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Seagreen Wind Farm Phase 1

CAP 1885

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Chapter 1

Executive Summary

Objective of the Proposal

- 1.1. Seagreen Wind Energy Ltd (SWEL) has permission to develop an offshore wind farm, known as Seagreen Wind Farm Phase 1, which will be located approximately 27km from the Angus coastline to the East of Arbroath. Having received planning consent from Scottish Ministers in 2014, the development was delayed by a Judicial Review, which concluded with planning consent being confirmed in November 2017. The proposed site covers an area of approximately 400km² and will contain up to 150 wind turbine generators (WTGs), each just under 210m tall (to maximum blade tip height).
- 1.2. It is a well understood consequence of the construction of WTGs that significant interference can be caused to Primary Surveillance Radar (PSR) displays, with the creation and display of 'false' radar returns known as clutter. Where large wind farms are built containing a large number of WTGs, the quantity of clutter can also lead to saturation of the processing capability of the PSR. NATS (NERL) initially objected to the Seagreen Wind Farm Phase 1 proposal based upon the impact it would have on the Perwinnes PSR. As a result, conditions were applied to the planning consent granted by Scottish Ministers under Section 36 of the Electricity Act 1989. These conditions direct that no WTGs may be erected until a PSR mitigation strategy is agreed and that no blades may be fitted to WTGs until the agreed mitigation strategy has been implemented.
- 1.3. In this Airspace Change Proposal (ACP), SWEL propose the application of Radar Range Azimuth Gating (RAG), more commonly known as radar blanking, to the Perwinnes PSR covering the area that will be affected by the WTGs. This will prevent the display of potentially erroneous radar returns, or clutter, caused by the WTGs. However, the blanking will also remove the display of radar returns from aircraft within the same area and this ACP seeks to introduce a Transponder Mandatory Zone (TMZ) covering the blanked area from SFC to FL100. This will allow aircraft to be displayed to ATC using Secondary Surveillance Radar (SSR) returns.
- 1.4. A map illustrating the proposed blanked area and TMZ is at Appendix A.

Summary of the Decision Made

- 1.5. As a result of the Seagreen Wind Farm Phase 1 development the CAA recognises the requirement to introduce radar blanking to the Perwinnes PSR and approves the proposed implementation of a TMZ to enable traffic in the area to remain displayed to ATC through the use of SSR returns. The design of the proposed TMZ is to be as described and illustrated in the document 'Seagreen Airspace Change Proposal v1.3' published to the CAA Airspace Change Portal on 29th November 2019.

- 1.6. The CAA has set 3 conditions against its approval of this proposal. The first requires that, prior to implementation of this proposal, SWEL must conclude its negotiations with the MoD and agree a Radar Mitigation Strategy Agreement. Should such agreement not be reached the CAA will withdraw its approval for this airspace change. The second and third conditions require SWEL to initiate and complete the required airspace change process to remove this TMZ in the event that either technology advances render it no longer required, or the wind farm itself is removed thereby rendering this TMZ no longer required.

Next Steps

- 1.7. Implementation of the proposed airspace will be notified through a single AIRAC cycle (AIRAC 03/2021) and will become effective on 25th February 2021.
- 1.8. The CAA's Post-Implementation Review (PIR)¹ of the changes approved by the CAA in this decision will commence at least one year after the implementation date. It is a condition of the CAA's approval that the Sponsor captures and collates data throughout the year following implementation of the airspace change, which will be used to inform the PIR. In due course, the Sponsor will be advised of the specific data sets to be captured, the analysis that will be required and the dates by which this information must be provided.

¹ PIR is the 7th Stage of the CAA's airspace change proposal process as described in [CAP1616](#)

Chapter 2

Decision Process and Analysis

Chronology of the Proposal Process

Statement of Need and Assessment Meeting (Stage 1, Step 1A)

- 2.1 SWEL submitted a DAP1916 Statement of Need (SoN) on 29th March 2019. An Assessment Meeting (AM) was then held on 3rd June 2019 at which SWEL outlined the Current Situation, the Issue that had been identified and the Action that had been taken. The Sponsor provided a draft timeline for the ACP with evidence to support the proposed scaling and shortened timeline to decision.
- 2.2 The CAA determined that the proposal was in scope of the CAP1616 ACP process and stated the provisional level of airspace change attributable to the proposal as Level 2B. Minutes of the AM, together with a copy of the slide presentation that was used in the meeting, were published to the CAA ACP Portal (the Portal).

Development of the Design Principles (Stage 1, Step 1B)

- 2.3 SWEL used a set of appropriate Design Principles (DPs), inspired by those used for similar ACPs under the CAP1616 process, to begin their targeted engagement and development conversation with the stakeholder group. The stakeholder group included key aviation stakeholders, identified as NATS, the MoD and Aberdeen Airport, and a number of representative groups including offshore helicopter operators, members of NATMAC and GA bodies. The original DPs were amended in line with stakeholder feedback and a finalised submission was presented to the CAA and uploaded to the Portal.

Options Development and Appraisal (Stage 2, Step 2A & 2B)

- 2.4 SWEL contended that, in order to mitigate the effect of WTGs on the Perwinnes PSR, radar blanking and the subsequent introduction of a TMZ was the only viable airspace option. To this end, they developed 4 Options, each of which was a variation of the TMZ design. A 'Do Nothing' Option was also included and all 5 were considered and assessed against the DPs. Options B & D were shown to meet the DPs, but Option D: 'TMZ Aligned to a Smoothed/Rounded-off Boundary Plus 2nm Buffer' was chosen as the preferred Option as its simpler geometric shape was seen as advantageous for reasons of utility by the aviation community (Human Factors).

Define Gateway and Develop & Assess Gateway – 26th July 2019

- 2.5 The Define Gateway and the Develop & Assess Gateway were run consecutively on 26th July 2019. The CAA were content that the DPs had been developed

through appropriate and effective engagement with stakeholders and that the DPs reflected the requirements of CAP1616. It was highlighted during the Define Gateway that SWEL had blurred the lines between Stage 1 and Stage 2 of the CAP1616 process by engaging with stakeholders on the DPs (Stage 1 activity) and on the 4 proposed design Options (Stage 2 activity) simultaneously. The CAA considered that sufficient mitigation had been provided and the Define Gateway was approved.

- 2.6 Following approval of the Define Gateway, the Develop & Assess Gateway was presented for consideration. The CAA accepted that SWEL had adhered to the guidance provided in CAP1616 and followed the required process in order to develop suitable Options through engagement with stakeholders. The CAA also agreed the rationale used to identify the preferred Option to be taken forward in isolation to Stage 3.

Consult Gateway (Stage 3, Step 3B) – 30th August 2019

- 2.7 During the Consult Gateway held on 30th August 2019, the CAA accepted the rationale presented by SWEL that the consultation period be shortened from 12 weeks to 6 weeks. The justification provided by SWEL highlighted the Level 2B scaling of the ACP, the location of the proposed TMZ approximately 27kms offshore which considerably limited interested parties and stakeholders, and the work that had been undertaken with stakeholders to prepare them for a shortened consultation period.
- 2.8 Concerns raised by the MoD regarding the reduced consultation period were noted and, along with a number of other minor points of note, resulted in a 'Pending' decision from the CAA. Several issues were fed back to SWEL for consideration, action and formal response. This was provided on 2nd September 2019 to the satisfaction of the CAA and the Consult Gateway was subsequently Approved. SWEL launched its formal Consultation Period from 4th September to 16th October 2019.

CAA Assessment and Decision in Respect of Consultation

- 2.9 The CAA is satisfied that SWEL applied the fundamental principles of effective consultation before, during and after the consultation period, as follows: targeting the right audience; communicating in a way that suits them; giving them the tools to make informed, valuable contributions to the development of the proposals. In addition, the CAA considers that SWEL conducted its consultation in accordance with the requirements of CAP1616 and having taken into account the Government's Consultation Principles: Guidance, and the Secretary of State's Air Navigation Guidance.

Proposal Update and Submission (Stage 4, Step 4A & 4B) – 25th October 2019

- 2.10 SWEL submitted Step 4A (Update Design) and Step 4B (Submit Airspace Change Proposal) documentation to the CAA on 25th October 2019; these documents were also uploaded to the Portal.
- 2.11 The Step 4A Update Design submission considered the elements of Consultation feedback that had the potential to impact the proposed Option and discounted the requirement for any change to its design.
- 2.12 The formal Step 4B Airspace Change Proposal submission presented the design proposal known as Option D, 'TMZ Aligned to a Smoothed/Rounded-off Boundary Plus 2nm Buffer', to be considered for implementation as an appropriate mitigation for the impact of the proposed Seagreen Wind Farm Phase 1 WTGs on the Perwinnes PSR. Revised submissions of the Airspace Change Proposal were presented to the CAA and published to the Portal on 14th November 2019, 29th November 2019 and 6th January 2020 as v1.1, v1.2 and v1.3 respectively. These amendments changed the manner in which aircraft not equipped with a transponder would be affected, clarified the effect of the proposed TMZ on traffic operating within airway P18, a small segment of which overlaps the TMZ, and corrected the Aberdeen Radar frequency detailed in Annex 15.3.

CAA Analysis of the Material Provided

- 2.13 As a record of the analysis of the Step 4B Airspace Change Proposal formal submission provided by, or on behalf of, SWEL and relating to this ACP, the CAA has produced the following documentation which will be uploaded to the Portal:
- i) 20191206-Consultation Assessment
 - ii) 20191028-Final Options Appraisal Assessment
 - iii) 20191206-Environmental Assessment
 - iv) 20191206-Operational Assessment

Chapter 3

CAA Consideration of Factors Material to the Decision

Explanation of the CAA's Statutory Duties

- 3.1 The CAA's statutory duties are laid down in Section 70 of the Transport Act 2000. In addition, Commission Implementing Regulation (EU) No 923/2012 dated 26th September 2012 (Standardised European Rules of the Air (SERA)) and the CAA Policy for Radio Mandatory Zones & Transponder Mandatory Zones dated 14th August 2015 are applicable to this proposal.

Conclusions in Respect of Safety

- 3.2 The CAA's primary duty is to maintain a high standard of safety in the provision of air traffic services and this takes priority over all other duties.² In its consideration of this proposal, the CAA is satisfied that the implementation of the proposed TMZ maintains a high standard of safety:
- i) The proposed TMZ does not alter the classification of the airspace.
 - ii) The proposed blanking of the Perwinnes PSR will introduce effective suppression of all primary radar clutter associated with the WTGs.
 - iii) The proposed TMZ will ensure that all air traffic operating within the area affected by the blanking applied to the Perwinnes PSR will remain displayed to air traffic control operators (ATCOs) through the use of SSR returns.
 - iv) The addition of a 2nm buffer surrounding the blanked area provides ATCOs sufficient time to assimilate and react to an infringement of the TMZ by an aircraft not appropriately equipped with a transponder.

Conclusions in Respect of Efficient Use of Airspace

- 3.3 The CAA is required to secure the most efficient use of the airspace consistent with the safe operation of aircraft and the expeditious flow of air traffic.³ In its consideration of this proposal, the CAA is satisfied that the implementation of the proposed TMZ will have a minimal impact on the efficient use of this airspace while maintaining the safe operation of this airspace:
- i) The proposed TMZ will not impact or alter the current operation of the vast majority of users of the airspace within the TMZ.

² Transport Act 2000, Section 70(1).

³ Transport Act 2000, Section 70 (2) (a)

- ii) Analysis of operations conducted within the vicinity of the proposed TMZ indicate that far less than 1% (0.15%) of air movements are completed by aircraft not appropriately equipped to operate within the proposed TMZ.
- iii) The CAA considers the impact to users not equipped to enter the TMZ is proportionate and acceptable in order to maintain the safe operation of the airspace following the construction of the WTGs.

Conclusions in Respect of Environmental Objectives

- 3.4 The CAA is required to take into account the 2014 Guidance to the CAA on Environmental Objectives provided by the Secretary of State. In addition, Seagreen Wind Farm Phase 1 was scaled as a Level 2B ACP and CAP1616 provides additional guidance regarding the specific environmental considerations⁴. However, CAP1616⁵ allows a change sponsor to propose a departure from the process for reasons of proportionality. In this case, SWEL contested that the extremely small numbers of aircraft not appropriately equipped to transit the TMZ, and therefore required to fly additional track miles to deviate around the TMZ, were insufficient to provide meaningful output from the WebTAG system. In addition, SWEL contested that the extremely small numbers of air movements potentially impacted made the additional effort and expenditure required to provide more detailed analysis disproportionate as the impact would be negligible. This was accepted by the CAA at the Consult Gateway in consideration of the Full Options Appraisal.

Conclusions in Respect of Aircraft Operators and Owners

- 3.5 The CAA is required to take account of the requirements of operators and owners of all classes of aircraft⁶. In its consideration of this proposal the CAA accepts that the vast majority of air traffic will be unaffected by the introduction of the proposed TMZ but also recognises that a small element of the aviation community operates aircraft that are not fitted with transponders. However, the CAA accepts that, as suggested by SWEL, only a very small proportion of that community would wish to operate in the area covered by the proposed TMZ; such aircraft are more usually operated within gliding distance of the shore for safety reasons, which would locate them well away from the TMZ.

Conclusions in Respect of the Interests of Any Other Person

- 3.6 The CAA is required to take account of the interests of any person, other than an aircraft operator or owner, in relation to the use of any particular piece of airspace or the use of airspace in general. Regarding this proposal, which will be

⁴ CAP1616 Appendix B, page 123: Summary of environmental assessment requirements for Level 2 proposals

⁵ CAP1616 page 24, para 74

⁶ Transport Act 2000, Section 70 (2) (b)

implemented approximately 27kms offshore, the CAA considers that its impact will not be discernible to other persons.

Conclusions in Respect of the Integrated Operation of ATS

- 3.7 The CAA is required to facilitate the integrated operation of air traffic services provided by, or on behalf of, the Armed Forces of the Crown and other air traffic services⁷. The CAA notes that SWEL remains in negotiation with the MoD regarding mitigation of the impact to the RAF Leuchars PSR and contributory funding to research for a long-term technical solution to the impact of WTGs on PSR. The CAA considers that, in accordance with the planning consent granted by Scottish Ministers⁸, implementation of the proposed TMZ remains conditional upon reaching such agreement with the MoD.

Conclusions in Respect of the Interests of National Security

- 3.8 The CAA is required to take account of the impact that any airspace change proposal may have upon matters of National Security⁹. In this respect, the CAA is satisfied that the implementation of the proposed TMZ will have no effect on National Security.

Conclusions in Respect of International Obligations

- 3.9 The CAA is required to take account of any international obligations entered into by the UK and notified by the Secretary of State. The CAA is satisfied that the proposed implementation of this TMZ has no impact on international obligations.

⁷ Transport Act 2000, Section 70 (2) (e)

⁸ [Planning Consent Granted by Scottish Ministers, Annex 2 Para 23](#)

⁹ Transport Act 2000, Section 70 (2) (f)

Chapter 4

CAA's Regulatory Decision

General Summary

- 4.1 The Seagreen Wind Farm Phase 1 development is considered a Nationally Significant Infrastructure Project by the UK Government's Business, Energy and Industrial Strategy Department and its construction will lead to significant, strategic environmental benefit for the UK. This ACP seeks to implement a considered and well-designed airspace solution to satisfy the conditions of the planning consent given by Scottish Ministers, which will allow the wind farm development to progress, and to enable continued safe air operations in the affected area.
- 4.2 The proposed use of radar blanking on the Perwinnes PSR, along with the implementation of an associated TMZ, is entirely appropriate and accords with similar solutions at other wind farms in the UK. Due to the offshore location of the site and analysis that indicates the negligible amount of traffic that operates in the area without a transponder, the decision to propose exclusion of all aircraft not equipped with an appropriate transponder, with no option of bespoke ATC clearance to enter, is considered proportionate and acceptable. The proposed TMZ design is considered the optimum size and shape to meet the safety and operational requirements of the associated Perwinnes PSR blanking, whilst having minimal impact on other airspace users.

Decision

- 4.3 In considering the formal submission by SWEL with respect to ACP-2019-25: Seagreen Wind Farm Phase 1 the CAA recognises the requirement to mitigate the negative impact of the planned WTGs through the use of radar blanking to the Perwinnes PSR and APPROVES the implementation of a TMZ to enable traffic operating in the area to remain displayed to ATC through the use of SSR returns.
- 4.4 The design of the proposed TMZ is to be as described and illustrated in the document 'Seagreen Airspace Change Proposal v1.3' published to the CAA Airspace Change Portal on 29th November 2019.

Conditions and Recommendations

- 4.5 The planning consent granted to the Seagreen Wind Farm Phase 1 development by Scottish Ministers requires a PSR mitigation strategy to be agreed prior to construction of WTGs and stipulates that the mitigation is to be implemented prior to fitment of blades to the WTGs. It is noted that SWEL remains in negotiation with the MoD to reach a Radar Mitigation Scheme Agreement with

respect to the RAF Leuchars PSR and funding of research for a future technical mitigation for the effects of WTGs on PSR.

- i) **Condition 1:** Prior to the implementation of the TMZ described, considered and approved within this proposal, Radar Mitigation Scheme Agreement must be in place between SWEL and the MoD. Should such Radar Mitigation Scheme Agreement not be reached this will be considered to constitute a failure to meet the conditions of the planning consent and the CAA's approval of this ACP will be rescinded.

4.6 It is noted that the Radar Mitigation Scheme Agreement sought by the MoD includes potential contributory funding for research that seeks to identify, trial and implement a technical solution to the interference caused by WTGs on PSR. Successful development and implementation of such a system would negate the need for the use of blanking on a PSR, as well as a continued requirement for an associated TMZ.

- i) **Condition 2:** Should a long-term technical solution to the effects of WTGs on PSR be successfully developed and implemented on the Perwinnes PSR, the Sponsor will be required to initiate and complete the airspace change process to remove this TMZ construct.
- ii) **Condition 3:** Should the Seagreen Wind Farm Phase 1 development be withdrawn, removed or decommissioned, for whatever reason, including as a result of a planned closure, the Sponsor will be required to initiate and complete the airspace change process to remove this TMZ construct.

4.7 The CAA considers that the Consultation Document and the original Submission Document suggested a possible process by which aircraft not equipped with a suitable transponder may have been able to seek ATC approval to access and transit the proposed TMZ airspace. A subsequent amendment to the Submission Document removed reference to such a mechanism and explicitly stated that aircraft not equipped with a suitable transponder would be required to remain outside the proposed TMZ at all times. Although the amended Submission Document has been made available on the CAA Airspace Change Portal, alongside the original submission, it is not clear that SWEL communicated this change directly to its stakeholders.

- i) **Recommendation 1:** The CAA recommends that SWEL communicate the changes made to its formal Submission Document directly to its stakeholders and consultees, explaining the rationale behind the change and its impact. Evidence of this engagement activity, and any feedback received as a result, should be presented to the CAA.

Implementation

- 4.8 The proposed TMZ is approved for implementation as agreed through AIRAC 03/2021.

Post Implementation Review

- 4.9 In accordance with current CAA standard practice, as detailed in CAP1616, a minimum of 12 months after implementation the airspace change will be reviewed to evaluate whether the anticipated impacts and benefits stated are as expected. To enable a thorough and rigorous review, the Sponsor will be required to gather relevant data during the post-implementation period.
- i) **Requirement 1:** SWEL must make suitable arrangements for collection of the following data for use during the Post-Implementation Review:
 - (1) Details of occasions that requests for access to, or transit of, the TMZ by non-transponder equipped aircraft is denied.
 - (2) Details of occasions a non-transponder equipped aircraft infringes the TMZ, remaining within the 2nm buffer area (PSR return remains displayed).
 - (a) Details regarding the efficacy of any attempted controller intervention.
 - (3) Details of occasions a non-transponder equipped aircraft infringes the TMZ and buffer, resulting in it entering the blanked area (PSR return no longer displayed to a controller).
 - (a) Details regarding the efficacy of any attempted controller intervention.
 - ii) **Requirement 2:** SWEL must make suitable arrangements to ensure that related stakeholder and consultee observations (enquiry / complaint data) are collated and available for presentation to the CAA on request and/or during the Post-Implementation Review.

APPENDIX A

Map Showing Proposed TMZ

