Chapter 12 MATERIAL ASSETS - GENERAL

- **Appendix 12.1 Power Transmission Line in the vicinity of Trim Aerodrome**

Power transmission line in the vicinity of Trim Aerodrome
R Fewings ~ January 2014

1. Introduction

This technical note is an update of similar notes prepared in 2008 and 2010 and refers to the proposal by EirGrid to construct a 400KV power line, the route of which will pass to the north and east of Trim Aerodrome.

2. Trim Aerodrome

Trim Aerodrome is located in County Meath, some 15 minutes flying time from the coast (Irish Sea) and a similar flying time from Dublin International Airport. The aerodrome operator is registered as Mr. Pat Murphy, Dunganny, Trim, Co. Meath. It is assumed that normal aerodrome operational hours are from early morning to sunset and that, as the aerodrome operates under Visual Flight Rules, there are no navigation aids available at the airport in terms of runway and approach lighting.

The single runway (10/28) is grass, 560m long and 12m wide. The aerodrome elevation is quoted as 200 ft (61 metres) above mean sea level (AMSL) and it is assumed that the runway is generally level. Documentation on VFR Aerodromes in Ireland, as published by the Irish Aviation Authority, indicates that, at Trim Aerodrome, the approach and transitional surfaces are penetrated by several trees (refer Section 4). A detailed on-site survey was made in 2010 and confirmed that several trees in the immediate vicinity of the aerodrome are of significant height, in some cases between 15 and 20 metres high. Of particular interest are a group of trees alongside the Trim – Navan road which are approximately 20 metres high and either within or immediately adjacent to the approach surface for Runway 28. Although the species identity was not confirmed, these are believed to be beech with a potential maximum height of up to 25 metres. At present the current top level of these trees is estimated at 80 metres AMSL

3 EirGrid Proposals

EirGrid owns and operates the high voltage electricity transmission system within the Republic of Ireland. They have a duty to ensure that the overhead line network meets minimum statutory safety clearances along its route. As such, this will influence tower height and spacing, and cable sag.

EirGrid have proposed the construction of a 400KV power line between Cavan and Meath. A number of potential routes have been considered of which the proposed Route Corridor Option 3B has been selected and is considered here. The proposed route of the power line will run to the north and east of the aerodrome and will cross the extended centre line of the runway approximately 1300 metres to the east of the Runway 28 threshold.

The two nearest towers to the extended centre-line are Nos. 357 and 358. Both towers are located just outside of the approach surface (refer to the following Section) each being approximately 200 metres from the extended centre-line of runway 10/28. The ground level at the base of these towers is approximately 60 metres (357) and 56 metres (358) AMSL. The tower heights are 33.20 metres (357) and 39 metres (358). The top of tower 357 is 93.33 metres AMSL and the top of tower 358 is 94.54 metres AMSL. Due to sag the cable will be lower between the towers, for example, the ground wire between towers 357 and 358 may vary between 79 metres and 94 metres AMSL.

4 Regulatory requirements

The 2008 and 2010 notes commented that guidance to obstacles in the vicinity of aerodromes is dealt with by a number of documents including:

- ICAO Annex 14 Aerodromes, April 2010
- Manual of Aerodrome Licensing, ALM002, Irish Aviation Authority, June 2010
- Statutory Instrument SI 215 (2005), Obstacles to Aircraft

For the purpose of this report, the guidance given in ICAO Annex 14 will be referred to, supported by documentation published by the Irish Aviation Authority (ALM002, Chapter 5, The Assessment and Treatment of Obstacles).

The runway length at Trim is less than 800 metres; therefore the runway is classified as a Code ‘1’ runway. In addition, the runway is non-instrument, that is, there are no navigation aids available at the aerodrome. As a non-instrument runway, the following obstacle limitation surfaces shall be established:

- Conical surface
- Inner horizontal surface
- Approach surface
- Transitional surface

Of these, taking into consideration the location of the proposed power line, the inner horizontal surface and the approach surface are the most critical. The inner horizontal surface is a surface located in a horizontal plane above an aerodrome and its environs. The outer limits of the surface are measured by using circular arcs centred on the runway ends and joined tangentially by straight lines. For a non-instrument code 1 runway, the radius of the inner horizontal surface is 2000 metres. The height of the inner horizontal surface shall be 45m above the aerodrome elevation datum. If the aerodrome elevation datum is assumed to be 61 metres AMSL (Section 2) then the horizontal surface will be 106 metres AMSL. In other words, within 2000m of the runway, there should be no obstruction above 106 metres AMSL.

Towerss 361 and 353 (and others) are within 2000 metres of the Aerodrome. Information has been supplied on ground levels and tower heights for each tower. The top levels of the towers (refer also to Section 3) vary between 89 (353) and 96 (361) metres AMSL. All of these towers are therefore below the level delineated for the inner horizontal surface, that is, 106 metres AMSL.

As for the approach surface, for a non-instrument code 1 runway the critical surface extends for a distance of 1630m beyond the threshold and the slope of such surface is 5%, that is, a 1 in 20 slope. The location of the power line, beneath the approach surface, varies from approximately 1200 metres (adjacent to tower 357) to 1400 metres (adjacent to tower 358) from the threshold of Runway 28. Therefore, the power line will cross the extended centre-line of runway 10/28 approximately 1300 metres from the runway threshold.

Assuming that the reference height at the runway threshold is 61m AMSL then where the approach surface is adjacent to tower 357 the elevation of the approach surface will be approximately [1200 / 20] + 61 = 121m AMSL. The additional separation distance between the top of tower 357 and the nearest part of the approach surface will be approximately 121m – 94m = 27 metres.

Likewise, where the approach surface is adjacent to tower 358, the elevation of the approach surface will be approximately [1400 / 20] + 61 = 131m AMSL. The additional separation distance between the top of tower 358 and the nearest part of the approach surface will be approximately 131m – 95m = 36 metres.

Finally, where the power line crosses the extended centre-line of Runway 10/28, the elevation of the approach surface will be approximately [1300 / 20] + 61 = 126m AMSL. The additional separation distance between the power line (ground wire) and the approach surface will be approximately 126m – [95m – 17m] (maximum sag) = 48 metres.

5 Conclusions

The approach and transitional surfaces at Trim Aerodrome are penetrated by several trees. A detailed on-site survey has confirmed that several trees in the immediate vicinity of the aerodrome are in some cases between 15 and 20 metres high, in particular, trees alongside the Trim – Navan road which are approximately 20 metres high and either within or immediately adjacent to the approach surface for Runway 28. The current top level of these trees is estimated at 80 metres AMSL.

The two nearest towers to the extended centre-line are Nos. 357 and 358. Both towers are located just outside of the approach surface, each being approximately 200 metres from the extended centre-line of runway 10/28. The top of tower levels for the towers is approximately 94 - 95 metres AMSL. The top levels of other adjacent towers are similar.

The 'top of tower' levels are therefore no more than 14 to 15 metres above existing trees that are adjacent to the Aerodrome

The height of the inner horizontal surface shall be 45m above the Aerodrome elevation datum, assumed to be 61m AMSL. Therefore, within 2000m of the runway, there should be no obstruction above 106 metres AMSL. All towers meet this height limitation requirement, being below 106 metres ASML.

Adjacent to tower 357, the elevation of the approach surface will be approximately 121 metres AMSL. The separation distance between the top of tower 357 and the nearest part of the approach surface will be approximately 27 metres. Adjacent to tower 358, the elevation of the approach surface will be approximately 131 metres AMSL. The additional separation distance between the top of tower 358 and the nearest part of the approach surface will be approximately 36 metres. Finally, where the power line crosses the extended centre-line of Runway 10/28, the elevation of the approach surface will be approximately 126 metres AMSL. The additional separation distance between the power line (ground wire) and the approach surface will be approximately 48 metres.

Landing aircraft using Runway 28 would need to be visually aware of where the towers are located and a formal approach procedure of 'visual contact of towers / cables required before starting field approach' could be introduced even though there is a clear margin between the top of the towers and the obstacle limitation surface.