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Aviation Impact Assessment Report for 1a Hill Street & 105 Forest Road

Hurstville, NSW 2220

Final Report

Forest Road Holdings Pty Ltd

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Glossary

AHD	Australian Height Datum
ANEF	Aircraft Noise Exposure Forecast
CASA	Civil Aviation Safety Authority
DITRDCSA	Department of Infrastructure, Transport, Regional Development, Communications and the Arts
DPHI	Department of Planning, Housing and Infrastructure
ft	feet
HDA	Housing Delivery Authority
IFP	Instrument Flight Procedures
IFR	Instrument Flight Rules
Km	Kilometres
L	Left
m	Metres
MOS	Manual of Standards
nm	Nautical miles
OLS	Obstacle Limitation Surface
PANS-OPS	Procedures for Air Navigation Services-Operations
R	Right
RTCC	Radar Terrain Clearance Chart
RWY	Runway
SACL	Sydney Airport Corporation Ltd
TC	Tower Crane
VFR	Visual Flight Rules

Executive Summary

- Forest Road Holdings Pty Ltd is seeking approval to increase the height of the existing approved building on a site at 1a Hill Street & 105 Forest Road, Hurstville. One hammerhead crane will be used during construction.

- This aviation impact assessment report is submitted to the Housing Delivery Authority (HDA) in support of a building at 1a Hill Street & 105 Forest Road, Hurstville. The State Significant Development (SSD) reference for this development is SSD-84552728.

- The 1a Hill Street & 105 Forest Road development site is located approximately 5.7km southwest of the Runway 07 Threshold at Sydney Airport. Building developments in the Hurstville area are impacted by the prescribed airspace restrictions defined for Sydney Airport.

- The heights of Sydney prescribed airspace are:
    - Sydney Obstacle Limitation Surface (OLS): 130.0m AHD;
    - PANS-OPS Surface: 149.0m AHD;
    - Radar Terrain Contour Chart (RTCC) Surface: 152.4m AHD.

- The maximum height of the building is 133.2m AHD. Table 1 presents a summary of the impact of the building on Sydney prescribed airspace.

Table 1: Impact of Building on Sydney Prescribed Airspace

	Max Height	Impact on Prescribed Airspace
Building	133.2m AHD	Penetrate OLS by 3.2m 17.8m below PANS-OPS surface 19.2m below RTCC surface

- The maximum height of the crane is 149m AHD. Table 2 presents a summary of the impact of the crane on the Sydney OLS, PANS-OPS and RTCC surfaces.

Table 2: Impact of Cranes on Sydney Prescribed Airspace

	Max Height	Impact on Prescribed Airspace
TC1	149m AHD	Penetrate OLS by 19m Same height as PANS-OPS surface (at maximum boom radius to the north of the site) 3.2m below RTCC surface

Tables 1 and 2 shows that the building and crane will penetrate the Sydney OLS but both will not penetrate the PANS-OPS and RTCC surfaces.

- The building and crane will not impact any instrument flight procedure at Sydney Airport or impact the flight profiles of arriving or departing IFR aircraft on Runway 07/25. They will also not impact VFR operations in the Hurstville area or emergency helicopter operations at the St George Hospital Helipad.

- The development site at 1a Hill Street & 105 Forest Road is located outside the 20 Aircraft Noise Exposure Forecast (ANEF) contour. This means that all forms of housing are acceptable in this area.

- The building and crane will not impact the communication, navigations and surveillance systems at Sydney Airport. They are also outside the area where extraneous lighting might present a risk to pilots.

- This aviation impact assessment report has concluded that the building and crane at 1a Hill Street & 105 Forest Road will penetrate the Sydney OLS but not the PANS-OPS and RTCC surfaces. The building and crane will not impact the safety and efficiency of air transport operations at Sydney Airport. They will not present a risk to the safety of VFR operations in the Hurstville area or emergency helicopter operations at the St George Hospital Helipad. This development site is outside the 20 ANEF noise contour, which means that all forms of development is suitable in this area.

1.0 Introduction

Forest Road Holdings Pty Ltd is seeking approval to increase the height of the previously approved building at 1a Hill Street & 105 Forest Road, Hurstville. Construction will be undertaken by a hammerhead crane. This aviation impact assessment report is submitted to the Housing Delivery Authority (HDA) in support of a building at 1a Hill Street & 105 Forest Road, Hurstville. The State Significant Development (SSD) reference for this development is SSD-84552728.

This aviation impact assessment report has been prepared for two purposes, being 1) to present evidence to the planning authority that the building and crane conform to aviation regulations and guidelines; and 2) to form part of the aviation application for the building and crane to penetrate Sydney prescribed airspace.

The site is located approximately 5.7km southwest of the Runway 07 Threshold at Sydney Airport. Although the building and crane will penetrate the Sydney obstacle limitation surface (OLS) they will both remain below the PANS-OPS and radar terrain clearance chart (RTCC) surfaces.

This aviation impact assessment report reviews whether the penetration of the Sydney OLS by the building and crane will impact the safety and efficiency of air transport operations at Sydney Airport, or the safety of VFR of aircraft and helicopter activities in the Hurstville area.

The report begins by detailing the legislative context and methodology. Details are provided of the heights of prescribed airspace at 1a Hill Street & 105 Forest Road. The height and position of buildings are detailed along with the impact on the Sydney OLS, PANS-OPS and RTCC surfaces. Following a summary of the crane strategy, an assessment of the impact of the crane on prescribed airspace is provided. An assessment is then made of the impact on aircraft and helicopter operations from the building and crane operations. The impact of aircraft noise on the development site, the risk to pilots of extraneous lighting from the crane, and the likelihood of impaired performance to aviation systems is also assessed.

2.0 Legislative Context

Airspace surrounding an airport is protected by the Airports (Protection of Airspace) Regulations 1996. It details the process required to be undertaken when an obstacle could infringe prescribed airspace and the responsibilities of various organisations.

Prescribed airspace around an airport includes the obstacle limitation surface (OLS), the PANS-OPS surface and radar terrain clearance chart (RTCC) surface. An OLS provides general protection for aircraft operations around an airport. A PANS-OPS surface protects the airspace used by aircraft flying instrument approach procedures. The RTCC provides protection for aircraft that are operating under radar control but not flying on published instrument flight procedures or routes. In this case of Sydney, it also includes CASA Regulated Airspace, which provides greater control over buildings and cranes in proximity to the airport.

Permanent or temporary obstructions can be approved to penetrate the OLS. Permanent obstructions cannot be approved to penetrate the PANS-OPS surface. The Airports Act provides provision for temporary obstructions e.g., construction cranes to penetrate the PANS-OPS surface for a duration not exceeding three months. This temporary penetration of the PANS-OPS surface requires the support of the airport owner. It must also not materially impact aircraft operations. No temporary or permanent penetrations of the RTCC are permitted.

When the proposed height of an obstruction is likely to penetrate the OLS a proponent is required to make application to the airport owner-operator, in this case Sydney Airport Corporation Ltd (SACL). In cases where shielding is not available from existing buildings or a potential hazard may exist, the airport owner-operator may require the proponent to complete a detailed aviation study to be completed to support the application. The airport owner-operator then seeks the input from the Civil Aviation Safety Authority (CASA), Airservices and the building authority concerned. This process seeks to determine whether there is any impact on safety or operational efficiency to aircraft activities.

The Department of Infrastructure, Transport, Regional Development, Communications, Sport and the Arts (DITRDCSA) ultimately grant approval for the buildings and cranes to penetrate prescribed airspace. Should the development not be approved by DITRDCSA, there is also an appeal process to the Administrative Appeals Tribunal.

3.0 Methodology

This section provides an overview of the approach to determine the impact on prescribed airspace and aircraft operations of the proposed buildings and crane operations at 1a Hill Street & 105 Forest Road, Hurstville.

Prescribed airspace defined for Sydney Airport governs the maximum permissible heights for buildings and cranes in the Hurstville area. Calculations of the height of the OLS, PANS-OPS and RTCC surfaces were sourced from planning information maintained by SACL, as well as information held by this consultant.

The purpose of this report is to assess the impact of the proposed buildings and cranes at 1a Hill Street & 105 Forest Road on aircraft and helicopter operations. In particular, it seeks to determine whether the building and hammerhead crane will impact the safety and efficiency of air transport operations at Sydney Airport or the safety of VFR aircraft in the Hurstville area.

Buildings in proximity to Sydney Airport and its flight paths are very noise sensitive. The acceptability of different forms of development are depicted by ANEF contours that surround an airport. A chart depicting the ANEF contours was prepared for Sydney Airport by Airservices. The 1a Hill Street & 105 Forest Road site was plotted on to the ANEF contour chart to provide a preliminary assessment about the impact of aircraft noise on the development site.

To explore the safety impact on aircraft and helicopter operations of the proposed development at 1a Hill Street & 105 Forest Road, discussions and/or information was obtained from:

- Sydney Airport Corporation Ltd (SACL);
- Aeria Management Group-the owner-operator of Bankstown Airport;
- Aeronautical charts prepared by Airservices about aircraft operations at Sydney Airport; and
- CASA.

4.0 Sydney Prescribed Airspace

This section details the heights of the Sydney Obstacle Limitation Surface (OLS), PANS-OPS surface and RTCC surfaces above the development site at 1a Hill Street & 105 Forest Road.

4.1 Sydney Airport Obstacle Limitation Surface (OLS)

The height of the Sydney OLS at 1a Hill Street & 105 Forest Road is approximately 130m AHD.

4.2 Sydney Airport PANS-OPS Surface

Diagram 1 depicts the PANS-OPS surface over the 1a Hill Street & 105 Forest Road.

Diagram 1: Height of PANS-OPS Surface at 1a Hill St and 105 Forest Rd

Diagram 1 shows that the PANS-OPS surface above 1a Hill Street and 105 Forest Road is a gradient. This PANS-OPS gradient increases from approximately 151m AHD at the northwest boundary to approximately 165m at the southern boundary of the site.

Airservices' Procedure Design Unit (PDU) will confirm this height during their evaluation of the aviation application. They are final arbiter of the PANS-OPS height.

4.3 RTCC Surface

At the position of 1a Hill Street & 105 Forest Road the height of the RTCC surface is 152.4m AHD.

4.4 Summary

A building or crane that exceeds 130m AHD requires an aviation approval. The maximum building height over 1a Hill Street & 105 Forest Road is governed by the lower of the PANS-OPS and RTCC surfaces. Diagram 1 shows that the lower surface changes over the site. Over most of the site the RTCC surface (152.4m AHD) governs the maximum building height. At the northern portion of the site the PANS-OPS surface controls the maximum building height i.e., approximately 151m.

Note: the heights of Bankstown prescribed airspace were reviewed with Aeria Management Group. They advised that the height of the Bankstown OLS and PANS-OPS surfaces were above those of Sydney Airport.

5.0 Position, Height of Building and Impact on Sydney Prescribed Airspace

This section begins by detailing the position of the building. It then details the maximum building height and its impact on Sydney prescribed airspace.

5.1 Building Position

One building will be constructed at 1a Hill Street & 105 Forest Road. Table 3 below details the position coordinates for the tallest section of the building.

Table 3: Building Position Coordinates

	Position Coordinates
Northwest Corner	N 6239844.304; E 325286.698
Northeast Corner	N 6239843.198; E 325326.017
Southeast Corner	N 6239787.401; E 325334.244
Southwest Corner	N 6239777.495; E 325320.755

Position coordinates for the building are presented in Attachment 1.

5.2 Maximum Height of Building

The building at 1a Hill Street & 105 Forest Road will be constructed to a maximum height of 133.2m AHD.

Attachment 2 presents the maximum height of the building.

5.3 Impact of Building on Sydney Airport Prescribed Airspace

Table 4 summarises the impact of the building on Sydney prescribed airspace. Note the height of the PANS-OPS surface shown is the lowest over the site.

Table 4: Impact of Building on Sydney Prescribed Airspace

	Max Height	Impact on Prescribed Airspace
Building	133.2m AHD	Penetrate OLS by 3.2m 17.8m below PANS-OPS surface 19.2m below RTCC surface

The table shows that the building will penetrate the OLS but remain below the PANS-OPS and RTCC surfaces. This means that the building will require an aviation approval to penetrate Sydney prescribed airspace.

6.0 Summary of Crane Strategy

Construction will be undertaken by a hammerhead crane. The crane will operate up to but not penetrate the PANS-OPS surface. During initial construction activities the crane will operate up to a maximum height of 118m AHD. To complete the upper floors of the development the maximum height of the crane will be increased to 149m AHD.

Note: Since the boom will extend over part of Forest Road, where the PANS-OPS surface is 149m AHD, this will be the maximum crane height.

A mobile crane will be used to erect and dismantle TC1. The mobile crane will remain below the Sydney OLS while it erects the TC1.

When TC1 is to be dismantled, the mobile crane will penetrate the Sydney OLS. Approval for the mobile crane to penetrate the Sydney OLS will be obtained from Sydney Airport Corporation Ltd (SACL) toward the end of the construction period.

7.0 Position, Height of Crane and Impact on Sydney Prescribed Airspace

This section details the position and operating radius of the hammerhead crane. It also details the maximum height of the crane and its impact on Sydney prescribed airspace.

7.1 Position Coordinates and Operating Radius of Tower Cranes

Table 5 below details the position coordinates of the crane shaft and the boom radius.

Table 5: Position of Crane Shaft and Boom Operating Radius

	Position Coordinates	Boom Radius
TC1 Shaft	N 6239826.418; E 325317.454	49m

Attachment 2 details the position coordinates of the crane shaft and its boom operating radius.

7.2 Height of Tower Crane and Impact on Sydney Prescribed Airspace

The hammerhead crane will operate to a maximum height of 149m AHD. At this height the outer extremity of the boom will be at the same height as the PANS-OPS surface. Table 6 below details the maximum crane height and its impact on Sydney prescribed airspace.

Table 6: Impact of Crane on Sydney Prescribed Airspace

	Max Height	Impact on Prescribed Airspace
TC1	149m AHD	Penetrate OLS by 19m Same height as PANS-OPS surface (at maximum boom radius to the north of the site) 3.2m below RTCC surface

Table 6 shows that the crane will penetrate the Sydney OLS and operate up to but not penetrate the PANS-OPS surface. The two crane will not penetrate the RTCC surface.

8.0 Aircraft and Helicopter Operations in Hurstville Area

This section presents analysis of the position of the 1a Hill Street & 105 Forest Road development in relation to designated airspace and arriving movements to Runway 07. It then describes the impact on aircraft and helicopter operations from the penetration of the OLS by the building and crane.

8.1 Designated Airspace

The 1a Hill Street & 105 Forest Road site is located 5.7km southwest of the Sydney Runway 07 Threshold. It is within the Sydney Control Zone but outside the Bankstown Control Zone. Within the Sydney Control Zone VFR aircraft and helicopter operations can operate up to 2,500ft (AHD), provided they have an air traffic control clearance.

The development site is clear to the north of the Victor 1 VFR transit route that tracks close to the coast from Cape Solander to Jibbon Point. Within Victor 1 aircraft must operate below 500ft (AHD).

8.2 Aircraft Movements at Runway 07

The development site is located closest to Sydney Runway 07. Compared to the two north-south runways, Runway 07 has a small number of aircraft movements. It is primarily used when easterly wind conditions exist. The number of arrivals to Runway 07 range from an average of six per day (March) to 11 per day (October) (Transport for NSW, 2025).

8.3 IFR Operations

The maximum height of the building (133.2m AHD) and crane (149m AHD) will both penetrate the Sydney OLS but remain below the PANS-OPS surface. Since the building and crane do not penetrate the PANS-OPS surface they will not impact any instrument flight procedure (IFP) at Sydney Airport.

Departing aircraft from Runway 25 will be at least 500ft before a south bound aircraft will turn left. They will be clear above and to the west of the crane at 1a Hill Street & 105 Forest Road.

Most IFR aircraft landing Runway 07 fly along the extended runway centreline. On this track they are clear to the north of 1a Hill Street and 105 Forest Road. A relatively small number of turbo-prop join on a wide right-base to land Runway 07. Most of these aircraft track to the west of the development site before establishing on final approach. It is likely that arriving aircraft will be established on final abeam the 1a Hill Street & 105 Forest Road. If arriving aircraft were to track overhead the site, these aircraft

are likely to be at approximately 950ft (290m) AHD. At this height, the aircraft will be 460ft (140m) above and clear of the crane.

8.4 VFR Operations

As noted above, 1a Hill Street & 105 Forest Road is within the Sydney control zone but clear to the north of the Victor 1 low level VFR transit corridor.

Due to the proximity to Sydney Airport, there are very few VFR operations over the Hurstville area. On occasions when VFR aircraft and helicopters operate over the Hurstville area, Civil Aviation Regulations require aircraft and helicopters operating visually to fly at least 1,000ft above built-up areas. In addition, the regulations require them to be 500ft above the highest obstacle within a 300m radius. Since the maximum height of the crane is 149m (489ft) AHD or 89m (292ft) AGL, aircraft and helicopters operating VFR over the development site do not need to increase their height to maintain the 1,000ft/500ft obstacle clearance requirements.

In any case, the building and crane will be clearly visible, including having obstruction lighting and marking.

The closest strategically important helicopter landing site to 1a Hill Street & 105 Forest Road is the St George Hospital Helipad. The development site is located approximately 2.2km west of the St George Hospital Helipad. Flight paths to the helipad extend toward the north, south and west. Helicopters arriving or departing on the west flight path will be clear above the building and crane at 1a Hill Street & 105 Forest Road.

8.5 Conclusion

The building and crane will not impact any IFP at Sydney Airport or impact the flight profiles of arriving or departing IFR aircraft on Runway 07/25. They will also not impact VFR operations in the Hurstville area or emergency helicopter operations at the St George Hospital Helipad.

Therefore, the building and crane will not impact the safety and efficiency of air transport operations at Sydney Airport or the safety of VFR activities in the Hurstville area.

9.0 Exposure to Aircraft Noise

Airservices have published information about the likely impact of aircraft noise on various forms of activity in the vicinity of an airport. This information is depicted in an Aeronautical Noise Exposure Forecast (ANEF) chart. The ANEF chart depicts a number of noise contours surrounding an airport's runways. Each contour depicts an envelope, which relate to the forms of activity that are considered suitable with this volume of noise.

Attachment 3 presents the ANEF chart for Sydney Airport, along with the approximate position of the development site at 1a Hill Street & 105 Forest Road. The development site is depicted by a brown dot. It shows that the development site is outside the 20 ANEF contour. This means that all forms of development are acceptable in this area, including home units and flats.

10.0 Risk of Extraneous Lighting Distracting Pilots

National Airports Safeguarding Framework (NASF) Guideline E provides details about when extraneous lighting from buildings and cranes may cause a distraction to pilots. The guideline specifies four zones that extend for 4,500m on final beyond a runway threshold. At 5.7km from the Runway 07 Threshold (the distance of 1a Hill Street & 105 Forest Road from the threshold) and 1.3km from the extended runway centreline, the development site is outside the area where extraneous lighting may present a risk to pilots.

11.0 Impact on Aviation Systems

At 5.7km from Sydney Airport, the building and crane will not impact the aviation communication, navigations and surveillance (CNS) systems located on Sydney Airport.

12.0 CASA

CASA will review this report as part of their assessment about the safety impact to aircraft or helicopters arising from the proposed building and crane operations at 1a Hill Street & 105 Forest Road. They will consider safety issues that may impact on flight operations in the surrounding area.

Since the building and crane will penetrates the OLS, CASA will require these structures to be obstacle lit. Below are details of the obstacle lighting that will almost certainly be required and the specifications of the lighting systems:

12.1 Obstacle Lighting Requirements

a) Building must be obstacle lit by medium intensity flashing red obstacle lighting during the hours of darkness at the highest point of the building;

b) Crane must be obstacle lit with a medium intensity red obstacle light at night at the tip of the boom and the highest point above the cabin;

c) Obstacle lighting of the building and crane must have remote monitoring capability, including:
   - The proposed obstacle lighting system must incorporate an alarm system that will provide remote monitoring to notify the designated person responsible for the maintenance of the obstacle lighting;
   - The contact details of the person responsible for the monitoring of the obstacle lighting must be sent to SACL prior to the commencement of the obstacle lighting becoming operational;
   - The designated person must be available 24 hours per day, 7 days per week;
   - In the event of the obstacle lighting being inoperable, the designated person must immediately contact Sydney Airport Airfield Operations Supervisor on 0419 278 208 or 02 9667 9824 to advise of the outage;
   - Action must be taken to repair the obstacle lighting within 12 hours of the light not being operational;
   - Once the obstacle lighting is working again, the person responsible for the maintenance of the obstacle lighting must notify the Sydney Airport Airfield Operations Supervisor.

d) The cranes must be obstacle marked in alternating red and white bands of colour.

12.2 Obstacle Lighting Specifications (Extract from CASR Part 139 (Aerodromes) Manual of Standards)

‘9.4.7 Characteristics of Medium Intensity Obstacle Lights

9.4.7.1 Medium intensity obstacle lights are to be flashing or steady red lights or
flashing white lights, visible in all directions in azimuth.

9.4.7.2 The frequency of flashes is to be between 20 and 60 flashes per minute.

9.4.7.3 The peak effective intensity is to be 2,000 +/- 25% cd with a vertical distribution as follows:

(a) vertical beam spread is to be 3° minimum (beam spread is defined as the angle between two directions in a plane for which the intensity is equal to 50% of the lower tolerance value of the peak intensity);
(b) at -1 °elevation, the intensity is to be 50% minimum and 75% maximum of lower tolerance value of the peak intensity; and
(c) at 0° elevation, the intensity is to be 100% minimum of the lower tolerance value of the peak intensity.

9.4.7.4 Where the flashing white light is used in lieu of obstacle marking during the day to indicate temporary obstacles in the vicinity of an aerodrome, in accordance with Paragraph 9.4.2.4(a), the peak effective intensity is to be increased to 20,000 +/-25% cd when the background luminance is 50 cd/mÇ or greater.’

13.0 Conclusion

This aviation impact assessment report has concluded that the building and crane at 1a Hill Street & 105 Forest Road will penetrate the Sydney OLS but remain below the PANS-OPS and RTCC surfaces. They will not impact the safety and efficiency of air transport operations at Sydney Airport. The building and crane will not present a risk to the safety of VFR operations in the Hurstville area or emergency helicopter operations at the St George Hospital Helipad. This development site is outside the 20 ANEF noise contour, which means that all forms of development is suitable in this area.