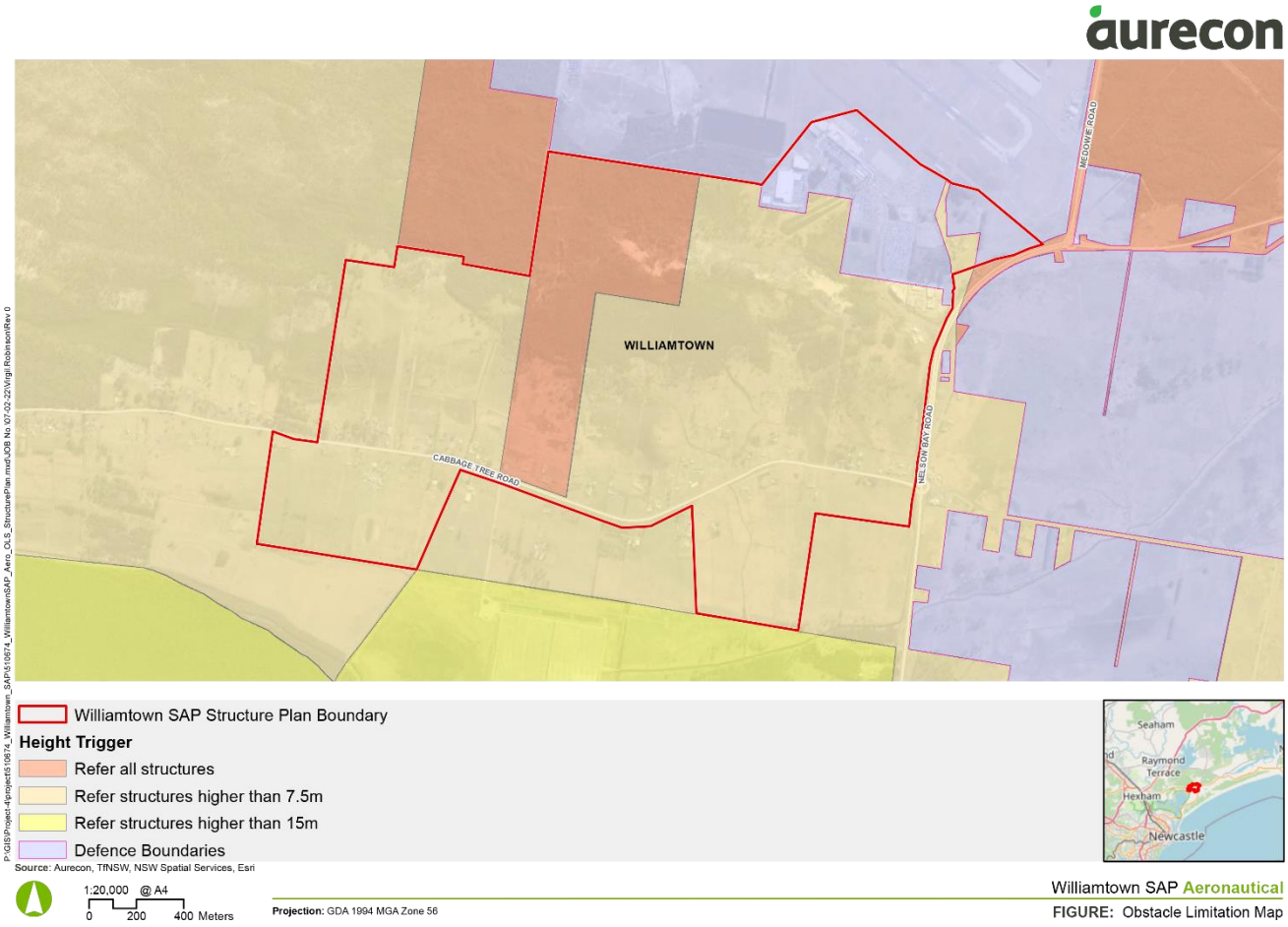

Figure 14 – Zoomed in Obstacle Limitation Map (Source: Port Stephens DCP 2014–B6, overlaid with SAP Structure Plan Boundary)

3.2.4 Managing the Risk of Building Generated Windshear and Turbulence at Airports

Windshear (NASF Guideline B) is not currently addressed in the existing planning framework for WAP. As part of the aviation baseline assessment phase for the SAP a preliminary 'windshear assessment trigger area' was identified as it pertains to the broader SAP investigation area (**Figure 15**). The trigger area occupies each runway end and extends beyond the base and airport boundary to occupy north east corner of the SAP. The windshear assessment zone intersects with the north eastern portion of the structure plan boundary but would need to be subject to detailed aviation engineer's review and modelling prior to finalisation in the SAP planning framework.

Design considerations for development that falls within the windshear trigger area relate to building height and footprint. For further information, see Wind Shear and Turbulence under 5.3.3 Aircraft operations in Mecone *Williamtown Special Activation Precinct –Statutory Planning Considerations Paper, February 2022.*

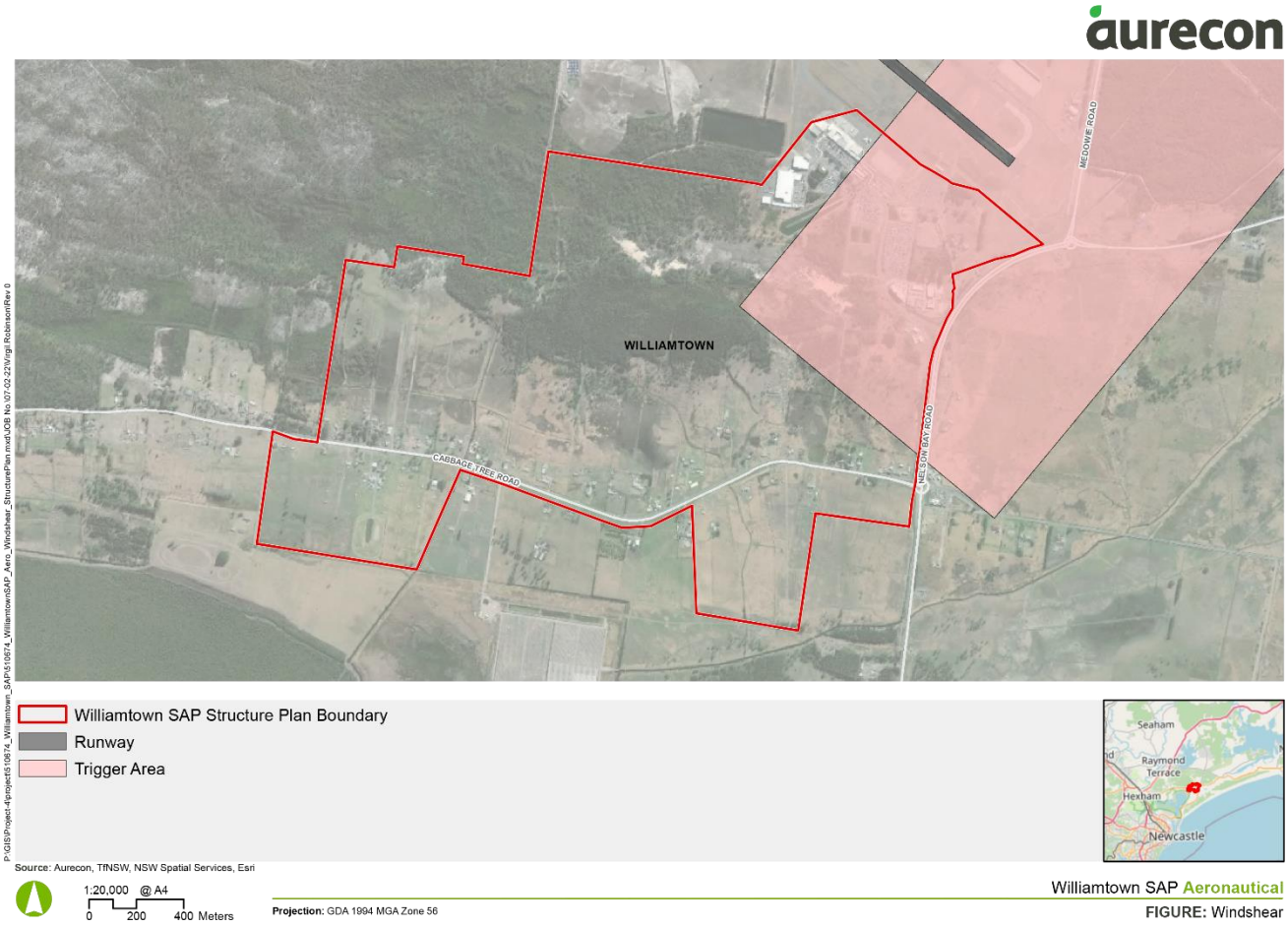

Figure 15 – Zoomed in Windshear Assessment Trigger Zones Map (Source: Aurecon 2020, overlaid with SAP Structure Plan Boundary)

3.3 Discussion

Four key NASF constraints applicable to the SAP structure plan have been individually discussed above. Mapping available per constraint indicates that future development in the north eastern portion of the site, near the runway, will be constrained in terms of bird strike risk, extraneous lighting, height restrictions and windshear and turbulence. Elsewhere, the SAP is much less constrained by WAP operations, notwithstanding the additional considerations of noise, communications of navigational equipment (CNS) and much broader CASA lighting buffer (6km radius).

These additional NASF constraints are addressed in the recommended planning controls (Table 3-1 below).

Notwithstanding the above, all the future developments within Williamtown SAP will need to be supported with more detailed statutory controls based on further mapping studies and design refinement. In addition, appropriate mitigation and monitoring controls should be addressed within the Master Plan and or Delivery Plan in collaboration with the Department of Defence and Newcastle Airport.

3.4 Recommendations for the Williamtown SAP planning framework

3.4.1 Planning approval pathway

The planning framework for the SAP is based on front-loaded specialist environmental studies (including this report) that identify the opportunities and constraints of the SAP and the likely requirements and impacts of different land uses. This informs the preparation of appropriate land use controls, development standards, mitigation measures and design requirements that allows suitable land uses to be undertaken as complying development under the Activation Precincts SEPP. The Williamtown SAP Master Plan and Delivery Plan will include all relevant planning controls and performance requirements to inform future development applications. This pathway is intended to reduce cost and time associated with obtaining development approval for suitable land uses within the Williamtown SAP.

A detailed outline of the SAP planning pathway recommendations is included under *Section 5.4 Planning pathway recommendations* of *Statutory Planning Considerations Paper* prepared by Mecone February 2022. An enabling State Significant Development (SSD) has been identified as an option to further streamline the planning pathway for Williamtown SAP. An enabling SSD may resolve some of the precinct's challenges, which are likely to be difficult for individual landowners to resolve on a lot-by-lot basis. The Environmental Impact Statement (EIS) for the SSD would be accompanied by a specialist aviation technical report. This report would address the NASF and ensure that works under the SSD demonstrate consistency with the aviation safeguarding framework applicable to Williamtown. Findings, recommendations, and management measures regarding aviation safeguarding would likely carry over to the EIS conditions of approval.

3.4.2 Planning controls

The NASF (AS 2021) is the key driver for aviation safeguarding planning controls within the SAP statutory planning framework. The recommendations in Table 3-1 reflect the need to apply the relevant policies under the NASF within the Activation Precincts SEPP, Master Plan and Delivery Plan for Williamtown SAP. Table 3-1 addresses the six (6) relevant NASF policy areas and provides a recommendation for related planning controls that ensure the implementation of each guideline across the SAP development area. As noted in Section 2.1.3, Public Safety Areas, Wind Turbines and Strategic Helicopter Landing Sites have not been discussed with regard to Williamtown SAP.

A rigorous aviation planning framework, supported by detailed mapping informed by specialist aviation engineering studies, would ensure that the need for external referral and assessment of development applications is minimised, allowing the streamlined planning pathway objective of the SAPs to be upheld. The Western Sydney Aerotropolis SEPP, DCP 2020 and related Aviation Safeguarding Guidelines (DPIE) are valuable precedents to look to when developing a site-specific planning framework for Williamtown SAP. Whilst some consultation with Defence and Newcastle Airport has occurred as part of the EbD process, ongoing consultation with key aviation stakeholders is recommended in the future stages of the Williamtown SAP project particularly in the preparation of the SAP Delivery Plan.

A detailed overview of recommended planning controls has been provided within **Section 2.2** and **Section 5.3.3** (aircraft operations) of Mecone *Williamtown Special Activation Precinct –Statutory Planning Considerations Paper, February 2022*. Based on a review of this report, controls outlined by Mecone are in direct response to the NASF relevant policy areas and draw from the precedent of Western Sydney Aerotropolis planning framework. They align with the constraints and considerations identified within this report and have been cross referenced in Table 3-1.

Table 3-1 summarises the aviation safeguarding performance criteria for the Williamtown Master Plan, references the corresponding statutory planning control and discusses the implications of the control for the SAP delivery plan.

Table 3-1 Aviation Planning Controls Williamtown SAP

NASF Policy Area	Recommended MP Performance Criteria	*Williamtown SAP Statutory Planning Considerations Paper*, Mecone, February 2022	Considerations for future development
Guideline A: Measures for Managing Impacts of Aircraft Noise *NB: The NSW Government has endorsed the use of ANEF for land use planning.*	• Impacts of aircraft noise are managed and mitigated in relation to SAP development • SAP development is in accordance with the adopted ANEF contours and Australian Standard AS2021-2015 • Sensitive land uses are appropriately located within the Precinct to limit adverse impacts in accordance with AS2021:2015 (Building Site Acceptability Based on ANEF Zones) • Development within the ANEF 20 and above contours (including extensions to existing development) is constructed to achieve indoor design sound levels as per the Indoor Design Sound Levels for Determination of Aircraft Noise Reduction in AS 2021 – Acoustics Noise Intrusion – Building Siting and Construction. NB: A dedicated noise assessment has been prepared – see*: Williamtown SAP, Planning Considerations for Noise, ERM for DPE, February 2022*	Table 8 P40-41 Suggested Activation Precincts SEPP Provisions–Noise	• Land use types within ANEF 20 and above contours would be subject to AS2021-2015 (Building Site Acceptability Based on ANEF Zones) • Development within ANEF 20 and above contours would be subject to the relevant Australian Standard (AS2021-2015) related to aircraft noise mitigation and acoustics in building design • The ANEF contours will be updated following the extension to the runway at WAP

Guideline B: Managing Risks of Building Windshear and Turbulence at Airports	• Airport operations are safeguarded from the risk of building generated windshear and building generated turbulence • Windshear implications are to be considered and assessed for development located within the Windshear Assessment trigger area	Table 8 P45 Suggested Activation Precincts SEPP Provisions–Windshear	• Development that introduces a building typology that may cause building induced turbulence and/or windshear, and penetrates the assessment surface shown at Figure 8 would require specialist aviation assessment in accordance with NASF Guideline B. Development and consultation with Defence • Development outside the Windshear Assessment Trigger Area that would not cause building induced turbulence and/or windshear, and does not penetrates the assessment surface is unlikely to require further specialist assessment or referral • Windshear and turbulence considerations should inform built form guidelines for development within the Windshear Assessment Trigger Area as part of concept design and detailed design
Guideline C: Managing Risks of Wildlife Strike in the Vicinity of Airports	• Wildlife management provisions, including waste management and disposal requirements, are applied appropriately throughout the Precinct in accordance with Guideline C: Managing Risks of Wildlife Strike in the Vicinity of Airports • Development, landscaping and drainage infrastructure does not attract wildlife which would create a safety hazard to the operations of the airport (Figure 13).	Table 8 P43 Suggested Activation Precincts SEPP Provisions–Wildlife Hazards	• Appropriate wildlife and birdstrike management measures should be applied to certain development types and land uses as outlined at 2.2.1. These should form part of the planning provisions. • An aviation specialist should provide input into the planting schedule for the precinct during detailed design stage.

Guideline E: Managing Risks of Distractive Lighting in Vicinity of Airports	• Airport Operations are safeguarded from the risk of lighting distractions to pilots • Development remains compliant with the relevant lighting provisions and lighting zones consistent with Regulation 94 of the Civil Aviation Act and CASA Manual of Standards (MOS-139) aerodromes	Table 8 P44 Suggested Activation Precincts SEPP Provisions–Lighting	• Restriction of certain types/qualities of light within high risk zones, certain guidelines applicable within moderate zones • Outside of high-risk zones development likely to be relatively unconstrained by lighting considerations • In consultation with WAP key stakeholders develop further detailed guidelines for the 'controlled light installation area'
Guideline F: Managing Risks of Intrusion into Protected Airspace	• Development does not impede on airspace required for aviation purposes (refer to Obstacle Limitation Surface Map (Figure 12). • Development within the Precinct protects aircraft from obstacles or activity that could be a threat to aviation safety • Development does not create a permanent or temporary physical or transient obstruction in the protected operational airspace of the Airport and complies with the Airports Act 1996 and Airports (Protection of Airspace) Regulations 1996.	Table 8 P42 Suggested Activation Precincts SEPP Provisions–Airspace operations	• Development proposals must comply with OLS and PANS-OPS mapping provisions • Developments that may cause intrusions into prescribed airspace may require referral to CASA, the Department of Defence and further consultation with airport stakeholders • Development within high risk OLS zones must be accompanied by an aviation hazard assessment
Guideline G: Protecting Aviation Facilities – Communications, Navigation and Surveillance	• Development does not adversely affect communications, navigation and surveillance (CNS) facilities associated with WAP	NA–Guideline G generally managed by WAP.	• Preparation of a Building Restricted Area (BRA) map, informed by the type and nature of CNS facilities at WAP • The BRA map will guide development compatible with the safe operation of CNS facilities at WAP • Development incompatible with the BRA may not be permissible, or may be subject to further detailed assessment and referral

4 Conclusion

The Structure Plan development process has provided an opportunity to review the existing legislative environment applicable to Williamtown SAP, as well as to determine how the NASF Guidelines should be applied within the SAP planning framework going forward. The SAP Master Plan and Delivery Plan should be finalised consistent with the NASF Guidelines, and with the recommendations outlined in Section 4 of this report.

Section 4.4.2 includes recommendations for the Williamtown SAP planning framework based on a review of the relevant aeronautical policies and safeguards. These align with the detailed controls identified within Mecone's Statutory Planning report (February 2022). They provide for a planning framework that would ensure that key aeronautical and safeguarding considerations inform further detailed land use and development planning of the SAP area.

Appendix A - Aviation Figures

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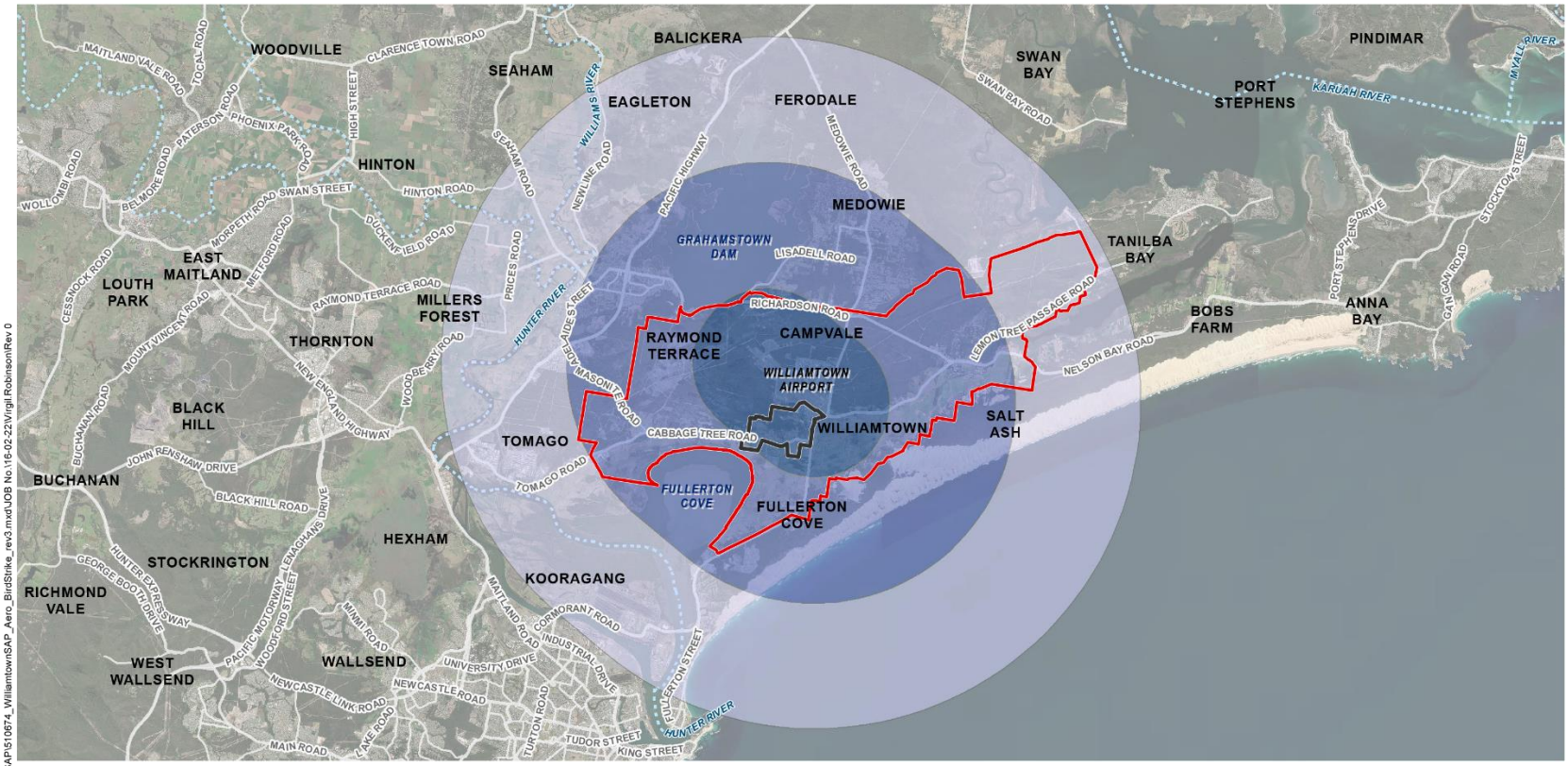

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Source: Aurecon, TfNSW, NSW Spatial Services, Esri

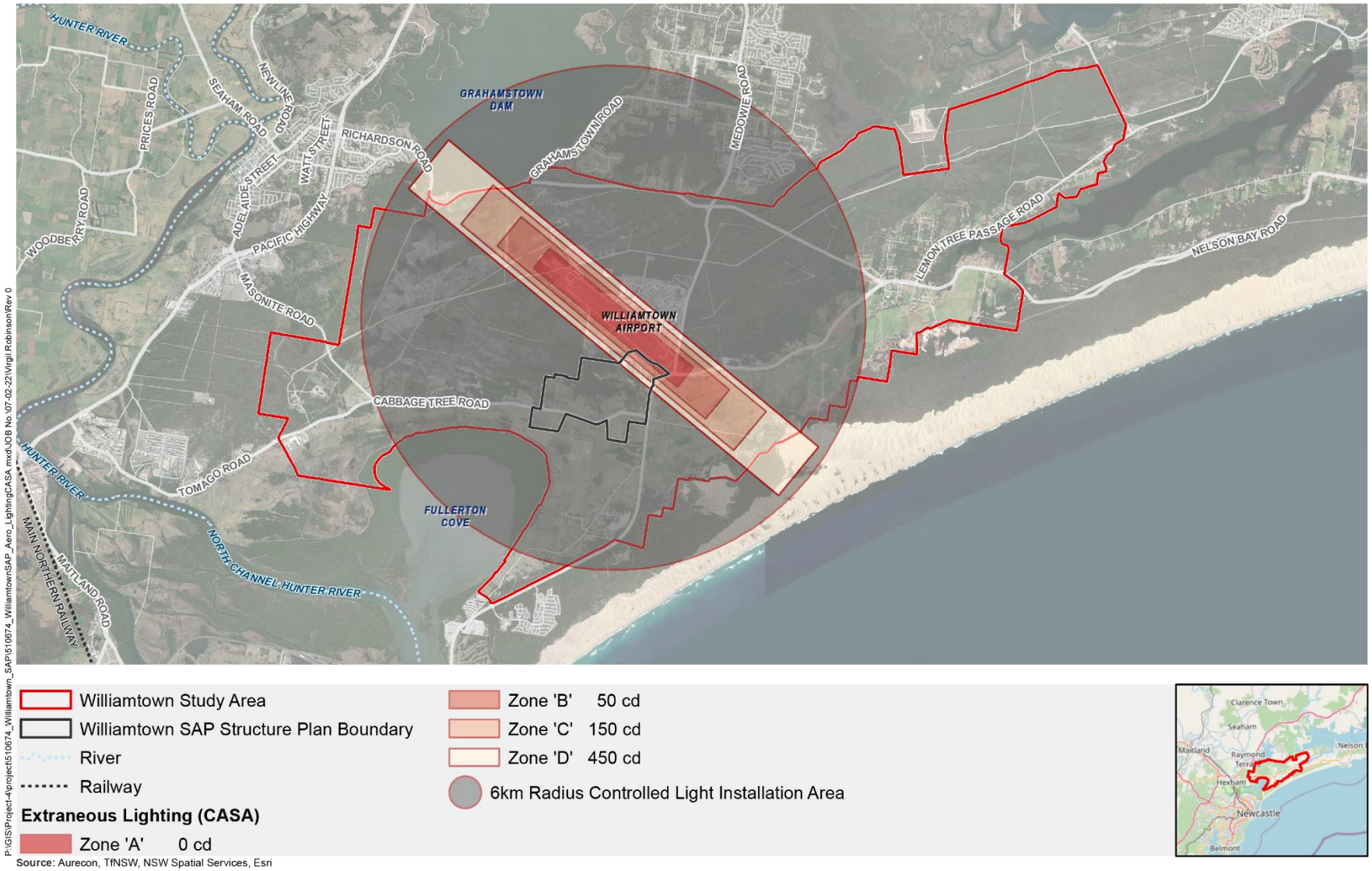
1:230,000 @ A4
0 2 4km

Projection: GDA 1994 MGA Zone 56

Williamtown SAP Aeronautical

FIGURE: Bird Strike Zone

Bird Strike Zones Map (Source: Port Stephens DCP 2014–B6, overlaid with SAP Study Area Boundary)



Extraneous Lighting Guidelines (CASA) (Source: Port Stephens DCP 2014–B6, overlaid with SAP Study Area Boundary)

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Williamtown Study Area
Williamtown SAP Structure Plan Boundary
River
Railway

Extraneous Lighting (DOD)
No light above the horizontal permitted
Restrictions apply

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Source: Aurecon, TfNSW, NSW Spatial Services, Esri

1:120,000 @ A4
0 2 4km

Projection: GDA 1994 MGA Zone 56

Williamtown SAP **Aeronautical**

FIGURE: Extraneous Lighting Map 2

Extraneous Lighting Requirements (DoD) (Source: Port Stephens DCP 2014–B6, overlaid with SAP Study Area Boundary)

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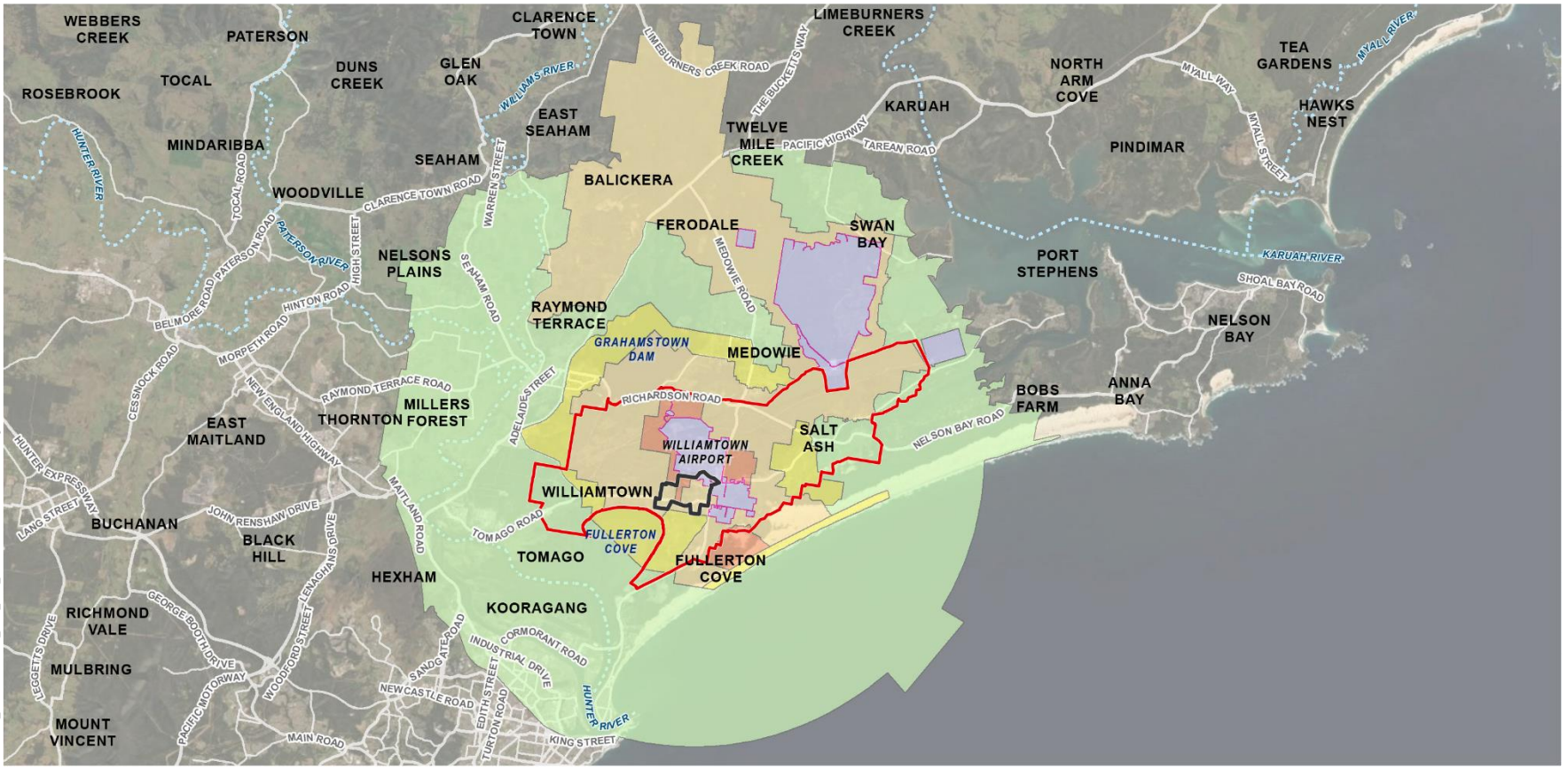

Williamtown SAP Boundary
Williamtown SAP Structure Plan Boundary
River
Refer structures higher than 15m
Refer structures higher than 45m
Defence Boundaries

Height Trigger

Refer all structures
Refer structures higher than 7.5m

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Source: Aurecon, TfNSW, NSW Spatial Services, Esri

1:300,000 @ A4
0 5 10 km

Projection: GDA 1994 MGA Zone 56

Williamtown SAP **Aeronautical**

FIGURE: Obstacle Limitation Map

Height Trigger Categories Map (Source: Port Stephens DCP 2014–B6, overlaid with SAP Study Area Boundary)

aurecon

Source: Aurecon, TfNSW, NSW Spatial Services, Esri

1:120,000 @ A4

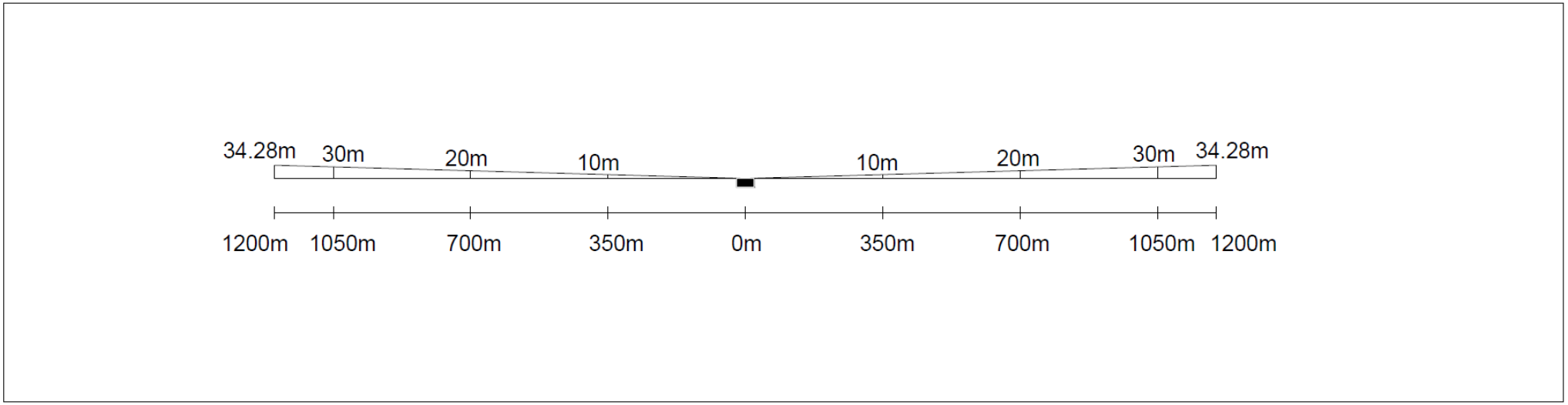
0 2 4km

Projection: GDA 1994 MGA Zone 56

Williamtown SAP **Aeronautical**

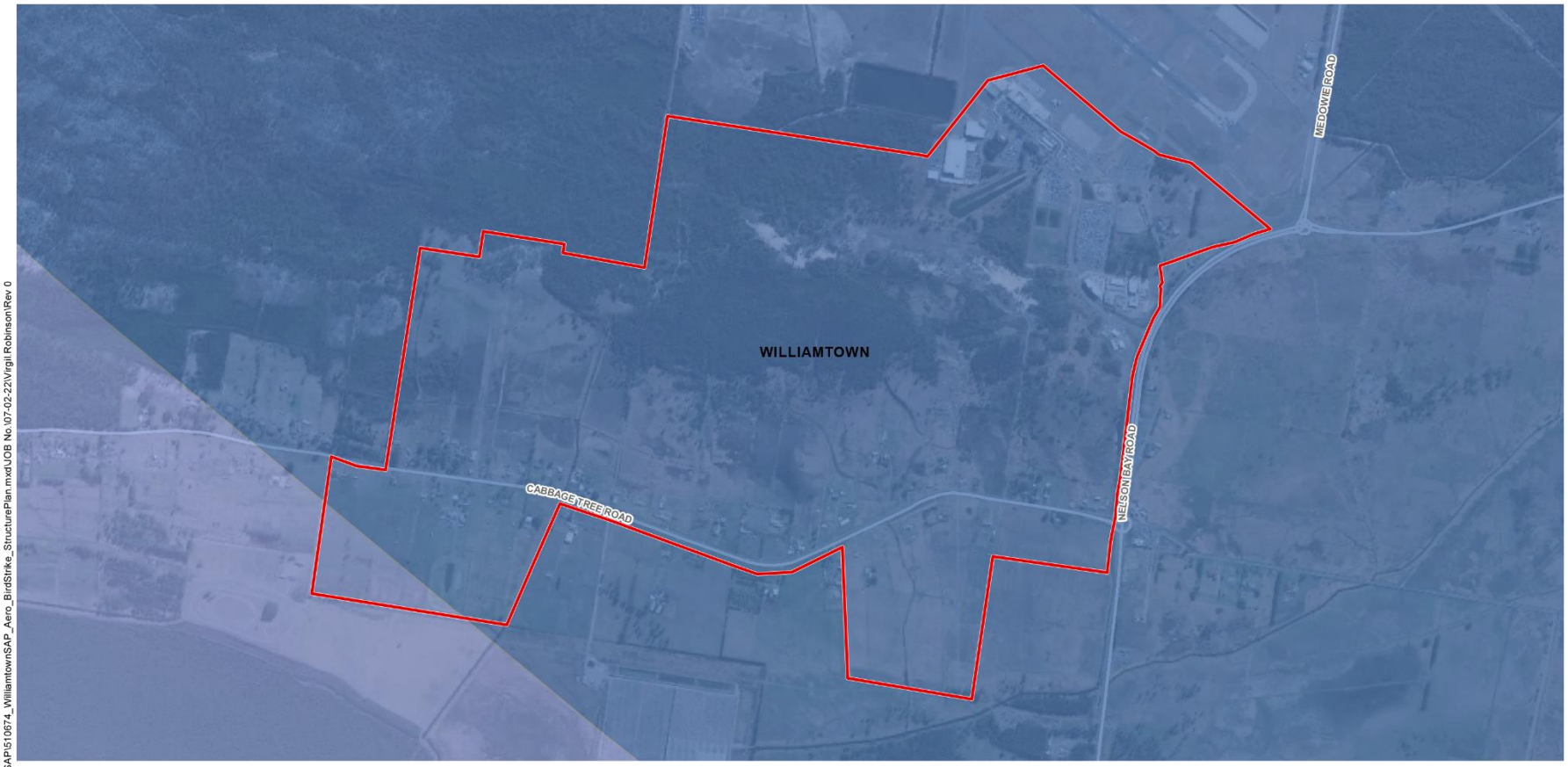
FIGURE: Windshear

Windshear Assessment Trigger Zones Map (Source: Aurecon 2020, overlaid with SAP Study Area Boundary)



Elevation View of Windshear Assessment Trigger Zone 1:35 surface (looking down a runway centreline)

aurecon



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Williamtown SAP Structure Plan Boundary

River

Bird Strike Radius*

Bird Strike Group A

Bird Strike Group B

** Following Commonwealth NASF Guidelines*

Source: Aurecon, TfNSW, NSW Spatial Services, Esri

1:20,000 @ A4

0 200 400 Meters

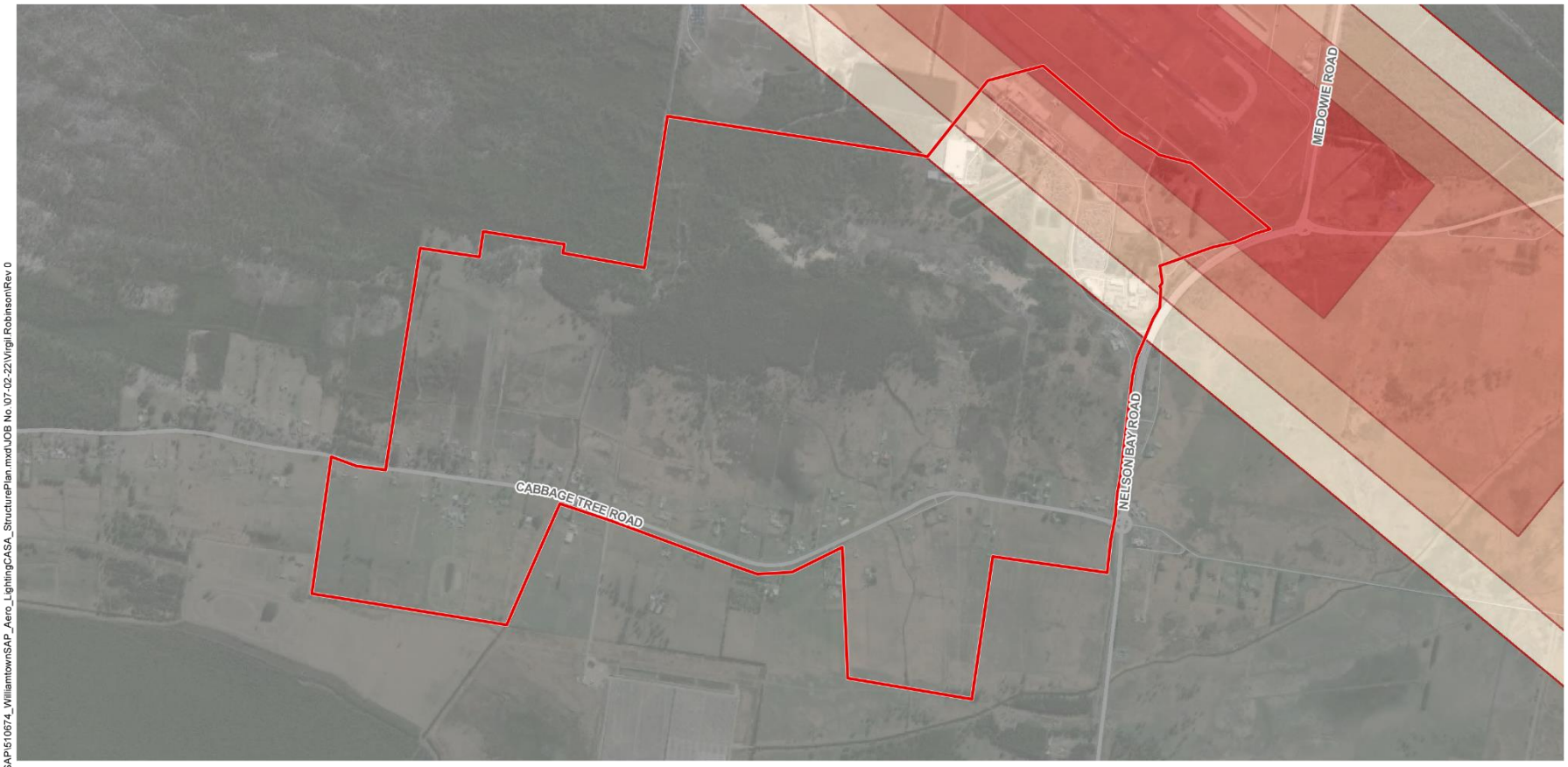
Projection: GDA 1994 MGA Zone 56

Williamtown SAP **Aeronautical**

FIGURE: Bird Strike Zone

Zoomed in Bird Strike Zones Map (Source: Port Stephens DCP 2014–B6, overlaid with SAP Structure Plan Boundary)

aurecon



Williamtown SAP Structure Plan Boundary

6km Radius Controlled Light Installation Area

Extraneous Lighting (CASA)

- Zone 'A' 0 cd
- Zone 'B' 50 cd
- Zone 'C' 150 cd
- Zone 'D' 450 cd

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Source: Aurecon, TfNSW, NSW Spatial Services, Esri

1:20,000 @ A4

0 200 400 Meters

Projection: GDA 1994 MGA Zone 56

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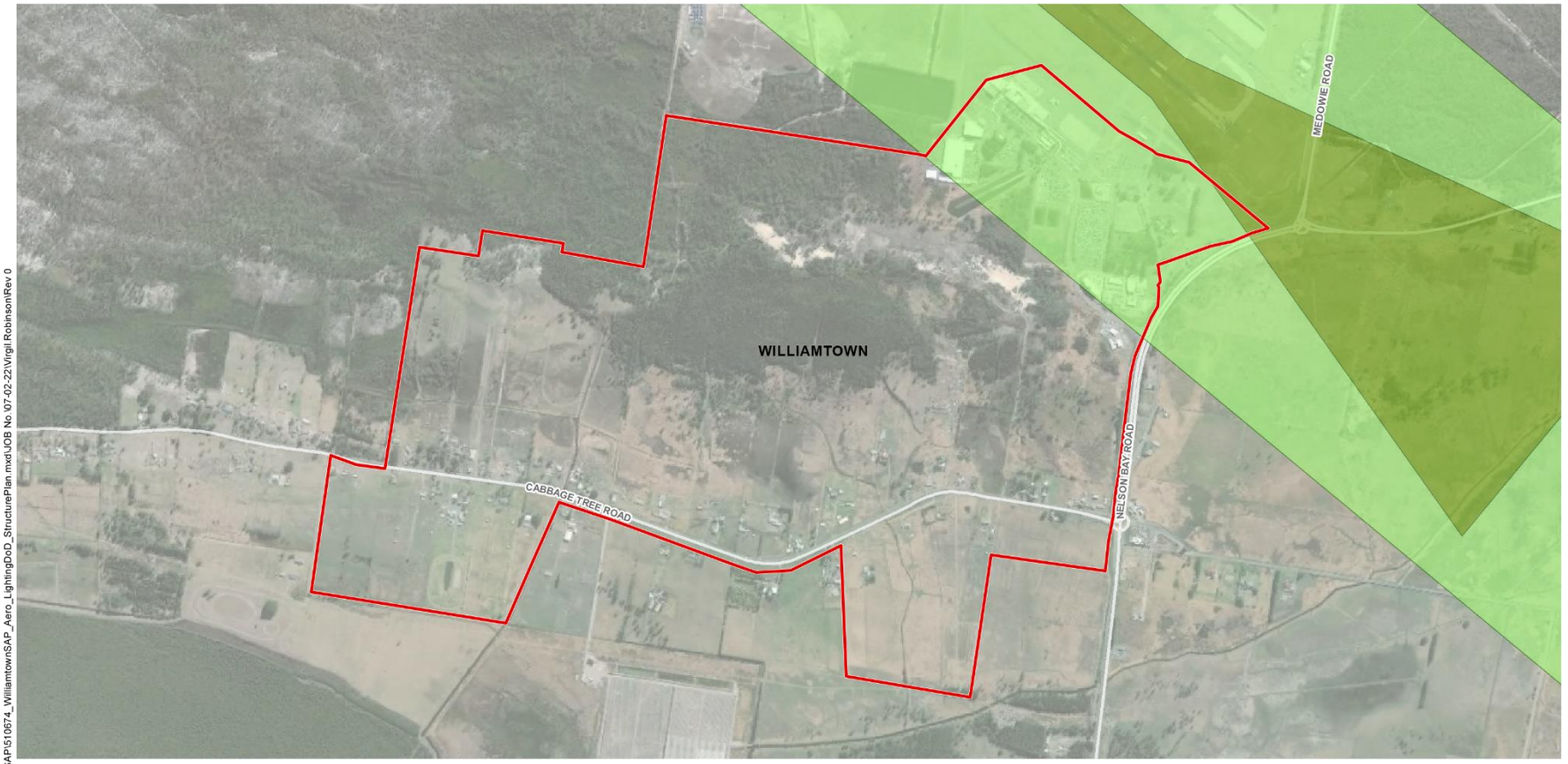
FIGURE: Extraneous Lighting Map 1

Zoomed in Extraneous Lighting Map 1 (Source: Port Stephens DCP 2014–B6, overlaid with SAP Structure Plan Boundary)

aurecon



Williamtown SAP Structure Plan Boundary

Extraneous Lighting (DOD)

No light above the horizontal permitted

Restrictions apply

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Source: Aurecon, TfNSW, NSW Spatial Services, Esri

1:20,000 @ A4

0 200 400 Meters

Projection: GDA 1994 MGA Zone 56

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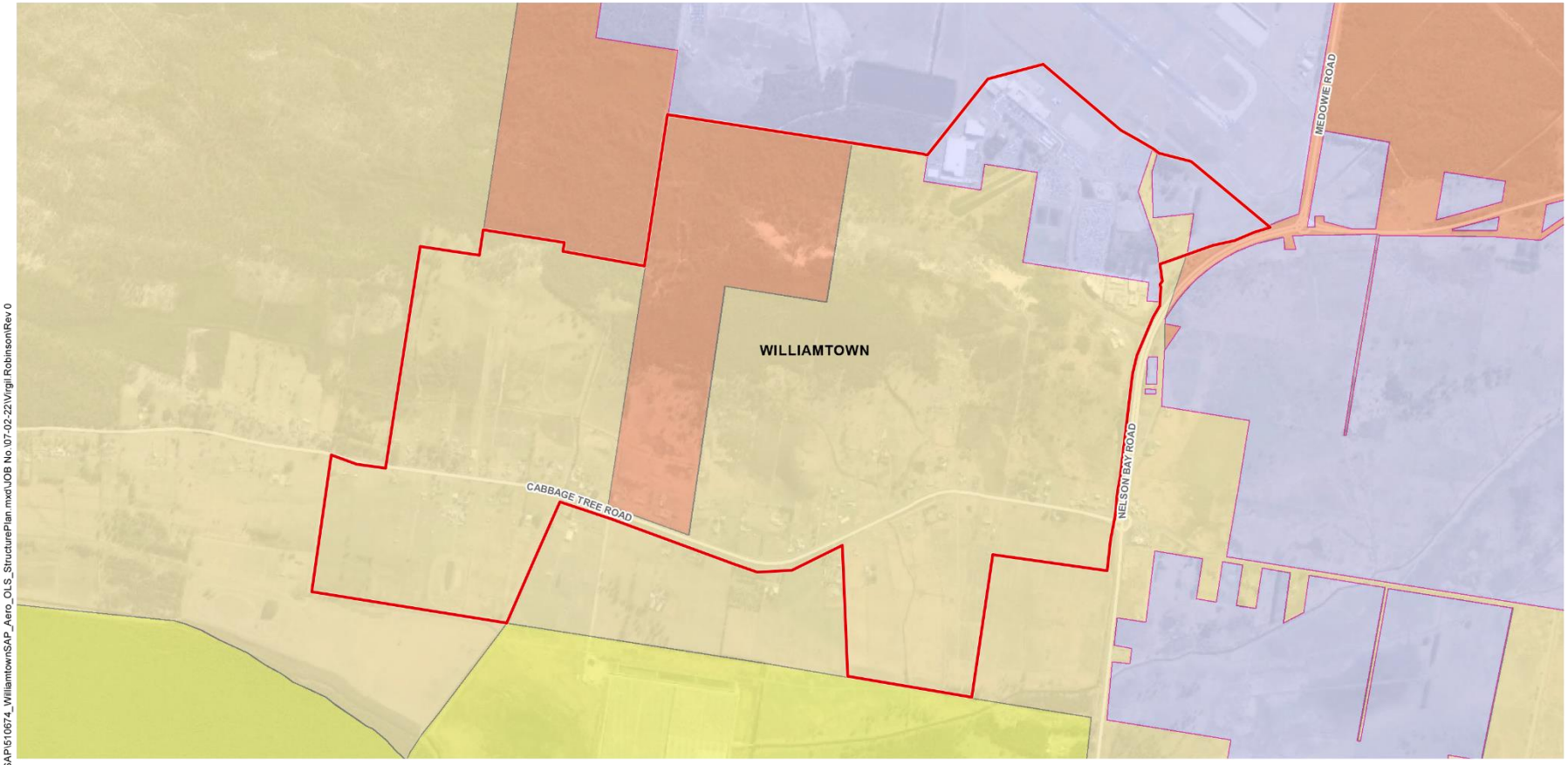
FIGURE: Extraneous Lighting Map 2

Zoomed in Extraneous Lighting Map 2 (Source: Department of Defence, overlaid with SAP Structure Plan Boundary)

aurecon



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Williamtown SAP Structure Plan Boundary

Height Trigger

- Refer all structures
- Refer structures higher than 7.5m
- Refer structures higher than 15m
- Defence Boundaries

Source: Aurecon, TfNSW, NSW Spatial Services, Esri

1:20,000 @ A4

0 200 400 Meters

Projection: GDA 1994 MGA Zone 56

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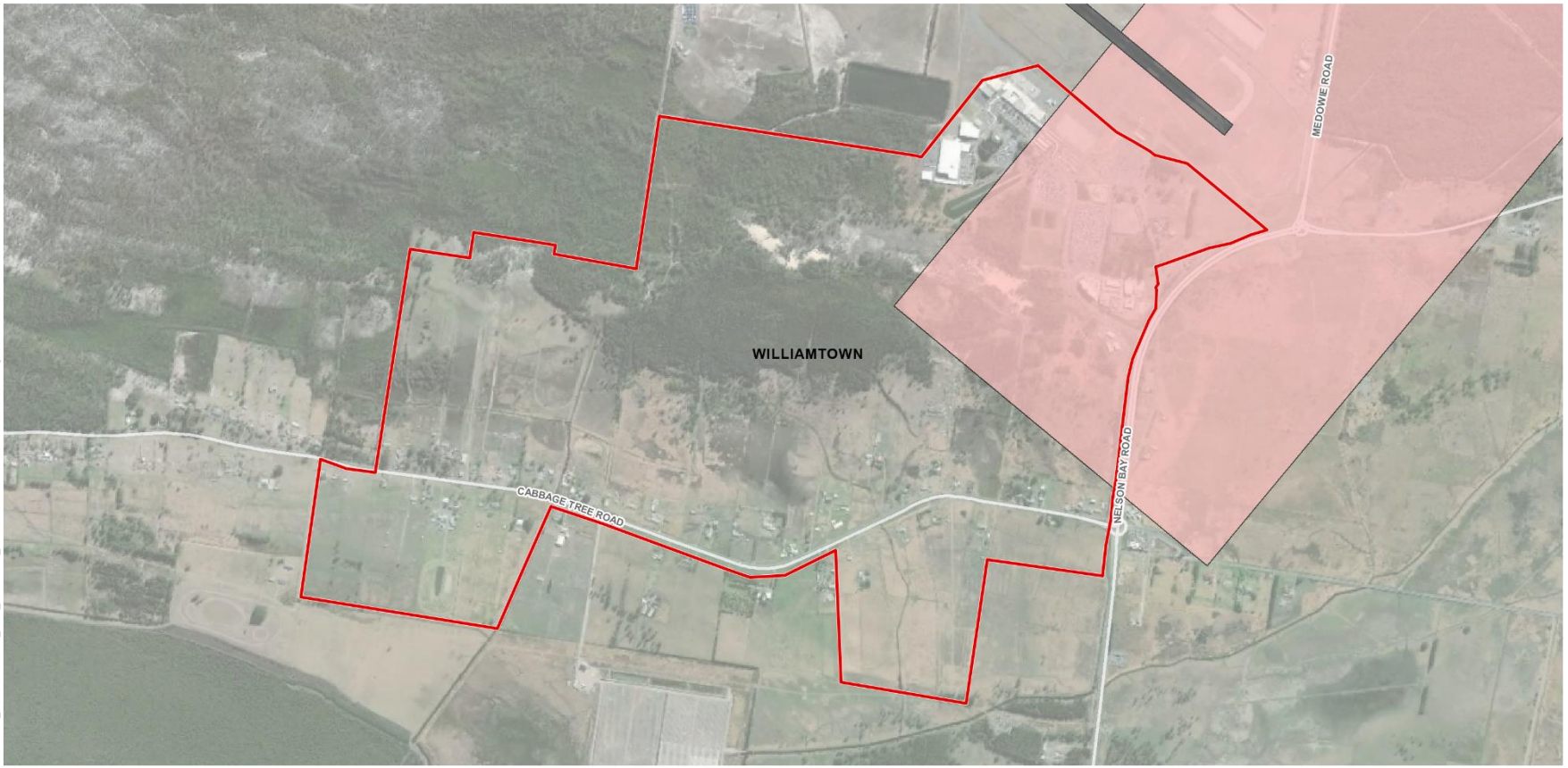
FIGURE: Obstacle Limitation Map

Zoomed in Obstacle Limitation Map (Source: Port Stephens DCP 2014–B6, overlaid with SAP Structure Plan Boundary)



Williamtown SAP Structure Plan Boundary
Runway
Trigger Area

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Source: Aurecon, TfNSW, NSW Spatial Services, Esri

1:20,000 @ A4
0 200 400 Meters

Projection: GDA 1994 MGA Zone 56

Williamtown SAP **Aeronautical**

FIGURE: Windshear

Zoomed in Windshear Assessment Trigger Zones Map (Source: Aurecon 2020, overlaid with SAP Structure Plan Boundary)

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