

APPENDIX

K

AIRPORT ENVIRONMENT

19 June, 2020

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Contact: 

Senior Environmental Scientist
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Attention: 

**RE: TRIPOLI WAY STAGE 1 EXTENSION
AVIATION IMPACT STATEMENT**

1. INTRODUCTION

REHBEIN Airport Consulting has reviewed the Tripoli Way Extension - 80% Complete Concept Design prepared by Cardno (6 May 2020) against the relevant National Airports Safeguarding Framework (NASF) Guidelines. The design information was provided in PDF format as follows:

- Drg Nos. 82016126-01-C2004 – C2013 – General Arrangement Key Plan & Sheets 1 - 9
- Drg Nos. 82016126-01-C2014 – C2015 – Ref Boundary Layout Plan Sheets 1 - 2
- Drg Nos. 82016126-01-C2030 – C2033 – Typical Road Cross Sections Sheets 1 – 4
- Drg Nos. 82016126-01-C2034 – Typical Civil Details
- Drg Nos. 82016126-01-C2040 – C2045 – Road Long Sections Sheet 1 - 6
- Drg Nos. 82016126-01-C2050 – C2070 – Road Cross Sections Sheets 1 - 21
- Drg Nos. 82016126-01-C2090 – C2094 – Intersection Layout Plan Sheets 1 - 5
- Drg Nos. 82016126-01-C2110 – C2118 – Road Pavement Layout Plan Sheets 1 – 9
- Drg Nos. 82016126-01-C2120 – C2128 – Line Marking and Signposting Layout Plan Sheets 1 - 9
- Drg Nos. 82016126-01-C2130 – C2138 – Property Acquisition Layout Plan Sheets 1 - 9
- Drg Nos. 82016126-01-C2140 – C2148 – Service layout Plan Sheets 1 – 9
- Drg Nos. 82016126-01-C2150 – C2161 – Vehicle Turning Path Layout Plan Sheets 1 – 12
- Drg Nos. 82016126-01-C2200 – C2201 – Bridge Over Hazelton Creek General Arrangement Layout Sheets 1- 2
- Drg Nos. 82016126-01-L1000 – L1009 – Landscape: Cover Sheet and Key Plan and Streetscape Plan Sheets 1 - 9
- Drg Nos. 82016126-01-L1020 – L1021 – Landscape: Typical Road Cross Sections Sheets 1 – 2
- Drg Nos. 82016126-01-L1030 – Landscape: Indicative Plant List and Planting Palette
- Conceptual Design Report – 8201612601/Rev 0 (14 May 2020)

2. PROPOSED DEVELOPMENT

The Tripoli Way Extension extends from Broughton Avenue east to the Illawarra Highway west of the Shellharbour Airport. The 80% Concept Design plans provide for the construction of a road connecting to existing roadway network with services, signage, light poles and landscaping.

The eastern extent of the Tripoli Way Extension connecting into the Illawarra Highway at the Taylor Road intersection is approximately one (1) kilometre south west of the Shellharbour Airport.

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Shellharbour Airport (previously known as the Illawarra Regional Airport) is owned and operated by Shellharbour City Council. The airport operates a range of general aviation business and is home to the HARS Aviation Museum and annual 'Wings over Illawarra' air show. Airline services are available from Shellharbour to Brisbane and Melbourne (Essendon) The airport is bordered by the Princes Highway and the railway line to the east, Tongarra Road on the south and the Illawarra Highway to the west.

The airport consists of two runways, Runway 16/34 and Runway 08/26. Runway 16/34 is lit for night operations. Runway 08/26 is currently not lit and operates day time only. For protection of any possible future activity Runway 08/26 will be evaluated as a possible future lit runway.

No detail was provided in relation to the equipment or operations required to construct the Tripoli Way Extension.

3. NATIONAL AIRPORTS SAFEGUARDING FRAMEWORK GUIDELINES

The National Airports Safeguarding Framework (NASF) is a national land use planning framework that aims to:

- Improve community amenity by minimising aircraft noise-sensitive developments near airports including through the use of additional noise metrics and improved noise-disclosure mechanisms; and
- Improve safety outcomes by ensuring aviation safety requirements are recognised in land use planning decisions through guidelines being adopted by jurisdictions on various safety related issues.

All the NASF Guidelines can be found at www.infrastructure.gov.au .

The framework currently consists of nine guidelines, as follows, each has been summarised for its relevance to the Tripoli Way Extension.

3.1 Guideline A (Aircraft Noise)

Guideline A: *Measures for Managing Impacts of Aircraft Noise* provides guidance to Commonwealth, state/territory and local government decision makers to manage the impacts of noise around airports including assessing the suitability of developments.

Given the nature of the proposed development is not sensitive to aircraft noise impacts, Guideline A is not relevant.

3.2 Guideline B (Windshear and Turbulence)

Guideline B: *Managing the Risk of Building Generated Windshear and Turbulence at Airports* provides guidance to Commonwealth, state/territory and local government decision makers and airport operators to manage the risk of building generated windshear and building generated turbulence at airports.

This Guideline relates specifically to buildings and similar structures. The 80% concept design includes light poles and electrical overhead power poles which may be considered slender items that do not fit into this Guideline. The 80% concept design does not identify any substantial structures such as substations or similar elements. Providing there are no “building-like” structures to be included in the design this guideline is not relevant.

However, it is relevant to note that the applicability of this guideline is initially determined by the location of the ‘assessment trigger area’ around the runway. This trigger area extends:

- 1200 m or closer perpendicular from the runway centreline (or extended runway centreline);
- 900 m or closer in front of runway threshold (towards the landside of the airport); and
- 500 m or closer from the runway threshold along the runway.

The easternmost section of the Tripoli Way Extension alignment is within the assessment trigger area for the Shellharbour Airport Runway 08/26 as illustrated on **Figure B16262/B**. At the closest point the road extension is approximately 450 m from the extended Runway 08/26 centreline.

Where a proposed development is within the assessment trigger area, the next step is to consider the height of the building to determine its acceptability. The rule is that buildings should not penetrate a 1:35 surface sloping upwards in the direction perpendicular to the runway centreline. Applying the 1:35 surface, building-like structures should not exceed 13 m in height within the assessment trigger area.

Providing such building-like structures are not included and located in the assessment trigger area in excess of 13 m in height, no further reference is required as per Guideline B.

3.3 Guideline C (Wildlife)

Guideline C: *Managing the Risk of Wildlife Strikes in the Vicinity of Airports* is intended to inform land use planning decisions and the way in which existing land uses are managed in the vicinity of airports with respect to the attraction of wildlife which could present a hazard to aviation, particularly birds and bats.

Attachment 1 to Guideline C provides guidance on the land uses that present a risk of attracting wildlife and triggers based on the distance from the airport. Attachment 1 is a tool to assess plans for new or revised land uses within the airport buffer zones of 3, 8 and 13 kilometres (km).

The Tripoli Way Extension sits within the Shellharbour Airport 3 km buffer zone. Attachment 1 does not list road infrastructure as a land use which may present a wildlife attraction risk. However, to respect the intent of the Guideline it should be noted that areas of standing water, and certain vegetation, have the potential to attract bird and bat populations.

To minimise the risk of standing water, stormwater management should ensure that any basins incorporated into the design are intended for short term holding of water only i.e. emptied within approximately one (1) day.

The 80% Concept Design includes a Landscape: Indicative Plant List and Planting Palette (Cardno Drg No. 82016126-01-L1030/RevA) stating all plant species selected are suitable plant species for the Shellharbour Local Government Area as per the Shellharbour DCP 2017. This suitable plant species list should be confirmed to be consistent with the Shellharbour Airport's requirements.

3.4 Guideline D (Wind Farms)

Guideline D: *Managing the Risk to Aviation Safety of Wind Turbine Installations (Wind Farms)/Wind Monitoring Towers* is not application to the Tripoli Way Extension.

3.5 Guideline E (Lighting)

Guideline E: *Managing the Risk of Distraction to Pilots from Lighting in the Vicinity of Airports* provides guidance on the risk of distractions to pilots of aircraft lighting and light fixtures near airports. The CASA Manual of Standards Part 139 – *Aerodromes Section 9.21: Lighting in the Vicinity of Aerodromes* sets out the restrictions and Guideline E provides advice to lighting suppliers on the general requirements to ensure aviation safety.

The primary area is divided into four light control zones: A, B, C and D. These zones reflect the degree of interference ground lights can cause pilots on approach to a runway. Lighting zones are applied to runways lit for night use.

The Shellharbour Airport Runway 16/34 is the only runway currently lit for night use at the time of writing. For the purposes of future planning for the airport, we have applied the light control zones to Runway 08/26 for future proofing the airport.

The Tripoli Way Extension is outside the lateral extents of the Runway 16/34 existing light control zones as illustrated on **Figure B16262/E1**.

Lighting poles are illustrated on:

- Cardno Drg No 82016126-01-C2201 – Bridge over Hazelton Creek General Arrangement Layout; and
- Cardno Drg No. 82016126-01-C2140/RevB – Service Layout Plan Sheet 1 of 9

The public lighting columns illustrated on the bridge over Hazelton Creek and the existing street lights at the intersection of the Illawarra Highway and Broughton Avenue are outside of the lateral extents of the Runway 08/26 possible future lighting restriction zones as illustrated on **Figure B16262/E2**.

The easternmost section of the Tripoli Way Extension, from approximately Hamilton Road east to and along the Illawarra Highway is within the Runway 08/26 possible future light control zones C and D as illustrated on **Figure B16262/E2**. Zone C allows for a

maximum intensity of light sources, measured at 3 degrees above the horizontal, to be 150 candela (cd). Zone D allows for 450 cd. It is recommended that, to the extent practical the Zone C and D restrictions be taken into account in the final lighting design.

3.6 Guideline F (Protected Operational Airspace)

Guideline F: *Managing the Risk of Intrusions into the Protected Operational Airspace of Airports* is designed to address the issue of intrusions into the operational airspace of airports by tall structures, such as buildings and cranes as well as trees in the vicinity of airports.

The Guideline also addresses activities that could cause air turbulence that could affect the normal flight of aircraft operating in the prescribed airspace and/or emissions of steam, other gas, smoke, dust or other particulate matter that could affect the prescribed airspace in accordance with Visual Flight Rules (VFR).

There are two sets of prescribed airspace to consider as outlined below.

3.6.1 Obstacle Limitation Surfaces

With respect to the Shellharbour Airport Obstacle Limitation Surfaces (OLS) the road alignment is outside the runway approach and departure areas and lies under the inner horizontal surface at 52 m AHD as illustrated on **Figure B16262/F**.

There are a number of elements illustrated in the 80% Concept Design that should be considered against the OLS inner horizontal surface as follows:

- The road surface and standard vehicle clearances;
- The existing electrical poles to be relocated to the proposed verge with details to be confirmed at the detailed design stage;
- Street lights at the Broughton Avenue intersection that currently exist and will be removed for earthworks and reinstated at completion with details confirmed at the detailed design stage;
- Public lighting columns on the bridge over Hazelton Creek to be confirmed at the detailed design stage; and
- Signage.

Cardno Drg No. 82016126-01-C2008/RevB illustrates the highest point in the road level to be 16.5 m AHD. Details of poles heights etc. above ground have not been provided, however we would expect most poles associated with roads to be no more than 15 m high. Providing all poles and signposts are no higher than 15 m above the highest point in the road level, the maximum height of any structure would be approximately 32 m AHD.

Structures at a maximum 32 m AHD will not infringe the OLS inner horizontal surface. Any structures exceeding 32 m AHD must remain below 52 m AHD to avoid infringing the OLS.

3.6.2 Procedures for Air Navigation Services – Aircraft Operations

The existing Shellharbour Airport Procedures for Air Navigation Services - Aircraft Operations (PANS-OPS) protection surfaces include:

- GNSS Arrival;
- NBD-A;
- RNAV-Z (GNSS) Runway 16; and
- RNAV-Z (GNSS) Runway 34.

A preliminary assessment of the protection surfaces indicates that the critical surface in relation to the Tripoli Way Extension is the RNAV-Z (GNSS) Runway 16 primary area. However, we estimate this surface to be higher than the OLS elevation of 52 m AHD.

Any structure at a maximum elevation of 32 m AHD should not infringe the PANS-OPS critical surface.

Airservices Australia is the custodian of the Shellharbour Airport instrument flight procedures and associated PANS-OPS surfaces, and as such any impact on procedures will need to be confirmed by Airservices Australia at the request of the airport operator.

3.7 Guideline G (CNS)

Guideline G: *Protecting Aviation Facilities – Communication, Navigation and Surveillance (CNS)* provides land use planning guidance to better protect CNS facilities which support the systems and processes in place by Airservices Australia, the Department of Defence or other agencies under contract with the Australian Government to safely manage the flow of aircraft into, out of and across Australian airspace.

Airservices Australia operates a Non-Directional Beacon (NDB) navigation aid at Shellharbour Airport. The proposed road works are outside the Building Restricted Area for the NDB as set out in Guideline G (a 300 metre radius from the NDB) and should not impact the operation of the facility.

3.8 Guideline H (Helicopter Landing Sites)

Guideline H: *Protecting Strategically Important Helicopter Landing Sites (HLS)* provides guidance to state/territory and local government decision makers as well as the owner/operators of identified strategically important HLS.

The Wollongong Hospital HLS (YXWL) is located approximately 18 kilometres north east of the proposed Tripoli Way Extension. The road is not within the extents of the obstacle protection areas identified within Guideline H, which extend approximately 3.5 kilometres from the HLS.

3.9 Guideline I (Public Safety Areas)

Guideline I: *Managing the Risk in Public Safety Areas at the Ends of Runways* provides guidance on approaches for the application of a Public Safety Area (PSA) planning

framework in Australian jurisdictions. This Guideline is intended to ensure there is no increase in risk from new development and assist land-use planners to better consider public safety when assessing development proposals, rezoning requests and when developing strategic plans.

A PSA is a designated area of land at the end of an airport runway within which development may be restricted in order to control the number of people on the ground around runway ends. Roads and transport corridors are identified as uses which required careful consideration within a PSA.

The Tripoli Way Extension is not within the PSAs when defined using the Queensland State Planning Policy PSA Model as described in Attachment 2 to the Guideline and illustrate on **Figure B16262/I**.

4. CONSTRUCTION CONSIDERATIONS

Detailed information in relation to construction of the Tripoli Way Extension has not been provided.

The construction sequencing and methodology should be considered in relation to the OLS and PANS-OPS surfaces, at the appropriate time prior to construction commencing.

As illustrated in **Figure B16262/F**, the OLS limit is the most restrictive at 52 m AHD.

Penetrations of the OLS will need to be reviewed and approved by the Shellharbour Airport operator (Shellharbour City Council) in consultation with the relevant aviation authorities including the Civil Aviation Safety Authority (CASA) and Airservices.

5. CONCLUSION

A summary of the Tripoli Way Extension 80% Concept Design assessment against the National Airports Safeguarding Framework guideline is provided below:

Guideline	Assessment
NASF Guideline A Aircraft Noise	Not Applicable
NASF Guideline B Windshear & Turbulence	§ Substantial (building-like) structures should not exceed 13 m in height in the assessment trigger area to avoid further assessment.
NASF Guideline C Wildlife	§ Shellharbour Airport to review and comment on the plant species list; and § Stormwater management should ensure that any basins incorporated into the design are intended for short term holding of water only i.e. emptied within approximately one (1) day.
NASF Guideline D Wind Farms	Not Applicable

19 June, 2020

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Contact: Bridget Wouts

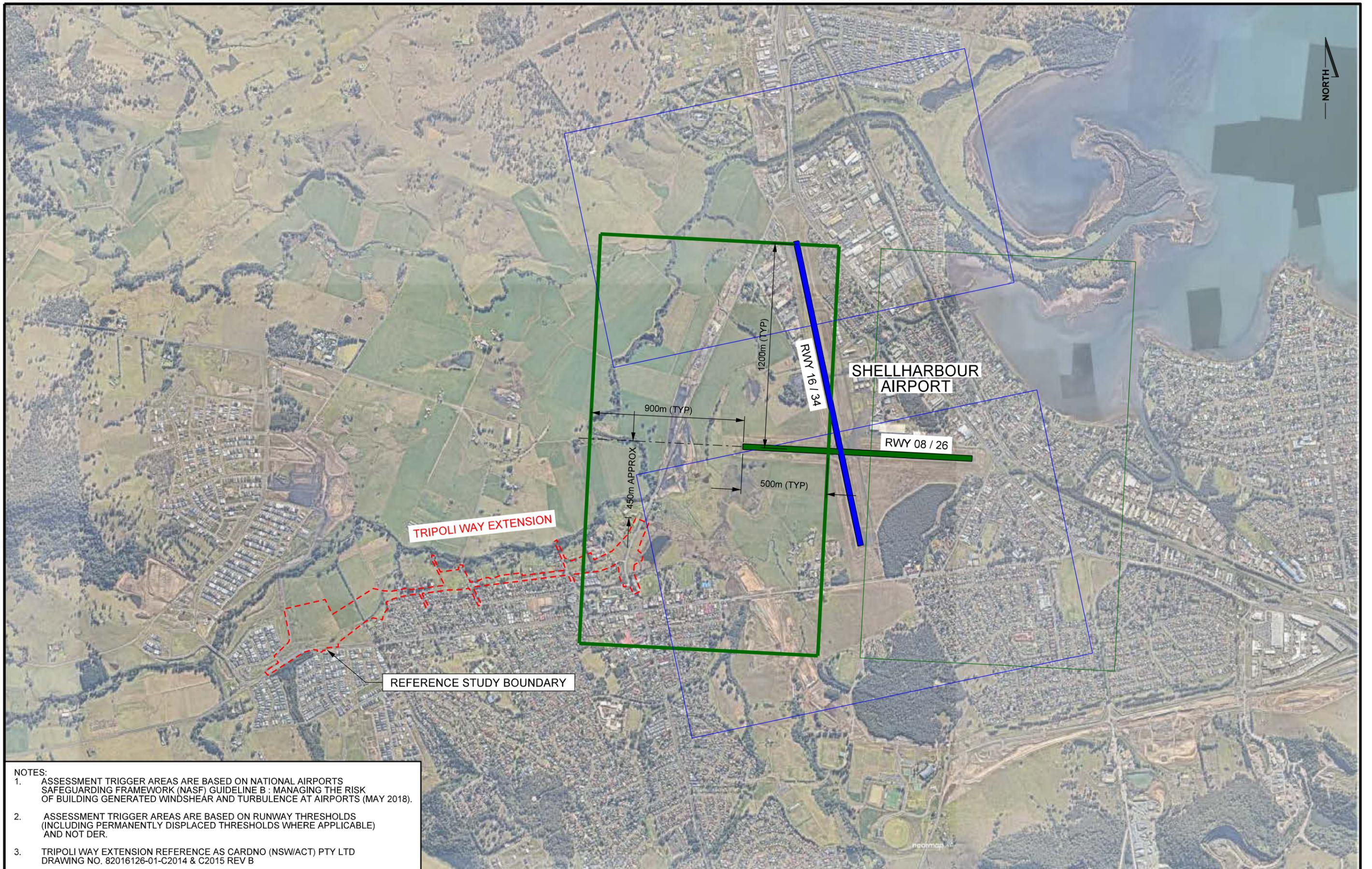
Guideline	Assessment
NASF Guideline E Lighting	§ Zone C and D lighting restrictions should be taken into account in the final lighting design, to accommodate for potential future lighting of Runway 08/26
NASF Guideline F Protected Operational Airspace	§ Based on an estimated maximum height of any structure at approximately 32 m AHD there would be no infringement of the OLS inner horizontal at 52 m AHD; § Preliminary assessment of the PANS-OPS indicates the instrument approach procedures surfaces to be higher than the OLS. § Any impact on the PANS-OPS procedures will need to be confirmed by Airservices Australia at the request of the airport operator
NASF Guideline G CNS	§ The proposed development is outside the Building Restricted Area for the NDB as set out in Guideline G.
NASF Guideline H Helicopter Landing Sites	§ The proposed development is outside the extents of the Wollongong Hospital HLS obstacle protection areas identified within Guideline H.
NASF Guideline I Public Safety Areas	§ The proposed development is outside the PSAs when defined using the Queensland State Planning Policy PSA Model as described in Attachment 2 to the Guideline.
Construction	§ Construction sequencing and methodology should be considered in relation to the OLS and PANS-OPS surfaces. The most restrictive limit over the site is the OLS inner horizontal at 52 m AHD. All intrusions above 52 m AHD must be reviewed and assessed by the airport operator in consultation with the relevant aviation authorities.

For further assistance or enquiries in relation to this matter please do not hesitate to contact the undersigned.

Yours faithfully
For and on behalf of
LAMBERT & REHBEIN (SEQ) PTY LTD



Enc: Figure B16262/B - Building Generated Windshear & Turbulence Assessment Trigger Areas
Figure B16262/E1 - Maximum Lighting Intensity Zones
Figure B16262/E2 - Possible Future Maximum Lighting Intensity Zones
Figure B16262/F - Protected Operational Airspace Obstacle Limitation Surfaces
Figure B16262/I - Public Safety Areas



- NOTES:
1. ASSESSMENT TRIGGER AREAS ARE BASED ON NATIONAL AIRPORTS SAFEGUARDING FRAMEWORK (NASF) GUIDELINE B : MANAGING THE RISK OF BUILDING GENERATED WINDSHEAR AND TURBULENCE AT AIRPORTS (MAY 2018).
 2. ASSESSMENT TRIGGER AREAS ARE BASED ON RUNWAY THRESHOLDS (INCLUDING PERMANENTLY DISPLACED THRESHOLDS WHERE APPLICABLE) AND NOT DER.
 3. TRIPOLI WAY EXTENSION REFERENCE AS CARDNO (NSW/ACT) PTY LTD DRAWING NO. 82016126-01-C2014 & C2015 REV B

Project:
**TRIPOLI WAY EXTENSION
 AVIATION ASSESSMENT**

Client: CARDNO (NSW/ACT) PTY LTD

Title: NASF GUIDELINE B
 BUILDING GENERATED WINDSHEAR & TURBULENCE
 ASSESSMENT TRIGGER AREAS

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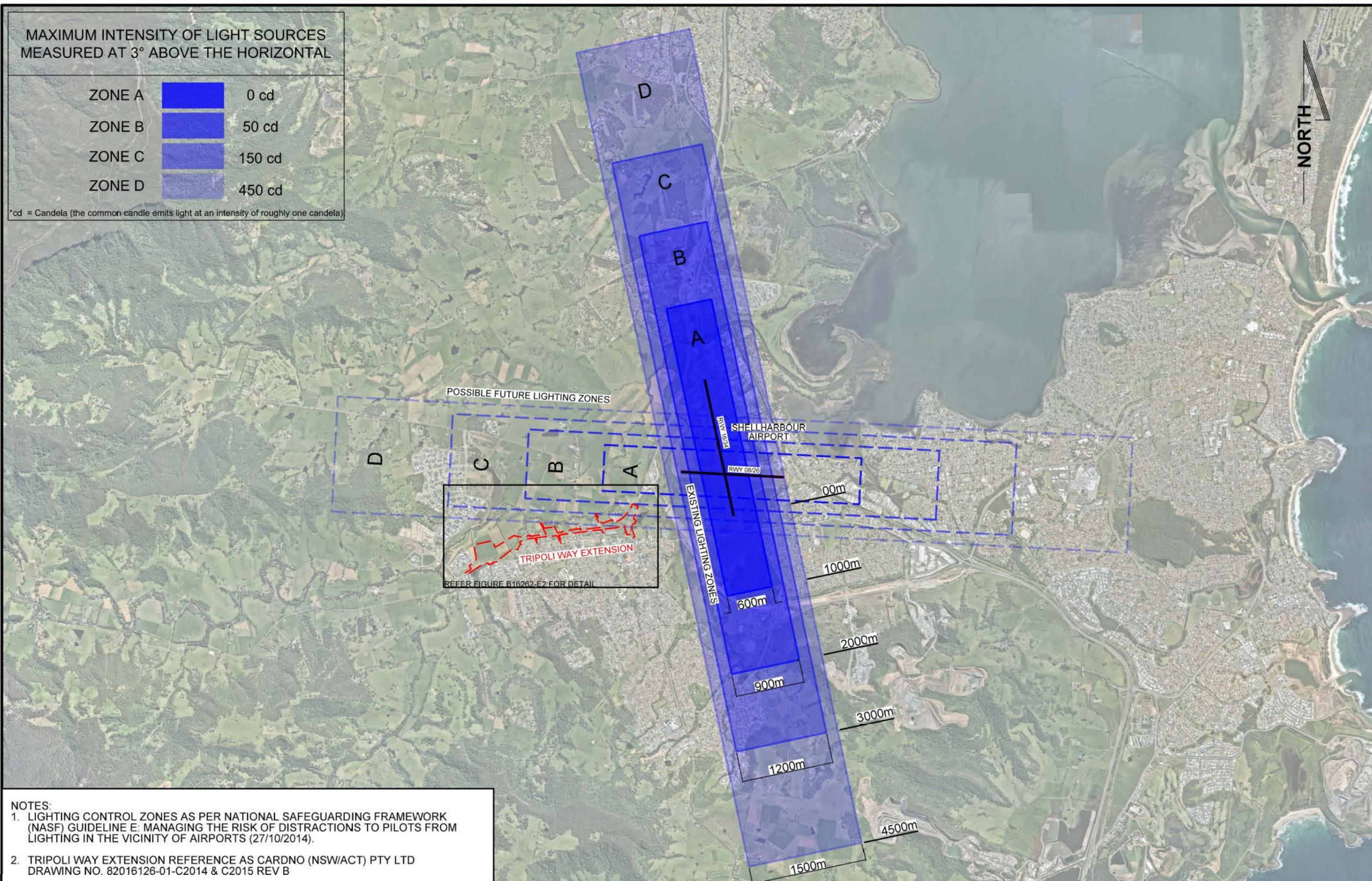
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MAXIMUM INTENSITY OF LIGHT SOURCES
MEASURED AT 3° ABOVE THE HORIZONTAL

ZONE A		0 cd
ZONE B		50 cd
ZONE C		150 cd
ZONE D		450 cd

*cd = Candela (the common candle emits light at an intensity of roughly one candela)



- NOTES:
- LIGHTING CONTROL ZONES AS PER NATIONAL SAFEGUARDING FRAMEWORK (NASF) GUIDELINE E: MANAGING THE RISK OF DISTRACTIONS TO PILOTS FROM LIGHTING IN THE VICINITY OF AIRPORTS (27/10/2014).
 - TRIPOLI WAY EXTENSION REFERENCE AS CARDNO (NSW/ACT) PTY LTD DRAWING NO. 82016126-01-C2014 & C2015 REV B

Project
**TRIPOLI WAY EXTENSION
AVIATION ASSESSMENT**

Client **CARDNO (NSW/ACT) PTY LTD**
Title **NASF GUIDELINE E
MAXIMUM LIGHTING INTENSITY ZONES**



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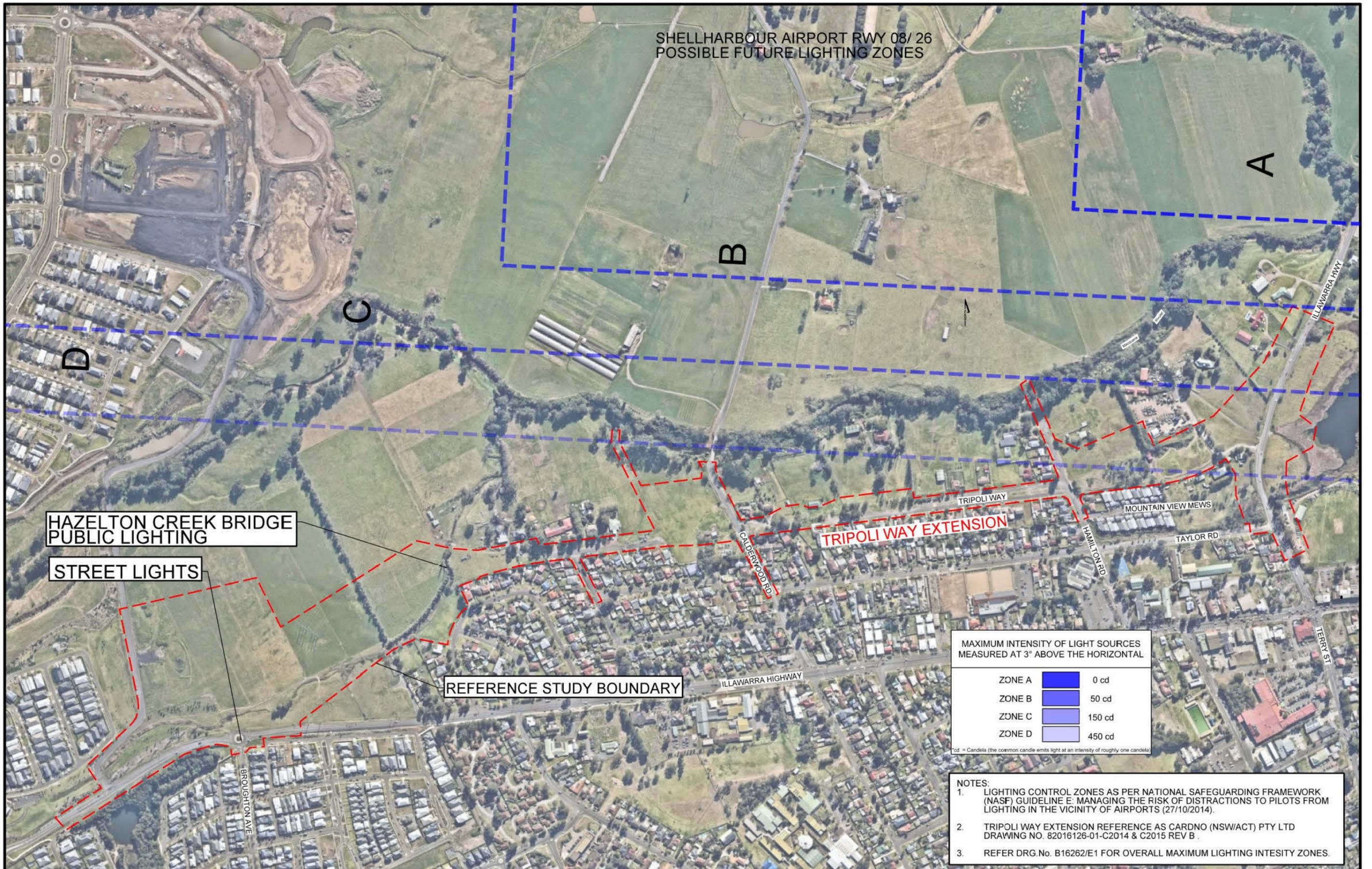
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Project TRIPOLI WAY EXTENSION AVIATION ASSESSMENT	Client CARDNO (NSW/ACT) PTY LTD	 SUITE 1, GROUND FLOOR 55 WALSH STREET WEST MELBOURNE VIC 3003 A C N 110 685 160 TELEPHONE (03) 9328 4366 FACSIMILE (03) 9328 4255 EMAIL mail@rehbein.net.au	Figure No B16262/E2
	Title NASF GUIDELINE E - POSSIBLE FUTURE MAXIMUM LIGHTING INTENSITY ZONES		Scale 16,000
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Shellharbour Airport Existing Obstacle Limitation Surfaces based on:
 RWY 16 / 34 Code 3 Instrument Non-precision
 RWY 08 / 26 Code 2 Non-Instrument
 Reference Elevation Datum - 7.0m AHD
 (AIP Australia 21 May 2020 FAC YSHL-1)
 (AIP Australia DAP 163 Effective 21 May 2020 YSHL)

SHELLHARBOUR AIRPORT

ILLAWARRA HIGHWAY

RWY 16 / 34

RWY 08 / 26

52 50 40 30 20 10

OLS TRANSITIONAL SFC

OLS INNER HORIZONTAL SFC
 HP 52m AHD

PROPOSED ROAD SURFACE
 MAX. ELEV. 16.5m AHD

TRIPOLI WAY EXTENSION

REFERENCE STUDY BOUNDARY

Macquarie

Rivulet

TERRY ST

MOLES ST

- NOTES:
1. TRIPOLI WAY EXTENSION REFERENCE AS CARDNO (NSW/ACT) PTY LTD DRAWING NO. 82016126-01-C2014 & C2015 REV B
 2. ALL ELEVATIONS INDICATED ARE METRES ABOVE THE AUSTRALIAN HEIGHT DATUM (mAHD).
 3. HP DENOTES HORIZONTAL PLANE.

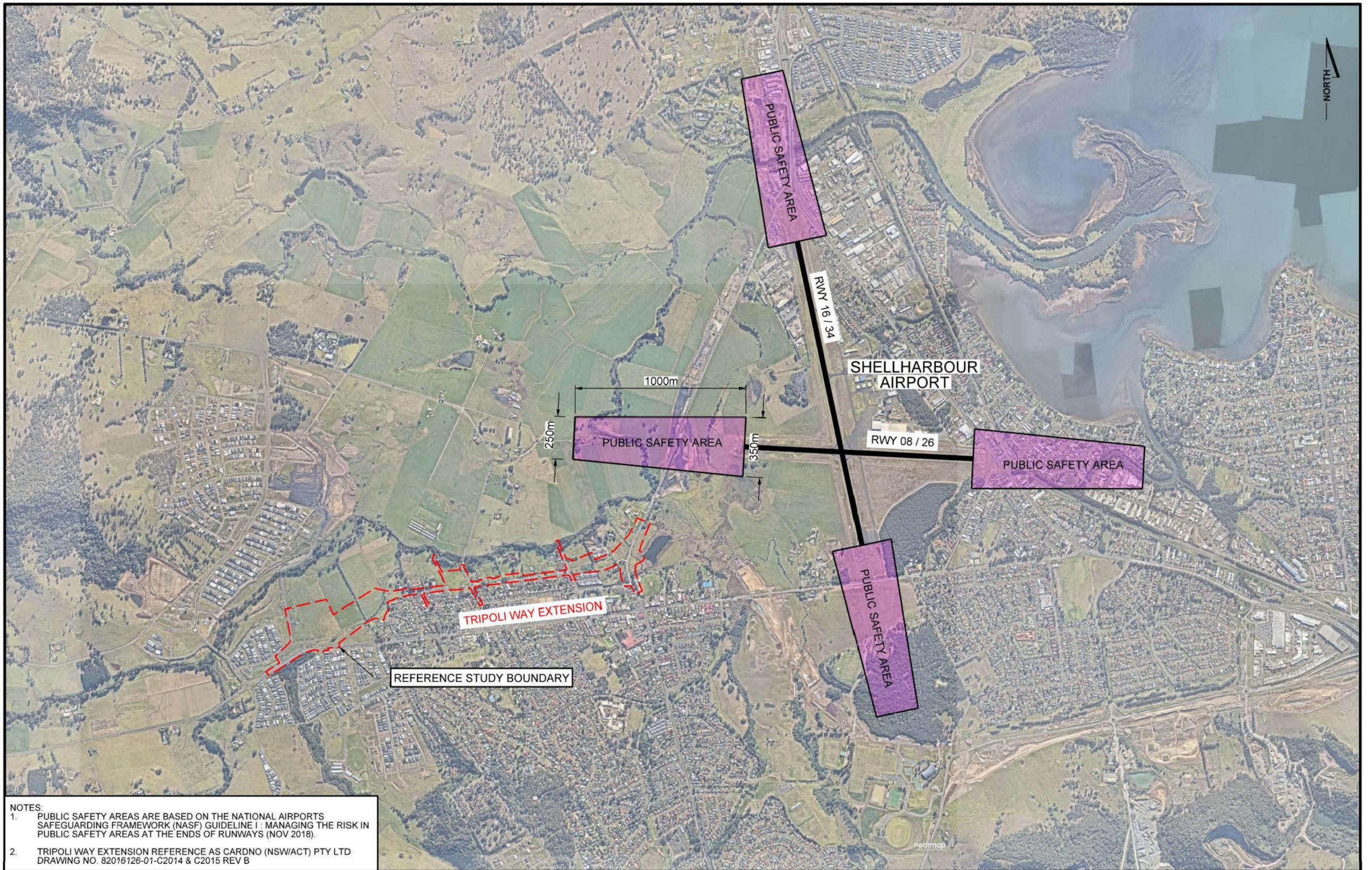
Project: TRIPOLI WAY EXTENSION AVIATION ASSESSMENT

Client: CARDNO (NSW/ACT) PTY LTD
 Title: NASF GUIDELINE F PROTECTED OPERATIONAL AIRSPACE OBSTACLE LIMITATION SURFACES

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- NOTES:
1. PUBLIC SAFETY AREAS ARE BASED ON THE NATIONAL AIRPORTS SAFEGUARDING FRAMEWORK (NASF) GUIDELINE I : MANAGING THE RISK IN PUBLIC SAFETY AREAS AT THE ENDS OF RUNWAYS (NOV 2018).
 2. TRIPOLI WAY EXTENSION REFERENCE AS CARDNO (NSW/ACT) PTY LTD DRAWING NO. 82016126-01-C2014 & C2015 REV B

Project
 TRIPOLI WAY EXTENSION
 AVIATION ASSESSMENT

Client
 CARDNO (NSW/ACT) PTY LTD

Title
 NASF GUIDELINE I
 PUBLIC SAFETY AREAS

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