Aeronautical Assessment Report

re Lands West of Old Belgard Road and North, South and West of Cookstown Road, Cookstown Industrial Estate, Tallaght, Dublin 24

FOR

Cookstown Castle

Strategic Housing Development
Planning Application

BY

Joseph Costello, Absolute Limousines Ltd.
& Boherkill Property Development Ltd.

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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

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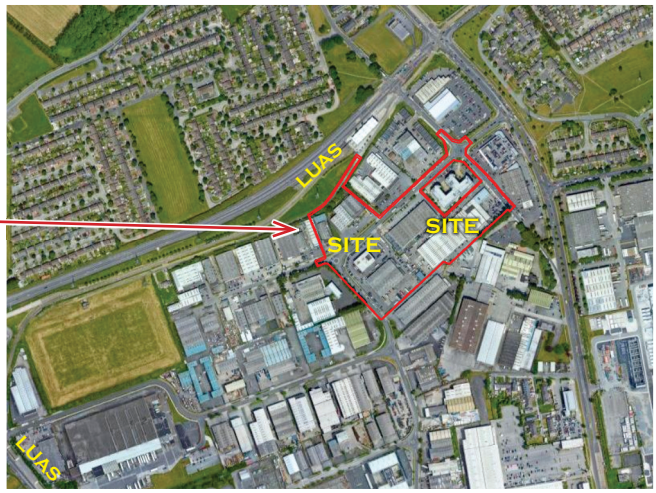
1. Scope of Report and Location of Site & Surroundings

1.1 Site Location

This report addresses the aviation impact of a proposed Strategic Housing Development on an application site totalling 4.995 ha overall approx, in South County Dublin, to either side of Cookstown Road, and adjoining Belgard Luas Station.



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

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

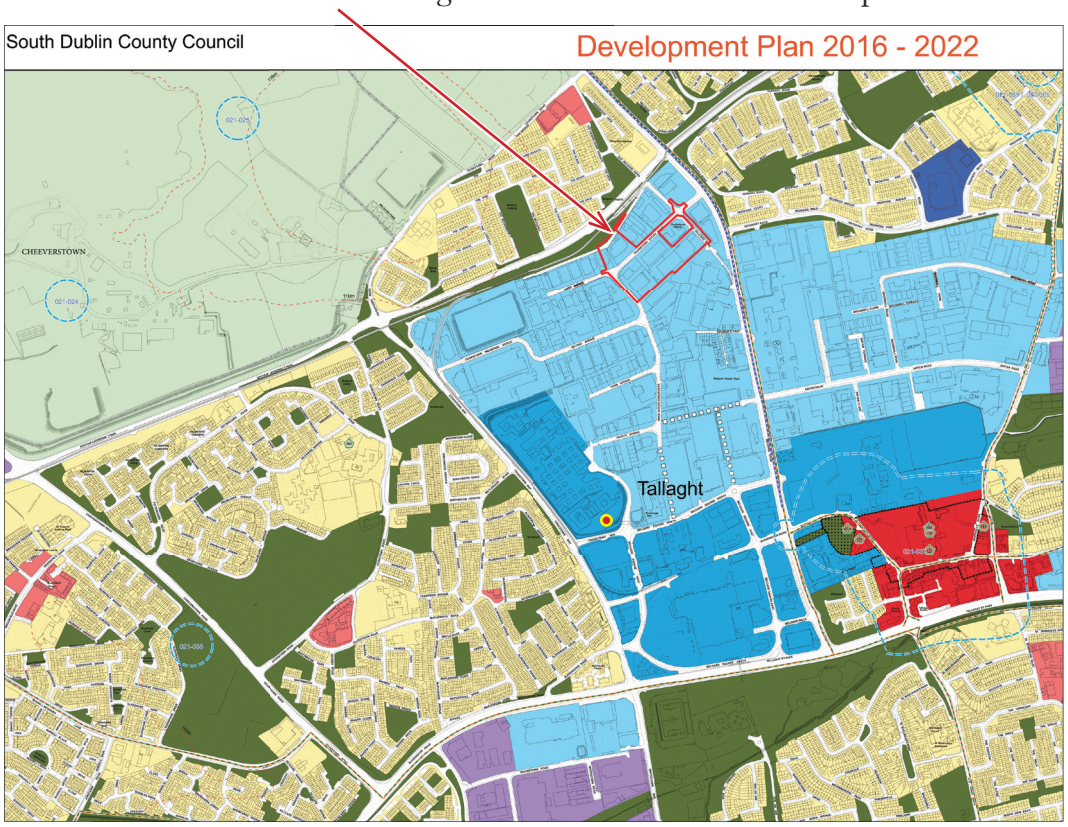
(ii) In **November 2018, I.C.A.O. issued revised 'Annex 14' Standards** bringing these standards (applied at Casement) in line with the new E.A.S.A. airport specifications.

(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 Sites 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 outlined in red on amalgamated extracts of S.D.C.C. Maps 5 & 9 below:



1.4 Items of aeronautical significance in relation to the sites 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 the nearest corner at a distance of 4.55 km from the threshold of runway 28.

(ii) The site lies under the Conical Surface at Casement military aerodrome (*see diagrams and section on pages 10 & 12*).

(iii) The proposed ground level for the buildings on this site (at 100.7m-101m OD) is 5m higher than the level of the threshold of Casement Aerodrome's Runway 28, and 14.4m higher than the aerodrome's datum (at 86.6m OD).

(iv) The proposed buildings lie at between 780m – 970m north of the helipad *(red+yellow dot on map above)* at Tallaght Hospital.

2. Obstacle Limitation Surfaces in Relation to the Site

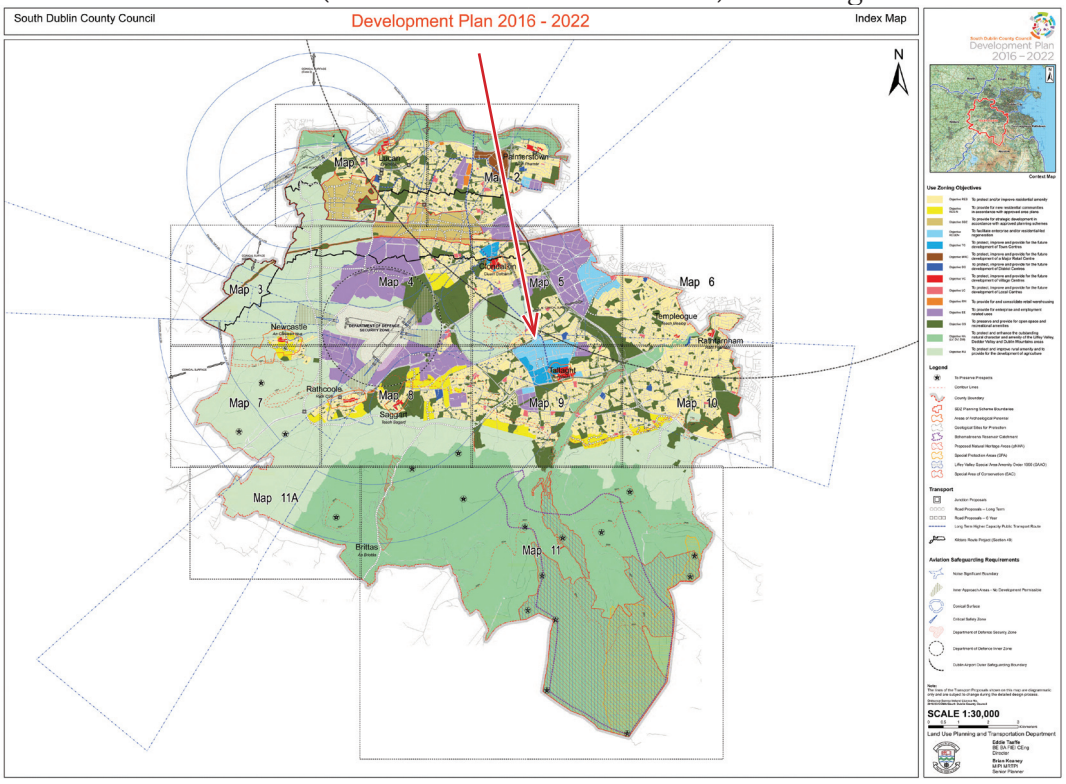
2.1 The Department of Defence has adopted the I.C.A.O. Obstacle Limitation Surfaces in relation to Casement Aerodrome. Being a military aerodrome, Casement is not bound by these Civil Aviation standards, but the Department of Defence has opted to apply these Standards at Casement (to protect aircraft in flight). These Obstacle Limitation Surfaces – which are similar to the E.A.S.A. Specifications now applicable at Dublin and other 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 Approach Surface to Runway 28 (the highest surface in this location);
(ii) the Take-off Climb Surface from Runway 10; and
(iii) the Conical Surface for Casement Aerodrome as a whole (–the lowest surface).

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.

The Conical Surface is an inclined plane commencing at 45m above the aerodrome's datum level (set at 86.6m OD at Casement) and rising at 5%.



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 227m from the inner edge of Casement's Conical Surface, an additional 11.35m height (227 × 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 under both Surfaces. *[* per ICAO revision of 2018.]*

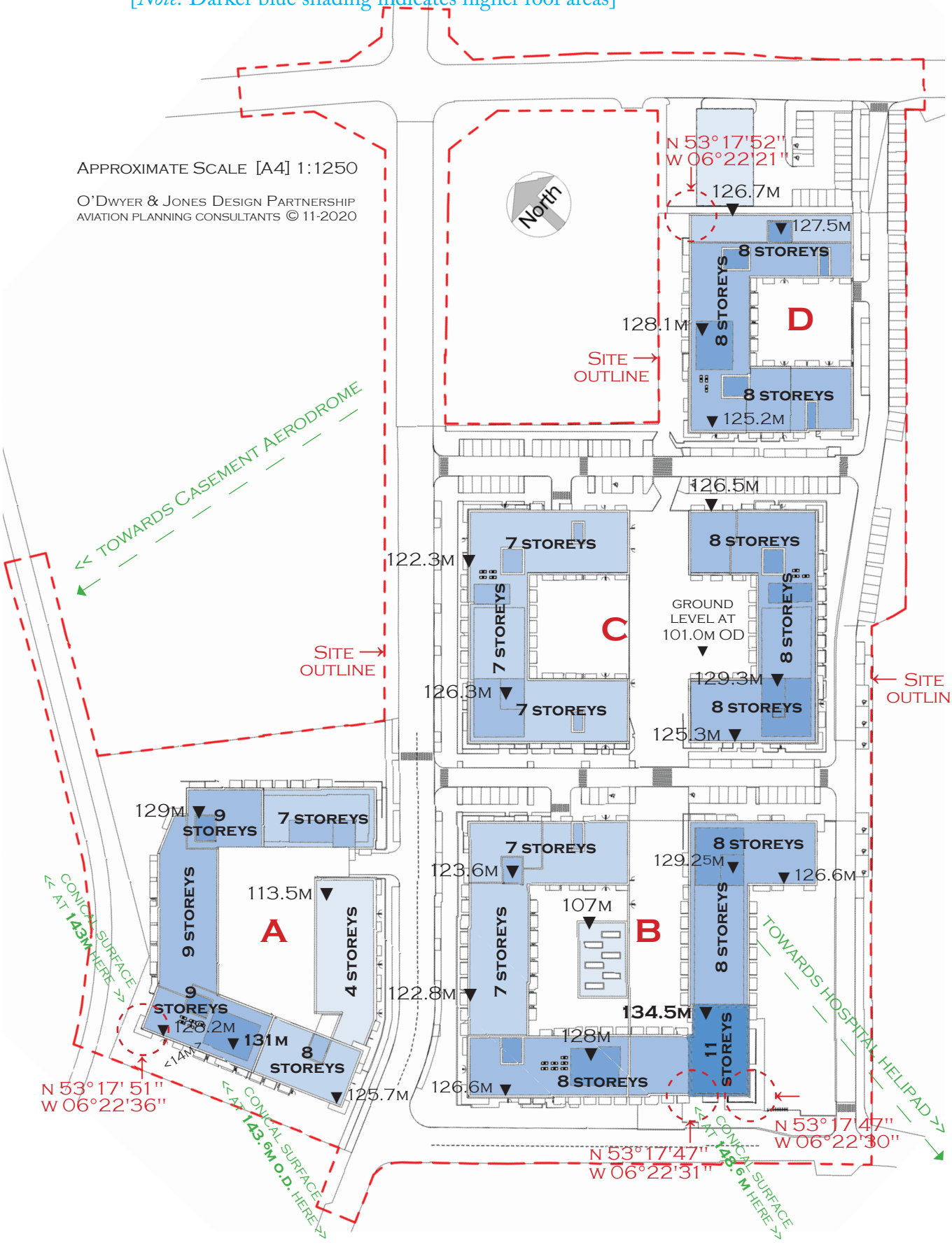
Calculations in relation to Casement's **Conical Surface** are provided (*in* ***Section 7***).

3.6 Prior to submission of this report, we have provided details of the proposed development to the Irish Aviation Authority and to the Department of Defence (for forwarding to the Air Corps at Casement).

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).

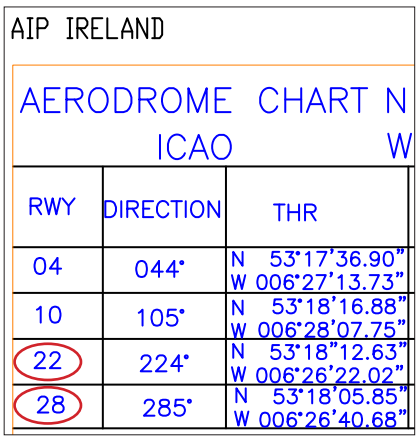
4. Layout & Elevations of the Proposed Development

Below is a roof plan of the proposed development, with apartments on 4 to 11 storeys as indicated, and with elevations (OD) of the highest roof elements.
[*Note:* Darker blue shading indicates higher roof areas]



4.2 **Coordinates Data – Proposed Development:**
Relevant corners of the proposed development are circled on the previous page. These are —
the nearest **Building** corner of the development to **Casement** Aerodrome,
with coordinates: **53° 17' 51" N, 006° 22' 36" W**;
the corner nearest **Casement** of the **highest element** of the development (at 134.5m),
with coordinates: **53° 17' 47" N, 006° 22' 31" W**;
the nearest **Building** corner to Tallaght Hospital **helipad** (also the highest element),
with coordinates: **53° 17' 47" N, 006° 22' 30" W**;
and the farthest **building** corner from Tallaght Hospital **helipad**,
with coordinates: **53° 17' 52" N, 006° 22' 21" W**;

4.3 **Coordinates Data – Casement & Helipad:**
The two relevant Casement coordinates are:
(i) the centre of the threshold of Runway 22
at **53° 18' 12.63" N, 006° 26' 22.02" W**
– the reference point for setting out the Conical Surface above the wider Cookstown area; *and*
(ii) the displaced threshold of Runway 28
at **53° 18' 05.85" N, 006° 26' 40.68" W**
– used for precise calculation of the Inner Edges of the Approach Surface to Runway 28 (at 60m east of that location), and of the Take-off Climb Surface from Runway 10 (at 240m east of that location).


AIP IRELAND

AERODROME CHART N
ICAO W

RWY	DIRECTION	THR
04	044°	N 53°17'36.90" W 006°27'13.73"
10	105°	N 53°18'16.88" W 006°28'07.75"
22	224°	N 53°18"12.63" W 006°26'22.02"
28	285°	N 53°18'05.85" W 006°26'40.68"

The centre of Tallaght Hospital helipad (102.8m OD) is at **53° 17' 22" N, 006° 22' 36" W**

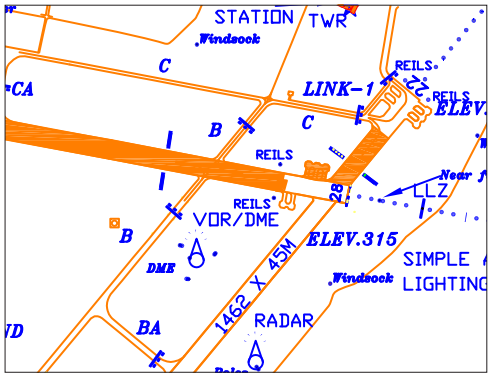
4.4 **Distances Between Coordinates:**
Runway 22 Threshold to nearest Building = **4,227m** *(4,241m to 131m OD roof)*
Runway 22 Threshold to highest element = **4,339m**
Runway 28 Threshold to nearest Building = **4,546m**
Runway 28 Threshold to highest element = **4,652m**

Hospital helipad to nearest Building (and highest element) = **780m**
Hospital helipad to farthest building corner (towards east) = **967m**

4.5 **Distances as Measured along the Extended Centreline of Rwy 10/28:**
For Approach and Take-off Climb Surface calculations, the distances along extended runway centreline (rather than the direct distances from site to threshold) are relevant. Thus, for the building corner nearest to Casement, at **4,546m direct distance**, and lying at **750m** approx. north of the extended centreline of Runways 10/28, its distance as measured along that extended runway centreline is **4,484m***.
* *Calculation: $(4546)^2$ minus $(750)^2 = (4483.7)^2$*
Similarly, the tallest element of the development – at **4,652m direct distance** and at **550m** north of the runway centreline – lies at **4,619m*** along the centreline.
** *Calculation: $(4652)^2$ minus $(550)^2 = (4619.4)^2$*

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 also the elevation of the Inner Edge of the Approach Surface commencing at **60m** from that runway threshold.



By deducting 60m from the 4,484m listed in paragraph 4.5 *(on the previous page)* it is established that the nearest corner of the site lies at **4,424m** from the inner edge of the Approach Surface to Casement's Runway 28 (as measured along the centre of that Surface – i.e. along the extended centreline of Runway 28), and a similar calculation shows that the near corner of the building development's highest element (at 134.5m OD) lies at **4,559m** from the inner edge of the Approach Surface.

5.2 The ground floor levels on the site are set at 101m OD, i.e. at 5m higher than the Threshold of Casement's Runway 28.

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 building development's nearest corner (at **4,424m** from the Surface's Inner Edge, *as shown on page 7*) the Approach Surface to Rwy28 lies at **191.6m OD***, and therefore lies 90.6m above the 101m OD ground elevation, and at **63.4m** above the parapet (at 128.2m OD) of the 9-storey structure in this location.

* *calculated as follows —*

(3000 × 2%) + (1424 × 2.5%) +96m OD = 60 + 35.6 + 96m = 191.6m OD

5.4 Residential building heights of 4 to 11 storeys are proposed on this site, with the highest part – the 11-storey part of Block B, extending to 134.5m OD. – being 33.5m high. The nearest corner of this highest element lies at **4,559m** from the Inner Edge of the Approach Surface to Rwy28, so that at this point the Approach Surface lies at **195m OD****, i.e. at **60.5m** above the highest point of the development.

** *calculated as follows —*

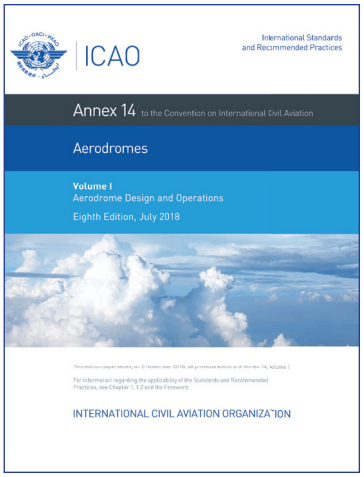
(3000 × 2%) + (1559 × 2.5%) +96m OD = 60 + 39 + 96m = 195m OD

5.5 Thus the proposed development complies fully with the requirements of the S.D.C.C. Development Plan with regard to the Approach Surface to Runway 28.

5.6 A Longitudinal Section Diagram *(on page 12)* illustrates the features noted above.

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

6.1 The **Take-off Climb Surface** from Runway 10 commences at 240m [180+60m] from the displaced Threshold of Runway 28. This places the Take-off Surface's Inner Edge at **4,244m*** from the development, and deemed to be at ~96m OD elevation *['highest point' per ICAO Annex 14 para. 4.1.27]*.
Rising at 2% *(per ICAO for this category of runway)* the Take-off Climb Surface from Runway 10 therefore rises to **180.9m OD*** (i.e. **52.7m** higher) above the nearest corner of the development, and well above any part of it.



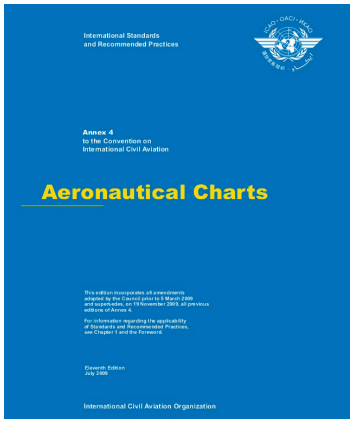
* *calculated as follows (4484 - 240 = 4244m):*
4244 × 2% +96m OD = 84.9+ 96m = 180.9m OD

And above the highest element (@ 134.5m OD), the Take-off Climb Surface from Runway 10 lies at **183.6m OD**** (and therefore at **49.1m** above this location).

** *calculated as follows (4619 - 240 = 4379m) :*
4379 × 2% +96m OD = 87.6 + 96m = 183.6m OD

6.2 Thus the proposed development (which extends to 134.5m OD) will not affect the Take-Off Climb Surface from Casement Runway 10 (as defined by I.C.A.O.), which lies **at 49.1m+ above its highest element**.

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, and this would lie at **166m OD***** above the highest element of the development (which reaches 134.5m OD).



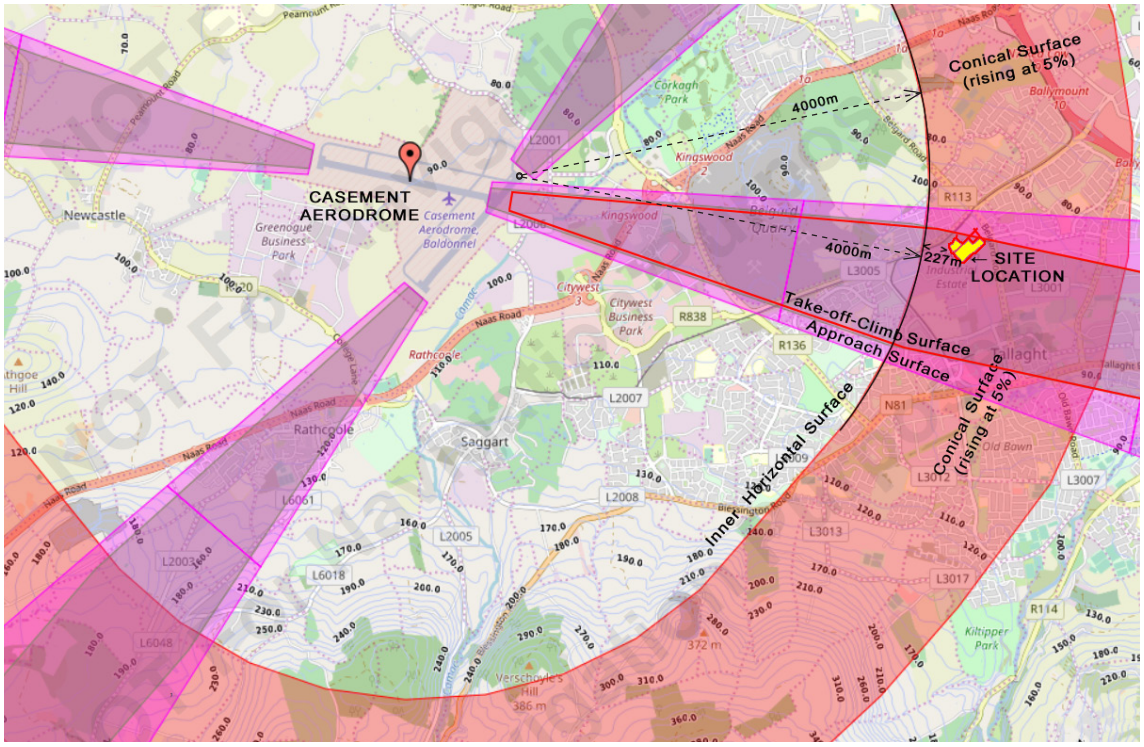
*** *calculated as follows —*
4379 × 1.6% +96m OD = 70 + 96m = 166m OD

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 **148.5m OD**** above the highest element (at 134.5m OD), i.e. at **14m** *above* the highest point of the proposed development.

**** *calculated as follows —*
4379 × 1.2% +96m OD = 52.5 + 96m = 148.5m OD

7. Calculations with regard to the Conical Surface at Casement

7.1 As noted in Section 3 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]. From this 131.6m OD elevation at its inner edge, the Conical Surface at Casement rises at a gradient of 5% for a distance of 2 km horizontally, reaching an elevation of 145m above the aerodrome's datum at its outer rim (i.e. rising to an elevation of 231.6m OD).
The drawing below (with Conical Surface shown coral-coloured, and Approach & Take-off Climb Surfaces in purple & grey) is taken from the published I.A.A. 'Asset' data: onto it we have added the site in yellow, and notes + dimensions in black. —



[In this 'Asset' diagram above, which pre-dates ICAO's 2018 amendments to 'Annex 14', Approach Surfaces are shown commencing at 300m rather than at current 280m widths; this 10m reduction to both sides of the Approach Surface does not however affect this site. In addition, the Inner Edge of the Take-off Climb Surface from Runway 10 was shown as coinciding with the Inner Edge of the Approach Surface to Runway 28 (rather than at 180m separation, due to displacement of the 28 Threshold) – we have amended the location of this Take-off Climb Surface from Runway 10 in an added red outline included above.]

7.2 It can be seen that this site lies under the Conical Surface of Casement Aerodrome, at 227m from its inner rim (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 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.

7.3 The setting-out locations for Casement's Inner Horizontal and Conical Surfaces are the centrelines of the relevant runways, and for the Cookstown area the reference point is the centre of Threshold 22 – about which a 4km arc is described (to N-E of the R136 road, extending from Grange Castle Road to Cheeverstown Road approximately). —*See diagram on previous page. The coordinates and distances from the site of this Threshold 22 reference point are given in paragraphs 4.2–4.4 above.*

7.4 As noted in paragraph 4.4 *[on page 7 above]*, the corner of this development nearest to Casement Aerodrome lies at 4,227m from the reference point at the centre of Threshold 22, i.e. it lies at 227m from the inner (lower) edge of the aerodrome's Conical Surface. This means that the Conical Surface in this location (where the building height is 128.2m OD) lies **14.8m** above this corner, at **143 metres OD***, *calculated as follows:*

* $131.6 + (227 \times 5\%) = 131.6 + 11.4 = 143m$ *OD*

7.5 As also noted in paragraph 4.4 *[on page 7 above]*, the highest element of this development lies at 4,339m from the reference point at the centre of Threshold 22, i.e. it lies at 339m from the inner (lower) edge of the aerodrome's Conical Surface. This means that the Conical Surface in this location (where the building height is 134.5m OD) lies **14.1m** above the highest building element, at **148.6 metres OD****, *calculated as follows:*

** $131.6 + (339 \times 5\%) = 131.6 + 17 = 148.6m$ *OD*

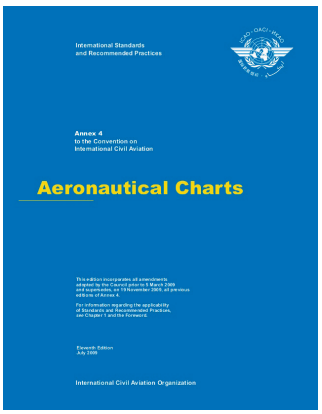
7.6 And at its closest, the Conical Surface is found to lie at **143.6m OD***** above the part of Block A with roof level at 131m OD, i.e. **12.6m** above that roof, *calculated as follows:*

*** $131.6 + (241 \times 5\%) = 131.6 + 12 = 143.6m$ *OD*

Thus all parts of the proposed development are significantly lower than the Conical Surface above the site. **At its closest, the Conical Surface lies at 12.6m** above the nearest roof element to it of the proposed development (at 131m OD on Block A).

8. Summary re Casement Aerodrome's Obstacle Limitation Surfaces

8.1 Calculations (in Sections 5, 6, & 7 above) in relation to the development's nearest corner, and to its highest element etc., show that 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.

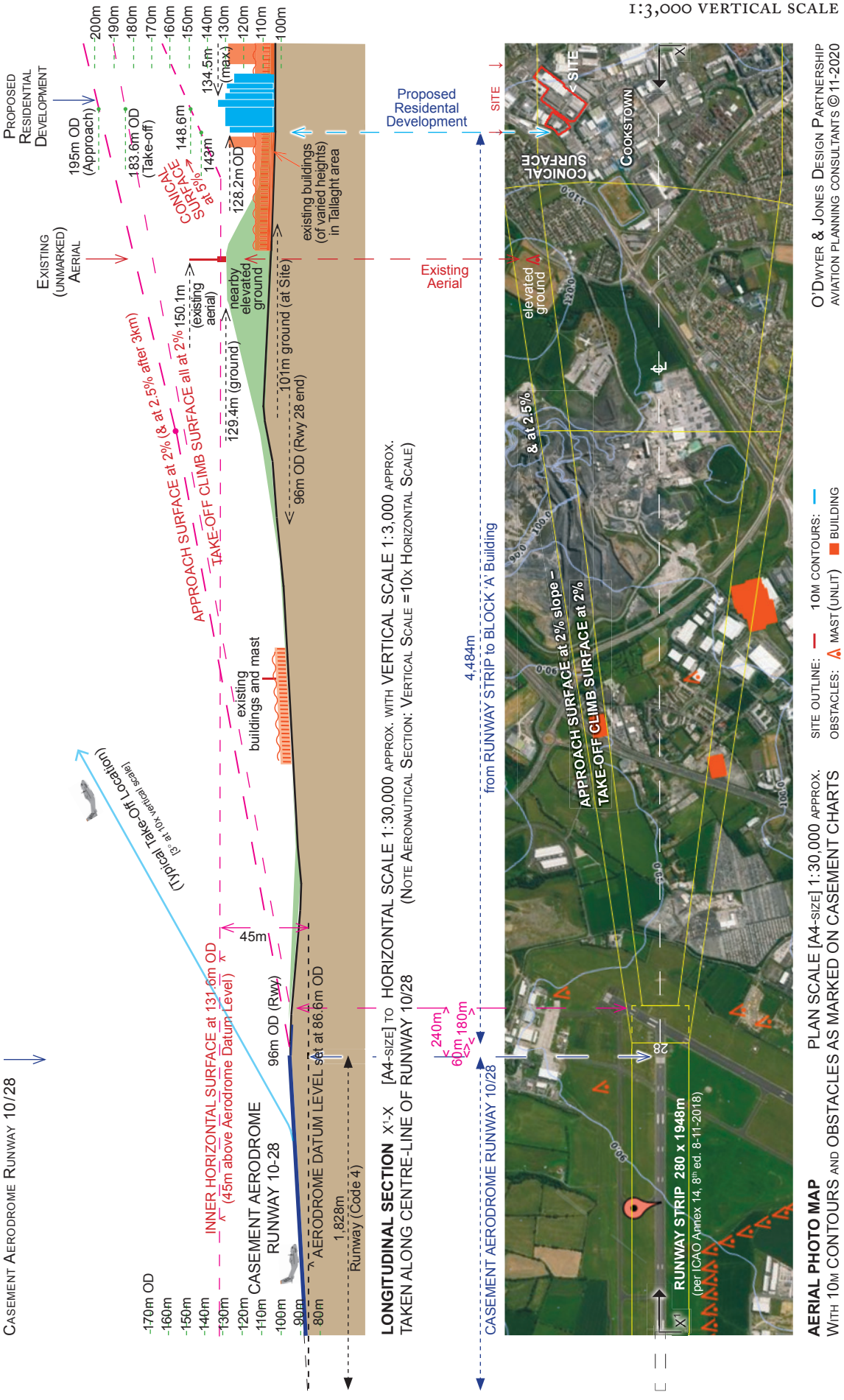


These 3 Surfaces are illustrated in the Longitudinal Section Diagram on the following page 12.

8.2 As noted in para. 6.4 above, the proposed development also lies at **14m** below a 1.2% slope extended from the inner edge of the take off flight path from Casement's Runway 10, and therefore does not require to be shown on aerodrome charts *(per para. 3.8.1.1 of I.C.A.O.'s Annex 4 – 'Aeronautical Charts').*

9. Longitudinal Section Diagram

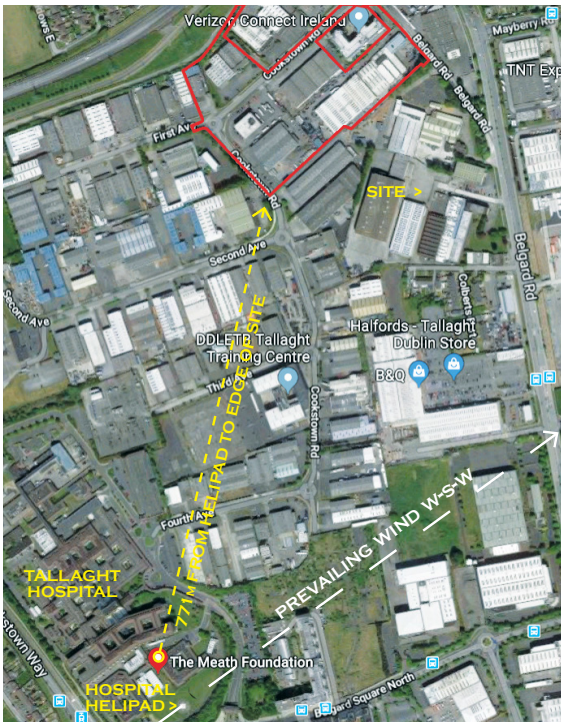
[A4-SIZE] 1:30,000 HORIZONTAL SCALE
1:3,000 VERTICAL SCALE



10. Tallaght Hospital Helipad

10.1 The site lies between 780m and 970m to the north of the helipad at Tallaght Hospital. Being a private helipad, it has no published flight procedures or established 'obstacle limitation surfaces'.

The building at the corner of the site closest to the helipad rises to 134.5m OD (i.e. 31.7m higher than the helipad surface at 102.8mOD), and lies at 780m from the centre of the helipad, so that this highest element – and all parts – of the development will lie below a 1:24 (4.1%) slope rising from the edge of the helipad (commencing 9m from the helipad's centre).



10.2 It may be noted that I.C.A.O. sets out *(in its Annex 14 'Vol II: Heliports')* various Heliport Design Slopes for Approach & Take-off Surfaces – from 4.5% (1:22.2), to 8% (1:12.5), to 12.5% (1:8 —for *'Slope Design Category C'* to suit higher performing twin-engined helicopters, such as use this helipad). With the development's highest element extending no higher than a 4.1% (1:24) slope from the hospital helipad, the proposed development complies comfortably with all possible helicopter approaches to this helipad.

10.3 It is worth noting that this helipad currently faces existing 9- & 10-storey buildings [>>] – i.e. of similar heights to the proposed development on the Cookstown Castle site. These are directly to south of the helipad on the other side of the adjacent Belgard Square North roadway, and are at substantially closer distances to the helipad (at 55m to its south).

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

10.4 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 other land and buildings well south of this site).

11. Other Aviation Considerations Relevant to this Site

11.1 Outer Horizontal Surface of Dublin Airport

The site and the proposed development lie 350m outside the Outer Horizontal Surface of Dublin Airport, which is unaffected by the development.

11.2 Glint & Glare

Solar/PV panels (or any reflective roof surface) are not being provided as part of this development, and no glint or glare affecting aviation is likely to arise.

11.3 External Lighting

Being under Approach and Take-off Climb Surfaces, external lighting (including any street lighting) should ideally be of the cut-off type (i.e. showing no light above the horizontal). While aircraft warning lighting is not necessary on this site, consideration might be given to providing low-intensity lighting on the highest part (in particular if that may be considered desirable by the IAA or by the Air Corps).

11.4 Use of Cranes During Construction

It is proposed that mobile (rather than tower) cranes will be used during construction on this site, and it is intended that cranes will operate below all of Casement's Obstacle Limitation Surfaces, the lowest of which (the Conical Surface) lies at 12.6m above the nearest roof element of the development.

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 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 cranes to be fitted with aviation warning lights.

Prior notification to the **HSE's Aero-Medical Section** (based at Phoenix Park) may also be made in respect of Tallaght Hospital helipad, by means of their *Crane Notification Form*.

It is worth noting that, on elevated ground beside Cookstown Road (at less than 1km north-west of this site, and also under the Approach Surface to Runway 28 and nearer to that runway) there is an existing reservoir pump-house building, constructed at a ground level of 129.4m OD, which building itself projects above Casement's Inner Horizontal Surface, and above which there is an aerial extending to an elevation of 150.1m OD. This existing obstacle could provide a 'shielding' to development of similar height in the Cookstown Road area.

12. Summary

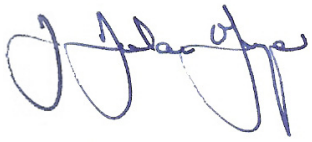
12.1 **Approach & Take-Off Climb Surfaces**
The Approach Surface to Casement's Runway 28 and the Take-off Climb Surface from its Runway 10 are the significant Obstacle Limitation Surfaces in relation to this site, and the proposed development lies substantially lower than both of these Surfaces, i.e. its highest element (in Block B) lies at **60.5 metres** below the Approach Surface, and at **49.1 metres** below the Take-off Climb Surface.
The development is also **14m** lower than the 1.2% slope above which it would be required for a structure 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 Climb 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 **12.6m** above the nearest roof to it of the proposed development [a roof surface at 131m OD on Block A], and is unaffected by it.

12.3 **Tallaght Hospital Helipad**
The proposed development is at sufficient distance from the hospital helipad that it will not interfere with helicopter operations to/from this helipad. While this helipad is not a 'heliport', Approach and Departure Surfaces – to any of the three ICAO slopes (for all categories of helicopter) – could readily be provided above the proposed building.

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

Prior to the submission of this report, we have provided an advance copy of it to the Irish Aviation Authority, and to the Department of Defence (for forwarding to the Air Corps at Casement Aerodrome).



J. Declan O'Dwyer B.Arch MBA RIBA
18th November 2020
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