Aeronautical Assessment Report

re site at
Units 66 & 67, Fourth Avenue
Cookstown Industrial Estate
Tallaght, Dublin 24

for
Strategic Housing Development
Planning Application

by
Steelworks Property Developments Ltd.

October 2019

O'DWYER & JONES DESIGN PARTNERSHIP
AVIATION PLANNING & ARCHITECTURE CONSULTANTS
28 LEESON PARK • DUBLIN 6 • TEL.:353-1-498 1893 [FAX:353-1-496 4410]

www.AviationPlanning.ie e.: admin@AviationPlanning.ie / DesignPartners@iol.ie

INDEX

page

1. Scope of Report and Description of Site & Surroundings . . . 1
2. Obstacle Limitation Surfaces in Relation to the Site 3
3. Relevant S.D.C.C. Development Plan Paragraphs 4
4. Layout & Height (elevations O.D.) of the Proposed Development . . 6
5. Calculations with regard to **Approach Surface** to Casement Runway 28 . 7
6. Calculations with regard to **Take-off Climb Surface** from Runway 10 . 8
7. Calculations with regard to the **Conical Surface** at Casement Aerodrome . 9
8. Summary re Casement Aerodrome's Obstacle Limitation Surfaces . . 10
9. **Longitudinal Section Diagram and Aerial Photo Map** . . . 11
10. Tallaght Hospital Helipad 12
11. Other Aviation Considerations 14
12. Summary 15

1. Scope of Report and Description of Site & Surroundings

1.1 Site Location

This report addresses the aviation impact of a proposed Strategic Housing Development planning application on a site of 0.71 hectares approx. in South County Dublin, located to the east of Tallaght Hospital (where Cookstown Road meets Fourth Avenue).

1.2 Some Aviation Changes to Note (at variance with the SDCC Development Plan)

(i) In **December 2017**, the standards relating to the nine international and regional airports in Ireland (including **Weston** and **Dublin**, but not Casement) came **under E.A.S.A.** [European Aviation Safety Agency] control, rather than I.C.A.O. [International Civil Aviation Organization] control as previously, with several changes to airport design specifications (including narrower Approach Surfaces).

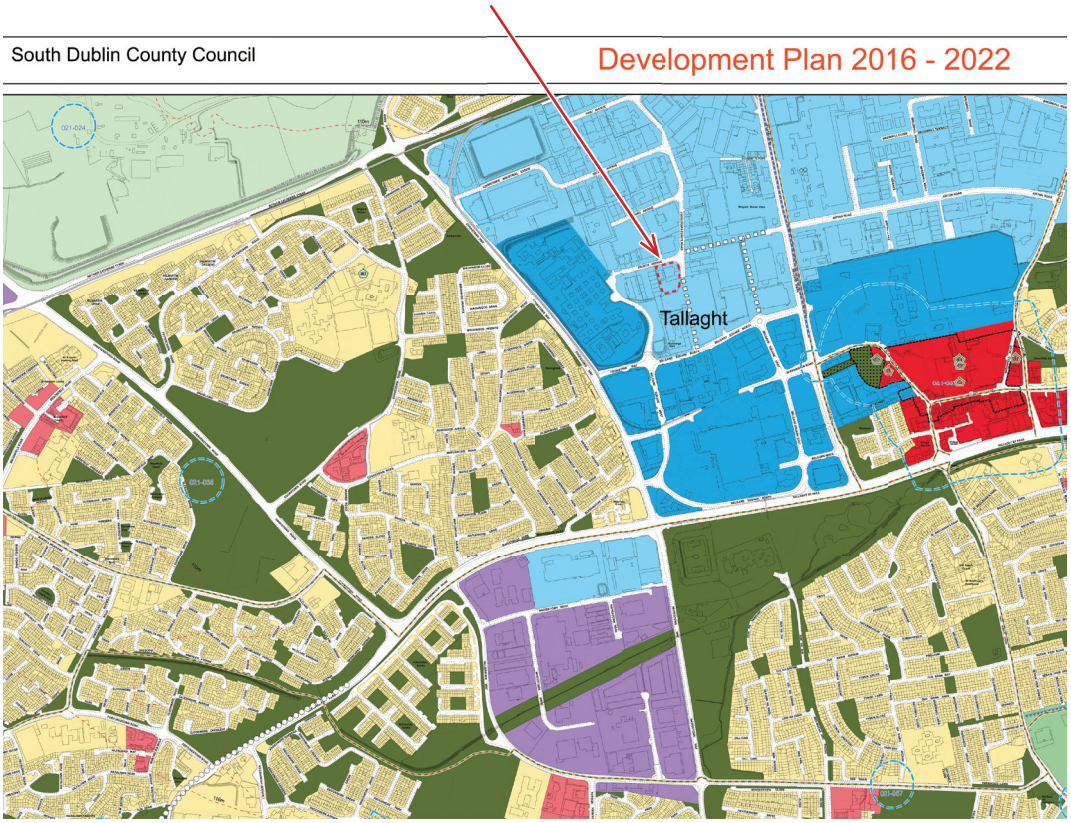
(ii) In **November 2018, I.C.A.O. issued revised 'Annex 14' Standards** bringing these in line with the new E.A.S.A. airport specifications.

(iii) In **February 2019**, **Casement's runway designations** were changed: its main runway (formerly 11/29, as in the SDCC Development Plan) was redesignated as **10/28**, and its subsidiary runway (formerly 05/23) was redesignated as **04/22**. This arose from a shift in magnetic variation with affected Casement. In this report we use the new 2019 designations, but they refer to the same runways as are in the SDCC Plan.

1.3 The Site in Relation to the Current S.D.C.C. Development Plan

In the current South Dublin County Council Development Plan 2016-2022, this site (formerly part of Cookstown Industrial Estate) is zoned **'Objective REGEN: To facilitate enterprise and/or residential-led regeneration.'**

The site is shown with dotted red outline on the S.D.C.C. Map 9 extract below.



1.4 Items of aeronautical significance in relation to the site are:

(i) The site lies under the Approach and Take-Off Climb Surfaces to/from Casement Aerodrome's main runway 10/28 in South County Dublin, with its nearest corner at a distance of 4.7 km from the threshold of runway 28.

(ii) The site lies under the Conical Surface at Casement military aerodrome (*see illustration in section 7 on page 9*).

(iii) The ground level on the site (at 104m OD) lies 8m higher than the level of the threshold of Casement Aerodrome's Runway 28, and 17.4m higher than the aerodrome's datum level (86.6m OD).

(iv) The site lies at between 223m – 336m to the north-east of the helipad at Tallaght Hospital.

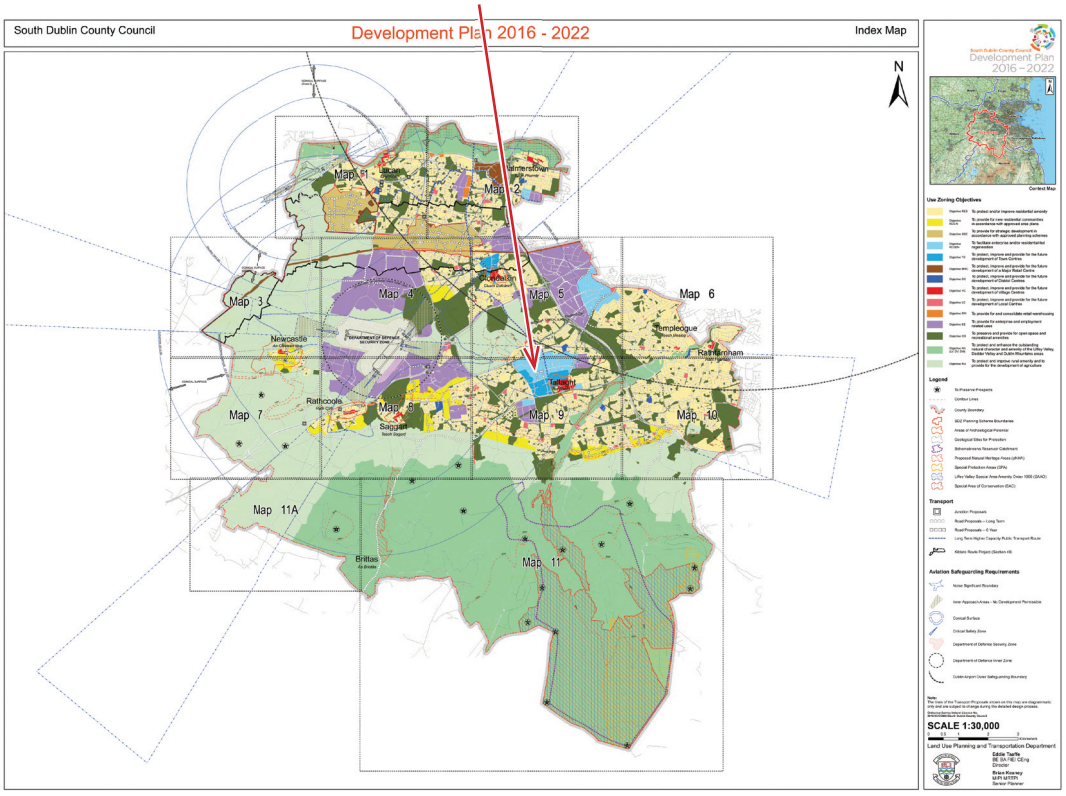
2. Obstacle Limitation Surfaces in Relation to the Site

2.1 The Department of Defence has adopted the I.C.A.O. Obstacle Limitation Surfaces in relation to Casement Aerodrome. Being a military aerodrome, Casement is not bound by these Civil Aviation standards, but the Department of Defence has opted to apply these Standards at Casement (to protect aircraft in flight). These Obstacle Limitation Surfaces – similar to the E.A.S.A. Specifications which now apply at Dublin and Weston airports – are set out by the International Civil Aviation Organization (based in Montreal) as *International Standards and Recommended Practices* in its *Annex 14 – 'Aerodromes'* document, *[with revisions to several Annex 14 dimensions made by ICAO on 8 November 2018].*

2.2 The Conical Surface for Casement Aerodrome, and the Approach Surface to Casement's Runway 28, are shown on the current S.D.C.C. Development Plan Index Map *(illustrated below)* on which the site's location is indicated by an arrow.

The three Obstacle Limitation Surfaces which affect this site at Cookstown are
(i) the Conical Surface for Casement Aerodrome as a whole;
(ii) the Approach Surface to Runway 28; and
(iii) the Take-Off Climb Surface from Runway 10.
The Conical Surface is an inclined plane commencing at 45m above the aerodrome's datum level (a datum set at 86.6m OD at Casement) and rising at 5%.

The Approach and Take-Off Climb surfaces are inclined planes of different widths which increase as distance from the runway increases, and which rise at different slopes depending on the category of runway.



3. Relevant Development Plan Paragraphs

Of particular relevance to the aeronautical assessment of the site in question are the paragraphs reproduced below from the South Dublin County Council Development Plan 2016-2022, including —

3.1 (i) Paragraph (a) referring to Casement runway 11/29 *[now designated runway 10/28]* on page 137 of the Plan (under Section 7.8.1 – 'IE8 Objective 2'):

> The airspace of Casement is defined by the Obstacle Limitations Surfaces, prepared and mapped on the County Development Plan map in accordance with the ICAO Standards and the Irish Aviation Authority 'Guidance Material on Aerodrome Annex 14 Surfaces (2015)', including the following:
>
> a). Prevent objects from penetrating the Obstacle Limitation Surfaces for runway 11/29. The existing main runway (11/29) is considered as an instrument approach Code 4 runway and the relevant Obstacle Limitation Surfaces of the Irish Aviation Authority 'Guidance Material on Aerodrome Annex 14 Surfaces' (2015) are applicable.

3.2 (ii) The paragraphs on 'Outer Approach Area' on page 229 of the Plan (under Section 11.6.6 'Aerodromes'):

> **Outer Approach Area**
>
> Under the Outer Approach Surface (outside the Inner Approach Area but within the approach funnels), graded heights of development below the Obstacle Limitation Surfaces of the runways may be permitted, subject to demonstration that the development is not an obstacle to the operation of the runway.
>
> The Planning Authority will consult with the DoD and the IAA, as required, in this assessment. The Planning Authority will require the applicant to submit a longitudinal section through the relevant Approach Surface funnel. The section drawing shall include the following:
>
> → The Ordnance Datum (OD) of the relevant runway,
>
> → The approach surface slope for the relevant runway in accordance with Table 3 & 4 of the IAA Guidance Material on Aerodrome Annex 14 Surfaces (2015) and set out in Table 11.26 below,
>
> Table 11.26: **Aerodrome Surface Slopes**
>
> | APPROACH RUNWAY | SURFACE SLOPE |
> |---|---|
> | **Casement Runways 11/29** | 2% for first sector (3000m) |
> | **Casement Runways 05/23** | 3.33% (non – instrument runway) |
> | **Weston Runway 07/25** | 4% |
>
> → The OD of the highest point and OD of the predominant height of the proposed development,
>
> → A range of OD reference points for the existing ground levels on the subject site,
>
> → The horizontal distance of the subject site from the Aerodrome, and
>
> → Heights of existing permanent obstacles in the vicinity of the site if applying the principle of shielding (see Section 3.23 of the Irish Aviation Authority Guidance Material on Aerodrome Annex 14 Surfaces, 2015).
>
> The distance from threshold shall be taken into account in the section drawing.
>
> For significant developments and in instances of marginal cases, the applicant may be requested to submit an individual aeronautical assessment.

3.3 **(iii) The paragraphs on 'Conical Surface' on page 230 of the Plan:**
[also referred to on page 228 of the Plan under Section 11.6.6 (ii) 'Aerodromes']

IMPLEMENTATION	SOUTH DUBLIN COUNTY COUNCIL DEVELOPMENT PLAN 2016 - 2022

Conical Surface

Generally, development will be acceptable in this zone provided the development is under the height restriction of 45 metres above the elevation datum of the Aerodrome (86.6m OD).

The applicant shall be required to detail the OD height of the proposed development, in the context of the relevant Aerodrome.

3.4 It may be noted (as illustrated in the I.A.A./I.C.A.O. diagram on page 228 of the Plan) that a Conical Surface slopes upwards (at a slope of 5%) so that, while the 45m height quoted above is applicable at the lowest edge of the Conical Surface (i.e. at 131.6m OD), considerably greater height is possible under this Surface (up to 145m above the elevation datum of an aerodrome) as distance from the aerodrome increases. For this site, with its nearest point at 500m from the inner edge of Casement's Conical Surface, an additional 25m height (500 × 5%) – in addition to the 45m quoted above – is possible anywhere on the site.

All references (in the Development Plan) to Casement's Runways 11/29 and 05/23 now refer to Casement's ***Runways 10/28 and 04/22*** *(as redesignated in Feb. 2019).*

3.5 Below (*in* ***Section 5)*** are our calculations in relation to the **Approach Surface** to Casement Runway 28 (rising at slopes of 2% and 2.5%) as provided for in the SDCC Plan.

We also include calculations (*in* ***Section 6***) in relation to the **Take-Off Climb Surface** from Casement Runway 10, because – for this category of runway (code 4, precision approach) – the Take-Off Surface is lower at the site's location than the Approach Surface. [The Take-Off Climb Surface rises continuously (for 15km) at a 2% slope, while the Approach Surface slope changes from 2% to 2.5% after 3km)].

For this category of runway, the Take-Off Climb Surface (which starts at 180m width) is narrower than the Approach Surface (which starts from the runway strip at 280m* width). This difference in width is not relevant however for this site, which is located near the centre-line of both Surfaces. *[* per ICAO revision of 2018.]*

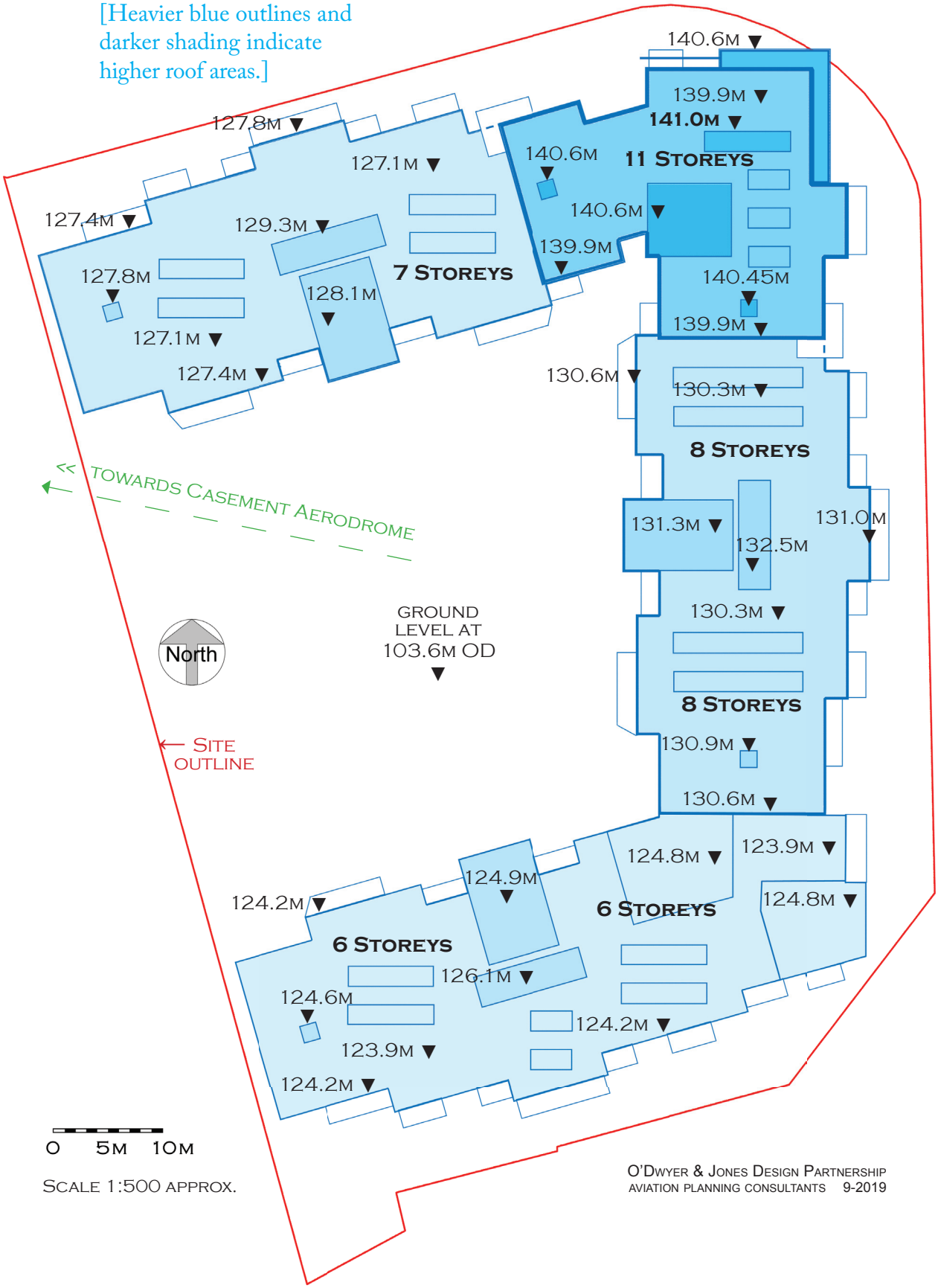
Calculations in relation to Casement's **Conical Surface** are provided (*in* ***Section 8***).

3.6 Prior to submission of this report, we have (both in 2018 and 2019) consulted with – and provided details of the proposed development on this 'Phase 2' site to – the Air Corps, the Department of Defence, and the Irish Aviation Authority.

3.7 We also point out that much of the information concerning aviation and aerodromes (including for Casement military aerodrome) has been provided by our own firm to S.D.C.C. (at the time of preparation of the previous Development Plan).

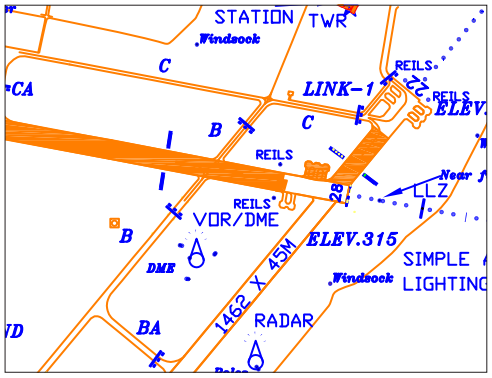
4. Layout & Elevations of the Proposed Development

Below, to approx. scale 1:500, is a roof plan of the proposed 6-to-11-storey development, with elevations (OD) of its highest elements.
[Heavier blue outlines and darker shading indicate higher roof areas.]



5. Calculations with regard to the Approach Surface to Runway 28

5.1 Relevant Data:
The relevant runway threshold (28) is stated on the current Aerodrome Chart *[>]* to be at 315ft AMSL elevation, i.e. at 96m OD which is the elevation of its Approach Surface where it commences at 60m from the runway threshold.



We calculate that – measured along the centre of the Approach Surface (i.e. the extended centre-line of runway 28) – the overall site lies at between 4.703km (at its nearest western corner) and 4.875km (at its farthest eastern corner) from the start of the Approach Surface to Casement's Runway 28.

5.2 The ground elevations on the site are at ~103.0-104.2m OD. These small variations in existing ground levels across the site can be ignored because all proposed building heights are related to an established ground elevation of 103.6m OD.

5.3 The slopes of the **Approach Surface** to Runway 28 (as stated in the Development Plan [in which it is referred to as Runway 29] – and as per ICAO for a Code 4 instrument runway) are 2% for the first 3,000 metres and 2.5% for the next 3,600 metres.

Thus, at the site's nearest corner (at 4,703m from the Runway Strip to Runway 28), the Approach Surface lies at **198.6m OD***, and therefore lies 95m above the 103.6m OD ground elevation at that part of the site.

* *calculated as follows —*
(3000 × 2%) + (1703 × 2.5%) +96m OD = 60 + 42.6 + 96m = 198.6m OD

And at the site's farthest corner from Runway 28 (at 4,777m from the Runway Strip) the Approach Surface lies at 200.4m OD** (98.8m above ground level).

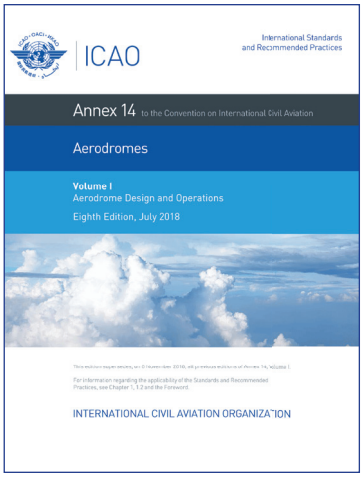
** *calculated as follows —*
(3000 × 2%) + (1777 × 2.5%) +96m OD = 60 + 44.4 + 96m = 200.4m OD

5.4 Residential building heights of 6 to 11 storeys are proposed on this site, with the highest part being of 37m height, i.e. extending to 141m OD. This height is 57.6m below the 198.6m OD lowest elevation of the Approach Surface above this site, and the proposed development complies with the requirements of the S.D.C.C. Development Plan with regard to that Surface.

5.5 A Longitudinal Section Diagram *(on page 11)* illustrates the features and dimensions as noted above, and as noted on the next three pages 8-10.

6. Calculations with regard to the Take-Off Climb Surface from Runway 10

6.1 The slope of the **Take-Off Climb Surface** from Runway 10 (as defined by I.C.A.O. for Code 4 runways in its *Annex 14 [Aerodromes'] to the Convention on International Civil Aviation, 8th ed.* >>) is 2%. Thus, above the site's north-western corner (nearest to Threshold 28), the Take-Off Climb Surface from Runway 10 is at **190.0m OD*** (and therefore at 86.0m above the ground in this location).



* *calculated as follows —*
4703 × 2% +96m OD = 94 + 96m = 190m OD

And at the site's south-eastern corner, the Take-Off Surface from Runway 10 is at 191.5m OD** (and therefore at 87.5m above the ground in this location).

** *calculated as follows —*
4777 × 2% +96m OD = 95.5 + 96m = 191.5m OD

6.2 Thus the proposed development (which extends to 141m OD) will not affect the Take-Off Climb Surface from Casement Runway 10 (as defined by I.C.A.O.), which lies at 49m+ above its highest point.

6.3 I.C.A.O. also includes a *recommendation* (in paragraph 4.2.26 of its *Annex 14 – 'Aerodromes'*) that *'If no object reaches the 2% take-off climb surface, new objects should be limited to … a surface down to a slope of 1.6%…'* We therefore include the following calculation in relation to a possible 1.6% Take-Off Climb Surface, which lies at 171.2m OD*** above the north-western corner of the site.

*** *calculated as follows —*
4703 × 1.6% +96m OD = 75.2 + 96m = 171.2m OD

6.4 In addition, I.C.A.O. includes a provision (in paragraph 3.8.1.1 of its *Annex 4 – 'Aeronautical Charts'*) that any obstacle projecting above a 1.2% slope in the take-off flight path area be considered a significant obstacle, and be shown on Aeronautical Charts. We therefore include an additional calculation in relation to a 1.2% slope, which lies at **152.4m OD**** above the site, which is 11.4m higher than the highest point (at 141.0m OD) of the proposed development.

**** *calculated as follows —*
4703 × 1.2% +96m OD = 56.4 + 96m = 152.4m OD

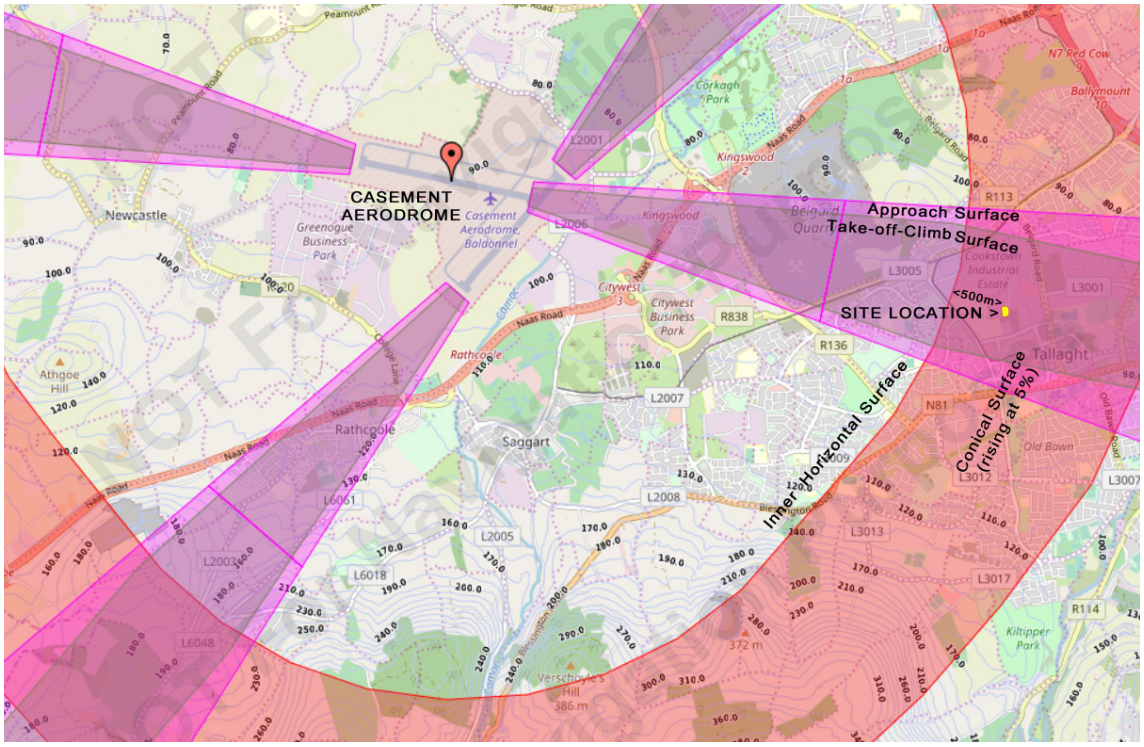
6.5 Thus the proposed development will not affect –
(i) Casement's Take-Off Climb Surface from Runway 10 (at 2% slope), or
(ii) a lower Take-Off Climb Surface (at a 1.6% slope), and
(iii) it does not constitute an obstacle in respect of the 1.2% slope.

7. Calculations with regard to the Conical Surface at Casement

7.1 As noted above, the **Conical Surface** at Casement Aerodrome commences from the outer edge of the aerodrome's Inner Horizontal Surface [which lies at 131.6 metres OD, being 45m above the Department of Defence's chosen datum of 86.6m (which was the elevation of the aerodrome's lowest runway threshold)].
From this elevation of 131.6m OD at its inner edge, the Conical Surface at Casement rises at a gradient of 5% for a distance of 2 km horizontally, so that, at its outer rim, it reaches an elevation of 145m above the aerodrome's datum level, i.e. an elevation of 231.6m OD.

[Note: The comment (on page 230 of the S.D.C.C. Development Plan) that "the Inner Horizontal Surface of Casement is 86.6 metres OD" is a misprint, which should read "… is at 131.6 metres OD".]

On the drawing below [which includes Irish Aviation Authority & Aer Corps data] this Conical Surface is shown coloured pink (with the site's location indicated here in yellow). All Approach Surfaces (and the narrower Take-Off Climb Surfaces) are included in purple. —



7.2 It can be seen that this site lies under the Conical Surface of Casement Aerodrome (as well as being under – but not projecting above – the Approach and Take-Off-Climb Surfaces to/from Runways 10/28). The Conical Surface (although much less important at an aerodrome than the more critical Approach and Take-Off Climb Surfaces) is, in this location, the lowest of the three Obstacle Limitation Surfaces which affect this site.
[In the above diagram taken from IAA 'Asset' data, Approach Surfaces are shown at pre-2018 widths (commencing at 300m) rather than at current widths commencing at 280m; this 10m reduction to both sides of the Approach Surface does not however affect this site.]

7.3 As noted in paragraph 3.4 above (*page 5*), the nearest point of this site – which lies at 4,703m from the runway strip to Casement's Runways 10/28 – also lies at 500m from the inner edge of the aerodrome's Conical Surface. This means that the Conical Surface above this point (where the building height is 127.4m OD) lies at **156.6 metres OD***, calculated as follows:

* *131.6 + (500 × 5%) = 131.6 + 25 = 156.6m OD*

And the Conical Surfaces rises (at its 5% gradient) to **160.5 metres OD**** above the farthest corner of this site, which lies at 578m from the inner edge of the aerodrome's Conical Surface, calculated as follows:

** *131.6 + (578 × 5%) = 131.6 + 28.9 = 160.5m OD*

And the tallest part of the proposed development (extending to 141.0m OD) commences at 544m from the inner edge of Casement's Conical Surface, above which the Conical Surface lies at **158.8m OD***, calculated as follows:

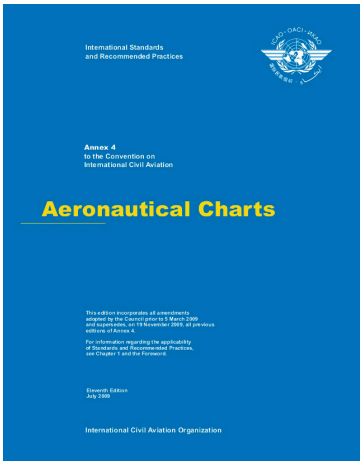
****131.6 + (544 × 5%) = 131.6 + 27.2 = 158.8m OD*

7.4 Thus all parts of the proposed development (with its various high points extending from around 124.2m OD to a maximum of 141m OD) are significantly lower than the Conical Surface above the site. That Surface is at 158.8m above the proposed development's highest point (at 544m from the inner edge of Casement's Conical Surface). This is at 55.2m above ground level (103.6m OD), and provides **17.8m clearance** above the proposed highest element of the building (at 141m OD).

8. Summary re Casement Aerodrome's Obstacle Limitation Surfaces

8.1 All parts of the proposed development on this site are significantly lower than any of Casement Aerodrome's three Obstacle Limitation Surfaces which lie above the site.

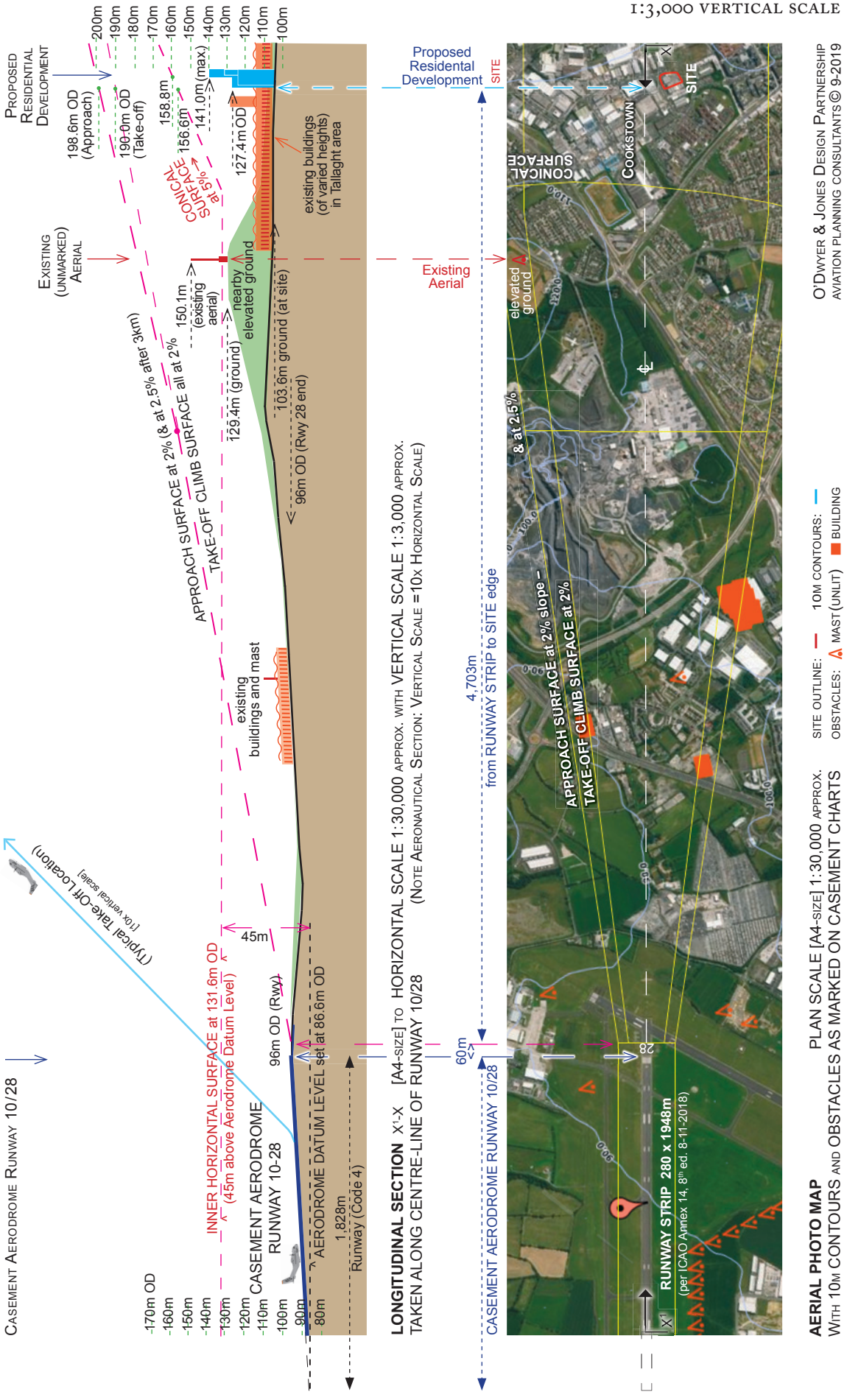
This is illustrated in the Longitudinal Section Diagram *on the following page 11*, on which all three Obstacle Limitation Surfaces are shown.



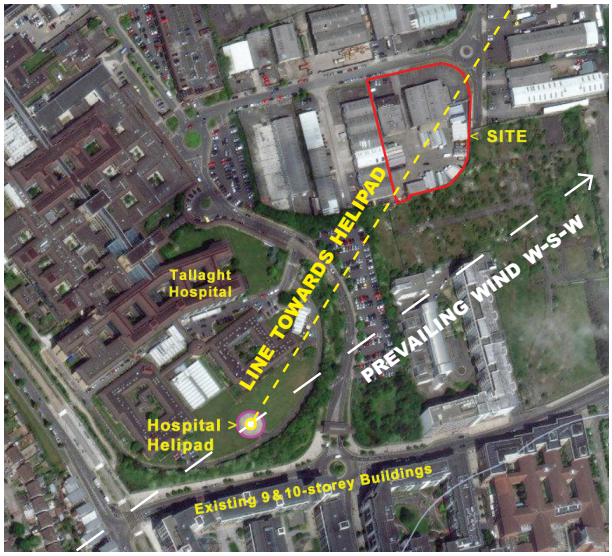
8.2 As noted in para. 6.4 above, the proposed development also lies at 11.4m below a 1.2% slope extended from the edge of the flight strip to Casement's main runway 10/28, and therefore does not require to be shown on aerodrome charts (as provided for in I.C.A.O.'s *Annex 4 – 'Aeronautical Charts'*, paragraph 3.8.1.1 >>).

9. Longitudinal Section Diagram

[A4-size] 1:30,000 horizontal scale
1:3,000 vertical scale



10. Tallaght Hospital Helipad



10.1 The helipad at Tallaght Hospital is located at 223m *approx.* to south-west of the nearest corner of this site. Being a private helipad, it has no published flight procedures or established obstacle limitation surfaces.

We have provided details of the proposed development to the I.A.A. and to helicopter pilots who have flown into this hospital helipad, and we have not been advised of any new operating problems envisaged at the helipad due to the proposed building development.

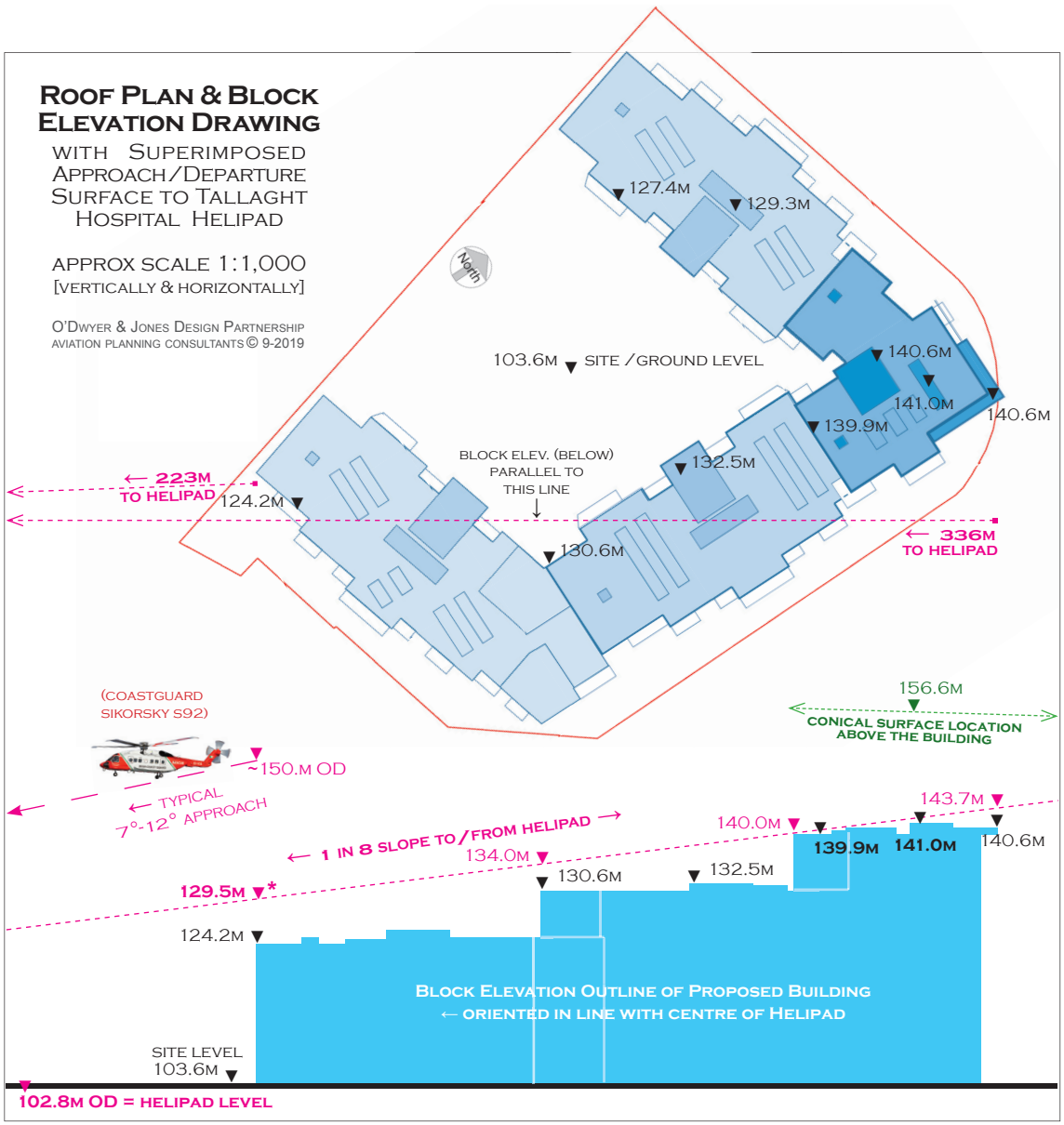
The building layout on the site has been designed to render its shape more suited to helicopter movements to/from the nearby helipad: i.e. with lower building height towards the corner nearest the helipad, and with height increasing from south to north, towards the corner farthest from the helipad – so that all of the building will lie below a 1 in 8 slope leading to the edge of the helipad (in accordance with the international guidelines described in §10.4 & §10.5 below).

10.2 It is worth noting that this helipad currently faces existing 9 & 10 storey buildings [>>] – i.e. of comparable height to the proposed development on this site – directly to south of the helipad, on the other side of the adjacent Belgard Square North roadway. These are at very much closer distances to the helipad (at 55 metres to south). The helipad is also surrounded by mature planting to east and south.

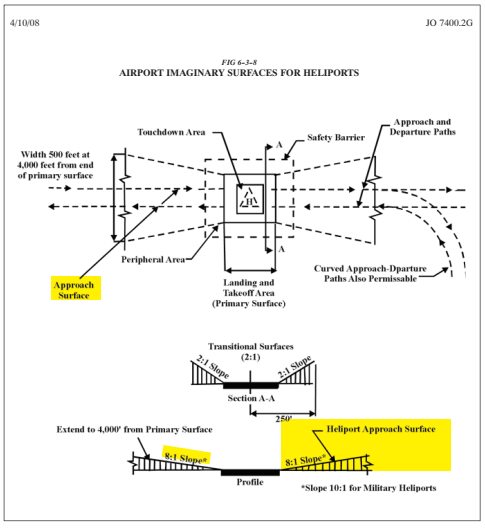
EXISTING 9-10 STOREY BUILDINGS BESIDE TALLAGHT HOSPITAL ENTRANCE & HELIPAD

10.3 The prevailing wind in the area is from west-south-west *(indicated by the dashed white arrow on the aerial photo above)*, with 41% of wind recorded at Dublin Airport since 2000 in sectors west, w-s-w, and s-w. For this reason, a typical direction of take-off (into wind) from this helipad would be to west-south-west, taking departing helicopters away from this site; and a typical helicopter arrival will come from east-north-east (i.e. over existing buildings and land to south of this site).

10.4 While this is a private helipad without established Surfaces, it is worth noting that I.C.A.O. sets out (in its *Annex 14 'Vol II: Heliports'*) a 12.5% (1:8) slope for Approach & Take-Off Surfaces in *'Slope Design Category C'* (– to suit higher performing twin-engined helicopters, such as use this helipad). A similar 1 in 8 slope guideline is provided in *FAA Order JO-7400.2G*: the relevant FAA extract is illustrated on the following page, along with a Block Elevation Drawing oriented in line with the centre of the helipad *(parallel to the dashed yellow line in the aerial photo above)*.



10.5 It can be seen from the Plan & Block Elev. drawing above that the proposed building, which steps down towards the helipad site, would comply (e.g.) with the Heliport Airspace Surface guidelines in the F.A.A.'s *'JO-7400.2G'* document *'Procedures for Handling Airspace Matters' [illustrated right >]* in the event that such Surfaces might be desired above this site.



* *Sample calculation for nearest corner at 223m from helipad : — for Coastguard's Sikorsky S92 (largest helicopter, of length 17.1m) the Approach / Departure Surface commences at 9m from helipad centre, & rises at 1:8 slope from 102.8m OD, to reach 129.5m* at 223m from the helipad :*

* *[(223-9)÷8 = 26.7m] + 102.8m = 129.5mOD.*

11. Other Aviation Considerations Relevant to this Site

11.1 Outer Horizontal Surfaces to Dublin Airport and to Weston Aerodrome

The site and the proposed development lies at about 900m outside the Outer Horizontal Surface to Dublin Airport, which is unaffected by the development.

The site also lies just outside a new Outer Horizontal Surface established for Weston Airport [at 196.3m OD] and is unaffected by it.

11.2 Solar Panels – Glint & Glare

This aspect is the subject of a separate 'glint & glare' study by Innovision Media Ltd., with whom we have consulted. We understand that non-reflective solar panels are proposed, and that these panels (being directed towards the south) will inevitably be oriented away from the east-west flight directions of the relevant runway(s) 10/28.

11.3 External Lighting

Being close to the centre of the Approach and Take-Off Climb Surfaces to and from runway(s) 10/28, it is recommended that any external lighting (including any street lighting) should be of the cut-off type (showing no light above the horizontal).

11.4 Use of Cranes During Construction

It is intended that mobile (rather than tower) cranes will be used during construction on this site, and these will mainly operate below all Obstacle Limitation Surfaces. The use of such cranes has been discussed in outline at a meeting with the Department of Defence and the Air Corps (and further details should be notified in good time as they become known). In any event, it will be necessary [under S.I. 215 of 2005 – *'Irish Aviation Authority (Obstacles to Aircraft in Flight) Order'*] for prior notification of the use of any very tall cranes to be submitted, 30 days in advance, to the Irish Aviation Authority and to Casement Aerodrome, who may need to issue notifications to pilots, and who may require these cranes to be fitted with aviation warning lights.

It is worth noting that, on the elevated ground beside Cookstown Road (at just over 1km north-west of this site, and also lying under the Approach Surface to Runway 28 but much closer to that runway) there is an existing reservoir pump-house building, constructed at a ground elevation of 129.4m OD, which itself projects above Casement's Inner Horizontal Surface, and on which there is an aerial extending to an elevation of 150.1m OD. As was illustrated *(in its figure 8.7)* in the Department of Defence's *Mott MacDonald Report of 2009 re Casement Aerodrome*, this existing obstacle would provide a degree of 'shielding' to development of similar height in the Cookstown area.

12. Summary

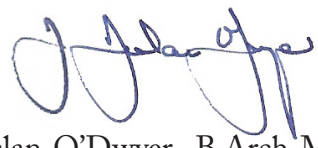
12.1 **Approach & Take-Off Climb Surfaces**
The Approach Surface and the Take-Off Climb Surface to Casement Runway(s) 10/28 are the significant Obstacle Limitation Surfaces in relation to this site, and the proposed development lies significantly lower than both of these surfaces, i.e. its highest point lies at more than 57.6 metres below the Approach Surface, and at more than 49 metres below the Take-Off Climb Surface. The development is also 11.4m lower than the 1.2% slope which would require it to be notified as a potential obstacle on aeronautical charts.

12.2 **Conical Surface**
The Conical Surface, while being a less significant Surface than the Approach or Take-Off Surfaces, is the lowest of the three Obstacle Limitation Surfaces at Casement Aerodrome lying above this site. However this Conical Surface (sloping upwards at 5%) lies at 17.8m above the highest point of the proposed development on this site, and is unaffected by it.

12.3 **Tallaght Hospital Helipad**
It is not anticipated that the proposed development will interfere with current helicopter operations to/from the hospital helipad. While this helipad is not a 'heliport', Approach and Departure Surfaces in compliance with an international 'heliport' standard can (if required) be designed and provided above the proposed building.

12.4 **General**
We consider that the proposed residential development complies with all aviation and aeronautical requirements affecting the site.

Prior to the preparation of this report, we have consulted with the Irish Aviation Authority, with the Department of Defence and with the Air Corps at Casement Aerodrome, to all of whom we have provided details of the proposed development on this site and of our aeronautical calculations in relation to it.



J. Declan O'Dwyer B.Arch MBA RIBA
10th October 2019
O'Dwyer & Jones Design Partnership
Aviation Planning Consultants

O'DWYER & JONES DESIGN PARTNERSHIP
AVIATION PLANNING & ARCHITECTURE CONSULTANTS
28 LEESON PARK • DUBLIN 6 • TEL.:353-1-498 1893 [FAX:353-1-496 4410]
WWW.AVIATIONPLANNING.IE E.: ADMIN@AVIATIONPLANNING.IE / DESIGNPARTNERS@IOL.IE
J. D. O'DWYER B.ARCH MBA RIBA S. JONES MA