

GHDWoodhead

**52 MCLAREN STREET NORTH SYDNEY
REVIEW OF AIRSPACE IMPLICATIONS OF PROPOSED
DEVELOPMENT
FINAL REPORT**

SUBMITTED BY

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**The purpose of this form is to ensure that documents are reviewed and approved prior to issue. The form is to be bound into the front of all documents released for the Project.*

**PROPOSED MIXED USE DEVELOPMENT - 52 MCLAREN STREET NORTH
SYDNEY**
REVIEW OF AIRSPACE IMPLICATIONS OF PROPOSED DEVELOPMENT
Version 2.0 FINAL

1.0 INTRODUCTION

This report supports a Planning Proposal Application for a proposed mixed-use commercial / residential development, comprising two multi-storey buildings, to be located at 52 McLaren Street, North Sydney. The report concerns the impact, if any, of the proposed development on the airspace over North Sydney, and on aircraft flight operations at Sydney Airport due to the proposed development.

2.0 SITE DESCRIPTION

The site of the proposed mixed-use development at 52 McLaren Street is DP 218407, located on the north side of McLaren Street, east of Miller Street and west of Walker Street, in the North Sydney CBD. The site is generally rectangular in planform and is located immediately adjacent to the North Sydney Rydges Hotel at 54 McLaren Street, which is situated on the east side of the proposed development land parcel (**Exhibit 1**).

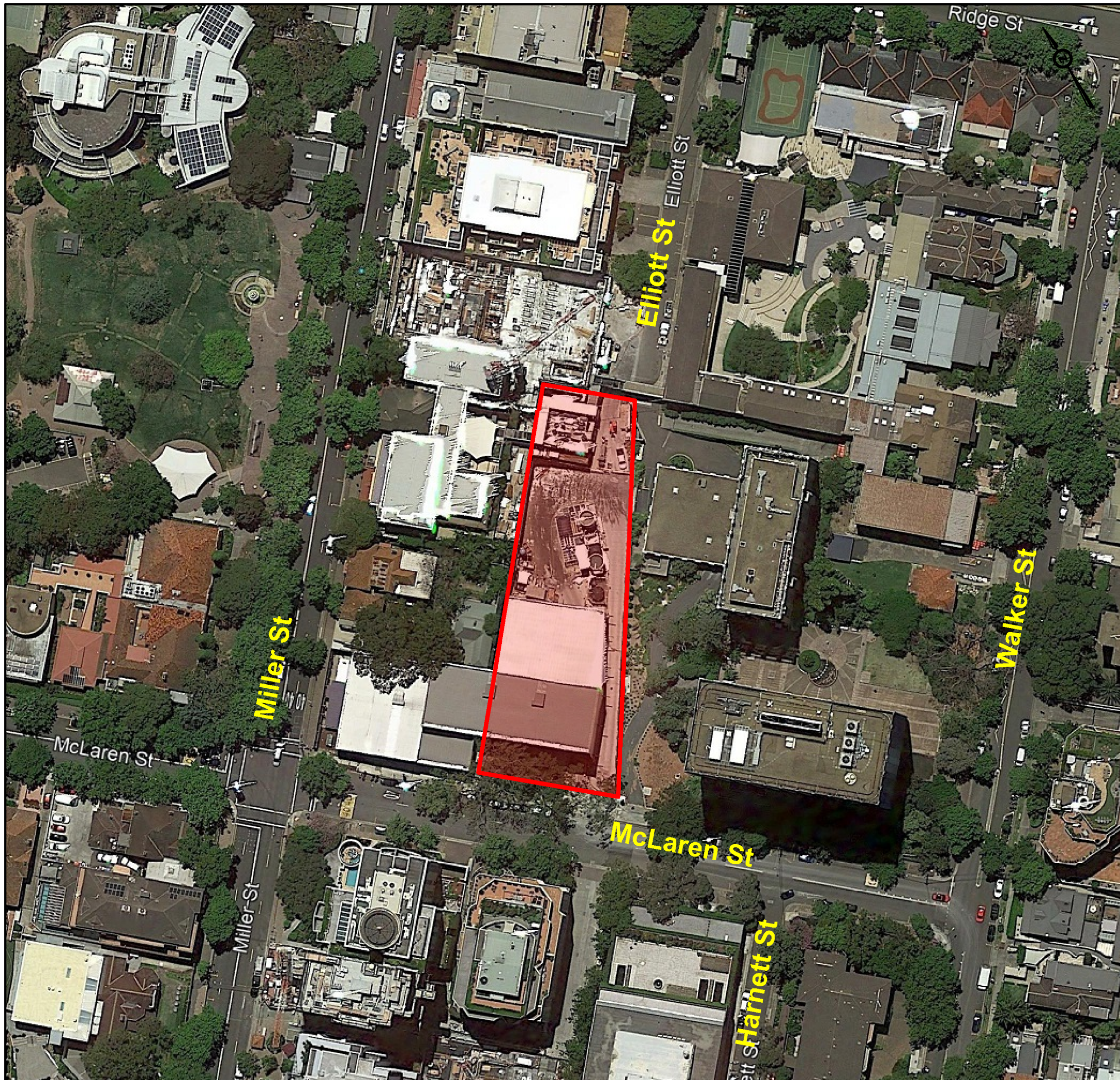
Ground elevations across the site range from approximately 73m AHD at McLaren Street to 77m AHD at the northern limits of the site.

Surrounding land uses are of a mixed-use commercial nature, comprising several low-to-medium rise buildings.

3.0 OVERVIEW OF THE PROPOSED DEVELOPMENT AT 52 MCLAREN STREET

The Planning Proposal for 52 McLaren Street, is for a mixed-use commercial/residential development in North Sydney. The proposed development is prepared as 24 storey mixed-use building to the south, comprising 3 levels of commercial development and 21 levels residential. The building to the north consists of a 7 storey mixed-use building, containing 2 levels of commercial, 1 level of childcare, and 5 levels of residential.

From an airspace perspective, the key element of the proposal is the top elevations for the buildings. The South Building which is the taller of the two buildings in the proposed development, has an elevation of 156m AHD. An indicative scheme has been prepared as part of the Planning Proposal to illustrate the proposed development, and an image of the East Elevation of the development is provided as **Exhibit 2**.



SOURCE : GOOGLE IMAGE

52 McLaren St - North Sydney

Note:

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Legend

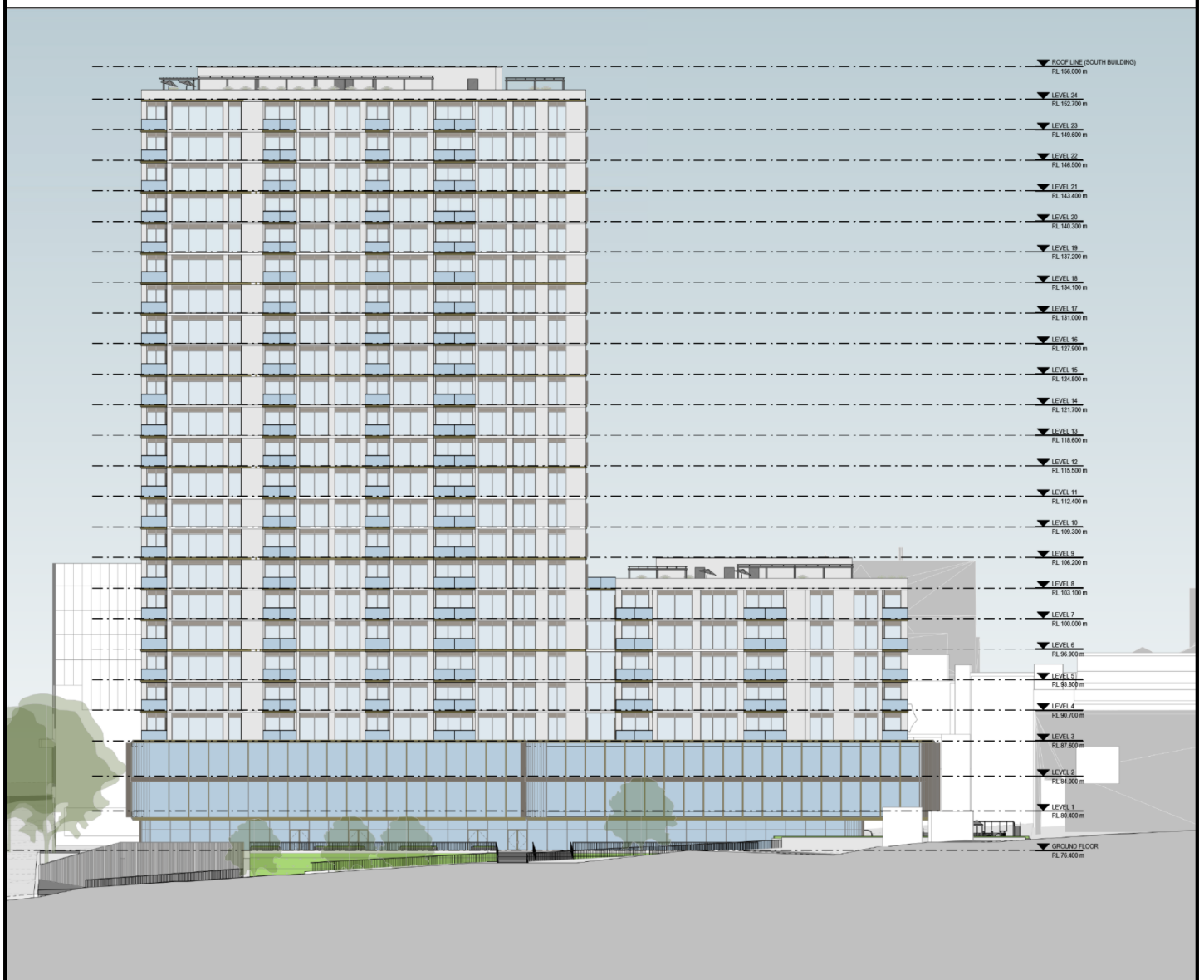
52 McLaren St North Sydney Development Site

Exhibit 1 52 McLaren St - North Sydney Site Plan

Scale :



Exhibit 2
52 McLaren St - North Sydney
East Elevation - Commercial



4.0 AIRSPACE ENVIRONMENT FOR THE PROPOSED DEVELOPMENT

The proposed development at 52 McLaren Street is within the North Sydney Central Business District among other low and medium-rise structures. Within the immediate environs of the proposed development, and adjacent to it, there are several multi-level structures, the closest of which are:

- Victoria Cross Building Northern Entrance	105.6m AHD
- Wenona School	95.1m AHD
- Rydges Hotel	123.7m AHD

None of these nearby buildings rise above the “marker” elevation of 156m AHD which represents the elevation of the Outer Horizontal Surface of the Obstacle Limitation Surfaces (OLS) for safeguarding the Sydney Airport airspace over the North Sydney municipality. None of the existing nearby development therefore penetrates the critical protected obstacle safeguarding surfaces for the Sydney Airport. For the proposed new development at 52 McLaren Street, as the proposed elevations of its two buildings are 106.2m AHD for the North Building and 156.0m AHD for the South Building, the structures proposed for the site at 52 McLaren Street would not rise above the Outer Horizontal Surface for the Sydney Airport either, and neither building would therefore constitute a violation of the protected airspace as far as the airport’s obstacle limitation surfaces are concerned.

It is to be noted that there are proposals for development of other structures in the immediate vicinity of the 52 McLaren Street development site, and both are directly adjacent to it. Both are for sites immediately east of the subject development. One is for an addition of a Conference Centre building on the west side of Rydges Hotel at 54 McLaren Street, for which a proposed top elevation is indicated in the development application as 90.88m AHD. The other is for development of a site adjacent to Rydges Hotel at 168 Walker Street, comprising a number of buildings, the westernmost of which is to have a top elevation of 156.81m AHD, while the easternmost building is indicated in the Development Application (DA 48615) as having a top elevation of 167.51m AHD. This proposed development at 168 Walker Street does therefore propose structures taller than that proposed for 52 McLaren Street, and these taller structures both exceed the maximum elevation of the Outer Horizontal Surface of the Sydney Airport OLS. As the status of 168 Walker Street with respect to the airspace, is not known at the time of writing this report, 168 Walker Street cannot yet be regarded as providing any ‘shielding’ effect for the purposes of obstacle assessment, and the proposal to develop the site at 52 McLaren Street must therefore be assessed on its own merits as far as airspace implications are concerned.

Aside from the existing, and proposed, buildings in North Sydney, the highest, and therefore the most critical structure that forms an obstacle to aviation, in the protected airspace for Sydney Airport is a structure rising to 334.06m AHD over the Sydney CBD. This is approximately 3km south of the proposed development at 52 McLaren Street in North Sydney. This governing obstacle in the Sydney CBD is noted on aeronautical charts as having a top elevation of 1096ft (334.06m) AHD. There are also other tall structures (TV Masts) located to the north of the Sydney Harbour which are also within the Sydney Control Zone at 8.5NM from the Sydney Airport, and these rise to 1076FT (327.9m AHD). The governing obstacle for the airspace to the north of the airport, including over Sydney CBD and North Sydney, is therefore this structure rising to 334.06m AHD and this therefore sets the Minimum Sector Altitude (MSA) for aircraft operating in the airspace of the Control Zone of the Sydney Airport and within 10NM of the airport. Based on an obstacle clearance requirement of 1000FT over the governing

obstacle, rounded up to the nearest 100FT to 1100FT (335.3m) AHD, the MSA is therefore set at 2100FT (640m) AHD.

5.0 ASSESSMENT OF IMPACT OF PROPOSED DEVELOPMENT AT 52 MCLAREN STREET NORTH SYDNEY ON PROTECTED AIRSPACE AND AIRCRAFT OPERATIONS AT SYDNEY AIRPORT

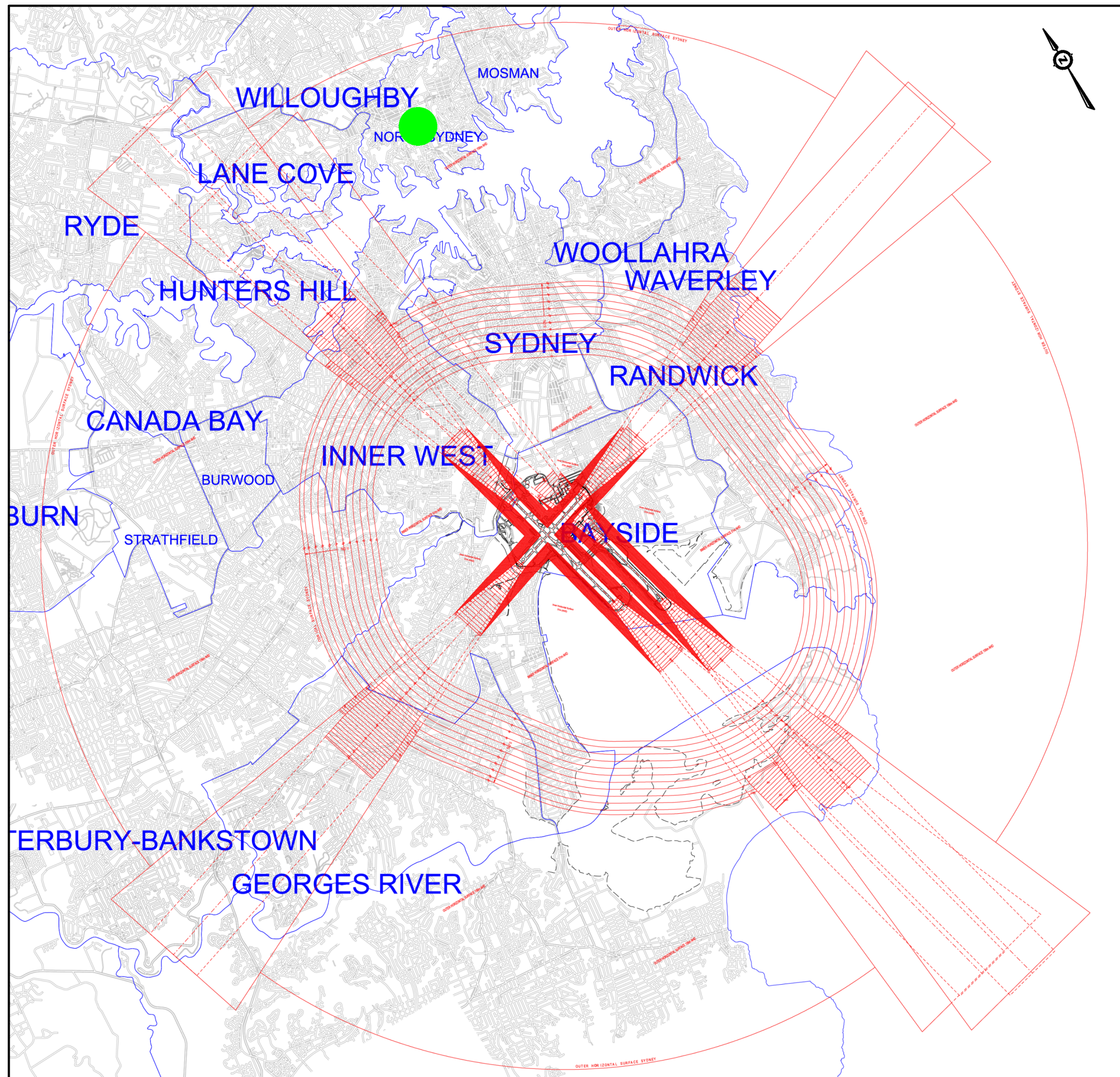
The airspace over North Sydney is protected from erection of obstacles that might compromise aircraft safety in the following ways:

- By protection of the Sydney Airport Obstacle Limitation Surfaces, defined by the Civil Aviation Safety Authority (CASA) and promulgated under the *Civil Aviation Safety Regulations Part 139*;
- By protection of the Obstacle Identification Surfaces (OIS) required to safeguard the flight procedures defined for the Sydney Airport, and known as the PANS-OPS surfaces (as specified in ICAO Doc 8168 Procedures for Air Navigation Services – Operations), and defined, monitored and amended from time to time by Airservices Australia;
- By protection of several other surfaces of relevance to aviation that protect the signal transmission from ground-based air navigation aids (including radar equipment), protect the visibility of airfield lighting such as High Intensity Approach Lighting for approaching aircraft, protect terrain clearance for aircraft vectored in the airspace under radar guidance, and protect the visibility of the Precision Approach Path Indicator systems (PAPI) for landing aircraft.

Protection of the airspace from erection of obstacles that could create a hazard to aviation either by infringing vertically into the airspace so as to create a collision risk, or by obscuring electromagnetic transmissions from navigation aids and visibility of airfield lighting systems, is achieved by regulation of the required protection surfaces by the Commonwealth Government - Department of Infrastructure and Regional Development - under the *Airports (Protection of Airspace) Regulations*. In this report, the effect of the proposed development on all of these protected surfaces and installations is assessed, and described in the sections below.

5.1 Sydney Airport Obstacle Limitation Surfaces

As far as erection of obstacles that could affect aircraft operations at, or above, Sydney Airport is concerned, a set of obstacle limitation surfaces (OLS) has been established by CASA to ensure that obstacles are not erected that might represent a hazard to flight operations for aircraft arriving at, or departing from, Sydney Airport, or otherwise circling around or over Sydney Airport, or transiting the Sydney airspace. These surfaces define the required areas within which obstacles are to be assessed, monitored and controlled so that additional hazards are not created due to obstacles that are too high, or inappropriately located, with respect to safe aircraft flight operations. While the defined OLS are designed to enable the aviation regulator to control and prevent erection of obstacles that might have an adverse effect on safe flight operations, they are also intended to define the maximum height to which obstacles can safely be erected beneath the OLS, and where obstacles may penetrate the protected OLS but may still be permitted on the basis of an aeronautical study that demonstrates that such violations of the OLS do not result in a hazard to aircraft operations. The OLS applicable to the Sydney Airport are illustrated in **Exhibit 3**.



52 McLaren St - North Sydney

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 52 McLaren St North Sydney Development Site

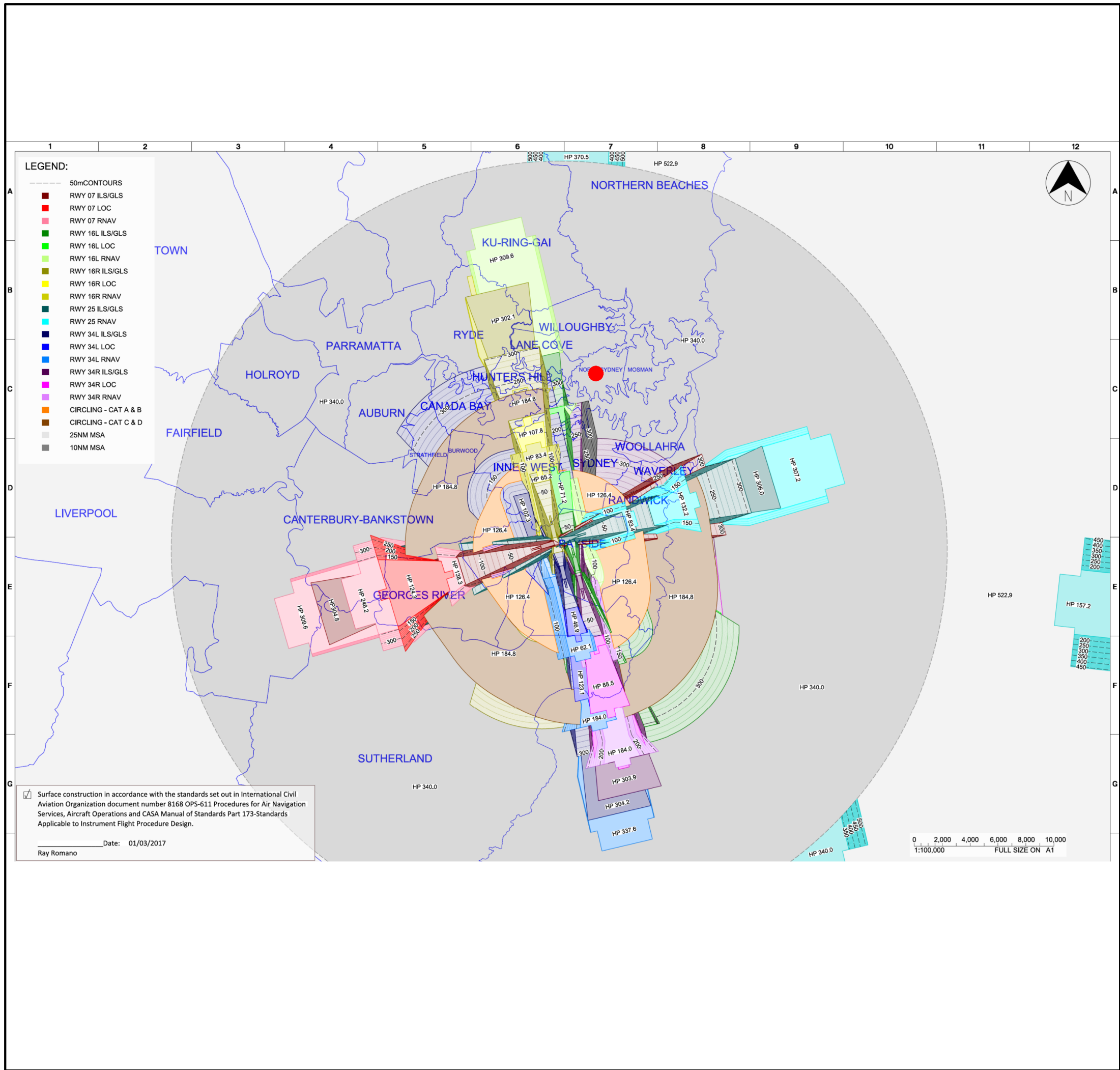
Exhibit 3
 52 McLaren St - North Sydney
 Sydney Airport
 Obstacle Limitation Surfaces

In relation to the Sydney Airport, the proposed development at 52 McLaren Street, North Sydney, is located approximately 12.4KM to the NNE of Sydney Airport, outside the critical approach and take-off areas for the runways, outside the transitional areas for the runways, and outside the protected Inner Horizontal Surface area established at a distance of 4KM around the airport. The 52 McLaren Street development is, however, located within the declared Outer Horizontal Surface (OHS) area for the airport which extends to a distance of 15KM around the airport. This protected surface is an imaginary plane that is set at a height of 150m above the Sydney Airport reference elevation of 6m AHD, and is therefore established at an elevation of 156m AHD. This forms a protected surface that is monitored and controlled to the extent necessary to ensure safe flight operations for the airport. At 156m AHD the proposed South Building of the proposed development at 52 McLaren Street would meet, but not penetrate, the protected OHS, and therefore does not constitute an obstacle of concern for the protection of the OLS.

Several tall buildings and structures already exist in the Sydney CBD and in the north of the protected airspace for Sydney Airport, and already penetrate the OHS. This already creates an obstacle environment containing structures that penetrate the protected OHS for the airport and has the effect of establishing precedents for tall structures within the proscribed airspace for Sydney Airport that have been judged to be acceptable obstacles in terms of flight operations. Nevertheless, any additional tall structures that are planned to be constructed within 15KM of the Sydney Airport, and which would rise to an elevation above 156m AHD, and therefore penetrate the OHS of the obstacle limitation surfaces established for the airport, are subject to review and approval by the Civil Aviation Safety Authority (CASA), based on advice from Sydney Airport and Airservices Australia. Consequently, the development proposed at 52 McLaren Street, which lies within the area of the OHS but has a planned elevation of 156.0m AHD and therefore does not penetrate the OHS, would be regarded as an acceptable structure within the area of obstacle assessment for Sydney's airspace.

5.2 Sydney Airport PANS-OPS Surfaces

As far as the arrival, approach, missed approach and circling procedures for Sydney Airport are concerned, the prescribed airspace of the PANS-OPS surfaces defined to protect aircraft operations into and out of the Sydney Airport is illustrated in **Exhibit 4**. As is evident, the proposed development at 52 McLaren Street, North Sydney, is sited well clear of the prescribed airspace for the PANS-OPS surfaces, and is therefore not significant to flight operations based on these procedures. As far as the protected PANS-OPS surfaces for Sydney Airport are concerned, the proposed development at 52 McLaren Street in North Sydney would be acceptable.



52 McLaren St - North Sydney

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Legend
 52 McLaren St North Sydney Development Site

Exhibit 4
 52 McLaren St - North Sydney
 Sydney Airport PANS-OPS

5.3 Navigation Aids Protection Surfaces

Protection surfaces for the ground-based navigation aids at Sydney Airport extend to approximately 3km around the airport. Beyond this there is no restriction applied with respect to these installations. As the proposed development site in north Sydney is 12.4KM from the airport, the proposed development does not infringe upon the protection of the navigation aids serving Sydney Airport, and is therefore acceptable from that perspective.

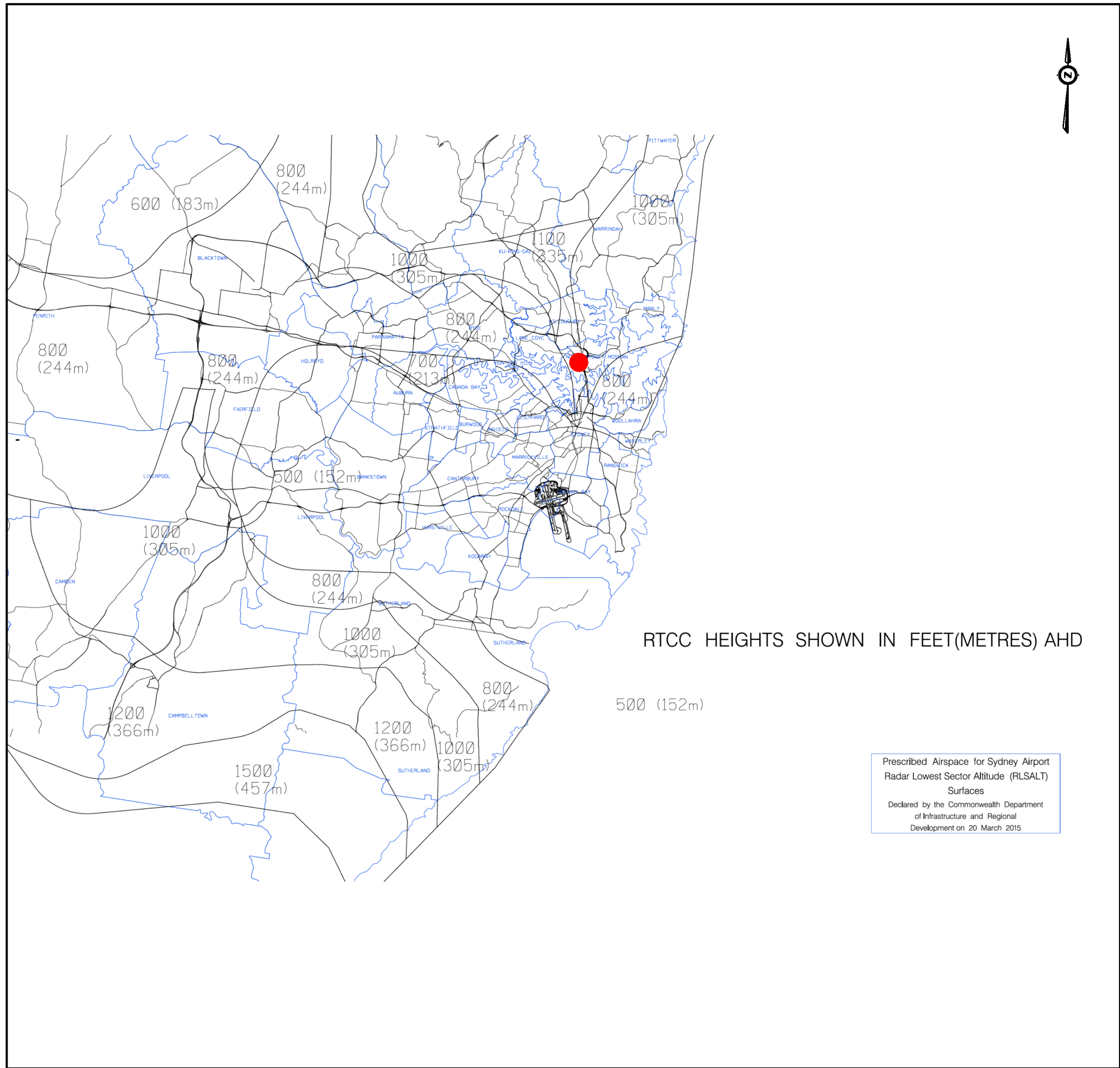
5.4 High Intensity Lighting Protection Surfaces

Protection surfaces for the airport's high intensity approach lighting system extend to some 900m north of the runway thresholds for Runways 16L & R. As the proposed development in North Sydney is some 12.4KM north of the airport, it does not infringe upon the protection areas established for the airport's approach lighting, and is therefore acceptable from that perspective.

5.5 Radar Terrain Clearance Surfaces

Review of the protected surfaces for radar signal propagation at Sydney Airport shows that the maximum obstacle permitted in the vicinity of the proposed development site, to ensure radar coverage of aircraft operating within the Sydney airspace at the minimum sector altitude, is 335m AHD. This equates to an obstacle elevation of 1100ft, giving a minimum sector altitude (MSA) of 2100ft (**Exhibit 5**).

As the proposed development does not rise above 156m AHD, it lies well below the maximum obstacle limitation established to protect radar signal coverage of aircraft operations over, and to the north of, Sydney and North Sydney. Consequently, the proposed development would not adversely affect radar coverage of aircraft operating at the minimum sector altitude for the airspace north of Sydney, and is therefore acceptable.



SOURCE : SYDNEYAIRPORT.COM.AU - AIRSPACE PROTECTION

52 McLaren St - North Sydney

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 52 McLaren St North Sydney Development Site

Exhibit 5
 52 McLaren St - North Sydney
 Sydney Airport
 Radar Terrain Clearance

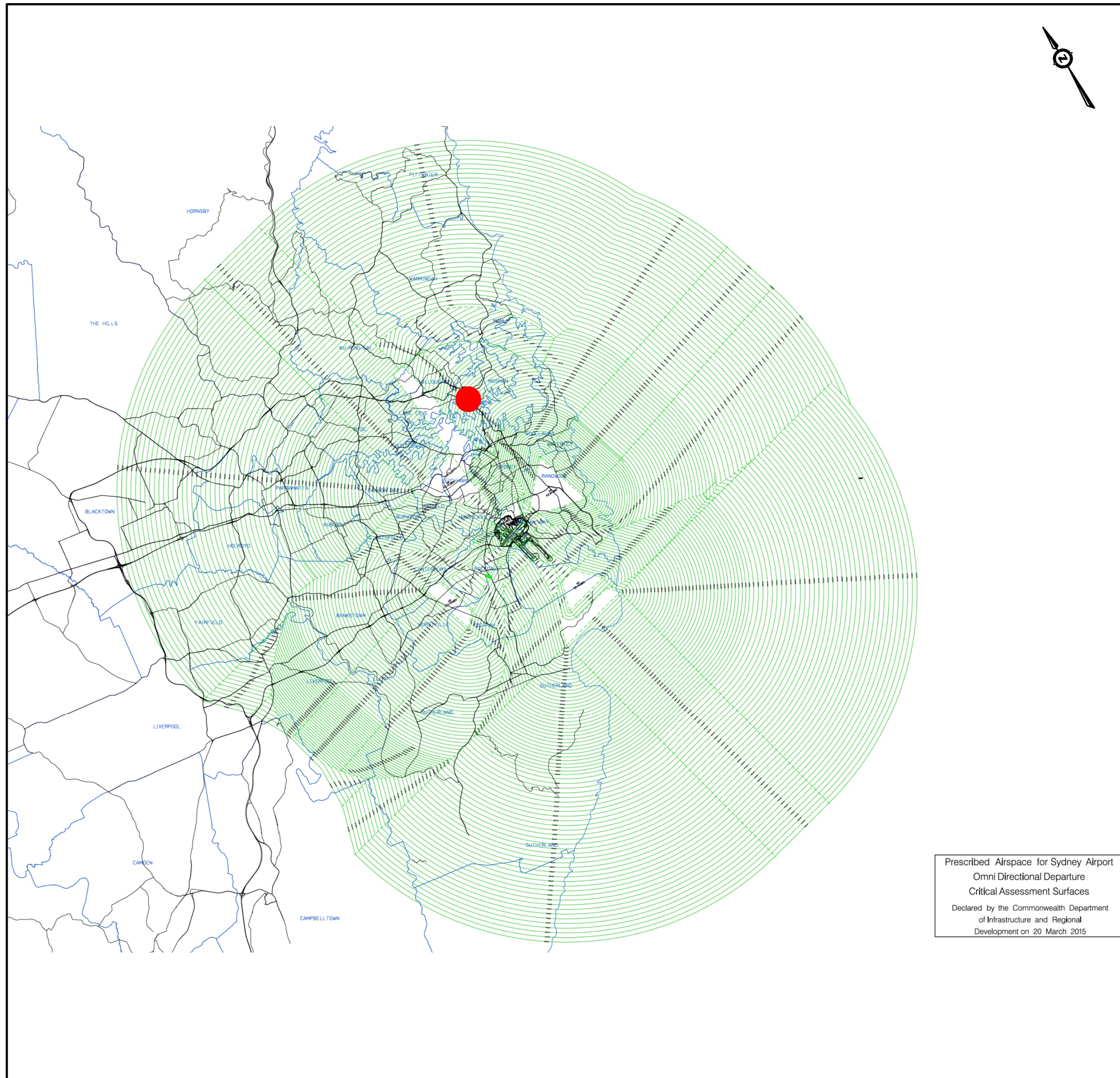
5.6 Radar Departure Assessment Surfaces

Review of the airspace protection surfaces established to protect aircraft operations directed by radar in the Sydney airspace indicates that the elevation of the radar protection surface in the vicinity of the proposed development in North Sydney is 390m AHD (**Exhibit 6**). As the proposed development at 52 McLaren Street will rise to only 156.0m AHD, the development lies well below the protected surface for radar-directed operations over North Sydney, and consequently would not affect flight operations over North Sydney. The development at 52 McLaren Street is therefore acceptable from the point of view of radar-directed flight operations in the Sydney airspace.

5.7 Precision Approach Path Indicator (PAPI) Protection Surfaces

The Precision Approach Path Indicator (PAPI) system provides visual reference for aircraft approaching the airport, and assists by informing pilots of their position relative to the defined glide path for the approach in the final stages of the approach prior to crossing the runway threshold. The system provides a series of light indications out into the approach and any obstacles that might obstruct the visibility of these lights could jeopardise the ability of an aircraft to make a safe approach to land when using the PAPI light system. Protection surfaces to protect the visibility of the PAPI lights are therefore established from the source of the PAPI signals out into the runway approach areas. Review of the PAPI light protection areas for the runways at Sydney Airport shows that these protected areas do not extend north of the Sydney Harbour, and do not extend as far north as North Sydney. Further, the location of the proposed development at 52 McLaren Street lies well to the north-north east of the PAPI light protection areas for approaches to Runways 16L & R.

Consequently, the proposed development at 52 McLaren Street would not adversely affect the use of PAPI lights for approaches from the north to the runways at Sydney Airport, and is therefore acceptable.



Prescribed Airspace for Sydney Airport
 Omni Directional Departure
 Critical Assessment Surfaces
 Declared by the Commonwealth Department
 of Infrastructure and Regional
 Development on 20 March 2015

52 McLaren St - North Sydney

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Legend
 52 McLaren St North Sydney Development Site

Exhibit 6
 52 McLaren St - North Sydney
 Sydney Airport - Combined Radar
 Departure Assessment

6.0 SUMMARY OF AVIATION IMPACT OF DEVELOPMENT AT 52 MCLAREN STREET, NORTH SYDNEY

The following table summarises the impact on the aviation environment arising from the planned construction of the development at 52 McLaren Street, North Sydney, and the acceptability of this structure as an obstacle to aviation.

Obstacle Condition / Protection	Detail	Comment
Proposed New Obstacle at 52 McLaren Street, North Sydney	Proposed New Obstacle is the South Building of the proposed development at 52 McLaren Street at 156m AHD, located at 33° 50' 3.45" S 151° 12' 30.52" E (North side of McLaren Street, East of Millar Street and west of Walker Street in North Sydney)	Current proposal for development at 52 McLaren Street rises to 156.0m AHD and meets but does not penetrate the Outer Horizontal Surface of the OLS for Sydney Airport. Any construction cranes erected for the purposes of construction of the proposed development would, however, rise above and penetrate the OHS of the OLS as temporary obstacles for the period required for construction. The maximum elevation of such construction cranes is unknown at the time of preparation of this report. (Note separate application for erection of construction cranes will be submitted prior to construction).
Shielding of Proposed New Obstacle by Other Nearby Tall Structures	Shielding principle is not applicable as status of Development Applications of adjacent sites is unknown.	Shielding not applied in this assessment
Existing Tallest Obstacle within Sydney Proscribed Airspace within 10NM of Sydney Airport	Tall structure in Sydney CBD at 334.06m AHD (1096ft), approximately 3km south of proposed development at 52 McLaren Street, North Sydney, inside Sydney Airport Control Zone	This obstacle at 334.06m AHD is the tallest obstacle in the airspace for Sydney Airport and sets the governing minimum sector altitude of 2100ft for the Sydney airspace north of the airport. The proposed development at 52 McLaren Street at 156m AHD lies well below the elevation of this governing obstacle and is acceptable
Minimum Sector Altitude (MSA) within 10NM of Sydney Airport & Minimum Radar Vectoring Altitude	Minimum Sector Altitude is 1000ft above the tallest obstacle within 10NM of the airport. MSA for the airspace over North Sydney is 2100FT (640m AHD)	MSA is based on ensuring a 1000FT obstacle clearance over the governing obstacle at 1096FT (334.06m AHD), rounded up to nearest 100ft to 1100FT (335.3m AHD).

Obstacle Condition / Protection	Detail	Comment
		Proposed structures comprising development at 52 McLaren Street at 156m AHD do not penetrate Outer Horizontal Surface of Sydney Airport OLS and lie well below the elevation of the governing obstacle within 10NM of the Sydney Airport by over 179m
Sydney Airport Obstacle Limitation Surfaces (OLS)	Outer Horizontal Surface of the Sydney Airport OLS is set at 156.0m AHD. New Building at 52 McLaren Street, North Sydney, meets but does not penetrate the OLS Outer Horizontal Surface at 156m AHD	There is no violation of the Sydney Airport OLS due to the proposed development at 52 McLaren Street, North Sydney. The operation of aircraft at Sydney airport is therefore not adversely affected by the proposed development as far as the OLS are concerned.
Sydney Airport PANS-OPS Surfaces	Proposed development at 52 McLaren Street, North Sydney, does not violate proscribed PANS-OPS Surfaces for Arrival, Approach and Circling Operations for Sydney Airport	Proposed development would not adversely affect aircraft operations for Arrival, Approach and Circling Operations as per published PANS-OPS surfaces and is acceptable as far as the PANS-OPS surfaces are concerned.
Sydney Airport Protection Surfaces for Navigation Aids	The protected areas established to protect the signal propagation of ground-based navigation aids at Sydney Airport extend to approximately 3KM around the airport	The proposed development at 52 McLaren Street in North Sydney is 12.4KM NNE of the Sydney Airport and therefore well clear of the protected surfaces for the airport's ground-based navigation aids
Sydney Airport High Intensity Lighting Protection	Protection areas for the high intensity approach lights for the runways at Sydney Airport extend some 900m from the runway thresholds	Proposed development site at 52 McLaren Street, North Sydney is some 12.4KM NNE of the Sydney Airport and well clear of the approach areas to the runways at Sydney Airport. Proposed development does not infringe upon the protected areas for the HIAL systems at Sydney Airport
Radar Signal Terrain Clearance	Radar signal terrain clearance in the area of North Sydney over the proposed development is shown on Sydney Airport safeguarding charts as being available where obstacles do not rise above 335m AHD	Proposed development at a maximum elevation of 156m AHD ensures ample radar signal terrain clearance, so long as the maximum obstacle in the vicinity of the development lies below 335m AHD. The proposed

Obstacle Condition / Protection	Detail	Comment
		development with a top elevation of 156m AHD lies well below that limit and therefore does not obstruct radar signal terrain clearance requirements.
Radar-Directed Departure Assessment Surfaces	Radar signal coverage that would ensure radar visibility of aircraft operating at the Minimum Sector Altitude of 2100ft is available down to 390m AHD at the site of the proposed development.	With a top elevation of 156m AHD, the proposed development at 52 McLaren Street lies well below the radar signal coverage for aircraft operating in the Sydney airspace north of the airport at the Minimum Sector Altitude of 2100ft under radar control.
Sydney Airport Precision Approach Path Indicator System (PAPI)	Protected areas for visibility of PAPI light system for approaches into the Sydney Airport runways do not extend north of the Sydney Harbour	Proposed development at 52 McLaren Street North Sydney is north of the Sydney Harbour limits and well clear of the protected surfaces for the PAPI lights serving the runways at Sydney Airport, particularly for Runways 16L & R.

7.0 CONCLUSIONS

From review of the obstacle environment of the airspace over North Sydney, as well as the operation of the airspace and protection for flight operations established for Sydney Airport and within the positive control zone surrounding Sydney Airport, it is concluded that the proposed development at 52 McLaren Street North Sydney at the proposed location and elevation would not adversely affect the safety of flight operations at Sydney Airport, or within the airspace surrounding the airport. While the proposed new development is to rise to 156.0m AHD, it does meet but does not penetrate the maximum elevation limit of 156.0m AHD set for the Sydney Airport Outer Horizontal Surface. It is to be noted that the maximum obstacle elevation for the Sydney Airspace north of the airport is 335.3m AHD, based on the maximum obstacle used to determine the minimum sector altitude for this part of the Sydney airspace¹.

¹ This does allow sufficient height above the proposed McLaren Street structure for the temporary use of construction cranes, although separate and specific application for erection of temporary construction cranes would need to be sought from Sydney Airport at a later date.