Clash Gour Wind Farm ACP-2021-046

Consultation Document

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Table of Contents

Table of Figures

Table of Tables

Glossary

Term	Meaning
ACP	Airspace Change Proposal
agl	above ground level
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information Regulation and Control
ATC	Air Traffic Control
ATCRMS	Air Traffic Control Radar Mitigation Scheme
ATS	Air Traffic Service
ATZ	Aerodrome Traffic Zone
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CAS	Controlled Airspace
CGH	Clash Gour Holdings
EDFER	EDF Energy Renewables
EFIS	Electronic Flight Information Systems
ft	feet
FL	Flight Level
Force9	Force9 Energy
GA	General Aviation
GW	GigaWatt
IFR	Instrument Flight Rules

m	metre
MATZ	Military Aerodrome Traffic Zone
MOD	Ministry of Defence
MW	MegaWatt
NATS	National Air Traffic Services Ltd
nm	Nautical Mile
NOTAM	Notice to Aviation
PSR	Primary Surveillance Radar
RAF	Royal Air Force
RAG	Range Azimuth Gating
RCS	Radar Cross Section
RDDS	Radar Data Display Screen
RDP	Radar Data Processor
SSR	Secondary Surveillance Radar
TMZ	Transponder Mandatory Zone
TRAG	Temporary Reserved Area (Gliding)
VFR	Visual Flight Rules

1 Consultation – Scope & Purpose

1.1 Introduction

Welcome to the Consultation Document for the Clash Gour Wind Farm Airspace Change Proposal (ACP). In this document we will explain the background to our consultation, we will tell you what we are consulting on and we will explain how you can plan your part and have your say.

This consultation is open to everyone; if there is anyone you know who you feel may be affected by these proposed changes, and you believe that they may not have heard about our consultation, then please feel free to share this document with them or let them know that they can find all the information regarding this consultation on the CAA airspace change portal.

This document forms part of the document set required in accordance with the requirements of the CAP 1616 airspace change process. For previous stages of the airspace change process, including the Statement of Need, Design Principles and Design Options, please see the CAA Airspace Change Portal detailing the progress of this proposal and how we have arrived at the options presented in this document.

1.2 Aim of the Airspace Change Proposal

This Airspace Change Proposal (ACP) is sponsored by us, Clash Gour Holdings Limited, referred to in this Consultation Document as the Change Sponsor.

We intend to develop an onshore wind farm in the Moray Council area which will be capable of providing power to approximately 200,000 houses. This ACP does not discuss or consult upon the principle of the development itself. That has been established through an application to Scottish Ministers under the Electricity Act 1989. That application was consented by Scottish Ministers on 21st October 2022.

Two conditions are attached to the grant of consent which require to be discharged before turbines can be erected and operated on site. Each condition requires the development and agreement of an Air Traffic Control Radar Mitigation Scheme (ATCRMS) each in respect of both RAF Lossiemouth and Inverness Airport. This ACP is established in response to that requirement and deals solely with proposed airspace solutions as mitigation to any effect the windfarm may have on the Air Traffic Control (ATC) capability of the two units.

2 Clash Gour Windfarm Development

2.1 Background

Force9 Energy (Force9), jointly with EDF Energy Renewables Limited (EDFER) is developing the Clash Gour Wind Farm (Clash Gour) in the name of its wholly owned subsidiary Clash Gour Holdings (CGH). Clash Gour will be a substantial onshore windfarm which will be located in the Moray Council Area, approximately 14 Nautical Miles (nm) southwest of Elgin and 13 nm southeast of Nairn. Clash Gour will consist of 48 wind turbines with a maximum blade tip height of 180 metres (m) above ground level (agl). Figure 1 below provides the location of the site boundary (outlined in red) for the Clash Gour development.

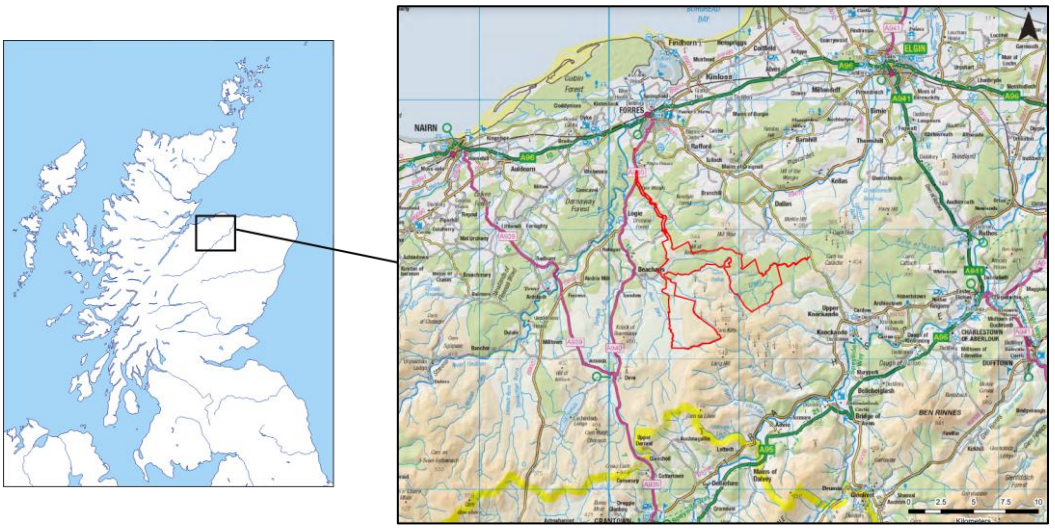

Figure 1 Clash Gour Wind Farm Location

Clash Gour will have an installed capacity of up to circa 225 MegaWatt (MW) which will make it one of the largest onshore windfarms currently under consideration in Scotland. Clash Gour is expected to produce between 570 GigaWatt (GW) hours and 710 GW hours of electricity annually which is sufficient to power up to 193,000 houses. Clash Gour is a strategically important project in the context of Scottish national targets for renewable energy production (12GW on new onshore wind capacity by 2030 set out in the On Shore Wind Policy Statement December 2022).

2.2 Section 36 Electricity Act Application

As part of the development consent process for Clash Gour, CGH, through Force9, engaged with relevant aviation stakeholders to determine the impact of Clash Gour's operational wind turbines on aviation radar systems and operations. In particular and relevant to this ACP, both the Ministry of Defence (MOD) and Inverness Airport confirmed that, without mitigation, the development would have an operational

effect due to an adverse impact on their ability to provide an Air Traffic Service (ATS). This is because wind turbines have the potential to create interference (radar clutter) on the current Primary Surveillance Radar (PSR) systems in operation at RAF Lossiemouth and Inverness Airport. Clash Gour is located approximately 13 nm southwest of Royal Air Force (RAF) Lossiemouth and 15 nm southeast of Inverness Airport, as shown in Figure 2 below.

Figure 2 Clash Gour Wind Farm Location

Source: Google Earth

As such, an Air Traffic Control Radar Mitigation Scheme (ATCRMS) is required to be in place prior to commencement of the key phase of construction of the wind farm. An agreement was reached between CGH and both Inverness Airport and the MOD on the wording of conditions which are attached to the grant of consent. The conditions will require CGH to agree aviation mitigation plans with those parties, as set out below:

Condition Number	Condition	Reason
5	**Lossiemouth Radar Mitigation (Section 36 Condition)** (1) No wind turbine shall be erected unless and until an *Air Traffic Control Radar Mitigation Scheme ("ATCRMS") to address the impact of wind turbines upon air safety has been submitted to and	In the interests of aviation safety.

Condition Number	Condition	Reason
	approved in writing by the Scottish Ministers in conjunction with the Ministry of Defence ("MoD"). (2) No wind turbine erected as part of this development shall be permitted to rotate its rotor blades about its horizontal axis, other than for the purpose of testing radar mitigation for this development for specific periods as defined in the approved ATCRMS or otherwise arranged in accordance with provisions contained the in approved ATCRMS, until: (a) those mitigation measures required to be implemented prior to any wind turbine being permitted to rotate its rotor blades about its horizontal axis as set out in the approved ATCRMS have been implemented; and (b) any performance criteria specified in the approved ATCRMS and which the approved ATCRMS requires to have been satisfied prior to any wind turbine being permitted to rotate its rotor blades about its horizontal axis have been satisfied and Scottish Ministers, in conjunction with the MoD, have confirmed this in writing. (3) Thereafter the development shall be operated strictly in accordance with the details set out in the approved ATCRMS for the lifetime of the development, provided the Radar remains in operation. *Reason: In the interests of aviation safety* *The Air Traffic Control Radar Mitigation Scheme ("ATCRMS") is a scheme designed to mitigate the impact of the development upon the operation of the Primary Surveillance Radar at RAF Lossiemouth ("the Radar") and the air traffic control operations of the MOD which are reliant upon the Radar. The ATCRMS shall set out the appropriate measures to be implemented to mitigate the impact of the development on the Radar and shall be in place for the lifetime of the development provided the Radar remains in operation.	

Condition Number	Condition	Reason
6	**Inverness Airport Radar Mitigation (Section 36 Condition)** (1) No wind turbine forming part of the Development shall operate, other than for testing and evaluation as agreed with the operator of Inverness Airport, unless and until a ** Radar Mitigation Scheme has been submitted to and approved in writing by the Scottish Ministers, after consultation with the operator of Inverness Airport and the Civil Aviation Authority. (2) No wind turbine forming part of the Development shall be operational until and unless all measures required by the approved Radar Mitigation Scheme have been fully implemented. (3) Thereafter, the Company must exhibit such lights as detailed in the approved aviation lighting scheme. The lighting installed will remain operational for the life time of the development. *Reason: To secure mitigation of impacts and ensure the Development does not affect the safe operation of Inverness Airport through interference with the Primary Surveillance Radar.* ** "Radar Mitigation Scheme" means a scheme setting out measures to address and mitigate the impact of the wind turbines forming part of the development upon the operation and performance of the Primary Surveillance Radar at Inverness Airport. The scheme will include the appropriate measures to be implemented and that are to be in place for the operational life of the development provided the Radar remains in operation. It will also include provision for future and alternate agreement of the mitigation solution with the operator of Inverness Airport.	*Reason: To secure mitigation of impacts and ensure the Development does not affect the safe operation of Inverness Airport through interference with the Primary Surveillance Radar.*

Table 1 Consent Conditions Relevant to Aviation Radar

This ACP, entitled 'Clash Gour Wind Farm', has been initiated to create a path for CGH to satisfy the aviation related conditions attached to the grant of consent for the wind farm. It will provide a mitigation solution to the operational effects on Inverness Airport and RAF Lossiemouth created by visibility of wind turbines on PSR. Under the ACP, CGH will then be able to operate the wind farm to test technical mitigation solutions to fully discharge the relevant conditions.

2.3 Why We Need an Airspace Solution

When providing an ATS, air traffic controllers are able to use information provided by two radar systems; these are generally used together but can be used as individual systems if required. These systems are known as the Primary Surveillance Radar (PSR) and the Secondary Surveillance Radar (SSR).

2.3.1 Primary Surveillance Radar

The PSR is a conventional radar sensor that illuminates a large portion of space with an electromagnetic wave and receives back the reflected waves from targets within that space. Primary radar detects all aircraft (and other objects, such as flocks of birds, weather phenomena, other environmental factors and wind turbines) without selection. It can also detect and report the position of anything that reflects its transmitted radio signals, including the rotating blades of the wind turbines. It indicates the position of targets but does not identify them.

2.3.2 Secondary Surveillance Radar

SSR works together with transponders which are installed on the aircraft. The ground based SSR radar interrogates the transponder which transmits an electronic signal which is captured by the radar. The information transmitted by the transponder identifies the aircraft along with details as to the aircraft's altitude.

2.3.3 Primary Radar Interference

Because wind turbines blades are moving targets, it is hard for a PSR to distinguish them from aircraft. Radar data processing connects returns from successive sweeps of the radar, and from this infers speed. Multiple wind turbines in a windfarm create multiple radar returns and these can appear as stationary or rapidly moving primary returns on the radar display. Therefore, a solution is required to mitigate the impact of the development upon the operation of the PSR's at both RAF Lossiemouth and Inverness Airport and the air traffic control operations which are reliant upon the radar's. The presence of a wind farm will have no impact on a SSR since this system relies on electronic signals transmitted from a transponder unit.

As a result, radar detectable wind turbines cause a significant amount of radar false plots, or clutter, as the rotating blades can trigger the Doppler threshold (e.g., minimum shift in signal frequency) of the Radar Data Processor (RDP) and therefore may be interpreted as aircraft targets. Significant effects have been observed on radar sensitivity caused by the substantial Radar Cross Section (RCS) of the wind turbines structural components (blades, tower and nacelle) which can exceed that of a large aircraft; the effect 'blinds' the radar (or the operator) to required targets in the immediate vicinity of the wind turbine. False plots and reduced radar sensitivity may reduce the effectiveness of radar to an unacceptable level. This can therefore create an operational effect on air traffic control by compromising the provision of a safe radar service to participating aircraft and detection of aircraft targets.

Stationary objects do not cause an effect to radar systems as radar processing techniques remove stationary objects from the radar display; therefore, radar detectable wind turbines only create effect to radar once they are in operation.

Generally, the larger a wind turbine is, the larger its RCS will be to a radar. This results in more energy being reflected and an increased chance of it creating unwanted returns (clutter). This clutter will be processed by the radar and presented to the air traffic controller on their Radar Data Display Screens (RDDS). Additionally, the blades of wind turbines rotate which give an indication that the target is moving with respect to the radar and thus defeating doppler processing techniques. This issue can be further compounded by a large number of wind turbines located together which cause a cumulative effect over a greater volume with higher densities of clutter produced.

The generalised effects wind turbines have on radar systems are as follows:

- Twinkling appearance/blade flash effect which can distract a controller
- Masking of true aircraft targets by increased clutter on an RDDS.
- Increase in unwanted targets or false aircraft tracks.
- Receiver saturation.
- Target desensitisation causing loss of valid targets that are of a small RCS.
- Shadowing behind the wind turbines caused by physical obstruction (blocking of radar transmitted signal).
- Degradation of tracking capabilities including track seduction.
- Degradation of target processing capability and processing overload.

Radar detectability of wind turbines does not automatically provide justification for an objection from radar stakeholders. Other factors will determine the nature and severity of the operational impact on the receptor e.g.:

- The consideration of airspace structure and classification in the wind turbine vicinity.
- The operational significance of the airspace to the operator.
- The range of the development from the radar source.
- Aircraft traffic patterns and procedures.
- The type of radar service provided to air traffic using the airspace.

Wind turbine derived clutter appearing on radar displays through primary radar returns can affect the safe provision of an ATS as it can mask aircraft from the air traffic controller and/or prevent the controller from accurately identifying aircraft under control. In some cases, radar reflections from the wind turbines can affect the performance of the radar system itself. In providing a safe ATS, an air traffic controller must maintain standard separation distances between aircraft that are under control and those radar returns that are unknown or not in receipt of a radar service. Depending on the ATS being provided, the controller will need to provide a minimum of 5 nm radar separation between an aircraft receiving a radar derived ATS and any unwanted radar returns that have the potential to obscure unknown aircraft targets. The radar clutter presented on radar displays that would be associated with radar detectability of the development would require aircraft to be manoeuvred away from desired aircraft track to achieve the appropriate lateral separation criteria. Without specific wind turbine mitigation processing capabilities, radars cannot distinguish between returns from wind turbines (false returns, or 'clutter') and those from aircraft. Air traffic controllers are required to assume that

actual aircraft targets could be lost over the location of a wind farm; furthermore, identification of aircraft under control could be lost or interrupted.

In the event that no mitigating actions are implemented for Clash Gour, the clutter created by the detectability of the operational wind turbines will affect the safe and effective provision of a radar based ATS by both RAF Lossiemouth and Inverness Airport as set out in consultees responses to the Section 36 application for the development.

Each of these individual effects reduces the overall effectiveness of the primary radar in detecting targets, which can result in the misidentification of aircraft, loss of track position, and loss of track identity as aircraft symbols and track history may be obscured. These in turn can affect the accuracy and timeliness of controller instructions and potentially cause serious safety and operational issues to ATC and the flying community operating within the area of wind turbine induced radar clutter.

If mitigation is not introduced, RAF Lossiemouth and Inverness Airport air traffic controllers would be required to limit or suspend the ATC radar services that they provide to aviation operating within the vicinity of the development areas. Furthermore, dependent on the type of radar service being provided, controllers would be required to vector all aircraft around the wind turbine induced radar clutter which would inevitably lead to greater track distances flown, an increase in both pilot and controller workloads, greater noise exposure to communities, greater fuel burn and an increase in NO_2 and CO_2 emissions through extended routing around the area of wind turbine clutter.

The proposed ATCRMS is to deploy Range Azimuth Gating (RAG) on the RAF Lossiemouth and Inverness PSR's to remove all primary radar returns from the wind turbines from the wind farm. RAG radar blanking blocks any primary radar return within selected ranges and azimuth sectors. This can be mapped to suppress plots within wind turbine clutter regions. However, the primary blanking in any area is complete which means that RAG will also remove primary radar returns from aircraft within the blanked area. To mitigate against this removal of primary radar coverage, it will be necessary to establish an airspace solution over the consented wind farm so that aircraft can be visible to ATC via another means.

2.4 Current Airspace Environment

The proposed site for the Clash Gour Wind Farm, shown in red outline in Figure 3 below, is located within Class G airspace, which is established from ground level to Flight Level (FL)195 (approximately 19,500 ft). That is, the airspace around the site is uncontrolled airspace where aircraft are permitted to fly without the need to submit a Flight Plan, be in radio contact with ATC or display any type of electronic conspicuity that would allow the aircraft to be detected by ATC. There are no set routes and aircraft are free to fly anywhere, unrestricted and in any direction, as long as they abide by the weather minima stipulated for flight under Visual Flight Rules (VFR). Aircraft flying under Instrument Flight Rules (IFR) and in receipt of an ATS are also permitted to fly through this airspace. In this case, the air traffic controller will need to provide directional information to the aircraft to provide a minimum of 5

nm separation between the aircraft receiving a radar derived ATS and any unidentified aircraft in the area.

To the north of the site, there is a Military Aerodrome Traffic Zone (MATZ), controlled by ATC at RAF Lossiemouth. The MATZ is a circle radius 5 nm that extends vertically to 3,000 ft above the level of the aerodrome. Although civil recognition of the MATZ is not mandatory, it is good airmanship for pilots of civil aircraft to call ATC before entering the MATZ. The MATZ depicted around Kinloss Airfield is no longer in force and will be removed from the chart when the next edition is published.

To the west, Inverness Airport has an Aerodrome Traffic Zone (ATZ) which is a circle radius 2.5 nm and extends vertically to 2,000 ft above the level of the aerodrome. The ATZ is established to provide protection to aerodrome traffic including those aircraft at the critical stages of flight (take-off and landing).

Above Inverness Airport ATS routes flow roughly north to south. These are generally used by commercial air transport for routing between airports across Scotland. The heights of these routes vary depending on their location, but in the vicinity of Inverness Airport, the routes are generally from 9,500 ft and above. Although these routes are Controlled Airspace (CAS), their classification is such that aircraft flying VFR can fly through these routes without talking to ATC.

To the east of the proposed site lies the busy airspace around Aberdeen International Airport. The CAS around Aberdeen Airport, and the ATS routes to the south, are a higher classification of airspace where stricter rules are implemented should aircraft wish to fly in these areas.

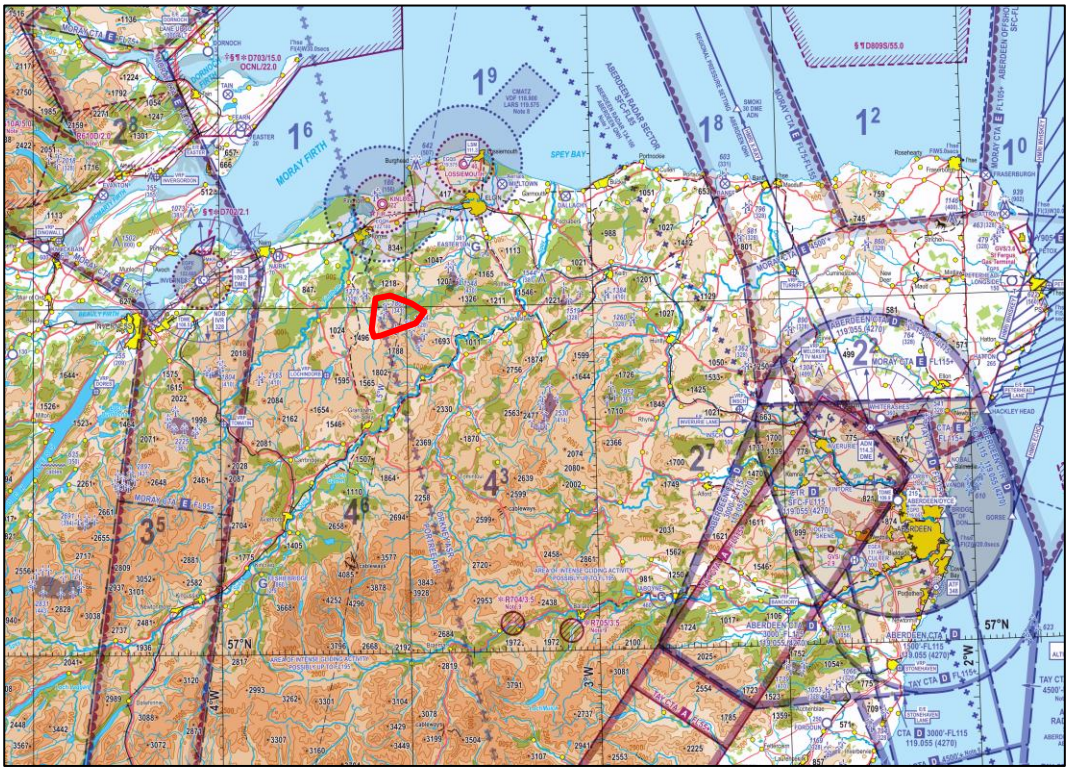

Figure 3 Current Local Airspace Structure

In the UK, CAA Policy states that all civilian aircraft must operate a transponder above FL100 (approximately 10,000 ft). A transponder is a piece of electronic equipment that transmits a signal that identifies the aircraft, along with details of the aircraft's altitude. This signal is interrogated by a ground-based Secondary Surveillance Radar (SSR), which displays the information to ATC. However, some exemptions exist to the policy which enables aircraft to operate above FL100 without a transponder subject to specific rules and areas of operation. One such example of aircraft being permitted to operate above FL100 without a transponder are gliders.

Non-SSR Glider Areas have been established to accommodate non-transponder equipped glider operations at and above FL100. One such area (Area 1 in Figure 4 below) encompasses the area above the proposed Clash Gour site. Between FL100 and FL195 (approximately 19,500 ft), gliders are able to operate in this area without the use of a transponder or talking to ATC (unless they require access to CAS). In addition, further areas have been established to allow gliders to operate above FL195 also without use of a transponder. However, in these areas, the gliders must be equipped with a radio which must be operated in accordance with the instructions in the UK AIP ENR 1.11. The Scottish Area North Temporary Reserved Area (Gliding) (TRAG), as shown in Figure 4 below, is established above the proposed Clash Gour site and permits non-SSR glider operations up to FL270.

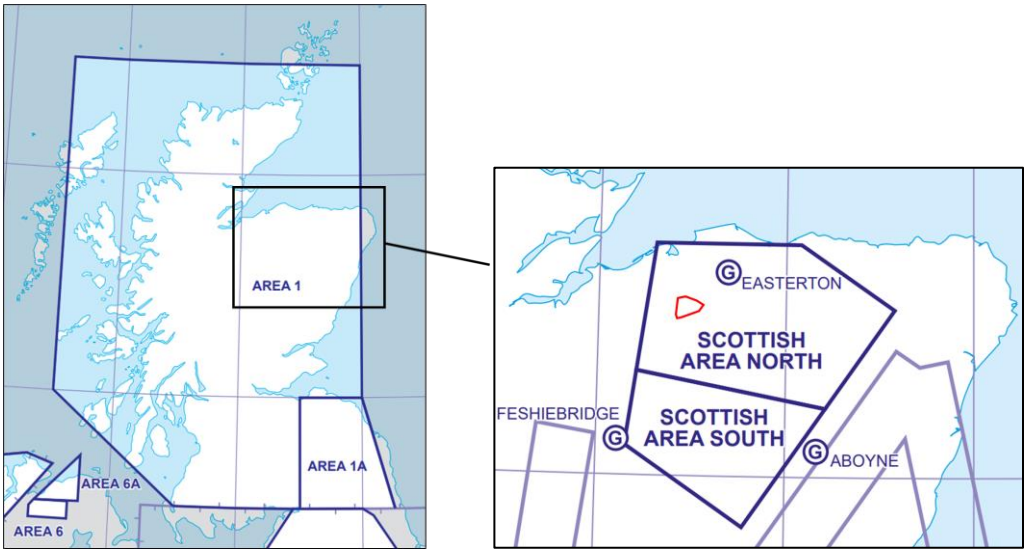

Figure 4 Glider Areas

Source: NATS UK AIP ENR 6

An initial qualitative traffic assessment conducted at Stage 2 concluded that the proposed area for Clash Gour featured low traffic levels involving users such as local general aviation (GA) traffic; gliding; recreational and leisure aircraft; military transit and training traffic; as well as infrequent off-route commercial air traffic. The Change Sponsor also conducted a more detailed quantitative analysis of traffic within the area surrounding the proposed wind farm development. Details of the traffic survey and supporting analysis is explained in the following paragraph.

2.5 Current Airspace Usage

At the previous stage of the airspace change process, the Change Sponsor conducted a detailed analysis of traffic within the area surrounding the proposed wind farm development. The aim of the analysis was to determine the type and density of transiting traffic in the area and estimate the number of aircraft potentially affected by the proposed airspace solutions. The analysis was conducted using an online aircraft tracking system in an area extending 10 nm from the centre of the proposed Clash Gour site, as shown in Figure 5 below. The survey was conducted for a time period of 2 weeks during August 2022, which was expected to be a busy period for recreational flight in the area and therefore representative of a high use period.

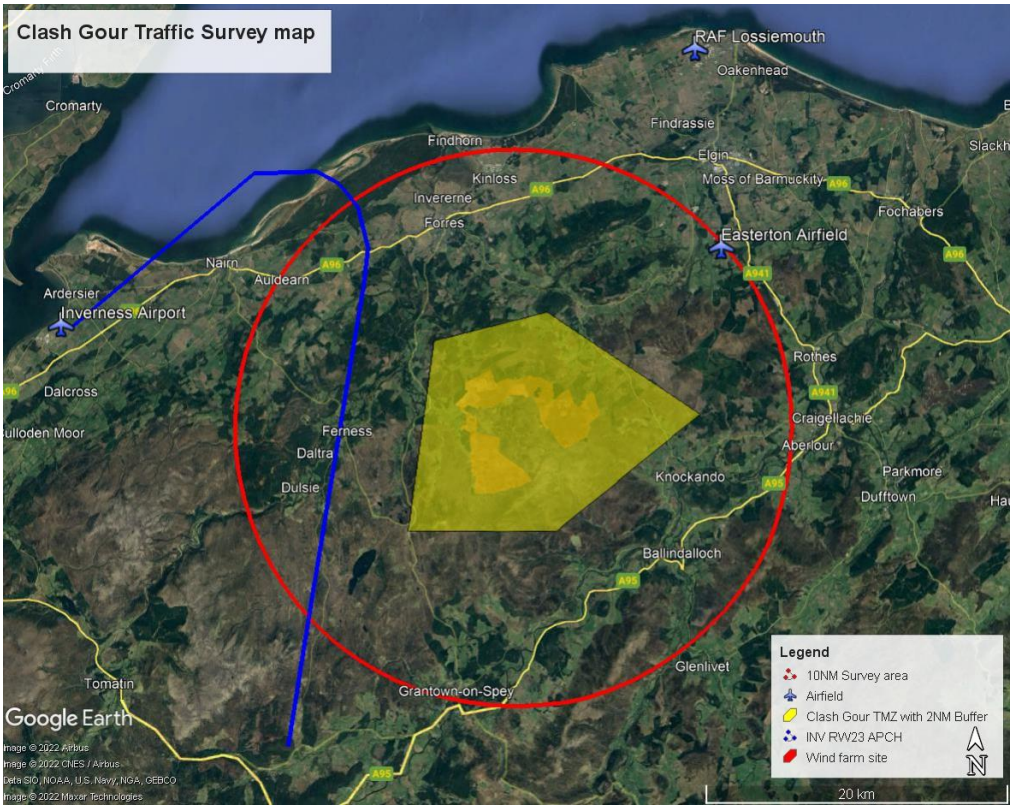

Figure 5 Traffic Survey Area

Source: Google Earth

2.5.1 Results

During the 2-week period, a total of 468 movements transited the surveyed volume of airspace. Of this total, 263 movements transited the surveyed volume below 20,000 ft, averaging approximately 19 movements per day. The most movements on a single day was 34 on the 10th August. The least was 6 on the 13th August. Fifty-nine of the movements were aircraft inbound to Inverness Airport and were concentrated on a path in the western side of the surveyed area that went from south to north to make a left turn for Runway 23. Seventy-four of the movements were general Aviation (GA) aircraft, including single engine piston aircraft, twin engine GA aircraft, gliders or other GA aircraft. Figure 6 below provides a representation of the aircraft tracks in the vicinity of the proposed Clash Gour site for the 24-hour period on the 10th August, the busiest day. The aircraft inbound to Runway 23 at Inverness Airport can be seen on the left-hand side of the image.

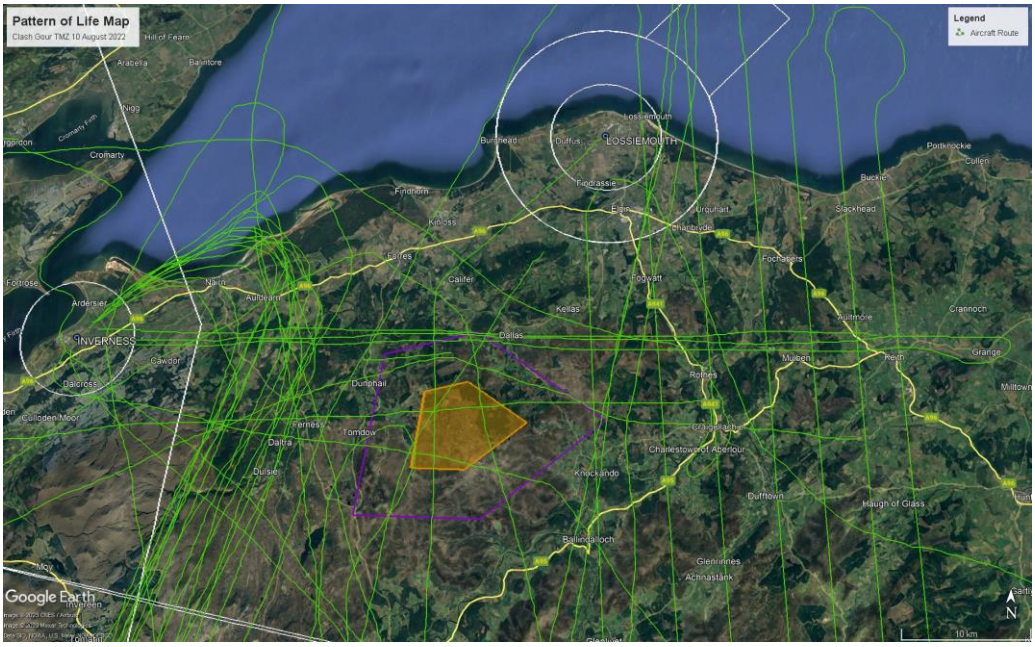

Figure 6 Pattern of Life Map – 10th August 2022 Source: Google Earth

It should be noted that only aircraft carrying the necessary transponder equipment would be identified by the aircraft tracking system. As previously stated, it is not mandatory in the UK for all aircraft to have this equipment and therefore movements in the area (particularly GA) that may have occurred that have not appeared in the survey. To estimate the maximum potential effect of the development, a scaling factor has been applied to the GA traffic data.

Although an exact figure is difficult to determine, a report produced as part of a project working on behalf of the CAA to Develop Minimum Technical Standards for Electronic Conspicuity and Associated Surveillance suggests that approximately 40% of GA aircraft are fitted with the appropriate equipment. It can therefore be estimated that as well as the 74 GA aircraft identified, there would have been a further 111 aircraft not fitted with the equipment, and therefore not identified in the survey. This would give a total of 185 GA aircraft over the two weeks surveyed. This averages approximately 13 movements per day and considering that the survey took place at the height of summer, when GA traffic is busiest, this is likely to be an upper estimate compared to the rest of the year.

2.5.2 Conclusion

From this traffic survey, based upon the data analysed, it can be deduced that the airspace above the wind farm is a low-density air traffic environment.

2.6 Stakeholders

Stakeholders are third-party groups or individuals interested in an ACP.

CGH has identified the key stakeholder organisations and individuals as potentially being affected by the proposal. The Consultation Strategy document details all the stakeholders that we have targeted to participate in this consultation. The

Consultation Strategy can be found on the airspace change portal alongside this document.

For details on how to respond to this consultation see Section 6 on page 21.aipo

2.7 Justification

The justification for this airspace change is to enable the construction of the Clash Gour Wind Farm.

The wind farm is expected to provide an environmental benefit by saving of c.0.5 million tonnes of CO_2 emissions per annum, which will only be realised if the airspace change is implemented and the wind farm built.

The objectives of this proposal are to:

- Ensure aviation safety, with no increased risk to an ATC Officer's ability to detect aircraft conflictions.
- Meet the planning consent condition for this wind farm development to enable its construction and realise significant environmental benefits by the generation of renewable energy.

2.8 Options for Consultation

After the previous development stage of the airspace change process, three options remained for progression:

- Do nothing – we do not prefer this option because the planning consent condition would not be met, construction could not start, and the benefits of renewable energy would not be realised (Section 3).
- Transponder Mandatory Zone (TMZ) Option 7(E) – RAG blanking over the proposed wind farm array locations. Simplified polygon TMZ 'rubber banded' around the proposed windfarm locations with no buffer (Section 4).
- Transponder Mandatory Zone (TMZ) Option 7(F) – RAG blanking over the proposed wind farm array locations. Simplified polygon TMZ 'rubber banded' around the proposed wind farm locations extended to include a 2 nm buffer (Section 5).

3 Do Nothing Option

3.1 The Do Nothing Option

CAP 1616 states that a baseline will be required for all environmental assessments. The Change Sponsor must conduct an assessment to understand its current impacts so that a comparison can be made with the impacts of the options. In most cases, this will be a Do Nothing scenario and will largely reflect the current-day scenario.

The Change Sponsor has concluded that, in order to best reflect the current impacts, the Do Nothing scenario shall be the current situation today, in which the Clash Gour Wind Farm has not been constructed. Wind farms that are already established in the immediate vicinity of the proposed Clash Gour Wind Farm (i.e. Berry Burn) will be included within the baseline scenario.

3.2 Full Options Appraisal

The scenario within the Do Nothing Baseline reflects todays operation in which Clash Gour Wind Farm does not exist and as such has no impact on local Air Navigation Service Provider's, airspace users, local communities (noise and air quality) or Tranquillity and Biodiversity receptors. Details of the Full Options Appraisal that has been conducted can be found on the CAA airspace change portal alongside this document.

3.3 Conclusion

The Do Nothing option is considered not to be a viable option due to the requirement to mitigate the impact created to the RAF Lossiemouth and Inverness PSRs, which will affect the ATS being provided. This option does not meet the conditions which are attached to the grant of consent and as such the Clash Gour Wind Farm development would not be constructed and the subsequent environmental benefits would not be realised. It is therefore included for comparison purposes only.

4 Option 7(E) – TMZ

4.1 Option 7(E)

RAG blanking over the proposed windfarm array locations. Simplified polygon TMZ 'rubber banded' around the proposed windfarm locations with no buffer.

Figure 7 below provides an illustration of Option 7 (E). This design is a simplified polygon surrounding the locations of 3 arrays which comprise Clash Gour and includes Berry Burn and Berry Burn 2 Wind Farms, all with no buffer. This option has a simplified boundary shape. Aircraft entering the TMZ will be required to be equipped with and operate SSR transponder equipment or to have established two-way radio communications with the TMZ Controlling Authority[1] before entry.

The TMZ proposed under this option purely covers for the geographical layout of the Development Areas and does not consider the establishment of a buffer zone. Establishing a TMZ without an additional buffer zone around the RAG would prevent the controller from maintaining primary radar track identity as the aircraft enters/leaves the TMZ however, the simplified design is advantageous for pilots to display on in-cockpit Electronic Flight Information Systems (EFIS) and air traffic controllers on radar displays. As such this is preferable for Human Factors reasons as the potential misinterpretation of the airspace comprising the TMZ and inadvertent penetration is reduced.

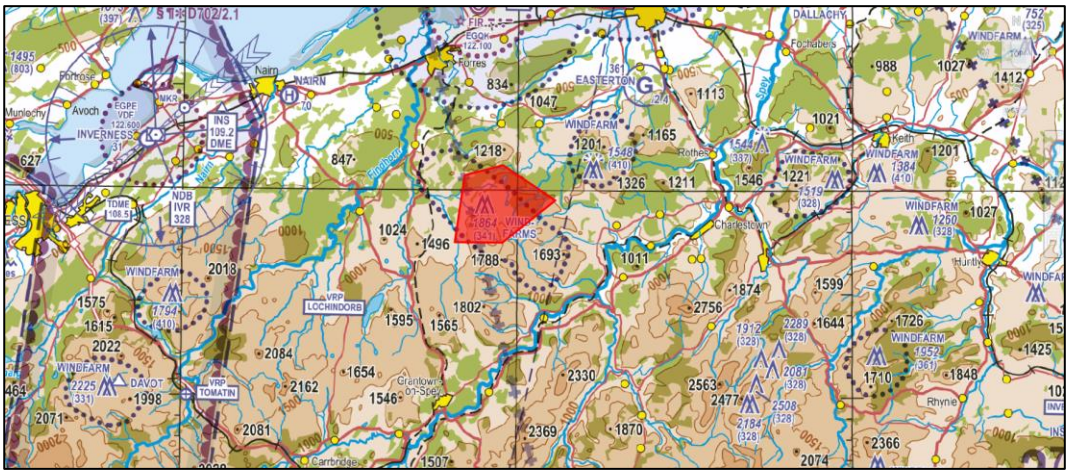

Figure 7 Simplified Polygon TMZ

The proposed RAG radar blanking will block any primary radar returns within the wind turbine clutter regions. The primary blanking in any area is complete which means that RAG will remove the primary radar returns from aircraft at any altitude within the blanked area. In general, civilian aircraft must operate a transponder above FL100 in the UK, therefore there would be no requirement to extend the TMZ above FL100 as all aircraft should be visible to ATC units. However, as described in Section 2 above, the airspace above the proposed Clash Gour site has been

[1] Controlling Authority of the airspace change will be agreed further along in the ACP process.

designated as an area where gliders can operate without the carriage of a transponder. Therefore the TMZ must extend to FL195. Above FL195, gliders must be equipped with a radio which must be operated in accordance with the instructions in the UK AIP ENR 1.1 and therefore would be able to obtain clearance to enter the TMZ.

4.2 Full Options Appraisal

From a safety perspective, Option 7(E) provides a radar mitigation solution suitable for managing traffic within the vicinity of the proposed wind farm. As a result of the introduction of primary radar blanking and a TMZ, controllers will have greater situational awareness of traffic operating in the vicinity and will not experience significant radar clutter caused by the presence of the wind farm. There may be a slight increase in controller workload, should an aircraft without a transponder and not in communication with ATC enter the TMZ; however, this is expected to be minimal. In addition, this option does present a hazard in terms of GA integration, however, this can be procedurally and tactically mitigated. Option 7(E) also provides a simplified TMZ airspace design which reduced complexity for both controllers and pilots.

With regards to environmental factors, due to the small scale of the proposed TMZ and low airspace usage in the area, any re-routing required by aircraft (without a transponder and not in communication with ATC) is expected to be minimal, resulting in minimal additional noise, greenhouse gas, fuel burn, access and economic impacts. The low airspace usage is based on the traffic survey undertaken at Stage 2 which was conducted for a time period of 2 weeks during August 2022, which was expected to be a busy period for recreational flight in the area and therefore representative of a high use period. The development consent process for the wind farm development included a detailed Environmental Impact Assessment (EIA) which assessed the significant environmental effects of the development. This included a carbon assessment which showed that the development is carbon positive for approximately 27.5 years of its 30 year lifetime, a factor which was balanced against the environmental effects when Scottish Ministers consented the project. This must be considered in balance against the minimal environmental impacts of displaced air traffic. There is expected to be no or very little additional costs for commercial airlines, GA and ANSPs as a direct result of this option. There may be a minor cost associated with controller training and that a cost shall be incurred for the staffing and management of the TMZ. Although these costs cannot be quantified at this time, they are likely to be covered by CGH in forming the agreements required to discharge the planning conditions. It must also be noted that the development and construction costs of the wind farm itself are outside the scope of the CAP 1616 process and as such have not been considered.

Further details can be found in the Full Options Appraisal on the CAA airspace change portal alongside this document.

The Change Sponsor considers Option 7(E) to be the minimum option to achieve the objectives of this ACP.

5 Option 7(F) – TMZ + Buffer

5.1 Option 7(F)

RAG blanking over the proposed windfarm array locations. Simplified polygon TMZ 'rubber banded' around the proposed wind farm locations extended to include a 2 nm buffer.

Figure 8 below provides an illustration of Option 7 (F). This option is an extension of Option 7(E). It combines the advantages of the simplified TMZ shape with the benefit of the 2 nm buffer. The addition of a buffer is intended to give ATC some warning (and time to react) between a non-transponder equipped aircraft infringing the TMZ and it disappearing from the radar screen and subsequently allows the PSR to re-establish a target/plot once an aircraft has exited the RAG (blanked) area. This option has been successfully utilised as a radar mitigation scheme in previous wind farm developments requiring mitigation.

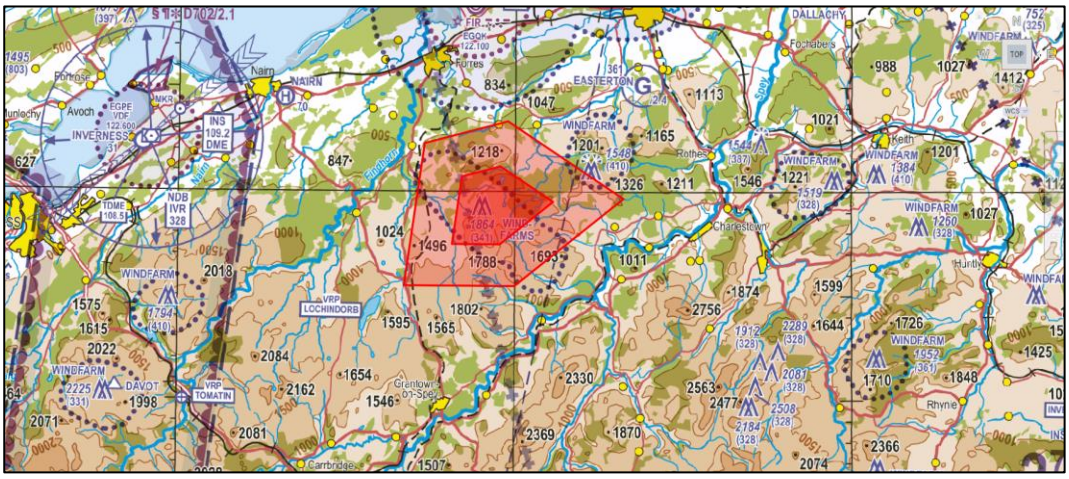

Figure 8 Simplified Polygon TMZ with 2 nm Buffer

The proposed RAG radar blanking will block any primary radar returns within the wind turbine clutter regions. The primary blanking in any area is complete which means that RAG will remove the primary radar returns from aircraft at any altitude within the blanked area. In general, civilian aircraft must operate a transponder above FL100 in the UK, therefore there would be no requirement to extend the TMZ above FL100 as all aircraft should be visible to ATC units. However, as described in Section 2 above, the airspace above the proposed Clash Gour site has been designated as an area where gliders can operate without the carriage of a transponder. Therefore the TMZ must extend to FL195. Above FL195, gliders must be equipped with a radio which must be operated in accordance with the instructions in the UK AIP ENR 1.1 and therefore would be able to obtain clearance to enter the TMZ.

5.2 Full Options Appraisal

From a safety perspective, Option 7(F) provides a radar mitigation solution suitable for managing traffic within the vicinity of the proposed wind farm. As a result of the introduction of primary radar blanking and a TMZ, air traffic controllers will have greater situational awareness of traffic operating in the vicinity and will not experience significant radar clutter caused by the presence of the wind farm. There may be a slight increase in controller workload, should an aircraft without a transponder and not in communication with ATC enter the TMZ, however, this is expected to be minimal. In addition, this option does present a hazard in terms of GA integration, however, this can be procedurally and tactically mitigated. Furthermore, this option includes a 2 nm buffer, which provides air traffic controllers with additional warning and reaction time, should a non-participating aircraft enter the TMZ. Option 7(F) also provides a simplified TMZ airspace design which reduced complexity for both controllers and pilots.

With regards to environmental factors, due to the small scale of the proposed TMZ and low airspace usage in the area, even when the 2 nm buffer is considered, any re-routing required by aircraft (without a transponder and not in communication with ATC) is expected to be minimal, resulting in minimal additional noise, greenhouse gas, fuel burn, access and economic impacts. The low airspace usage is based on the traffic survey undertaken at Stage 2 which was conducted for a time period of 2 weeks during August 2022, which was expected to be a busy period for recreational flight in the area and therefore representative of a high use period. The development consent process for the wind farm development included a detailed Environmental Impact Assessment (EIA) which assessed the significant environmental effects of the development. This included a carbon assessment which showed that the development is carbon positive for approximately 27.5 years of its 30 year lifetime, a factor which was balanced against the environmental effects when Scottish Ministers consented the project. This must be considered in balance against the minimal environmental impacts of displaced air traffic. Furthermore, there is expected to be no or very little additional costs for commercial airlines, GA and ANSPs as a direct result of this option. There may be a minor cost associated with controller training and that a cost shall be incurred for the staffing and management of the TMZ. Although these costs cannot be quantified at this time, they are likely to be covered by CGH in forming the agreements required to discharge the planning conditions. It must also be noted that the development and construction costs of the wind farm itself are outside the scope of the CAP 1616 process and as such have not been considered.

Further details can be found in the Full Options Appraisal on the CAA airspace change portal alongside this document.

The Change Sponsor considers Option 7(F) to be the preferred option to achieve the objectives of this ACP as the inclusion of the 2 nm buffer enhances safety. The introduction of a 2 nm buffer is intended to give ATC some warning (and time to react) between a non-transponder equipped aircraft infringing the TMZ and it disappearing from the radar screen. Furthermore, a 2 nm buffer would allow the PSR sufficient processing time to re-establish a target/plot once an aircraft has exited the RAG (blanked) area.

6 How to Participate

6.1 How to Respond to this Consultation

6.1.1 Consultation Period

This consultation begins on 29th March 2023 and runs for 9 weeks. All comments must be received via the media listed below by midnight on 31st May 2023. This consultation is not limited to those individuals and organisations that we have contacted directly, anyone may respond.

6.1.2 Responding via the Airspace Portal

This consultation is being conducted by CGH, using the CAA's online consultation portal which can be accessed through the airspace change portal here:

Airspace change proposal public view (caa.co.uk)

The CAA's Airspace Regulation Department will oversee the consultation and ensure that it adheres to the CAP 1616 process and government guidelines. All comments will appear in the public domain and the CAA will also act as moderator for the comments.

This consultation document and all supporting documents are available on the CAA portal. There is a link to our consultation questionnaire hosted by Citizen Space where you can submit your answers to our specific questions. There is a free-text comments field for you to submit anything you feel is not covered by our questions. Please submit your response directly to us via the CAA portal at the link above.

We will not accept any e-mail responses to this consultation. All online responses should be submitted via the airspace change portal at the link above. However, if you have any questions of understanding relating to the information provided, please contact us in writing or at the following e-mail address:

clashgouracp@consultation-online.co.uk

If you are unable to access the consultation materials in the conventional way and would like us to provide the information in an alternate format, please get in touch by writing to us at the address shown in paragraph 6.1.4 or by e-mailing at the address above.

6.1.3 Responding in Person – or Finding Out More

We invite you to come along to one of our public drop-in sessions to find out more, ask questions or submit a response in person. These are being held at the following times and locations:

- North Room, Forres Town Hall, Forres, IV36 1PB – Wednesday 19th April 2023 2pm – 7pm
- Elgin Town Hall, 1 Trinity Place, Elgin, IV30 1UL – Thursday 27th April 2023 2pm – 7pm

All in-person responses to our questionnaire or hand-written comments will be uploaded to the CAA Portal for moderation and must be legible and include your full name and contact details to be considered.

In addition, we will be holding two virtual consultation sessions where you can find out more about our proposal and ask questions. To join one of our virtual consultation sessions, please email clashgouracp@consultation-online.co.uk for joining details. These are being held at the following times:

- Thursday 20th April 2023 6pm – 8pm
- Tuesday 25th April 2023 6pm – 8pm

6.1.4 Responding by Post

Respondents can submit a postal response to the consultation. We will not commit to respond to all postal responses directly; however, respondents are welcome to include a stamped addressed envelope if they do require a reply or an acknowledgement of receipt. Proof of postage is not proof of delivery and we will be otherwise unable to acknowledge receipt of responses. We have provided a Feedback Form for postal responses, which can be found at Appendix A1 at the end of this document. This asks the same questions as the online survey. Online responses will have the option to upload a supporting document – if you wish to supply more information on paper by post, please enclose it with your completed feedback form.

Postal responses can be sent to the following address:

Force9 Energy
for Clash Gour Wind Farm ACP
272 Bath Street
Glasgow
G2 4JR

Written responses are to be received by the close of the consultation on 31st May 2023.

6.1.5 Frequently Asked Questions

If, as the consultation is undertaken, a variety of different stakeholders request the same information that was not foreseen and is not included in the documentation, we will develop 'frequently asked questions' (FAQ) material for publication on both the airspace change portal and Citizen Space.

6.2 Reversion Statement

The Do Nothing option would not provide mitigation against radar clutter. Should the proposal be approved and implemented, it would not be possible to revert to the pre-implementation state without affecting ATC operations unless a technical mitigation solution has been tested and implemented. The proposed changes would be considered permanent until a technical mitigation scheme is developed and implemented to the satisfaction of both RAF Lossiemouth and Inverness Airport. Any reversal in the decision to implement a solution, other than a technical solution being implemented, would result in the wind farm becoming non-operational.

In the unlikely event that there are unexpected issues caused by this proposal, then short notice changes could be made via a Notice to Aviation (NOTAM). For a permanent reversion, the changes would have to be reversed by incorporating this into an appropriate future AIRAC date to align with NATS' engineering updates; of which there are only four a year.

The Change Sponsor considers the proposed Option 7(E) to be the minimum option and Option 7(F) to be the preferred option as the inclusion of the 2 nm buffer enhances safety.

6.3 Compliance with the Airspace Change Process

This proposal is confirmed by the CAA as Level 1.

If you have questions or comments regarding the conduct of the airspace change process (such as adherence to the CAP1616 process), please contact the CAA:

Airspace Regulation
Ref: ACP 2021-46
Safety and Airspace Regulation Group
Aviation House
South Area
Gatwick Airport
RH6 0YR

Form FCS 1521 –UK Airspace Report can be used for this purpose.

Note: These contact details must not be used for your response to this consultation. If you do so, your response may be delayed or missed out, reducing its effectiveness.

6.4 What Happens Next

After the consultation period closes, we will analyse the feedback received and publish a report on the CAA Airspace Change Portal summarising the findings and how each item might affect the airspace design.

We will consider those findings, determine if the airspace design needs to change in light of the feedback, and, if needed, publish a second report detailing the amended design.

Finally we will submit an Airspace Change Proposal to the CAA based on this consultation document and the feedback reports.

The CAA will then study the proposal to decide if it has merit and will publish a decision on its website.

If the CAA approves this proposal, we plan to implement the changes by Q3 2025; however this will be dependent on future site development work.

6.5 Consultation Timetable

Table 2 below summarises the key dates and activities for our consultation:

Activity	Location	Date
Consultation Launch	CAA airspace change portal	29th March 2023
Public Drop-In Session	Forres Town Hall, Forres	19th April 2023
Virtual Consultation Session	Online	20th April 2023
Virtual Consultation Session	Online	25th April 2023
Public Drop-In Session	Elgin Town Hall, Elgin	27th April 2023
Consultation Ends		31st May 2023

Table 2 Consultation Period Key Activities and Dates

6.6 Thank You

Thank you for taking the time to consider the information in this document. A reminder that if you, or anyone you know, requires this information in an alternative format, please ask at one of our events or write to us at the following address:

Force9 Energy
for Clash Gour Wind Farm ACP
272 Bath Street
Glasgow
G2 4JR

A1 Postal Responses

A1.1 Feedback Form for Postal Responses

Stakeholders without internet access are able to complete the form below and send by post to the address detailed in Section 6 – How to Participate.

<table>
<tr><td colspan="4">Your name:</td></tr>
<tr><td colspan="4">Postcode:</td></tr>
<tr><td colspan="4">Your e-mail address:</td></tr>
<tr><td colspan="4">Delete one of the following boxes, as applicable:</td></tr>
<tr><td colspan="2">I am responding as an individual</td><td colspan="2">I am responding on behalf of an organisation
Organisation name:

Position within the organisation:</td></tr>
<tr><td colspan="4">In accordance with the UK Civil Aviation Authority's CAP 1616 airspace change process, consultation responses will be published on Citizen Space via the Airspace Change Portal. Responses will be subject to moderation by the Civil Aviation Authority (CAA). If you wish your response to be published anonymously your personal details (Name, Address & Position) will be redacted and only be seen by the CAA.</td></tr>
<tr><td colspan="2">Yes - I want my response to be published with my details</td><td colspan="2">No - I want my response to be published anonymously</td></tr>
<tr><td colspan="4">Our Proposals for Consultation</td></tr>
<tr><td colspan="4">Do you support the proposed Airspace Change Proposal? Please select on item:</td></tr>
<tr><td>SUPPORT</td><td>NEUTRAL</td><td>OBJECT</td><td>NO COMMENT</td></tr>
<tr><td colspan="4">Please provide any additional comments to allow us to understand why you have responded as above. Please consider:
• What do you believe will be the impact of the TMZ on your operation?
• How often do you think these impacts will occur?
• Do you have any suggested mitigations or design changes you think should be considered?
• Do you think there may be any unintended consequences of the TMZ?
Please provide evidence:</td></tr>
</table>

Consultation Options – Please indicate which is your preferred option:				
Do Nothing	Option 7(E)	Option 7(F)	Do not support either Option 7(E) or 7(F)	No preference
Please provide any additional comments to allow us to understand why you have responded as above:				
Further Feedback				
Do you have any further feedback on this airspace change proposal?				

If you require any additional space to provide your response, please feel free to write your feedback on additional blank sheets of paper and include with these response sheets.