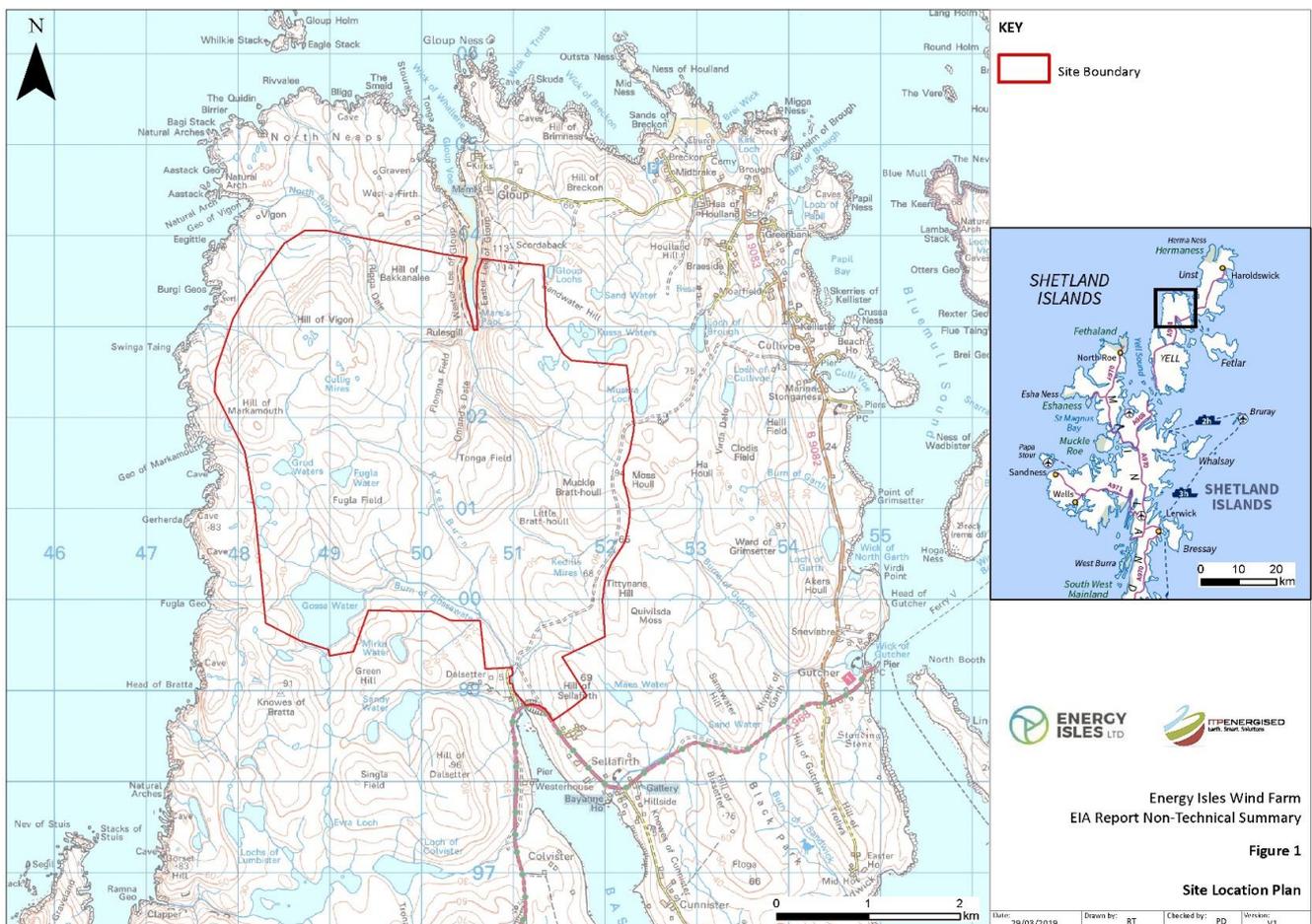


# 1 Background

1.1 This document is a Non-Technical Summary of the Energy Isles Wind Farm Environmental Impact Assessment (EIA) Report which supports the application by Energy Isles Ltd (the Applicant), proposing the development of a wind farm (the Proposed Development) in Yell, in the Shetland Islands (refer to Figure 1). The Applicant is submitting an application to the Scottish Government's Energy and Consents Unit under Section 36 of the Electricity Act 1989, seeking consent to construct and operate the Proposed Development for a period of 30 years. The Applicant is also applying for a direction under Section 57(2) of the Town and Country Planning (Scotland) Act 1997 that planning permission for the development be deemed to be granted.

## The Applicant

1.2 The Applicant is a consortium of over fifty mainly Shetland-based companies working together to develop a large-scale wind farm in the north of Yell, with the intention of ensuring that the communities of Shetland realise the substantial benefits associated with renewable energy development. Companies in the group come from a wide variety of existing sectors including fishing, aquaculture, crofting, marine engineering, renewable energy and support services. Several are based in the North Isles of Shetland.



## 2 Purpose of the Proposed Development EIA Report

- 2.1 ITP Energised is appointed by the Applicant to undertake an EIA of the Proposed Development in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations). EIA is the systematic process of identifying, predicting and evaluating the environmental impacts of a proposed development.
- 2.2 The EIA process is reported in the EIA Report, which identifies the methodologies used to assess the beneficial and adverse environmental effects predicted to result from the construction, operation and decommissioning of the Proposed Development. Where appropriate, it also sets out mitigation measures designed to prevent, reduce and, if possible, offset significant adverse environmental effects. An assessment of residual effects, those expected to remain following implementation of mitigation measures, is also presented.

## 3 Availability of the Proposed Development EIA Report

- 3.1 Copies of the Proposed Development EIA Report are available from:

Energy Isles Limited  
10 Charlotte Street,  
Lerwick,  
Shetland,  
ZE1 0JL

Email: [info@energyisles.co.uk](mailto:info@energyisles.co.uk)

- 3.2 Electronic copies of the EIA Report can be accessed at <http://www.energyconsents.scot/> or at <https://www.energyisles.co.uk/>.
- 3.3 Hard copies of the Non-Technical Summary (NTS) are available free of charge from the Applicant. A hard copy of the EIA Report (Volumes 1, 2, 3, 4, 5 and 6) is also available for £1,250.00 (including printing and distribution). In addition, all documents are available (as a PDF for screen viewing only) on a CD for £10.00.
- 3.4 The EIA Report is free to view in hard copy at the following locations:

Cullivoe Village Hall  
Cullivoe  
Yell  
Shetland Islands  
ZE2 9DD

Lerwick Town Hall  
Hillhead  
Lerwick  
Shetland Islands  
ZE1 0JL

## 4 Representations to the Application

- 4.1 Any representations to the application should be made directly to the case officer at the Scottish Government Energy Consents Unit via the following:

Energy Consents Unit  
Scottish Government  
5 Atlantic Quay  
150 Broomielaw  
Glasgow  
G2 8LU

email: [representations@gov.scot](mailto:representations@gov.scot)

online: [www.energyconsents.scot](http://www.energyconsents.scot)

## 5 Site Location and Description

- 5.1 The Proposed Development application boundary (the “site”) is located approximately 147 m west of Sellafirth, 1.8 km west of Cullivoe and 812 m south of Gloup, on the island of Yell in the Shetland Islands. The site covers Hill of Vigon, Hill of Bakkanalee, Sandwater Hill, Hill of Markamouth, Tonga Field Muckle Bratt-houll, Little Bratt-houll, and Fugla Field. The elevation of the site ranges from 0-112 m above ordnance datum. The site occupies an area of 1,679 hectares (ha) and the central grid reference for the site is BNG 450134, 1201392. The site location and site boundary are shown in Figure 1.
- 5.2 The site comprises grazed peatland, intersected with waterbodies (including Gossa Water), burns and drainage ditches. No buildings or structures are located within the site boundary. The Dalsetter Hill Road (known locally as the Old Cullivoe Road) intersects the south-eastern corner of the site and will be used as the access to the site from the A968.

## 6 Design Process

### *Design Process*

- 6.1 The Proposed Development site has some of the best proven wind resources in the UK with capacity factors for existing wind farms far exceeding the averages achieved in England and Wales (30.9%) and mainland Scotland (35.2%) (BEIS, 2018). Burradale Wind Farm, located on mainland Shetland, has been operational since 2001 and has an average capacity factor of 52%, an increase of 16.8% compared to the estimated capacity factor for new developments in Scotland.
- 6.2 The design of the Proposed Development has undergone several iterations of turbine and access track layout. The process has resulted in a reduction of wind turbine generation sites from 63 to 29. It has taken into consideration factors including comments received from consultees, environmental constraints, visual effects and landscape character. The following principles were adopted during the design iterations to ensure that the final design was the most suitable for the site:
- ▶ maximising wind yield and maintaining adequate spacing between turbines;
  - ▶ avoiding peat of greater than 2 m depth where possible;
  - ▶ a minimum buffer of 1 km was maintained around residential dwellings in the surrounding area and the proposed turbines;
  - ▶ a minimum buffer of 50 m was maintained around watercourses and disturbance was limited within the Gossa Water Catchment;
  - ▶ respecting the constraints of geomorphological features;
  - ▶ application of a 500 m buffer between turbines and known breeding locations of threatened bird species and the provision of passageways between turbines to the sea for such bird species;
  - ▶ maintaining a 200 m buffer around listed buildings and scheduled monuments;
  - ▶ ensuring that the Proposed Development is compatible with other planned and consented wind farms in Yell; and
  - ▶ the Proposed Development should avoid inconsistent turbine spacing, such as relatively large gaps, outliers or excessive overlapping turbines to minimise visual confusion and ensure a balance / compact array from key views.

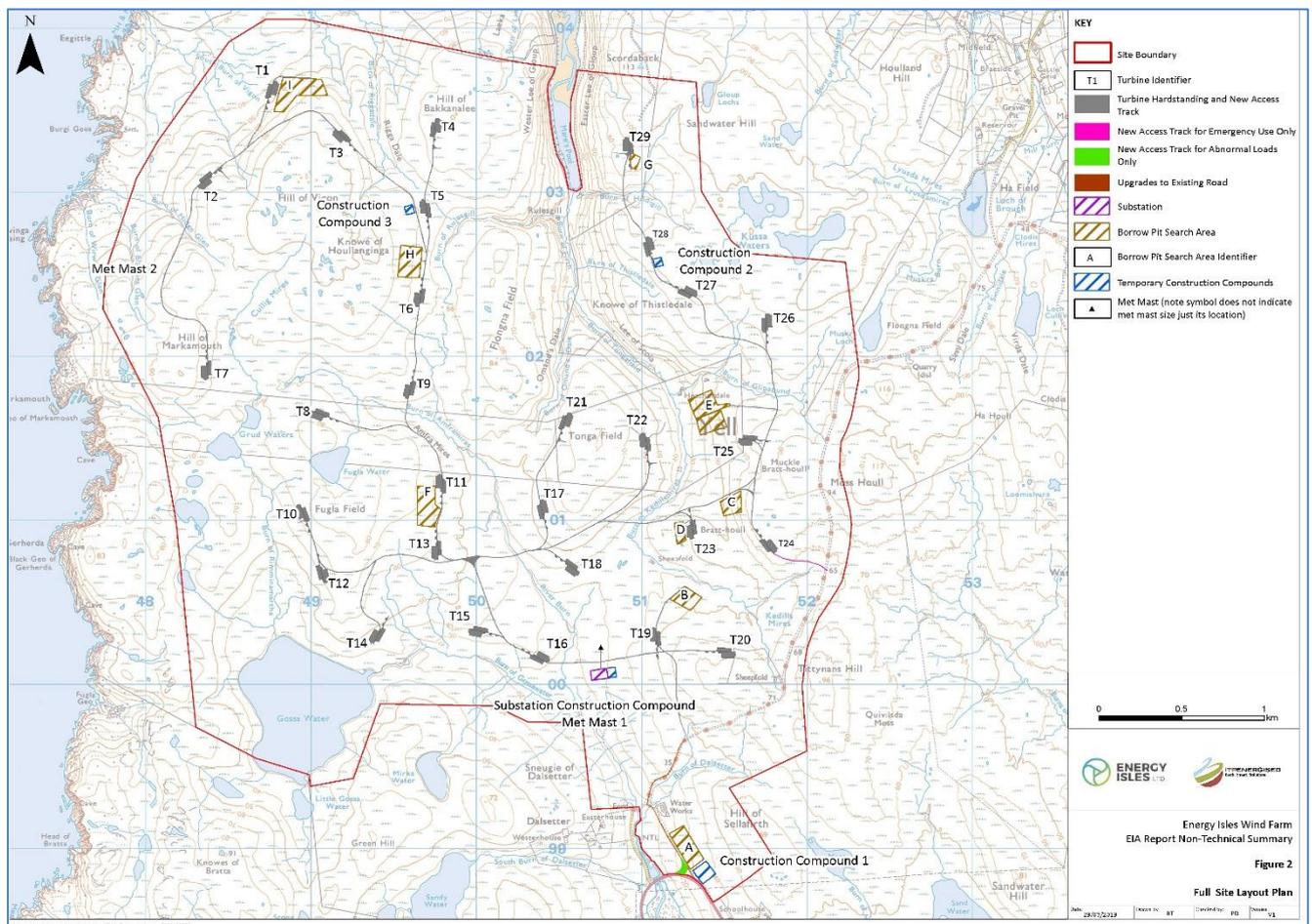
- 6.3 The Proposed Development layout put forward in the EIA Report is considered to represent the most appropriate design while maximising the generating capability of the site. The process of design iteration is explained fully in Chapter 2 of the EIA Report.
- 6.4 The proposed locations of the 29 turbines, together with their access tracks, substation, potential borrow pit search areas and construction compounds are shown on Figure 2. A micro-siting allowance of up to 100 m in all directions is being sought with regards to each turbine and its associated infrastructure. This will allow for flexibility in locating the Proposed Development following detailed pre-construction surveys, which may identify unsuitable ground conditions or environmental constraints that could be avoided. The final positioning will be addressed through an appropriately worded planning condition.

## 7 Description of the Development

- 7.1 This section provides an overview description of the Proposed Development and how it will be constructed. Further details are provided in Chapter 3 of the EIA Report.

### *The Proposed Development*

- 7.2 The Proposed Development comprises 29 wind turbines of up to a maximum 200 m height from ground to blade tip when vertical. The total power output of the Proposed Development is estimated to be up to 200 MW.



- 7.3 A number of ancillary elements are also proposed, including four temporary construction compounds, permanent hardstandings adjacent to the wind turbines for maintenance and decommissioning cranes, external transformers, internal access tracks including a junction off of the existing road network, a network of underground cables between turbines, an on-site substation and maintenance building, a permanent meteorological monitoring mast and, nine potential borrow pit search areas. The proposed site layout is shown in Figure 2.
- 7.4 Each turbine will be mounted on a tapered tubular steel tower and consist of a nacelle containing the gearbox, generator and associated equipment, to which are attached a hub and rotor assembly including three blades. At the base, the turbine will be approximately 7 m in diameter.
- 7.5 To enable the construction of the turbines, a crane hardstanding area and turning circle at each turbine location will be required to accommodate assembly cranes and construction vehicles. This will comprise a crushed stone hardstanding area measuring, at the widest point, approximately 35 m wide by 75 m long with a typical thickness of approximately 1 m and will remain in place during the lifetime of the Proposed Development to facilitate maintenance works.
- 7.6 All traffic will access the site from the south via the Dalsetter Hill Road (known locally as the Old Cullivoe Road) off the A968. The recommended route for all deliveries will be from the south, along the A968, from the port at Ulsta.
- 7.7 The access tracks within the site boundary will be approximately 5 m wide with some extra width provided on bends, gradients, junctions, passing and turning places. It is anticipated that approximately 18.35 km of the access tracks will be floated while approximately 1.75 km of the access tracks will be dug. There will be approximately 980 m of temporary floated and restored track and approximately 525 m of the Old Cullivoe Road will be widened.
- 7.8 To minimise the volume of imported material brought onto the site and any associated environmental impact, borrow pits located within the site will be used to source stone for track construction. A borrow pit is an area where material has been excavated for use at another location.
- 7.9 Four secure, temporary construction and material storage compounds will house temporary portable cabin structures to be used as the main site office and welfare facilities.
- 7.10 The electrical power produced by the individual turbines will be fed to an onsite substation via underground cables. The substation compound will measure approximately 100 m by 60 m and will accommodate all the equipment necessary for automatic remote control and monitoring of the Proposed Development, in addition to the electrical switchgear, fault protection and metering equipment required to connect the Proposed Development to the electricity transmission network, and a hardstanding area for vehicle parking.
- 7.11 The Applicant has entered into a grid connection agreement with the electricity system operator, who will provide a connection via the transmission licence holder, which will be subject to a separate planning process.
- 7.12 Based on recorded wind speed data, the annual indicative total power output for the site is expected to be 893,520<sup>1</sup> MWh/p.a., indicating that the Proposed Development would generate enough electricity to power over 236,318<sup>2</sup> average Scottish households. The Proposed Development is

## KEY FACTS:

Number of Turbines	29
Turbine Tip Height	Up to 200 m
Lifespan	30 years
Location	North Yell
Energy Generation	Up to 200 MWh

<sup>1</sup> This has been calculated by multiplying the annual capacity of the Proposed Development (200MW) by the hours in a year (8760) by the capacity factor (51%) (Renewable UK, 2019).

<sup>2</sup> This has been calculated by dividing the annual power output (893,520 MWh) by annual UK average household consumption (3.781 MWh) (Renewable UK, 2019).

anticipated to save 180,000 tonnes of carbon emissions annually. It would contribute towards international and national targets for the generation of renewable energy and the reduction in greenhouse gas emissions (further information is provided on this matter in Chapter 16 of the EIA Report).

### **Construction**

- 7.13 The estimated onsite construction period for the Proposed Development is expected to take approximately 24 months and includes a programme to reinstate all temporary working areas. Normal working hours will be between 07:00 to 19:00 Monday to Friday and 08:00 to 18:00 at weekends. These times are chosen to minimise disturbance to local residents.
- 7.14 Details of the construction programme will be provided to The Shetland Islands Council (SIC) in a Construction and Decommissioning Environmental Management Plan (CDEMP).
- 7.15 The construction programme will consist of the following principal operations. The Proposed Development will be phased but certain activities will take place concurrently:
- ▶ construction of the primary temporary site compound and establishment of a storage area for wind farm components and temporary site facilities;
  - ▶ construction of access tracks, including construction of watercourse crossings, and excavation of cable trenches;
  - ▶ construction of wind turbine foundations, crane pad hardstanding areas, met mast and substation;
  - ▶ cable laying;
  - ▶ erection of wind turbines;
  - ▶ connection of on-site electrical power and signal cables;
  - ▶ commissioning of the site equipment; and
  - ▶ site reinstatement and restoration of temporary works areas.
- 7.16 The main materials likely to be required in part or total for the construction of the track, turbine and control building foundations, hardstanding areas and cable trenches are described below:
- ▶ crushed stone;
  - ▶ geotextile;
  - ▶ cement;
  - ▶ sand;
  - ▶ concrete quality aggregate;
  - ▶ steel reinforcement; and
  - ▶ electrical cable.
- 7.17 The Applicant will ensure that all construction traffic will be routed as agreed with SIC and Transport Scotland, to minimise disruption and disturbance to local residents.
- 7.18 Prior to commencement of construction activities, a pollution prevention strategy, contained within the CEMP, will be agreed with SEPA to ensure that appropriate measures are put in place to protect watercourses and the surrounding environment.

### ***Operation and Maintenance***

- 7.19 During operation, only site maintenance vehicles and local utility company vehicles will normally be required on the site. Daily visits to the control building by maintenance personnel in four-wheel drive or conventional passenger vehicles will occur following the commissioning phase.
- 7.20 In the unlikely event that a major turbine component requires replacement, vehicles delivering the components will use the new access tracks and crane pads, utilising the same route as delivery of components during construction.
- 7.21 The Applicant will implement an Operation Environmental Management Plan (OEMP). Similar to CEMP, the OEMP will set out how the Applicant will manage and monitor environmental effects throughout operation. The OEMP will be developed in consultation with SNH, SEPA and SIC.

### ***Decommissioning***

- 7.22 The operational lifespan of the Proposed Development would be approximately 30 years, after which it would be appropriately decommissioned. It is expected that decommissioning would take approximately twelve months. The environmental effects of decommissioning are considered to be no worse than construction effects but experienced over a much shorter time period.
- 7.23 During the decommissioning phase, vehicles would access the site by the same routes used for delivery and construction.
- 7.24 All components would be removed from the site for disposal and/or recycling as appropriate and in accordance with regulations in place at that time.

## **8 Consultation**

- 8.1 Consultation remains a critical component of the EIA process. In order to inform the EIA, there has been on-going consultation with statutory consultees, engagement through the formal EIA Scoping process and subsequent discussions, correspondence and meetings as required. Full details of these are provided within each technical chapter of the EIA Report. A scoping report was submitted to the Energy Consents Unit (ECU) on 24 November 2017, and the corresponding scoping opinion was received on the 16 April 2018.

### ***Public Consultation***

- 8.2 The Applicant has consulted widely with the general public on the Proposed Development, including mail-drops, public exhibitions in June 2018 and February 2019 and, regular meetings with community council representatives. The information received was fed back to the project team and taken into consideration in refining the scheme design. Full details of all the public consultation that has been undertaken can be found within the Pre-Application Consultation Report which accompanies the S.36 application.

## **9 Environmental Impact Assessment (EIA)**

- 9.1 The EIA considers the effects of the Proposed Development during construction, operation and decommissioning on the following topics:
- ▶ landscape and visual (effects to the character of the landscape and views from agreed locations);
  - ▶ ornithology (the effects to birds and protected bird habitats);
  - ▶ ecology (the effects to protected habitats, flora and fauna, excluding birds);

- ▶ noise and vibration (effects to local properties from noise and vibration caused by the Proposed Development);
- ▶ cultural heritage (effects to the integrity and setting of historic sites);
- ▶ hydrology, hydrogeology and geology (the effects to surface water, ground water, rocks and soils);
- ▶ traffic and transport (effects from traffic travelling to, and from, the Proposed Development);
- ▶ socio-economics, tourism and recreation (effects to the local and national economy, local tourism businesses, recreation facilities, and the change in use of the land at the site of the Proposed Development);
- ▶ aviation and radar (effects to civil and military aviation facilities and air space);
- ▶ shadow flicker (effects caused by the passing of the turbine blades in front of the sun);
- ▶ telecommunications (effects to telecommunications facilities); and
- ▶ carbon calculator (the whole life carbon balance of the Proposed Development).

9.2 Chapter 4 of the EIA Report describes the broad approach to carrying out the EIA in more detail.

9.3 For each topic the existing conditions (the baseline) was identified and the effects of the Proposed Development on these conditions assessed (the potential effects). Potential effects are assessed to determine which are significant and on what scale. Mitigation measures have then been proposed to minimise or avoid adverse effects where likely significant effects have been identified. Following this an assessment was undertaken of the effects of the Proposed Development on the existing conditions taking into consideration the proposed mitigations (the residual effects). An assessment of the cumulative effects of Proposed Development in combination with other existing and proposed developments in the local area, primarily wind farms, was also undertaken.

9.4 A summary of the baseline conditions, the proposed mitigation and the resulting residual effects for each topic is provided below. Full details of the EIA for each of the topics are provided in Chapters 5 to 16 of the EIA Report.

### ***Landscape and Visual***

9.5 The full assessment of effects on landscape and visual receptors is provided in Chapter 5 of the EIA Report. The scope of the assessment and the viewpoints to be assessed were discussed and agreed with SIC and SNH.

9.6 The landscape assessment sets out the effects on the landscape including the effects on the coastal character and on seascapes. The assessment includes consideration of effects upon designated landscapes including the Shetland National Scenic Area and regionally designated Local Landscape Areas.

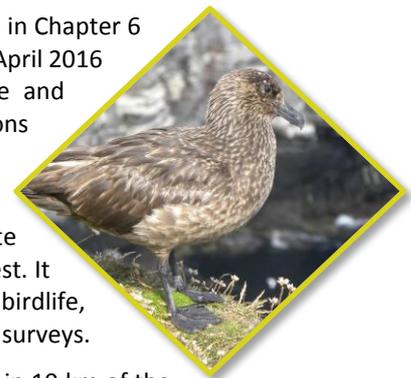
9.7 From a visual perspective, the assessment considers effects upon residents at settlements and users of roads, ferries and recreational routes. This was informed by assessment of visual effects at a series of representative viewpoints, which were agreed with SNH and SIC.

9.8 The assessment of cumulative effects is incorporated into the main assessment of landscape and visual effects as the key other wind farms with which interaction will occur are built and exist as part of the baseline (Garth Wind Farm, 2km from the Proposed Development) or are consented (Beaw Field Wind Farm, 17km to the south of the Proposed Development). Some cumulative interactions will occur, with Garth Wind Farm and the Proposed Development appearing as separate, contrasting wind farms.

- 9.9 A residential visual amenity study assessed how views from residential properties would be changed as a result of the presence of the Proposed Development. It concluded that while the proximity of the Proposed Development would give rise to significant visual effects it would not result in adverse effects of residential amenity or living conditions.
- 9.10 The turbines will need to be lit at night for aviation safety and a visual assessment of night-time lighting has been undertaken. It concluded that the effects of lighting on night time views would be significant, particularly in closer views and during the winter months when people are active during the hours of darkness. The effect was found not to be significant during the summer months where typically people will be asleep during the very short hours of darkness.
- 9.11 Whilst it is always necessary to take account and to balance the wide range of technical and environmental requirements, it is also a requirement to seek to optimise the layout design and choice of turbine from a landscape and visual perspective, in order to achieve mitigation which is embedded into the project design. Landscape and visual input into the wind farm design has been provided through the design development stages of the project.
- 9.12 Significant landscape and visual effects are to be expected for any commercial scale wind farm, and this is no exception. The landscape and visual assessment concluded significant effects at a number of nearby settlements as well as at 15 of the 21 viewpoints which incorporated a number of different receptors such as residents, road users and tourists. The Shetland National Scenic Area (four components) is located within the landscape study area for which the assessment concluded that the overall qualities and integrity of the NSA will not be altered by the Proposed Development. With regard to local landscape designations, 4 of the 6 identified within the study area were considered to not be altered by the presence of the Proposed Development. Two gardens and designed landscapes, Belmont House and Brough Lodge, were both found to have a significant visual effect. .
- 9.13 However, the large scale open landscape of Yell is considered to have attributes which are suited to wind farm development, as recognised in the Landscape Sensitivity and Capacity Study for Wind Farm Development in the Shetland Islands (LUC, March 2009). The Proposed Development is focused away from the scattered settlement and coastal crofting land within the expansive landscape of the interior which has a simple landform and an absence of development. This is a remote landscape with a simple landform. Whilst the effects will be significant local to the site, and for some visual receptors relatively distant from the site, it is considered that these can be accommodated in this open windswept landscape.

### ***Ornithology***

- 9.14 The full assessment of effects on ornithology (bird life) is provided in Chapter 6 of the EIA Report. Bird surveys were carried out during the period April 2016 to August 2016 and September 2017 to August 2018 inclusive and undertaken at a variety of times and in different weather conditions to ensure data were collected that were fully representative of a range of behaviour patterns
- 9.15 The ornithology assessment evaluated the bird interest at the site and determined the nature conservation importance of this interest. It considered the potential effects of the Proposed Development on birdlife, drawing on information from desk studies, consultations and field surveys.
- 9.16 It identified 13 statutory sites of nature conservation interest within 10 km of the site. These included: four Special Protection Areas (SPAs), one Marine Protection Area (MPA), and eight Sites of Special Scientific Interest (SSSIs). The SPAs are designated for their importance on an international level, and the SSSIs for their importance on a national level. The assessment considered the impact of the Proposed Development on populations of bird species which are features of these designated sites.



- 9.17 The assessment also determined the importance of the Proposed Development site for birds. The site was determined to be of international importance for populations of red-throated diver, great skua and arctic tern, of national importance for populations of curlew, dunlin, golden plover, whimbrel and arctic skua, and of regional importance for populations of snipe, fulmar and merlin. All other bird species populations found across the site were considered to be of local or negligible importance.
- 9.18 Construction activities of the Proposed Development were considered to provide a risk to birds species by disturbance of their habitat or nesting sites, causing displacement. Construction phase displacement would be greatest for species that are intolerant of noise and the visible presence of people. Species that were considered to be most at risk of disturbance associated with construction are those that use the site with regularity, rather than those that commute across it. These were considered to be: greylag goose, red-throated diver, curlew, dunlin, golden plover, lapwing, oystercatcher, redshank, ringed plover, whimbrel, snipe, great skua, arctic skua, arctic tern, and merlin.
- 9.19 Operational risks to bird species include displacement due to ongoing disturbance caused by the turbines and through collision with moving blades or associated infrastructure. For the Proposed Development, those species that are most susceptible are likely to be those that have a low tolerance to disturbance (such as red-throated diver), that breed on open moorland (such as merlin), and those which are susceptible to collision (such as greylag goose). The level of collision will depend on the extent to which birds are displaced and their ability to detect and manoeuvre around rotating turbine blades.
- 9.20 The Applicant proposes to implement the following measures to mitigate against construction and operational phase effects:
- ▶ the restriction of vegetation removal to winter (between October and February);
  - ▶ any areas for construction between March to August will be kept bare of vegetation to deter birds from nesting;
  - ▶ an Environmental Clerk of Works (ECoW) will undertake surveys of birds to record breeding success;
  - ▶ species specific buffers will be enforced around breeding sites, within which construction work will not be undertaken; and
  - ▶ habitat enhancement on and off site to provide breeding and feeding opportunities for displaced birds.
- 9.21 Following the application of the mitigation measures detailed above, the residual effects of the Proposed Development are assessed as being significant only at a site or local level, and it is considered unlikely that the residual impacts would be significantly greater when taken in combination with cumulative wind farm developments than in isolation.

### ***Ecology and Nature Conservation***

- 9.22 The full assessment of effects on ecology and nature conservation is provided in Chapter 7 of the EIA Report.
- 9.23 The Proposed Development site is upland in character, waterlogged and dominated by blanket bog and other mire types, with some areas of grassland in the more sheltered valleys and on better-drained slopes. Habitats of particular value to the natural resource of the area were identified as blanket bog, including a mosaic of bog pools and other standing and running waters, small areas of marshy and calcareous grassland and components of the unimproved grassland found in the watercourse valleys. Additionally, relict woodland is present along two cleughs, associated with the head of Gloup Voe. No non-native, invasive plant species were identified.

9.24 Otter presence was found across the Proposed Development site, but no evidence of freshwater pearl mussel was found during surveys. The fish study identified widespread presence of trout, likely in both brown and sea trout forms, and European eel. No Atlantic salmon were identified during electrofishing surveys. Suitable fish habitat is widely available across the site, though not all catchments are fully accessible to migratory fish species: several burns were identified as inaccessible from the sea and electrofishing indicated that fish were likely to be absent.

9.25 In addition to the design iteration process and application of industry standard impact mitigations, a range of habitat and species-specific measures have been presented to minimise the overall impact of the Proposed Development. This includes careful strip and storage of turves to permit restoration of temporary work areas and track batters; biosecurity and operative education; otter and fish protection measures, including avoidance of the salmonid breeding, incubation and emergence season. Additionally, it is proposed to implement a potential beneficial off-set mitigation (i.e. compensation), by restoring areas of degraded peatland elsewhere in Yell.



9.26 Residual effects were assessed as being negligible and not significant with the exception of effects to the valuable peatland habitats, assessed as a significant long term low adverse effect. No cumulative impacts are anticipated in combination with the other wind farms in the isles.

### **Noise**

9.27 The full assessment of noise and vibration effects is provided in Chapter 8 of the EIA Report.

9.28 This assessment considered the potential noise effects associated with construction and operation phases of the Proposed Development. No potential vibration effects were identified and therefore consideration of vibration was scoped out of the EIA Report.

9.29 The assessment of noise has comprised consultation with SIC, characterisation of the baseline noise environment (though dedicated surveys in line with recommended guidance), prediction of noise levels associated with construction activities, construction traffic, operational wind turbines and operation of other non-turbine fixed plant, and evaluation of predicted levels against derived criteria.

9.30 Baseline noise levels in the study area are typically dominated by wildlife and livestock, and show a strong correlation with wind speed. Noise from anthropogenic sources, such as road traffic, is a minor contributor to total noise levels.

9.31 Predicted noise levels associated with construction activities and construction traffic meet threshold noise levels at all identified representative noise sensitive receptors, both during weekday and weekend daytime periods. Noise effects from construction activities are therefore not significant.

9.32 Predicted wind turbines noise levels associated with operation of the Proposed Development meet derived noise limits at all identified representative noise sensitive receptors, both in isolation and cumulatively. Noise effects due to operation are therefore not significant.

### **Cultural Heritage**

9.33 The full assessment of effects on cultural heritage and archaeology is provided in Chapter 9 of the EIA Report.

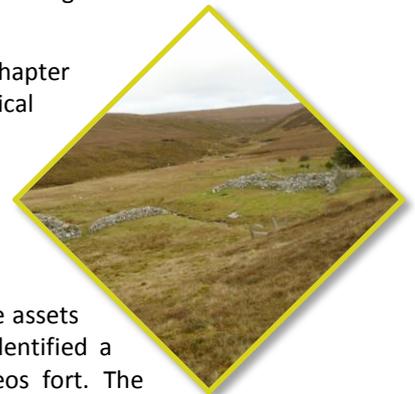
9.34 The cultural heritage assessment identified the archaeological and cultural heritage value of the site and assessed the potential for direct and indirect effects on archaeological features and heritage assets resulting from the construction, operation and decommissioning of the Proposed

Development. The assessment identifies measures that should be taken to mitigate predicted adverse effects.

9.35 Twenty-six heritage features are identified which are of potentially prehistoric to modern date within the site. One direct impact on a possible heritage feature is anticipated; a *negligible* and not significant effect on any surviving peripheral remains associated with the route of a former road from Heatherdale to Cullivoe. With the exception of this negligible effect, the Proposed Development has been designed to avoid direct impacts upon known heritage features within the site.

9.36 The presence of extensive peat cover across the site indicates the potential for historic environmental evidence to be contained within and underlying the peat. Additionally, remains of prehistoric to post-medieval date in and around the site indicate the potential for sub-surface archaeological deposits and features to exist. Given the potential for presently unknown archaeological remains, in particular of prehistoric and post-medieval date, to survive within the site, a programme of archaeological works designed to avoid inadvertent damage to known remains, and to investigate and mitigate against the possibility of uncovering hitherto unknown remains will be undertaken.

9.37 Full details of the proposed archaeological works are detailed in the chapter however they will include the fencing off of known archaeological features, investigating the palaeoenvironmental potential of the site through sampling and analysis of a sediment core, and the appointment of an Archaeological Clerk of Works during the construction phase to undertake an archaeological watching brief on a representative proportion of ground-breaking works.



9.38 Potential operational effects on the setting of 37 designated heritage assets have been considered in detail as part of this assessment. This identified a potential significant operational effect on the setting of Burgi Geos fort. The Applicant therefore proposes to undertake a programme of palaeoenvironmental sampling and interpretation and survey works at the fort to provide a better understanding of the monument. The results of this survey and the site survey will be disseminated to the public through a Heritage Interpretation Plan.

### ***Geology, Peat, Hydrology and Hydrogeology***

9.39 The full assessment of effects on geology, peat, hydrology (surface water bodies, drainage and flooding) and hydrogeology (groundwater) is provided in Chapter 10 of the EIA Report.

9.40 The geology, peat, hydrology and hydrogeology assessment involved the review of the baseline conditions by undertaking a desk-based review of mapping, aerial imagery and available information. Extensive consultation was undertaken with both Scottish Water and the Scottish Environment Protection Agency (SEPA) to establish an appropriate level of survey effort and later to agree appropriate and site specific mitigation measures. A hydrological site walkover, a peat slide site reconnaissance and comprehensive peat depth surveys covering the site area and the detailed design were undertaken to feed into the design and impact assessment.

9.41 The following sensitive receptors were identified relating to the water and soil environment: the Gossa Water Drinking Water Protection Area (DWPA) and associated Scottish Water infrastructure for the supply; the presence of blanket bog and peat across the majority of the site; the presence of bog pool summit complex systems; and the south eastern section drains south into Basta Voe, part of the Fetlar and Haroldswick Marine Protection Area (MPA). The Proposed Development has undergone a number of design iterations which took into consideration survey data on peat depths across the site, avoiding, where possible, areas of deeper peat and close proximity to water courses. Approximately 65% of the site infrastructure will require excavation, of this 65%, 26.4% will not be located on peat, or are of shallow peat.

9.42 Potential significant effects from the construction of the Proposed Development were identified on peat and hydrological features including the Gossa Water. The Applicant has provided detailed mitigation measures for the management, protection and restoration of peat in the Outline Peat Management and Restoration Plan demonstrating that all excavated peat can be appropriately reused onsite. The Applicant has also consulted and agreed with Scottish Water mitigation measures and follow best practice guidance to protect the Gossa Water and its catchment.

### ***Traffic and Transport***

9.43 The full assessment of effects on traffic and transport is provided in Chapter 11 of the EIA Report.

9.44 Assessment covered the likely traffic and transport effects associated with the construction, operation and decommissioning of the Proposed Development.

9.45 The construction phase would lead to increased traffic volumes on the local road network related to staff movements, the delivery of materials and the delivery of turbine components. Traffic volumes would be greater during the construction phase than in either the operational or decommissioning phases.

9.46 The highest traffic levels will be 52 heavy goods vehicle movements and 123 car and large good vehicle movements per day, however for the majority of the construction period levels are anticipated to be lower. Traffic levels during operation of the Proposed Development would be one or two vehicles per week for maintenance purposes.



9.47 No significant capacity issues are expected on any of the roads within the study area due to the additional construction traffic movements associated with the Proposed Development as background traffic movements are very low, the links are or will be of reasonable standard and appropriate mitigation is proposed.

9.48 It is proposed that turbine components would be transferred by sea to Ulsta via barge from either Sullom Voe or Greenhead and then transported to the site by road.

9.49 Effects would be minimised through development of the Construction Traffic Management Plan and Traffic Management Plan which would be agreed with SIC and secured through an appropriately worded planning condition.

### ***Socio-economic, Recreation and Tourism***

9.50 The full assessment of socio-economic effects, and effects on recreation and tourism is provided in Chapter 12 of the EIA Report.

9.51 The renewables industry is an important economic asset to the UK and Scotland, and supports a substantial and growing number of employment opportunities. Although not significant in terms of the EIA regulations, the Proposed Development will further contribute to the positive economic effect of renewable energy, and associated skills base within the UK and Scotland.

9.52 The Proposed Development is expected to generate a significant beneficial effect on the economy in the local area (Northern Isles), Shetland and in the wider Scottish economy during construction, operational and decommissioning. This is due to the contracts that could be secured in these areas by businesses, the jobs supported by these contracts and the additional spend of money by contractors in the local and regional areas.

9.53 Based on an installed capacity of 200 MW, the assessment of the Proposed Development's economic impact found that:

- ▶ during the development and construction phase it would generate up to
  - £25.5 million and 223 job years of employment in Shetland, and

- £87.9 million and 759 job years in Scotland (including Shetland).
  - ▶ during each year of the operational phase it would generate up to:
    - £0.6 million and 5 jobs in Shetland, and
    - £1.4 mil and 12 jobs in Scotland
- 9.54 The Proposed Development would also contribute non-domestic rates estimated at £2.7 million per year, or £79.7 million over the lifetime of the Proposed Development, supporting the delivery of public services.
- 9.55 The Proposed Development is expected to bring wider benefits to Yell, Unst and Fetlar, including community benefit fund of up to £1.0 million annually, and £30.0 million over the lifetime of the development. This could:
- ▶ support initiatives aimed at reducing fuel poverty, which affects households in Shetland at a much higher rate than Scotland as a whole;
  - ▶ increase the local area’s attractiveness to tourists through the development of visitor attractions and accommodation, a new strategy and better marketing; and
  - ▶ support existing community councils and voluntary organisations that have seen their budgets cut, as well as new initiatives that could support entrepreneurship and business growth on the islands.
- 9.56 The Applicant also committed to maximising the local economic impacts of the proposed development through partnerships with Shetland College, engaging with local suppliers and working with other renewable energy developments
- 9.57 There are a limited number of recreational opportunities within 5 km of the Proposed Development site, with more opportunities within the wider area. There will be no significant direct or indirect effects on tourism or recreation as a results of the Proposed Development both in isolation or cumulatively, although land within the site may be inaccessible to the public during construction and decommissioning phases for health and safety reasons. Any temporary closures of Core Path CPPY04 will be detailed in the Access Route Plan, as detailed in the mitigation proposed in Chapter 12 of the EIA Report.
- 9.58 The Proposed Development is expected to have no significant adverse effects on socio-economics, tourism, recreation and land-use during construction, operation or decommissioning, however, it will generate minor, positive effects to the local, regional and Scottish economies.

### ***Aviation and Radar***

- 9.59 The full assessment of effects on aviation and radar is provided in Chapter 13 of the EIA Report.
- 9.60 The Proposed Development has been assessed by aviation specialists Wind Power Aviation Consultants Ltd (WPAC), taking into account the guidance laid down in CAP 764 and other aviation regulations.
- 9.61 Radar propagation modelling has been undertaken which demonstrates that the turbines will be completely screened by terrain from the Compass Head radar used at both Sumburgh and Scatsta airports and will have no effect on the performance of the radar.
- 9.62 Given the location 30 km to the north of Scatsta Airport, there will be no effects on any civil aviation facilities however, the turbines will all need to be fitted with aviation lighting.
- 9.63 On the military side, the only affected system will be the air defence radar located at Saxa Vord, 20 km to the north-east of the Proposed Development. It will be necessary to agree a mitigation scheme with the MOD and for a suitably worded planning condition to be imposed.

- 9.64 Subject to a satisfactory mitigation scheme being agreed with the MOD, the Proposed Development would have no residual significant effects on aviation interests and radar systems.

### ***Shadow Flicker***

- 9.65 The full assessment of shadow flicker effects is provided in Chapter 14 of the EIA Report.
- 9.66 Shadow flicker is the effect of the sun passing behind the moving rotors of turbines casting a flickering shadow through the windows and doors of neighbouring properties. This occurs in certain combinations of geographical position, time of day, time of year and specific weather conditions. No impact can occur from this during the construction or decommissioning phases of the Proposed Development.
- 9.67 The study area within which properties could potentially be affected by shadow flicker extends 1,600 m from each turbine and covers a distance of 10 rotor diameters from each turbine and lies 130 degrees either side of north (relative to each turbine).
- 9.68 The assessment identified seven receptors with potential to experience flicker effects during operation of the turbines. Calculations showed that the maximum occurrence of shadow flicker within the realistic scenario would be just under five hours per year, or a maximum of four minutes per day. This is well within the accepted limits for realistic shadow flicker, of less than 8 hours per year.
- 9.69 It is important to note that these results do not take into account existing screening features (structure and vegetation), dwelling orientation and local mitigation measures such as blinds or curtains which will reduce potential effects further. Receptors may also be in rooms that are not generally used at the affected times, therefore the amount of time when shadow flicker is actually 'experienced' will likely be significantly less than what has been predicted.
- 9.70 Proposed mitigation measures relate to the implementation of a Shadow Flicker Protocol, to be agreed with Shetland Islands Council which could include a programme of selective automatic shutdown of certain turbine(s) under certain conditions, if required.
- 9.71 Therefore, the effect of shadow flicker resulting from the Proposed Development is expected to be of no significance for all receptors.

### ***Telecommunication***

- 9.72 The full assessment of effects on telecommunications is provided in Chapter 15 of the EIA Report.
- 9.73 The Shetland Isles have been fully switched over to digital television which has increased the availability and robustness of digital terrestrial reception. Therefore, potential effects on television reception were scoped out during the scoping process. The assessment considered the potential effects of the Proposed Development on existing and planned telecommunications infrastructure.
- 9.74 An initial scoping study relating to telecommunications identified those stakeholders potentially affected by the Proposed Development, considering all operators of telecommunication links. Consultations were conducted with Ofcom (via Spectrum Licencing); Joint Radio Company, who operate on behalf of the UK fuel and power sector; and Atkins, who operate on behalf of water utilities.
- 9.75 Consultation with the telecommunication operator determined that the Proposed Development would have no potential effects on telecommunication links, and therefore no mitigation measures are deemed necessary.

### ***Carbon and Climate Change***

- 9.76 The full assessment of the whole life carbon balance of the Proposed Development is provided in Chapter 16 of the EIA Report.

- 9.77 The justification for developing onshore wind farms is to reduce net greenhouse gas emissions by displacing grid electricity produced from conventional fossil fuel sources with renewable generation. However, no form of electricity generation is completely carbon free; for onshore wind farms there will be emissions as a result of manufacture of turbines, as well as emissions from construction activities and transport. In addition, where a wind farm is located on carbon rich soils such as peat, there are potential emissions resulting from direct action of excavating peat for construction and indirect changes to hydrology that can result in losses of soil carbon. Carbon losses and gains during the construction and lifetime of a wind farm and the long term impacts on the peatlands on which they are sited are evaluated through the use of the Scottish Government's latest Carbon Calculator (version 1.5.1).
- 9.78 The results of the carbon calculator show that the Proposed Development is estimated to produce annual carbon savings in the region of 180,000 tonnes of CO<sub>2</sub>e per year through the displacement of grid electricity, based on a counterfactual emission factor of 0.281 kgCO<sub>2</sub>e/kWh. This represents displacing grid electricity at the current average annual grid mix. Displacement of existing sources of generating capacity depends on the time of day and how the grid needs to be balanced.
- 9.79 The most significant cumulative impact of the Proposed Development is on the long-term grid electricity carbon factor. As the renewable generation capacity increases, the overall carbon intensity of the National Grid will decrease; this grid decarbonisation is a key component of the Scottish Government's strategy to reduce overall emissions and meet the Climate Change (Scotland) Act 2009 targets.
- 9.80 The assessment of the carbon losses and gains has estimated an overall loss through the lifetime of the Proposed Development of around 311,000 tonnes of CO<sub>2</sub>e, mainly due to embodied losses from the manufacture of the turbines and provision of backup power to the grid. Ecological carbon losses account for 29 % of the total emissions resulting from the Proposed Development and operation.
- 9.81 The estimated payback time of the Proposed Development, using the Scottish Government methodology, is estimated at 1.7 years, with a minimum/maximum range of 0.9 to 2.6 years. There are no current guidelines about what payback time constitutes a significant impact but 1.7 years is only around 6 % of the anticipated lifespan of the Proposed Development. Compared to fossil fuel electricity generation projects, which also produce embodied emissions during the construction phase and significant emissions during operation due to combustion of fossil fuels, this project has a very low carbon footprint and after 1.7 years, the electricity generated is estimated to be carbon neutral and will displace grid electricity generated from fossil fuel sources. The carbon intensity of the electricity produced by the Proposed Development is estimated at 0.016 kgCO<sub>2</sub>e/kWh. This is within the range of the carbon intensity required by the Scottish Government to meet the Climate Change Act target in 2050 and therefore the Proposed Development is evaluated to have an overall beneficial effect on climate change mitigation.

## 10 Conclusion

- 10.1 This Non-Technical Summary of the EIA Report provides an overview of the EIA undertaken for the Proposed Development on Yell, in the Shetland Islands.
- 10.2 Within Chapter 17 of the EIA Report a schedule of commitments can be found which details the environmental mitigation measures, summarised above, which the Applicant has committed to implement. Chapter 18 of the EIA Report summarises the potential effects, the mitigation to be implemented and the resulting residual effects.
- 10.3 The final layout has been informed by a robust EIA and lengthy design process taking into consideration consultation responses received, baseline data, best practise and appropriate guidance and planning policy. Consideration has been given to potential environmental impacts and their effects and where predicted effects have been found as a result of the Proposed Development,

mitigation measures have been implemented as far as possible to reduce or eliminate these. The Proposed Development layout is considered to represent the most appropriate design, taking into account potential environmental impacts on their effects, physical constraints, and health and safety considerations, while maximising the generating capability of the site.

10.4 Overall, the Proposed Development site, has some of the best proven wind resources in the UK and is appropriately designed to maximise energy production within acceptable environmental limits in order to provide a valuable contribution towards national targets for electricity generation from renewable sources, climate change initiatives and energy security. A position that is supported by Shetland Islands Council's Local Development Plan, within which the Council states that Shetland is well placed for the harnessing of renewable resources such as wind, wave and tidal energy and that the Council is committed to delivering renewable energy developments that contribute to the sustainable development of Shetland and optimise Shetland's renewable energy potential.

10.5 In addition, the construction and development of the Proposed Development will bring significant beneficial effects to the North Isles and Shetland through job creation and expenditure. The operation of the Proposed Development would have a long-term beneficial effect in the North Isles through the creation of five permanent jobs and community benefit fund of up to £1.0 million annually paid to the local communities.





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