IFP Safeguarding

Carrick Wind Farm

Prestwick Airport

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Introduction

Cyrrus conducted an Instrument Flight Procedure (IFP) Safeguarding Assessment on the impact of a Windfarm containing 13 turbines near Prestwick Airport. The development is located approximately 14.95NM South of the Airport as shown in Figure 1.

The purpose of the Assessment is to determine if any of the wind turbines infringe the protection surfaces of the IFPs serving the Airport. Each IFP type has a different set of criteria that needs to be considered with any penetration potentially impacting the minimum altitude an aircraft may descend to when conducting an approach, or the minimum gradient they must meet on approach, or exceed on departure.

These IFPs are particularly important during adverse weather conditions when flight visibility is reduced as they provide the pilot with assurances that there are no obstacles on the defined flight path. Whilst on the descent, the aircraft reaches a Decision Point at which the pilot must have the required visual references[1], if these references are not visually acquired the pilot must initiate a missed approach; this portion of flight is also protected and is assessed.

Figure 1: Approximate distance from ARP

[1] Required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path.

List of IFP Assessed

As per the UK Aeronautical Information Publication (AIP) at the date of this report.

- ATC SURVEILLANCE MINIMUM ALTITUDE CHART
- RNAV1 (DME/DME or GNSS) STANDARD DEPARTURE - INSTRUMENT (SID) LUCCO 1K SUDBY 1L SUMIN 1L
- RNAV1 (DME/DME or GNSS) STANDARD DEPARTURE - INSTRUMENT (SID) TRN 2K 2L DAUNT 1K OKNOB 1L
- RNAV5 (DME/DME or GNSS) STANDARD ARRIVAL - INSTRUMENT (STAR) BLACA 1P
- RNAV5 (DME/DME or GNSS) STANDARD ARRIVAL - INSTRUMENT (STAR) APPLE 2P RIBEL 2P
- RNAV1 (DME/DME or GNSS) APPROACH TRANSITIONS - INSTRUMENT RWY 12 TRN 2Q
- RNAV1 (DME/DME or GNSS) APPROACH TRANSITIONS - INSTRUMENT RWY 21 TRN 2S SUMIN 2S
- RNAV1 (DME/DME or GNSS) APPROACH TRANSITIONS - INSTRUMENT RWY 30 TRN 2R SUMIN 2R
- INSTRUMENT APPROACH ILS/DME/NDB(L) RWY 12
- INSTRUMENT APPROACH – LOC/DME/NDB(L) RWY 12
- INSTRUMENT APPROACH SRA RTR 2 NM RWY 12
- INSTRUMENT APPROACH RNAV (GNSS) RWY 12
- INSTRUMENT APPROACH NDB(L)/DME RWY 12
- INSTRUMENT APPROACH SRA RTR 2NM RWY 21
- INSTRUMENT APPROACH RNAV (GNSS) RWY 21
- INSTRUMENT APPROACH NDB(L)/DME RWY 21
- INSTRUMENT APPROACH ILS/DME/NDB(L) RWY 30
- INSTRUMENT APPROACH – ILS/DME/NDB(L) RWY 30 (ACFT CAT A,B) SHORT PROCEDURE
- INSTRUMENT APPROACH – LOC/DME/NDB(L) RWY 30
- INSTRUMENT APPROACH – LOC/DME/NDB(L) RWY 30 (ACFT CAT A,B) SHORT PROCEDURE
- INSTRUMENT APPROACH – SRA RTR 2NM RWY 30
- INSTRUMENT APPROACH – RNAV (GNSS) RWY 30
- INSTRUMENT APPROACH – NDB(L)/DME RWY 30

Data

In order to conduct the assessment, Cyrrus relies on the Client to provide accurate data, this is duplicated in this report for validation.

- Wind turbine position shapefile titled ` Carrick_WTG_DF_210920.shp`

The data was received in OSGB36 Easting, Northings seen in Table 1 and converted to WGS84 Latitude, Longitude using the Ordinates Survey GridInQuestII tool, the ground elevations for each point were extracted from Intermap NEXTMap British 25m DTM terrain data. The resulting coordinates and elevations are indicated in Table 2. The 13 turbines are planned to have a blade (rotor) diameter of 170m and a maximum blade tip height of 200m AGL.

Turbine No	Easting	Northing
T01	234298.1	599031.6
T02	235006.2	599144.2
T03	235700.5	599334.3
T04	234271.6	598307.7
T05	234967	598502
T06	235666	598647
T07	236449	598947
T08	237132.2	598584.1
T09	237884.6	598580.8
T10	238642	598676
T11	237545.8	597897.2
T12	238379.5	598000
T13	238031.6	597330.5

Table 1: Client Data Received

Turbine No	Ground Level (m)	Elevation (m)	Latitude	Longitude
T01	393.118	593.118	55° 15' 27.1149" N	4° 36' 31.8756" W
T02	386.677	586.677	55° 15' 31.6077" N	4° 35' 52.0480" W
T03	304.342	504.342	55° 15' 38.5855" N	4° 35' 13.1619" W
T04	389.521	589.521	55° 15' 03.6873" N	4° 36' 31.8447" W
T05	398.309	598.309	55° 15' 10.8070" N	4° 35' 52.9138" W
T06	363.141	563.141	55° 15' 16.3330" N	4° 35' 13.6732" W
T07	305.276	505.276	55° 15' 26.9653" N	4° 34' 30.0004" W
T08	298.685	498.685	55° 15' 16.0515" N	4° 33' 50.5864" W
T09	303.19	503.19	55° 15' 16.8376" N	4° 33' 08.0114" W
T10	286.1	486.1	55° 15' 20.8085" N	4° 32' 25.3561" W
T11	314.717	514.717	55° 14' 54.3459" N	4° 33' 25.7634" W
T12	303.011	503.011	55° 14' 58.6529" N	4° 32' 38.8102" W
T13	290.689	490.689	55° 14' 36.6070" N	4° 32' 57.1078" W

Table 2: Converted Turbine Coordinates and Elevation

Assessment

An IFP Safeguarding Assessment was completed against the procedures for Runway (RWY) 03/21 and 12/30 at Prestwick Airport.

Due to the technical nature of the information, this report is a distillation of the IFP modelling and subsequent assessment of the obstacles, the full data set is available if required[2]. The purpose of this Report is to identify what procedures were assessed and whether there is an impact, in the event of an impact, potential mitigation is provided[3].

Table 3 provides the summary of all the IFPs assessed.

Assessed Procedures	RWY	Impact	Comments
Visual Circling	All	No	Outside of obstacle protection areas
ATCSMAC		No	Nil
SID LUCCO 1K SUDBY 1L SUMIN 1L		No	Outside Protection Area
SID TRN 2K 2L DAUNT 1K OKNOB 1L		No	Outside Protection Area
STAR BLACA 1P		No	Nil
STAR APPLE 2P RIBEL 2P		No	Nil
Transition TRN 2Q	RWY 12	No	Nil
ILS/DME/NDB(L)		No	Nil
LOC/DME/NDB(L)		No	Nil
SRA RTR 2NM		No	Nil
RNAV (GNSS)		No	Nil
NDB(L)/DME		No	Nil
Transition TRN 2S SUMIN 2S	RWY 21	No	Nil
SRA RTR 2NM		No	Nil
RNAV (GNSS)		No	Nil
NDB(L)/DME RWY 21		No	Nil
Transition TRN 2R SUMIN 2R	RWY 30	No	Nil
ILS/DME/NDB(L)		No	Nil
ILS/DME/NDB(L) (Short)		No	Nil
LOC/DME/NDB(L)		No	Nil
LOC/DME/NDB(L) (Short)		No	Nil
SRA RTR 2NM		No	Nil

[2] Please note that the full data set normally runs in excess of 20 pages per procedure and can only be decoded by those familiar with the output generation from the IFP Software and trained IFP Designers.
[3] Mitigation for the IFPs is for the Airport to decide upon as these may have a direct impact on their operations.

Assessed Procedures	RWY	Impact	Comments
RNAV (GNSS)		No	Nil
NDB(L)/DME		No	Nil

Table 3: Summary of Assessed Procedures

Conclusion

The wind turbines associated with the Carrick wind farm have no impact on the procedures published for Prestwick Airport.

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