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Mr Nicholas D'Ambrosio
Development Manager
Frasers Property AHL Limited Pty Ltd
Suite 11 Lumiere Commercial
Level 12
101 Bathurst Street
Sydney NSW 2000

PRELIMINARY AERONAUTICAL IMPACT ASSESSMENT: CENTRAL STATION, SYDNEY

Dear Mr D'Ambrosio,

I refer to a request from Frasers Property AHL Limited Pty Ltd (Frasers) for advice in relation to identifying airspace height constraints associated with your proposed development located at Central Station in Sydney, referred to herein as "the site".

Avlaw Pty Ltd, trading as Avlaw Aviation Consulting (Avlaw) notes the site boundaries provided by Frasers indicate a proposed maximum building height of RL 205.8m, however details of temporary crane activity are unknown at the time of writing. Avlaw has conducted a preliminary aeronautical assessment at the site against prescribed airspace limits which exist due to necessary safety clearances (mandated in legislation) that must be provided between an aircraft and an obstacle. The findings of this assessment are as follows:

- the Conical Surface of the Obstacle Limitation Surfaces (OLS) is nominally 135m-145m AHD, rising south to north across the site;
- the Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) surfaces range from 280m-296m AHD, rising west to east across the site;
- the Radar Terrain Clearance Chart (RTCC) or Radar Lowest Sector Altitude (RLSALT) surface covering the site is 335.28m AHD; and
- the Combined Radar Departure Assessment Surfaces is nominally 255m AHD.

The critical (i.e. lowest) airspace protection surface for operations at Sydney Airport which cover the site is the Outer Horizontal Surface of the OLS. As this surface will be penetrated both permanently by the building and temporarily by crane(s), each will require aeronautical assessment and be classified as a "controlled activity" which will need to be approved to be carried out. Avlaw has determined that the OLS penetration itself should not be problematic in this instance because the site is clear of the approach and take-off areas for all runway at Sydney Airport. Avlaw has also determined that

penetration of the Combined Radar Departure Assessment Surfaces should not be problematic because Sydney Noise Abatement Procedures (NAP) must be followed by all aircraft operating to and from Sydney Airport which dictates that there will be no random aircraft departures deviating from Standard Instrument Departures (SIDs) and the required safety clearances for these procedures are accounted for in the PANS-OPS surfaces. The vertical distance between the proposed maximum building height of RL 205.8m and the next lowest and relevant airspace protection surface (i.e. PANS-OPS) is 74.2m, providing a generous buffer for temporary crane activity.

With respect to helicopter operations, Coded clearances in the Aeronautical Information Publication-En Route Supplement Australia (AIP-ERSA) for helicopter operations into and out of Sydney Airport which refer to Darling Harbour will not be affected by development at the site as they are further to the west.

Avlaw has also determined that the airspace protected under National Airport Safeguarding Framework (NASF) – Guideline H for strategically important helicopter landing sites does not apply with respect to the development as approaches and departures at Royal Prince Alfred Hospital are clear of the site.

In summary, provided temporary construction cranes and the overall building envelope inclusive of plant room and ancillary features (e.g. towers, masts, building maintenance unit (BMU) when in operation) all remain below the PANS-OPS, then aviation approval should be granted.

Each item specified in the scope of Avlaw's proposal to Frasers is addressed from the following page.

1. Relevant stakeholders

Applications to carry out a controlled activity, defined as any permanent or temporary penetration of prescribed airspace, are to be made to the airport operator in writing. Where more than one airport may be affected, the application must be sent to each. The information required in the application must include:

- a description of the proposed controlled activity (building construction, crane operation etc.)
- its precise location (street address and grid reference)
- if the controlled activity consists of the erection of a building or structure:
 - the proposed maximum height of the structure above the Australian Height Datum (including any antennae, towers, BMU etc.), and
 - the proposed maximum height of any temporary structure or equipment (e.g. cranes) intended to be used in the erection of the structure

The airport operator will conduct the initial assessment of the application in terms of:

- whether the activity results in an intrusion into its prescribed airspace and is therefore a controlled activity;
- the extent of the intrusion; and
- the precise location of the development or activity.

The airport operator may approve the application itself if there is no intrusion of the prescribed surfaces, however is required to invite the following organisations to assess or comment on an application if there is an intrusion which is not considered short-term (i.e. not expected to continue longer than 3 months):

- **the Civil Aviation Safety Authority (CASA)** for an assessment of the impact on aviation safety
- **Airservices Australia** for assessments of proposals resulting in a penetration of the PANS-OPS surface or temporary redirection of flight paths
- **the local council authority** responsible for building approvals
- **the Department of Defence** in the case of joint-user airports.

The final approving authority for penetration of prescribed surfaces is the **Department of Infrastructure, Transport, Cities and Regional Development** (Department) as specified in the *Airports Act 1996* and the *Airports (Protection of Airspace) Regulations 1996*. In making its determination, the Department is required to assess the respective assessments of the airport operator, Airservices Australia and CASA, however, they cannot issue an approval in the event CASA's assessment is not supportive of the application.

The approval process requires separate assessments of the permanent building structure and temporary construction crane(s), although approvals for permanent structures (even if assessed favourably) will not be issued until the all aviation stakeholders have completed their assessment of temporary construction cranes. Applications can be made in advance of planning approval for both,

however CASA does require detailed architectural drawings to be provided prior to completing its assessment.

2. Aviation legislation governing building and crane heights

Part 12 of the *Airports Act 1996* and the *Airports (Protection of Airspace) Regulations 1996* (Regulations) establish a framework for the protection of airspace at and around airports. The Airports Act 1996 defines any activity resulting in an intrusion into an airport's prescribed airspace to be a "controlled activity" that cannot be carried out without approval. The Regulations provide for the Department or the airport operator to approve applications to carry out controlled activities, and to impose conditions on an approval.

With respect to Sydney Airport, OLS, PANS-OPS and RTCC surfaces have been "declared" by the Department on 20 March 2015 and are therefore enshrined in legislation as its prescribed airspace. Avlaw has however obtained extracts from the draft approved revised 2018 OLS, PANS-OPS and RTCC charts, labelled Figures 1, 2 and 3 respectively below.

Regulations provides for some short-term temporary penetration of the PANS-OPS for construction cranes. It is preferable not to penetrate the PANS-OPS and any penetration must be supported by a detailed aeronautical impact assessment and equivalent safety argument.

3. Controlled activity approval process

Any activity that infringes an airport's prescribed airspace is called a **controlled activity** and requires approval before it can be carried out. Controlled activities include the following:

- permanent structures, such as buildings, intruding into the prescribed airspace;
- temporary structures such as cranes intruding into the prescribed airspace; or
- any activities causing intrusions into the prescribed airspace through glare from artificial light or reflected sunlight, air turbulence from stacks or vents, smoke, dust, steam or other gases or particulate matter.

Carrying out a controlled activity without approval is an offence under Section 183 of the Airports Act 1996 and is punishable by a fine of up to 250 penalty units. It is an offence under Section 185 of the Act to contravene any conditions imposed on an approval. Under Section 186 of the Act it is an offence not to give information to the airport operator that is relevant to a proposed controlled activity.

International standards have been adopted which define sets of invisible surfaces above the ground around an airport. The airspace above these surfaces forms the airport's **prescribed airspace**. Avlaw has identified the Sydney Airport airspace surfaces covering the site as the following:

- OLS;
- PANS-OPS surfaces;
- RTCC/RLSALT; and
- Combined Radar Departure Assessment Surfaces.

The Regulations differentiate between **short-term** and **long-term** controlled activities. The Regulations provide for the airport operator to approve short-term controlled activities, excluding

PANS-OPS infringements, and for the Department to approve long-term controlled activities, or short-term controlled activities referred to it by the airport operator, including short-term infringements of the PANS-OPS. However, long term intrusions of the PANS-OPS surface are prohibited.

The heights advised in the application for approval must include all towers, masts, BMU, construction crane(s), and ancillary features. An application will be considered in two elements, one being for the building itself (inclusive of all features) and one for construction crane(s).

Each penetration of the OLS, PANS-OPS, Combined Radar Departure Assessment Surfaces or RTCC has to be assessed against the effect on published Departure and Approach procedures and other matters. These include published survey data and Air Traffic Control (ATC) procedures and practices, including compatibility with the promulgated ATC RTCC that is used to safely vector aircraft in instrument meteorological conditions (non-visual). Each proposal has to be checked for proximity to published procedures to ensure statutory tolerances and safety buffers are maintained. The tolerances vary according to the type of navigation or aid being utilised and cover vertical, lateral and longitudinal aspects.

Timing to assess applications varies depending on the complexity of the assessment and the workload within the respective agencies at the time of receipt. Avlaw's experience suggests proponents should allow seven (7) months for project planning purposes with respect to processing time with Sydney Airport, Airservices Australia, CASA and the Department conducting their own assessments in succession. Avlaw recommends that applications for both building and crane height approval be made as early as possible.

4. Preliminary Aeronautical Impact Assessment

Based on the site location provided by the Frasers, interrogation of satellite imagery, OLS requirements, PANS-OPS limitations, the Combined Radar Departure Assessment Surfaces and RTCC stipulations, Avlaw's assessment of the heights above which an aviation approval is required has determined the following:

- the Conical Surface of the OLS is nominally 135m-145m AHD (refer to Figure 1 on the following page);
- the PANS-OPS surfaces range nominally from 280m AHD to 296m AHD, rising west to east across the site (refer to Figure 2 on the following page);
- the RTCC or RLSALT surface covering the site is 335.28m AHD; and
- the Combined Radar Departure Assessment Surfaces is nominally 255m AHD.

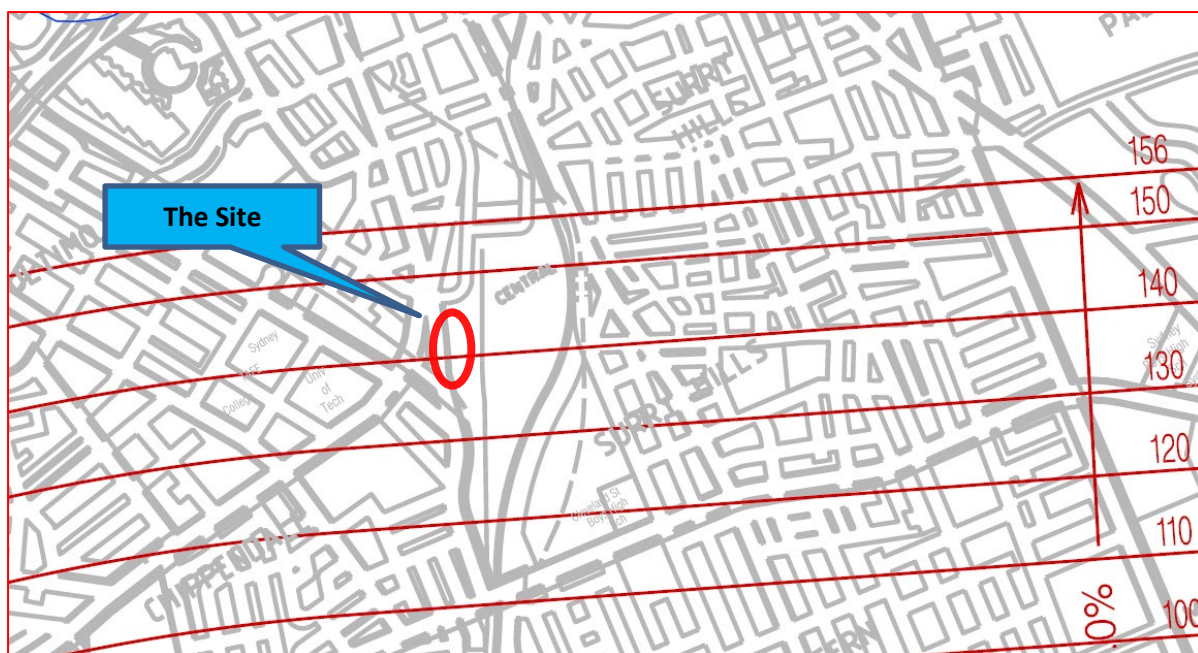


Figure 1: Extract from OLS Chart (2015)



Figure 2: Extract from draft PANS-OPS Chart (2018)

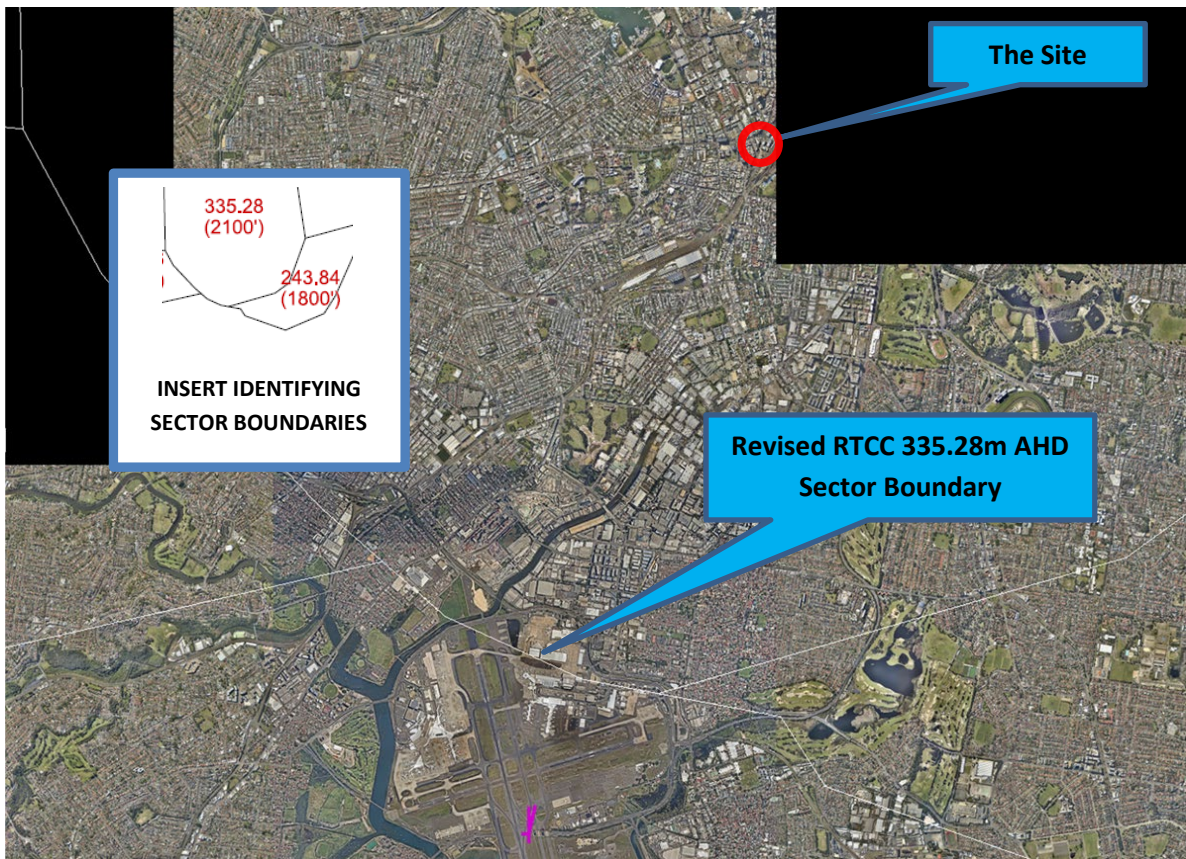


Figure 3: Extract from RTCC (2018)

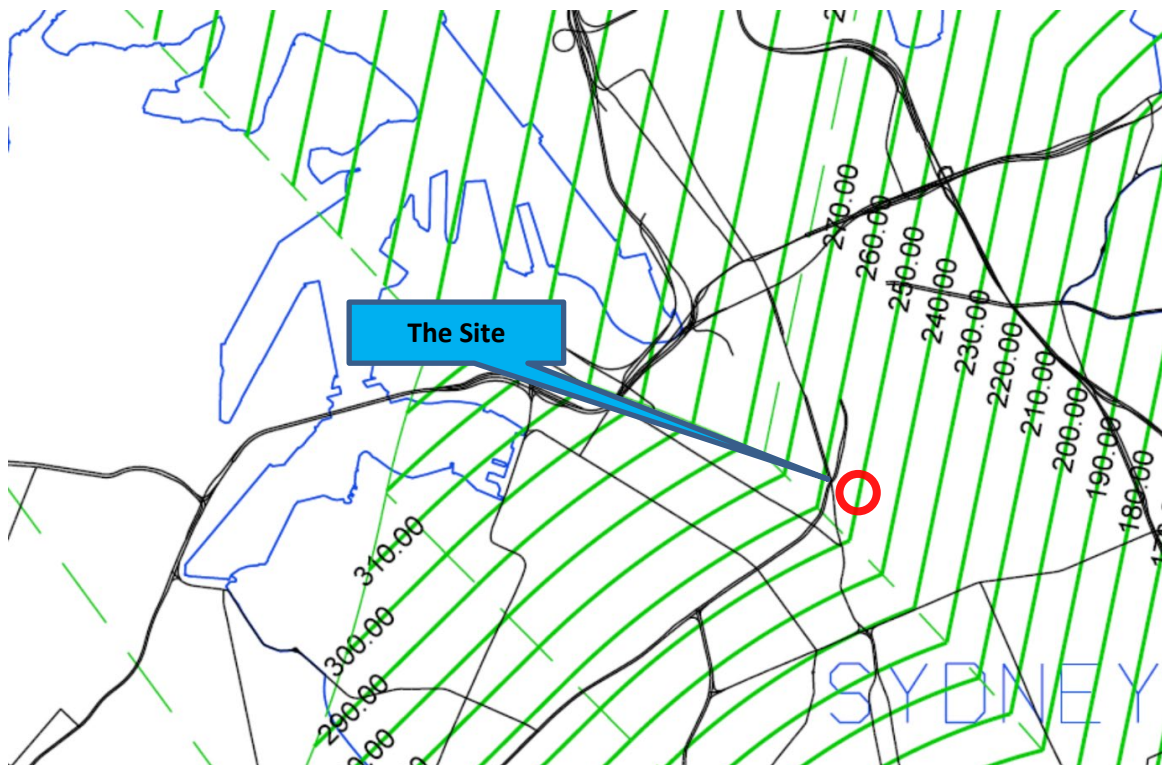


Figure 4: Extract from Combined Radar Departure Assessment Surfaces (2015)

The airspace protection surfaces over the site are the OLS, PANS-OPS, the Combined Radar Departure Assessment Surfaces and RTCC for Sydney Airport. Since the OLS is proposed to be penetrated by the building structure and temporary construction cranes, each will therefore be considered a controlled activity and trigger detailed aviation assessment. A maximum building envelope including any protrusions from a building (e.g. masts, BMU etc.) must be included in the final height of the building itself for aviation approval, as does temporary construction crane activity.

Penetration of the OLS is not considered problematic in this instance because the site is not in the approach and take-off area for any runway at Sydney Airport and providing there is no penetration of the PANS-OPS, then no flight operational surfaces will be affected.

Avlaw's assessment is that penetration of the Omni Direction Departure surface is not a limitation because Sydney NAP must be followed which dictates that there will be no random aircraft departures deviating from the SIDs which are covered by the PANS-OPS limitations.

Providing the buildings and temporary construction crane(s) remain below the PANS-OPS and RTCC, then current published flight operation surfaces will not be affected by the proposed development at the site.

5. Helicopter Operations

Legislation requires the pilot of a helicopter to determine the safe take-off and landing approach taking into account all factors including aircraft performance, wind direction, obstacles, and emergency landing in the event of engine failure. The proposed development is clear of specific helicopter transit routes. The helicopter operations assessed are all conducted under Visual Flight Rules (VFR) whereby the pilot in command (PIC) is solely responsible for safe navigation clear of any obstacles.

5.1 Coded Clearances and Sightseeing Flights

The nearest corner of site is located approximately 7,290m NE of Sydney Airport Aerodrome Reference Point (ARP). There are a number of prescribed helicopter transit routes published in AIP-ERSA for helicopter operations in the Sydney Control Zone. These are included in the Coded Clearances and Operating Requirements for Sydney Airport, with the coded clearances containing the specific routes and prescribed altitudes to be flown. The coded clearances published in AIP-ERSA for helicopter transit lanes to and from Sydney Airport are clear of the site.

5.2 Hospital Helipads

A [National Airport Safeguarding Framework \(NASF\)](#) Guideline H has been issued regarding protection of what are being termed *Strategic Helicopter Landing Sites (SHLS)*. Under the guideline, hospital helipads would be considered as SHLS and therefore protected from obstacles being erected in close proximity to it. The guideline provides for 140m wide rectangular steps in the direction of approach/take-off in 500m increments until reaching 125m above the SHLS which would be protected from obstacles such as buildings and cranes. The figure below has been sourced from the guideline and illustrates this proposed protection of SHLS and the heights above which it is triggered.

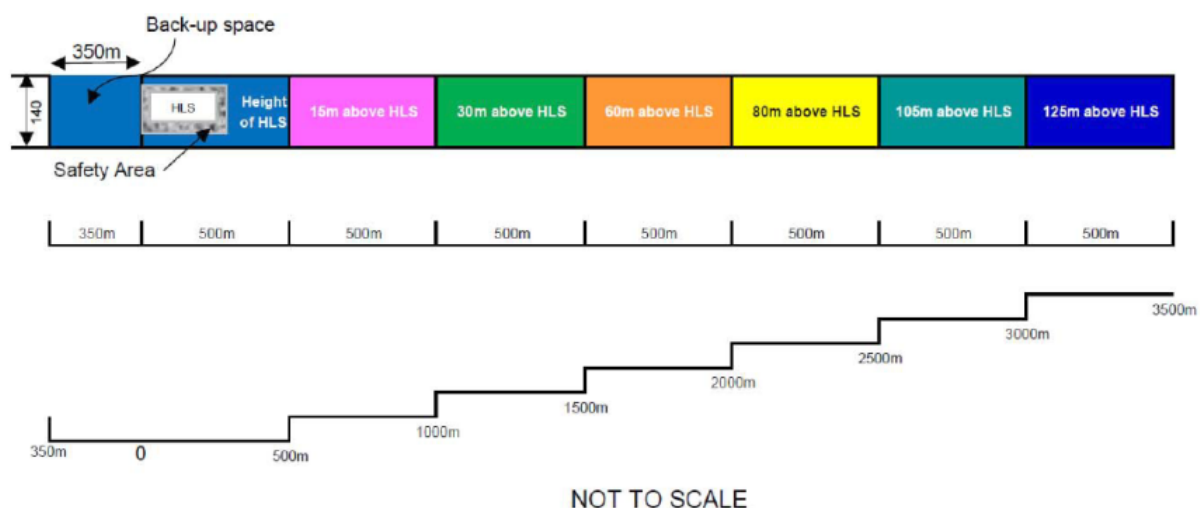


Figure 4: Referral trigger for SHLS

The Royal Prince Alfred Hospital Helipad is located 1,865m to the SW of the site, therefore within the 105m clearance step above the HLS. The declared elevation of the helipad is 29m AHD, so the NASF clearance step is 134m AHD if the direction of approach/take-off was in line with the site. Information provided to helicopter pilots for Royal Prince Alfred Hospital Helipad is that both approach and departure are to be north and south so the NASF guideline does not apply with respect to the site.

6. Rationale for obtaining approval

The Regulations require any decision by the Department to be made in the interests of the safety, efficiency or regularity of existing or future air transport operations into or out of the airport. The proposed development at the site will involve penetration of the OLS which in this case, Avlaw considers as not being problematic. An approval may be subject to specific conditions, which may concern how the controlled activity is carried out (e.g. hours of operation of a crane) or may require the building or structure to be marked or lit in a certain way as detailed in Manual of Standards (MOS) 139. These conditions must also be in the interests of the safety, efficiency and regularity of existing or future air transport operations. Avlaw considers that aviation approval should be given if no flight operation surfaces, in this case the PANS-OPS, will be affected by the proposed permanent building structure and temporary construction cranes.

7. Future controlled activity approval requirements

As mentioned in section three (3), Avlaw's experience suggests proponents should allow seven (7) months for project planning purposes with respect to processing time with Sydney Airport, Airservices Australia, CASA and the Department conducting their own assessments in succession. Avlaw notes that one proposed reform contained in the [Modernising Airspace Protection](#) Public Consultation Paper (December 2016) refers to a submission timeframe of 90 days prior to lodgement of a DA for controlled activity applications i.e. buildings and cranes. The preparation of a complete aeronautical impact assessment (i.e. Phase 2 in Avlaw's Proposal dated 9 April 2019) will assist an application for said approvals to be given.

The proposed development at the site will require two separate controlled activity applications if there is penetration of the OLS. With respect to development at the site, maximum building and crane

heights that may considered acceptable to aviation regulatory authorities must not penetrate the PANS-OPS. Avlaw's assessment based on current airspace restrictions across the site and proposed building (and likely) crane heights to remain below the PANS-OPS is that the proposed development and associated crane activity should both receive controlled activity approval.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Amin H.', is positioned above the printed name.

Amin Hamzavian
Managing Director