

Hunterston

National Offshore Wind Turbine Test Facility

Non-Technical Summary



This turbine is for illustration purposes only.

September 2011

Preface

This document forms the non-technical summary (NTS) of the Environmental Statement (ES) which accompanies an application made by SSE Renewables Development Ltd for deemed planning permission under Section 57(2), of the Town and Country Planning (Scotland) Act 1997 (as amended by The Planning etc. (Scotland) Act 2006) for the development of a National Offshore Wind Turbine Test Facility (NOWTTF). Owing to the scale and nature of the Development, an ES has been prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 ("The EIA Regulations").

The ES comprises three volumes:

- Volume I: Text;
- Volume II: Figures; and
- Volume III: Technical Appendices.

Additional documentation that will be submitted with the application includes:

- Planning Statement;
- Design and Access Statement;
- Pre-application Consultation Report; and
- Non-Technical Summary (NTS).

The ES (Text, Figures and Technical Appendices) and associated documents will be available for viewing during normal business hours at the following location:

North Ayrshire Council
Cunninghame House
Irvine
KA12 8EE

The ES will also be available for purchase, at £250 for paper copies and £10 for an electronic version on CD. Paper copies of the NTS are available for £25. All requests for copies of the ES or NTS should be addressed to:

Hunterston NOWTTF (Offshore Team)
c/o SSE Renewables Developments (UK) Ltd
1 Waterloo Street
Glasgow
G2 6AY

All requests should be made with a payment made payable to SSE Renewables Development UK Ltd.

The Application and ES will be advertised in the following newspapers:

- Largs and Millport Weekly;
- Ardrossan and Saltcoats Herald; and
- Irvine Times.

1 Introduction

This Non-Technical Summary (NTS) forms part of the Environmental Statement (ES) which accompanies an application by SSE Renewables Developments Ltd (“the Applicant”) to North Ayrshire Council for planning permission under The Town and Country Planning (Scotland) Act 1997 (as amended by The Planning etc. (Scotland) Act 2006) for the construction and operation of a National Offshore Wind Turbine Test Facility (NOWTTF) (“the Development”). The Development will comprise up to three wind turbines and associated infrastructure including foundations and crane pads, site entrance and access track, meteorological masts, grid infrastructure (transformers, underground cables and substation), a control and metering building and welfare facilities. The Development is located on the marine construction yard within the Clydeport Hunterston Terminal Facility, North Ayrshire, approximately 6 km south of Largs as shown on NTS Figure 1. The Development will be operational for a maximum of five years.

The purpose of the facility is to test prototype and new models of offshore wind turbines, which will be used to generate clean electricity from a renewable source of energy, the wind. The turbines are new designs to be deployed in the forthcoming offshore wind farm developments including the Scottish Territorial Waters sites and the UK Government’s Round 3 offshore sites. The Round 3 wind farm projects have the capacity to generate up to 25 GW of electricity across the UK. Of these Round 3 sites, two are located in Scotland’s Renewable Energy Zone. Locating the turbines on the marine construction yard at Hunterston provides a close approximation of the offshore marine conditions, whilst allowing for easier access to the turbines for testing, monitoring and maintenance.

The Applicant is the renewable energy development division of Scottish and Southern Energy plc (SSE). The company has responsibility for the development of onshore and offshore wind farms in the UK, Ireland and Europe, as well as developing hydro and marine projects.

SSE’s power generation assets total around 11,290 MW, comprising 4,470 MW of gas and oil-fired capacity; 4,370 MW coal-fired capacity and 2,450 MW of renewable (including pumped storage, hydro, wind and biomass) capacity.

SSE has over twenty onshore wind farms in operation in the UK and Ireland totalling over 910 MW with further onshore wind farms under construction or with consent for construction. In addition to its onshore capacity, SSE has offshore wind farm capacity in operation or under construction totalling almost 350 MW.

In all, SSE now has 3,780 MW of renewable energy capacity (onshore wind, offshore wind, hydro and dedicated biomass) in operation, under construction or with consent for construction in the UK and the Republic of Ireland.

2 EIA Process and Methodology

Environmental Impact Assessment (EIA) is a process aimed to ensure that permissions for developments with potentially significant effects on the environment are granted only after assessment of the likely significant environmental effects has been undertaken. The assessment must be carried out following consultation with statutory consultees, other interested bodies and members of the public. The information that an applicant is required to submit as part of the EIA process (as specified in Schedule 4 of the EIA Regulations) is presented in the ES.

Consultation has formed an integral role throughout the EIA process, including at the following key stages:

- Scoping - identification of key issues;
- Technical Assessments - collecting baseline information and confirming survey methodologies;
- Informing site design - communication with local communities; and
- Discussing opportunities for mitigation and enhancement.

A Scoping Report was submitted to North Ayrshire Council by Arcus on behalf of the Applicant in April 2011 which requested a scoping opinion on the Development. The Scoping Report was circulated to statutory and non-statutory consultees. All responses to the Scoping Report have been compiled and taken into account in the EIA.

As part of the wider consultation process, public exhibitions were held in May, and a second round in September 2011. The exhibitions provided members of the public the opportunity to learn more about the Development, feed in to the design process and to ask any questions.

3 Assessment for Alternatives

The Development is required to test new prototype turbine designs which will be used for future offshore wind farm projects. New turbine designs are required to be tested and approved in accordance with the International Standard IEC 61400-12 "Wind turbine generator systems". Once turbines are tested it is important that before deployment into the offshore environment, developers and manufacturers understand the reliability and performance of the turbines in order to maximise their effectiveness in generating power in the offshore environment.

Scotland has a significant offshore energy resource and the development of renewable power generation in the offshore environment is a key objective for the achievement of targets at a National, UK and European level. There are currently six sites located within Scottish Territorial Waters, granted by The Crown Estate for offshore wind projects, known as the Scottish Territorial Waters Sites. There are a further nine zones for offshore development around the UK which have been designated by The Crown Estate and are known as Round 3 sites. These Round 3 sites are reported to have an additional capacity of up to 25 GW. The Round 3 sites are located further from shore and hence maximising the ongoing reliability of the turbines is important to prevent the need for regular maintenance work in the difficult offshore environment. Ensuring the reliability of the turbines will maximise the efficiency of the offshore sites, reducing the cost of generating electricity in this way and providing increased reliability to secure funding for these projects.

The testing location needs to provide a similar environment to the marine conditions the turbines will operate in once offshore. It is not considered practical to have the test facility located offshore due to constraints relating to accessing turbines during periods of inclement weather, which could limit the ability to monitor, test and maintain the turbines throughout the test period. Therefore a test site which is both accessible and replicates marine conditions is beneficial to the testing process.

The Applicant has had discussions with turbine manufacturers with the intention to provide them the opportunity to test or certify their turbines. Scottish Enterprise will be responsible for the allocation of one of the turbine plinths on the site and will choose a turbine manufacturer based on the intention to invest in the future of the

Scottish offshore wind industry. The aim of this Development is therefore to provide a high quality turbine test facility in Scotland, and also to strengthen relationships between the Applicant, Scottish Enterprise and turbine manufacturers.

The EIA process has evaluated the alternatives for the project both in terms of not proceeding with this type of test facility in Scotland, the alternative locations of the test facility and the alternative designs on the Development site. The assessment of alternatives concluded that the establishment of a test facility in Scotland would promote both economic growth of the offshore wind industry and supporting supply chain in Scotland. This is, an important step in the progression of offshore wind generating sites which in turn will work towards maximising renewable energy generation and its associated environmental gains. With regard to the site selection an independent technical report concluded that the Hunterston site was the best available site in Scotland for such a test facility. This view was supported by further research performed by the applicant. The selection process took into account both the technical aspects of the site and environmental considerations such as the proximity to residential properties. Once selected, the design of the site went through an evolution process whereby the layout and design of the site was amended based on the technical requirements of the turbine layout, and environmental constraints. This evolution process developed the final design of the Development which is presented in NTS Figure 2. The location of the turbines in this design has been fixed however the access tracks and supporting infrastructure are shown as an indicative design and may be relocated within the red line boundary.

4 Project Description

The proposal is to construct, operate and decommission an onshore test facility for the testing of offshore turbines. The test facility will be comprised of the following:

- Up to three wind turbines (up to 198.5 m height to blade tip) and associated turbine foundations and crane pads;
- Main site entrance and access track from the public road and on-site access tracks between turbines, jetty and ancillary buildings;
- Permanent meteorological mast installed for a duration of up to six years (operational five year period plus six months) and up to three temporary met masts;
- Grid infrastructure (transformers, underground cables and substation);
- A control, metering building and storage buildings; and
- Welfare facilities.

In addition to the above components of the operational facility, the construction phase will involve:

- A temporary construction compound; and
- Laydown areas adjacent to crane hardstandings.

The Development will be operational for a five year period.

The total area within the planning application boundary, as shown in NTS Figure 2, is approximately 42 ha however onsite infrastructure will occupy only 3 ha (7%) of the site. The site is currently occupied by the marine construction yard operated by Clydeport plc. The Applicant has liaised with Clydeport throughout the design process and can confirm the Development will not infringe on the continued use of the construction yard for their purposes.

Site access for construction vehicles and personnel access will be taken from the A78 at the Hunterston Roundabout turning left onto the Clydeport owned site roads which will be followed to the site entrance located at the southern end of the access track to the construction yard.

It is intended that the turbine components will be delivered to the marine construction yard by the sea and offloaded at the existing marine construction yard jetty. Access tracks will be constructed connecting the jetty to the turbine bases. Where possible existing tracks will be used.

The initial construction, including construction of access tracks, hard standings, ancillary buildings and the first turbine base will be undertaken in one construction phase. This initial construction period will take up three months the current aim is for the first turbine to be installed and operational by the third quarter of 2012. Following this initial stage the two remaining turbine bases will be constructed and the turbines installed at phased intervals throughout the five year operational period. If possible, the site will be used to test more than three turbines. In the event a turbine has been tested as required it will be removed from the site and replaced by another turbine model. There will be a maximum of three turbines installed on the site at any one time throughout the five year operational period. Following the five year operational period the site will be decommissioned and the turbines removed.

The Development will be connected to the national grid at a substation at Hunterston Farm. An agreement has been made with Scottish Power Energy Networks (SPEN) to supply up to 24 MW to the grid from the Development. The offsite connection to the grid falls under a separate consenting process and will be subject to a separate application.

5 Planning

As the Development has the capacity to generate electricity of up to 24 MW, it is categorised as a major development under The Planning etc. (Scotland) Act 2006 and the Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations 2009.

With the introduction of The Planning etc. (Scotland) Act 2006, the planning system in Scotland has undergone significant adjustments to Development Planning and Development Management. During this period of change, Local Authorities will find that existing Structure Plans and Local Plans will be superseded by Strategic Development Plans (SDPs) and Local Development Plans (LDPs). During this transitional period, whilst there is an absence of Adopted SDPs and LDPs, the existing Structure and Local Plans remain the central point of reference in planning decision making.

The Structure and Local Plans, national policy and guidance (material considerations) provide the relevant planning policy context against which to assess the Development. The Development Plan for North Ayrshire is comprised of:

- Ayrshire Joint Structure Plan (2007); and
- North Ayrshire (Excluding Isle of Arran) Local Plan (2005).

The Development Plan policies of potential relevance to the Development are referred to within Chapter 5 of Volume I of the Environmental Statement.

The following documents are considered material to the determination of an application for the Development and include climate change legislation, both national planning and energy policies and Supplementary Planning Guidance:

- Climate Change Scotland Act 2009;
- National Planning Framework 2 (NPF2) (Updated 2009);
- Scottish Planning Policy (2010);
- Web based renewables advice which has replaced the Planning Advice Note (PAN) 45;
- Renewables Action Plan (Updated March 2011);
- 2020 Routemap for Renewable Energy in Scotland (June 2011);
- A Low Carbon Economic Strategy for Scotland (Nov 2010);
- Marine (Scotland) Act (2010);
- Blue Seas - Green Energy - the Sectoral Marine Plan (SMP) for Offshore Wind Energy in Scottish Territorial Waters (2011);
- Our Seas – A Shared Resource (2009);
- Government Economic Strategy (2011);
- Landscape Capacity for Wind Farm Development in North Ayrshire Phase One Report (2009); and
- Ayrshire Supplementary Planning Guidance (SPG): Wind Farm Development (2009).

6 Landscape and Visual Impact Assessment

The Landscape and Visual Impact Assessment (LVIA) aims to identify significant effects that would arise as a result of the Development. The assessment considers the effect on the landscape resource (both directly and on how the landscape is perceived) and the effect on visual amenity. Cumulative effects, arising from the effect of the Development in conjunction with other developments, are also considered. As the Development will be operational for a maximum period of five years, the timescales for the installation of the turbines is therefore significantly shorter than for a conventional wind farm development where consent for twenty five operational years would be typical.

The study area for the LVIA covers a 35 km radius from the Development site boundary. The extent of the study area was agreed following production of a preliminary zone of theoretical visual influence (ZTV), an initial layout for the turbines and consultation with North Ayrshire Council (NAC) and Scottish National Heritage (SNH). A ZTV identifies the potential visibility of the Development but does not take into account surface features such as buildings and vegetation. The same study area was applied to the assessment of the Development in addition to the landscape and visual effects of other wind farm developments in the region.

The landscape baseline for the study area was assessed taking into account the applicable Landscape Character Assessments of the area. These assessments identify Landscape and Seascape Character Areas against which the Development was assessed. Following the assessment significant environmental effects were identified as occurring within four of the twenty six Landscape Character Areas and one of the Seascape Areas. The areas in which significant effects were identified are the Raised Beach in which the Development is located and the adjacent Coastal Fringe with Agriculture; Rugged Moorland Hills and Valleys and Rolling Farmland with Estates.

In addition to the Landscape and Seascape Character Areas a number of landscape and visual receptors were identified. A number of receptor locations of national importance are located in the study area including a section of the Loch Lomond and Trossachs National Park and National Scenic Areas. The assessment did not predict any significant effects on these landscapes of national importance. Significant effects were identified on a regionally designated landscape namely the North Ayrshire Sensitive Landscape Area (NASLA). Despite the effects of the Development on the region, this designated area is already subject to the influence of a working quayside, the large scale and prominent Clydeport coal terminal, the Hunterston 'A' and 'B' power stations and infrastructure in the vicinity of the Development.

Twenty two representative viewpoints and a number of transport routes chosen for the assessment of visual effects were selected in consultation with NAC and SNH. Twelve of the twenty two viewpoints assessed would be subject to significant residual effects on both visual amenity and landscape character. Of these twelve viewpoints six would also be subject to significant cumulative effects when considered in relation to existing and consented turbines in the study area.

The viewpoints liable to significant effects are located within 9 km of the Development and concentrated along the Ayrshire coastline between West Kilbride and Largs and on the Dalry Moorland Road. The viewpoints are also situated along the eastern and southern sides of Great Cumbrae and on its elevated top, and in locations on Bruchag Road and at Kilchattan Bay on the Isle of Bute. It is apparent from these locations that the Development, whilst seen in the context of existing large scale built structures of the Hunterston 'A' and 'B' power stations and the Clydeport coal terminal, would represent a considerable alteration to the current baseline of views. This is due to the scale of the proposed turbines which would contrast with the enclosed Fairlie Roads channel and the dwellings of the neighbouring settlements at Largs and Fairlie which act as scale indicators, or when set against a backdrop of the small Cumbrae islands.

The effect on transport routes including road, railways and ferry routes within the study area were also assessed. Of the thirteen road routes assessed six were found to be subject to significant effects from the Development. These are the A78 between Largs and West Kilbride, the B781 road from West Kilbride to Munnoch, the B896 coastal road between Millport and Tomont Point on Great Cumbrae, the B899 on Great Cumbrae, the southern section of Bruchag Road on the Isle of Bute and the western end of Dalry Moorland Road. The railway route between West Kilbride and Largs will experience significant visual effects however except for a small intermittent section of the line, would not experience any cumulative views. Several ferry routes were assessed. Passengers on the Largs to Cumbrae and Brodick to Ardrossan ferries would experience significant effects. No National Cycle Routes will be subjected to significant effects.

Some recreational routes were found to experience significant effects namely walkers on the West Island Way and the Ayr to Greenock Coastal Path. Views of the Development from the Clyde Muirshiel National park would be limited to the western edge of the park where significant effects were found. Within the prominent views from the park the Development would generally be seen below the skyline.

Thirteen settlements within the study area were assessed to determine the significant effects of the Development. Four settlements were found to be subject to significant effects, Largs, Fairlie, West Kilbride and Brodick, however this would be limited to specific parts of these settlements due to the effect of building screening.

As well as assessing the effects of the Development in its own right, the landscape and visual assessment also assessed the cumulative effect that the addition of the Development may have in conjunction with other operational/under construction, consented or application stage wind farms. There are several existing and consented wind farm developments in the area surrounding the Development.

When considering transport links several of the routes are already subject to views of existing wind farm developments. The cumulative views would generally be intermittent as they will be interrupted by shielding from vegetation and buildings for example. The Development was identified as being seen cumulatively along some of the transport routes studied. The A78 between Greenock and Prestwick, and the B781 West Kilbride to Munnock Road where Dalry and Millour wind farms, were found to present cumulative views in addition to Kelburn in the case of the A78 and Ardrossan for the B781. The Ardrossan development will also be seen in cumulative views of the Development from the B899 Downcraig Ferry to Millport, the A815 north to Inverchapel, and the B896 Millport coastal road. A minor cumulative effect would be experienced by north bound/ north facing passengers on the Largs to Ayr railway between Hunterston and West Kilbride although these views would be intermittent. With regard to the ferry routes the Largs to Cumbrae ferry would experience cumulative views of the existing Ardrossan, Dalry and proposed Kelburn wind farm. The Ardrossan to Brodick ferry would experience more significant cumulative effects at the Ardrossan terminal which would decrease towards Brodick. For further ferry routes whilst the Development would be discernable, the change to the landscape would be minor.

There are several regional trails in the area. Significant cumulative effects were identified on stretches of these trails however this is specific to the section of the route and direction of travel. On the Ayr to Greenock Coastal Path a significant cumulative effect was predicted between Farland Head and Hunterston and between Largs and Wemyss Bay for southbound walkers. The West Island Way is closest to the Development at Kilchattan Bay where a significant effect is likely based on the other existing and consented wind farms in the area. No cumulative effects were predicted on National Cycle Routes.

As stated above the Development is visible from the westernmost edge of The Clyde Muirshiel Regional Park. At localised high points along this edge the Development will be seen in the same view as cumulative developments presenting a significant effect.

Cumulative views would be experienced from several settlements in the area. Within Largs the only cumulative views would be at the western edge of the settlement where the consented Kelburn wind farm would be seen in the same view as the Development from some properties. No cumulative visibility would occur from elsewhere in the town. Further significant cumulative effects have been identified at West Kilbride due to the views of the existing Ardrossan, Millour and Dalry wind farms in the area and the consented Kelburn array. No further significant cumulative effects were identified on settlements.

No significant cumulative effects were identified in relation to National Parks or National Scenic Areas. Whilst existing wind farms could be seen in the same view as the Development from the Loch Lomond and the Trossachs National Park the distance to the Development and the limited view would prevent any significant cumulative effects. Cumulative effects would be experienced within the North Ayrshire Scenic Landscape Area. Whilst the existing and consented wind

developments would occupy a prominent position in the landscape due to their upland location, the Development would remain the most prominent and would present a significant cumulative effect. Whilst the Development would be seen from the Argyll and Bute Area of Panoramic Quality and the Wild Land Search Area the distance to the Development and the prominent skyline position of the other wind farm developments do not result in a significant cumulative effect from the addition of the Development.

Of the Historic Gardens and Designed Landscapes considered in the LVIA only one, Mount Stuart, was considered to be subject to significant cumulative effects. These cumulative effects would however be limited to specific areas including the open elevated fields to the west of Mount Stuart House and the Shore Walk. The majority of the landscape is subject to dense woodland cover which would restrict any views of the Development and cumulative developments.

Five of the twenty six landscape character areas and two seascape character areas assessed were found to be subject to significant cumulative effects from the Development and other wind farm developments in the area.

Whilst significant effects on landscape character and visual amenity have been identified these are limited to within a 9 km radius of the Development occurring in an area enclosed by the Ayrshire moorland escarpment to the east, the Cumbrae islands and Isle of Bute to the north-west and west and by the Cowal peninsula to the north-west.

Receptors experiencing significant effects on visual amenity within this area would include sea kayakers, sailors and ferry passengers, road users, rail passengers and residents of some parts of West Kilbride, Fairlie, Largs, and Brodick. Outwith this envelope visual effects would be mitigated by a combination of the intervening topography and/or distance. The predicted effects would have a maximum duration of five years and, for all intents and purposes, would be entirely reversible.

Significant effects from the Development on its own and cumulatively are predicted for four landscape character types: the Raised Beach where the Development is proposed and the adjacent Coastal Fringe with Agriculture; Rugged Moorland Hills and Valleys and Rolling Farmland with Estates; and one of the two seascape areas considered, the Firth of Clyde. Given that the Development would not significantly affect landscapes of national importance such as a National Park or National Scenic Area, the scale of landscape effects is considered to be regional. This is reflected in the predicted effects on regionally designated landscapes such as the North Ayrshire Sensitive Landscape Area. However, this designated area is already subject to the influence of a working quayside, the large scale and prominent Clydeport coal terminal, and Hunterston 'A' and 'B' power stations and infrastructure in the vicinity of the Development. Even the more remote and elevated sections of this designated area contain existing and consented wind farm developments.

7 Ecology

An ecological impact assessment has been carried out in relation to the Development. This assessment was based on data from a series of ecological surveys, consultations and desk based literature reviews that followed recognised ecological guidelines. The information was used to generate a picture of the ecological baseline and assess the effects of the Development on the ecological interests of the area.

The desk-based assessment identified nine statutory designated sites within 15 km of the survey area. The closest of these is the Portencross Site of Special Scientific Interest (SSSI) which covers the Development site. The Portencross SSSI is designated for a *variety of seashore habitats, mud flats, wildfowl and waders, exposure of Old Red Sandstone and worn out platform caves*. No non-statutory sites are present within 15 km of the Development site. The Development site almost entirely comprises land historically reclaimed from the SSSI for industrial use and does not support any of the habitats or features cited above. The Development does not include any works beyond the boundary of the marine construction yard and therefore the Portencross SSSI is not deemed sensitive to the Development.

A series of surveys were undertaken at the Development site including a habitat survey, notable plant species survey, bat survey and otter survey. The habitats survey identified a limited range of habitats of low ecological value. A notable plant species, seaside centaury was identified on the site and was found to be most abundant in the north east corner of the Development site. The Development footprint does not utilise the north east corner of the site. No significant effects were identified with regard to habitats or notable plant species.

The site provided no suitable roosting habitat for bats. The platform provides no shelter from strong coastal winds and weather conditions and only a very limited foraging habitat. The surrounding area within 100 m of site contains woodlands, watercourses and infrastructure verges with potential for commuting, foraging and roosting bats. Suitable habitat for otters was found but limited to the constructed rock edges of the construction yard. Despite this no evidence of otters was found within the Development site. Protection measures will be implemented if this species is found within the survey area at the pre-construction/ construction phases.

Marine mammals including harbour porpoise, beaked common dolphin and bottle-nosed dolphins, some of the most common and widespread marine mammals in Scotland, are known to be present in the waters in the region of the Development site. There is potential these mammals may be affected by noise and vibrations from the construction process. A review of a recent marine mammal study which included an assessment of the potential effect of noise and vibration from the Hunterston Terminal facility was studies in relation to the Development. The study identified the waters surrounding the Development site to be of relatively low value for marine mammals and that the species did not appear to be resident, breeding or nursing in the area. The Development may include a small amount of piling, although this may not be necessary, which would be undertaken over a short time period and as such the effect on marine mammals from the Development was not found to be significant. As a best practice measure observations of the waters in the area will be undertaken prior to commencing any piling activities.

8 Ornithology

The possible key ornithological effects of any wind development are its potential to adversely affect the conservation status of bird populations through land-take, disturbance, displacement, collisions with the turbines and/or barrier effects. In order to assess the effect of the Development a review of existing ornithology information and field surveys was undertaken. The field surveys included through the tidal counts during the period of spring passage, vantage point surveys over spring, summer and autumn, a breeding bird survey and a breeding raptor survey.

The breeding bird survey recorded a total of forty six species of which thirty one were confirmed or suspected of breeding. No internationally or nationally important

breeding bird populations were recorded. Of the thirty one species confirmed or suspected of breeding within the study area and associated buffer zone, nine species are UK Biodiversity Action Plan Priority Species. These are Lapwing, Dunnock, Song Thrush, Spotted Flycatcher, Starling, Linnet, Bullfinch, Yellowhammer and Reed Bunting. Three of these species Lapwing, Linnet and Reed Bunting were recorded breeding within the Development site. Five species recorded during the surveys are Red Listed Species of Conservation Concern of which two species were breeding. These were five pairs of Lapwing within the Development site and a pair of Linnet along the Development site boundary. None of the breeding species were recorded at nationally important numbers, which is defined as being >1% of the national breeding population. The findings were in line with those reported by Scottish Natural Heritage which concluded the breeding birds were not a qualifying selection criteria for the Portencross SSSI. No breeding raptors were recorded within the study area.

The vantage point surveys identified a total of thirteen species flying through the study area, which includes the Development site. The most regular bird flight paths over the site was that of the Lesser Black-backed Gull. The flights lines and flight heights of these species were considered in determining the potential for collision risk. Few species were found to be flying through the site at a height where there was a risk of collision, and in several cases the flights were infrequent. An assessment of the collision risk based on this flight information and the population data of the species in question concluded that there was no significant effect.

Three UK Biodiversity Action Plan Priority Species were found to breed within the Development site. Given the limited footprint of the Development within the construction yard as a whole the Development is not considered to result in the likely loss of breeding habitat for all of these birds and is not considered to present a significant effect.

Direct habitat loss through wind farm construction was considered to not be significant for birds, as the construction only involves small losses of land associated with turbine bases, access tracks and other infrastructure.

The Portencross SSSI and Renfrewshire Heights Special Protection Area are potential sensitive receptors to the Development with regard to ornithology. Scottish Natural Heritage has indicated that site does not currently meet the criteria for the designation as a SSSI based on its bird assemblages and as such is not considered as sensitive to the Development. Renfrewshire Heights is designated due to breeding Hen Harrier. Data collected through the surveys only identified occasional records of one bird using the Development site and the site does not present connectivity with any suitable habitat for Hen Harriers. As such the Renfrewshire Heights are not considered as sensitive to the Development. The Central Lochs SSSI on the Isle of Bute is designated for its aggregation of Greylag Geese. From the existing data and surveys of the site, the Development site is not known to lie in the flight path of these geese and the site does not provide any connectivity with the roosting habitat. As such the Central Lochs is not considered to be sensitive to the Development.

Disturbance caused by construction operations may directly displace birds from breeding sites and/or foraging areas. The active nests of nearly all bird species are protected against destruction by the law and it is necessary to take measures to ensure compliance with the appropriate legislation. Care will be taken during construction to abide by these legal requirements and apply best practice to avoid disturbance as a result of the construction activities.

9 Hydrology, Hydrogeology and Ground Conditions

The effects of the Development have been assessed with regard to the water environment (surface water and groundwater) and ground conditions within the Development site and its surroundings. The site is located within the Clydeport Hunterston Terminal Facility, North Ayrshire and is mainly composed of made ground and drift geology. The study area includes the Clydeport Hunterston Terminal Facility, and the immediate area surrounding the site from Fairlie to Fairlie Head. This study area will allow for any effect on the hydrology and hydrogeology of the Largs channel and nearby designations such as Portencross Coast SSSI to be assessed. Ground conditions including soils and contaminated land have also been assessed.

The surface water and groundwater assessment comprised a desk based information review, consultation with statutory and non-statutory consultees and site visits.

The nearest surface water feature is the Firth of Clyde located directly west of the site, the Burn Gill is located approximately 500 m east of the site and flows north along the Clydeport Hunterston Terminal Facility into the Firth of Clyde. The site is strongly influenced by coastal and marine processes and is fitted with two pumps which control the on site drainage. These pumps discharge into the Firth of Clyde.

Published geological and hydrogeological data for the site provided by the British Geological Survey, were reviewed. The site is underlain by a "Concealed Aquifer". This feature is vulnerable to potential contaminated soils, and mobilisation of potential pollutants already present on the site, through the construction, operation and decommissioning activities.

The bedrock beneath the site is a sandstone formation indicated to be 1000 m thick. Igneous intrusions of rock were identified on the shoreline adjacent to the site but have not been found to be present on site. The Largs-Hunterston Fault Zone, a geological fault, is located 1 km from the Development site. The bedrock is overlain by drift deposits, known as Beach Deposits and Raised Marine Deposits. A ground investigation survey was undertaken which found the top layer of the site to be made ground. A contaminated land assessment was also undertaken which found the site to contain some contaminants which could potentially be mobilised by the construction, operation and decommissioning of the Development.

Areas subject to flooding are published by the Scottish Environmental Protection Agency (SEPA). According to the flood map the dry dock area is at risk from flooding from the sea. The main part of the site and the access track was not found to be at risk from flooding however due to the low lying nature of the site there is still potential for flooding as a result of tidal surges or wave action.

An assessment of the potential effects of the Development found the flood risk to be negligible during all phases. As best practice it is proposed a flood warning system would be established, and that vulnerable materials such as fuels, would be stored out of the way of potential flood events. Any surface water runoff would be directed to existing drainage channels and outfalls.

The water quality of the surface water and ground water within and surrounding the site has the potential to be affected by potential accidental spillages, and runoff

containing increased sediment during construction and decommissioning. Whilst the potential for this to occur, and the volume of materials is low, a Pollution Prevention Plan will be developed which will detail how the site will be managed so as to prevent and minimise the release of such materials. As such no significant effects are predicted with regard to water quality.

The existing level of contaminants identified on the site presents a low likelihood of soil contamination resulting in harm to human health, or mobilisation of contaminants to the Firth of Clyde. The sensitivity of human and surface water receptors is however high and so the Pollution Prevention Plan will also detail measures which detail working methods to minimise the potential for release of materials, and will take into account best practice guidance. As such no significant effects are predicted. There is a potential for waste to be generated during construction, such as ground dug out for the turbine bases, which will contain a certain level of contaminants. In order to prevent the distribution of these contaminants as a result of the generation of this waste, measures will be put in place to ensure it is appropriately handled and disposed of in accordance with best practice guidance and legislation. Similarly dusts generated during construction may contain contaminants already present in the ground. The Pollution Prevention Plan will include measures to contain this dust and prevent the spread of contaminants. During operation and decommissioning there is potential for new linkages to be made which will not add to the contaminants present on the site but may present a new pathway to a sensitive receptor. The potential effect of this will be minimised through the application of appropriate working methods developed in accordance with best practice guidance. The application of these best practice measures will minimise the potential effects as a result of these activities and as such no significant effects are predicted.

10 Cultural Heritage and Archaeology

The cultural heritage chapter has considered the potential effects of the Development upon cultural heritage resources which includes designated sites such as listed buildings and scheduled monuments, as well as non-designated archaeological remains and other archaeological sites. The assessment considered resources which may be directly affected by the Development such as through physical disturbance, or indirectly affected such as by changing the setting.

A desk-based study, walkover survey and site visits have been carried out in order to identify resources that may be affected by the Development and establish their its current condition. In addition consultation was undertaken with statutory consultees including Historic Scotland and the West of Scotland Archaeological Society.

A core archaeological study area of the Development site was used to consider features which have the potential to be directly affected by the Development. A data search revealed that the core study area contains one listed feature, this being the marine construction yard itself. Whilst the Development will be located on this feature it will not affect its structure or form. There are no Scheduled Monuments or Listed Buildings situated within the core archaeological study area. No part of the site falls into an Archaeologically Sensitive Area or Inventoried Garden or Designed Landscape. It is considered that there is low potential for unknown, buried archaeological remains to survive within the site as the site is constructed from made ground. The assessment concluded that no direct effects are anticipated from Development. Whilst the potential for unknown archaeological deposits is low this cannot be discounted. A watching brief will be maintained throughout construction

and should any archaeological remains be encountered a preservation record would be established.

A wider study area of 15 km from the Development site was established to identify cultural heritage assets which may have the potential to be affected by the Development. This distance was informed by the Zone of Theoretical Visibility produced as part of the Landscape and Visual Assessment. Fifty three cultural heritage resources were identified in this study area including Scheduled Monuments, Listed Buildings, Inventoried Gardens and Landscapes, and Conservation Areas. The majority of these resources were not found to be subject to significant effects on their cultural heritage setting as a result of the Development. This was due to reasons such as distance from the Development, the direction of view from the cultural heritage resource to the Development, or localised screening from vegetation. Significant effects were identified at two Listed Buildings (Hunterston House, Category B and Hunterston Castle, Category A) within 5 km of the Development. The close proximity of the Development means it will appear as a prominent feature within the views from these buildings. No mitigation is considered practicable in relation to these effects due to the nature of the Development. It should be noted that these effects are temporary and relatively short term in duration (a maximum of five years) and are fully reversible upon decommissioning of the test turbines when the significant effect will be reversed restoring the original setting of these cultural heritage features.

The potential for cumulative impacts resulting from this Development and other wind farm developments within 10 km have been considered. It has been concluded that there will be no cumulative effects on cultural heritage assets.

11 Noise

Noise will be emitted by equipment and vehicles used during construction and decommissioning of the wind farm and by the turbines during operation. The level of noise emitted by the sources and the distance from those sources to the receiver locations are the main factors determining levels of noise at receptor locations.

Background noise monitoring has been undertaken at six locations surrounding the Development site. These locations were agreed with the Environmental Health Officer of North Ayrshire Council and present the closest sensitive receptors to the Development site. This monitoring allowed the existing noise levels at these receptors to be monitored and characterised to determine if the noise level was as a result of human activity, such as traffic, or more like that of a rural environment where the noise is directly related to increased wind speeds. The findings of this monitoring were then used to assess the potential effects of the Development at these receptors, and where relevant, to identify controls which may be required to ensure no significant noise effects are generated.

During construction there is potential for noise from piling operations, in the event these are required. Any effects from piling would be temporary and short term in nature. An assessment of the various types of piling which may be used on the site has been performed and no significant effects were identified. It is proposed piling activities would be limited to restricted times as best practice. The assessment also considered the potential noise disturbance from construction traffic. Volumes of construction traffic were obtained through the Transport Assessment (detailed below) and were modelled in order to ascertain the increase in noise associated within this traffic. The assessment considered the increased noise at Fairlie and Hunterston. As these are the closest to the Development site they would experience

the highest levels of traffic, should these routes be used. This is because construction traffic will converge on the site from its point of origin from across the wider road network. The increase at both Fairlie and Hunterston was found to be small and no significant effects were identified. As best practice a Transport Management Plan will be developed in liaison with North Ayrshire Council which will identify the routes of access to the site for construction traffic, and will set times for deliveries.

Operational turbines emit noise from the rotating blades as they pass through the air. This noise can sometimes be described as having a regular 'swish'. The amount of noise emitted tends to vary depending on the wind speed. When there is little wind the turbine rotors will turn slowly and produce lower noise levels than during high winds when the turbine reaches its maximum output and maximum rotational speed. Background noise levels at nearby properties will also change with wind speed, increasing in level as wind speeds rise due to wind in trees and around buildings. The existing noise in some locations near the Development is also characterised by human noise sources including traffic and the existing operations of the Clydeport Terminal Facility. This was taken into account in the assessment of the noise emissions from the Development and the establishment of the appropriate noise limits for the site. The noise monitoring results were used in conjunction with the advice of North Ayrshire Council's Environmental Health officer to identify what noise level limits should be placed on the operational site. Using noise emission data provided by the turbine manufacturers, this was used to determine if the Development could be operated within these noise limits and operational constraints. Operation of the site within the defined noise limits which will be set by North Ayrshire Council, will not result in any significant effects in terms of noise within the area surrounding the Development.

12 Transport and Access

The Development will require the delivery of construction materials, personnel and turbine components to the site. The Transport and Access chapter presents the transport strategy for the delivery of these materials to the site, plus an assessment of the potential effects in terms of the capacity and size of the road network.

The initial stage of the assessment considered various transport options for the site. The Clydeport Terminal Facility is equipped with a railway link which was considered for the delivery of construction materials. In addition, the Development site has a jetty which was also considered for this purpose. Due to the limited scale of the Development the bulk deliveries required to deliver construction materials to the site by these means meant these options were not suitable. Furthermore, the use of rail and sea delivery ruled out the potential to utilise local suppliers for these services. It is therefore proposed to deliver the construction materials to the site by the road network. An assessment of the capacity of the road network was undertaken to ascertain if there are any significant effects associated with the Development. The assessment was based on worst case assumptions in terms of the maximum volume of material which may be required for the Development. The assessment included all construction traffic, both material and equipment deliveries, and personnel. The origin of the construction materials is not yet known however this will be delivered on the road network and converge on the site. As such the junctions and road network nearest to the site would experience the highest levels of construction traffic. The areas considered were the A78 at Hunterston and the A78 at Fairlie. At both of these locations the effect of the Development was found to be not significant. The highest level of increase at peak time was predicted as a 2.3% increase from the existing traffic flows. This was found at the A78 at

Hunterston. Whilst no significant effects are identified, the Applicant will work with North Ayrshire Council to develop a Transport Management Plan which will identify the routes for delivery to the site, and times of day when these deliveries can be made both to minimise disruption during peak traffic and any disruption to local residents along the road network.

As with construction materials various transport methods were considered for the delivery of the turbine components. One of the key reasons for the site selection was the presence of port facilities which may allow the delivery of the turbine components by sea. During the development of the transport strategy various options were considered including the delivery of the turbines by road. Delivery by sea was found to be the most preferable option. This prevents the need for the delivery of large scale components on the road network and any works associated with this. A marine access study was undertaken and confirmed the viability of delivering turbines to the site without the need to undertake any in water works specifically for the Development. The proposal is therefore to deliver the turbines to the site by sea details of which will be agreed with North Ayrshire Council.

13 Socio-Economics

Socio-economics is the assessment of the Development on the local and national economy, recreation and tourism, and land-use.

A review of published data and reports on both the local economy and the value of the offshore economy across the UK was undertaken. There is a huge potential for offshore wind in the UK due to the availability of natural renewable resources

Commitments to the reduction in carbon emissions, and to the promotion of renewable energy developments have been made at an International and National scale in order to tackle the challenge of climate change. Within Scotland the Climate Change (Scotland) Act 2009 creates a long-term framework for the current and future administrations in Scotland to ensure a reduction in Scottish greenhouse gas emissions of 80% by 2050 with an interim milestone of 42% by 2020. The Scottish Government is committed to promoting the increased use of renewable energy sources to help tackle climate change and to support economic growth in Scotland, and has recently announced that Scotland would commit to generating 100% of its electricity from renewable sources within the next decade. The offshore wind developments are a central part of fulfilling these targets. The forthcoming offshore wind projects are large projects which require a strong supply chain to achieve delivery. A report by the Scottish Government called *Scotland's Offshore Wind Route Map: Developing Scotland's Offshore Wind Industry to 2020* concluded that the direct economic potential of offshore wind market manufacturing could support up to an estimated 5180 jobs with an estimated economic impact of up to £294.5 million per year for the for Scotland's economy.

A report was prepared by BVG Associates on behalf of the Crown Estate titled *Towards Round 3: Progress in Building the Offshore Supply Wind Chain*. This report conducted a detailed assessment of the requirements for the offshore industry to meet the European renewable energy targets. The study suggests that there are massive economic opportunities from the offshore sector with estimates of a total capital investment ranging from £100 billion to £120 billion in supply chain i.e. turbine component manufacturing, foundation, installation vessels and subsea cables. The UK market is therefore a central focus for manufacturing companies targeting the offshore market and presents a huge opportunity for the growth of the UK and Scottish economy. In discussions with turbine manufacturers the need for

test sites for offshore turbines is a consistent message and is often stated as a precursor for the further investment in the development of supply chain activities in Scotland such as manufacturing sites. The Development therefore presents an excellent opportunity for the promotion of the offshore market and supply chain in Scotland. Furthermore the turbine manufacturer who will utilise the third plinth of the Development will be determined by Scottish Enterprise and will be selected based on their long term commitment to investment in the Scottish offshore supply chain. The Development therefore presents a key step in realising the long term economic gains which the offshore industry can bring to the Scottish economy.

It is estimated that job opportunities would be created for 10-20 workers during the construction phase. There will also be further supply chain gains for the local economy through the establishment of supply chain lines. The Applicant is currently liaising with various organisations to identify the opportunity to create an apprenticeship scheme or training opportunities at the Development during its operation. The Development presents a minor positive effect in terms of jobs creation.

North Ayrshire has an area encompassing 340 square miles including the Isle of Arran, Greater Cumbrae and Little Cumbrae and is an important tourist and recreational destination that centres on its natural environment, particularly its coastline and golf centres. An assessment of the potential effects on recreation and tourism was undertaken considering the location of the Development and research into the effect of wind developments on tourism. There are no public rights of way within the Development site. Local tourism attractions in the area include historic houses. There are popular outdoor pursuits in the area including visits to the surrounding islands such as Great Cumbrae and Arran. A market research poll was conducted by MORI in 2002 to determine public attitudes to wind farms and found no evidence to suggest that wind farms detract from the tourist experience of an area. Numerous studies into the public attitudes towards wind farms found the majority to be in favour of renewable energy solutions and that wind farms were a necessary component of this. Within the reports studied varying opinions were found however the majority of those surveyed do not have a negative attitude towards wind farms. An assessment of the effects on recreation and tourism was undertaken and found there to be no significant effects as a result of the Development.

With regard to land-use the marine construction yard is currently not in regular use however Clydeport maintain the site in order to utilise this space in the near future. The Development will therefore make an improvement to land-use by utilising this land whilst not impacting on the ability of Clydeport to use it for their future requirements.

14 Other Issues

Other considerations associated with the Development include:

- Aviation and Telecommunications;
- Shadow flicker;
- Air quality and climate; and
- Health and Safety.

14.1 AVIATION AND TELECOMUNICATIONS

Due to their size and nature, wind turbines have the potential to interfere with electromagnetic signals. Infrastructure that could be affected includes civil and

military aviation operations including impacts on radar, telecommunication links, and television reception.

Desk based study and consultation was undertaken in order to identify and assess existing telecommunications and utilities infrastructure and aviation facilities within a specific distance from the Development.

14.1.1 Aviation

There are no civil or military radar installations located within 30 km of the Development. Glasgow Prestwick Airport is the nearest airport to the Development, located approximately 31 km to the south east. Glasgow International Airport is located 32 km to the north west of the Development. The Ministry of Defence was consulted and did not identify any military facilities that need to be considered within this assessment and expressed no concerns regarding the Development.

Consultation was undertaken with these airports to determine if there was a potential concern regarding the Development. Glasgow Prestwick Airport did not identify any issues with the Development. Glasgow International Airport identified a potential radar issue. A study of the radar from the airport was undertaken with specific regard to the Development and the surrounding topography. The study concluded that there was significant terrain shielding of the radar from the Development and this would prevent interference with the radar. Consideration was given to the NATS En Route radars. At the maximum tip height there was visibility of the turbines however there was also a degree of terrain shielding. The Development is within restricted airspace due to the presence of the Hunterston 'A' and 'B' nuclear power stations. Advance permission must be sought from the power station to operate in this flight zone hence limiting air traffic. Consultation was undertaken with the emergency services that may use this flight zone and no issues were identified. The turbines require aviation safeguard lighting as they are structures over 150 m in height. The exact nature of the lighting is yet to be agreed with the Civil Aviation Authority but is expected to comprise a steady red aviation light on the nacelle of each turbine, with possible additional lights on the tower. Final details will be agreed with the Civil Aviation Authority.

14.1.2 Telecommunications

Structures such as wind turbines, and others with similar characteristics, have the potential to cause interference with television and telecommunication transmissions. Consultation was undertaken with numerous telecommunications organisations to identify what microwave links were present in the area. Four separate microwave links were identified however these were all found to be at a sufficient distance from the Development site to not be effected.

The BBC Wind Farm Tool shows there to be the potential for up to thirteen dwellings with no alternate off-air television service to be affected by the Development. As the area has changed from analogue to digital television signal the effects are likely to be minimal as the digital signal is not subject to interference to the same level as the analogue signal. In the event any issues do occur the Applicant will liaise with the relevant telecommunication operators to find a mitigation solution.

14.1.3 Shadow Flicker

Shadow flicker is an effect that can occur when the shadow of a moving wind turbine blade passes over a small opening (window), briefly reducing the intensity of light within the room, and causing a flickering to be perceived. The likelihood and duration of this flickering depends upon certain combinations of relative sun, turbine

and window locations, turbine orientation, times of day, days of the year and weather conditions.

An assessment of the Development site and surrounding area was undertaken in order to identify dwellings which have the potential, due to their location and distance from the Development, to be subject to shadow flicker. Four properties were identified. The weather conditions required for shadow flicker only occur 30% of the time in Scotland. This was taken into account alongside considerations such as the wind direction (which determines which way the turbines will be facing), and daylight hours to predict the hours per year when shadow flicker may occur at these dwellings. The results found there to be no significant effects associated with shadow flicker.

14.1.4 Air Quality and Climate

There is a potential for construction activities to generate dusts through earthworks, and the movement of soil and rubble. The generation of dusts from construction activities can be minimised by the application of best practice measures which will be contained within the Pollution Prevention Plan which will be applied during construction. Given the limited scale of the Development, and distance to residential properties, no significant effects associated with airborne dust are predicted.

Onsite plant has the potential to release emissions during the construction phase of the Development. As a consequence of the relatively small scale nature of the Development in combination with the high degree of dispersion of airborne pollutants that would occur prior to reaching nearby dwellings emissions originating from onsite plant are not considered significant.

During operation the Development will result in the generation of energy from a renewable source thus reducing the need for power generation from thermal, non renewable sources such as fossil fuels. This will result in the electricity produced creating a saving in emissions of CO₂, with the associated environmental benefit.

14.1.5 Health and Safety: Driver Distraction

The closest public highway to the site is located approximately 1.5 km from the nearest turbine this is the A78. Evidence from existing wind farms would suggest that the presence of the Development at this distance is in line with guidance and would not directly cause any decrease in highway safety.

14.1.6 Health and Safety: Safety of Structure in Extreme Weather

Due to the exposed nature of wind farm sites, wind turbines are designed to withstand extreme weather conditions. Wind turbines are equipped with features to safely deal with extreme weather conditions such as high winds and lightning strike. As a result of certain meteorological conditions, such as still, cold weather, ice can form on the rotor blades and can fall, or be thrown from the blades. Ice throw has been noted as a risk in extremely cold conditions that occur in locations such as the high latitudes of Scandinavia or high altitudes in mainland Europe. The design of the Development has taken into account the possibility of ice throw occurring. The turbines have been sited in locations to ensure that the rotor blades do not oversail any public roads or recreational routes to minimise the risk from ice fall. The low risk of ice throw is further minimised by the turbine's vibration sensors (or other ice detection measures) which detect any imbalance which might be caused by icing. The turbines which are affected by icing would be temporarily shut down until normal balance is restored.

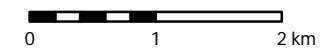


Key

 Site Boundary



1:60,000 Scale @ A3

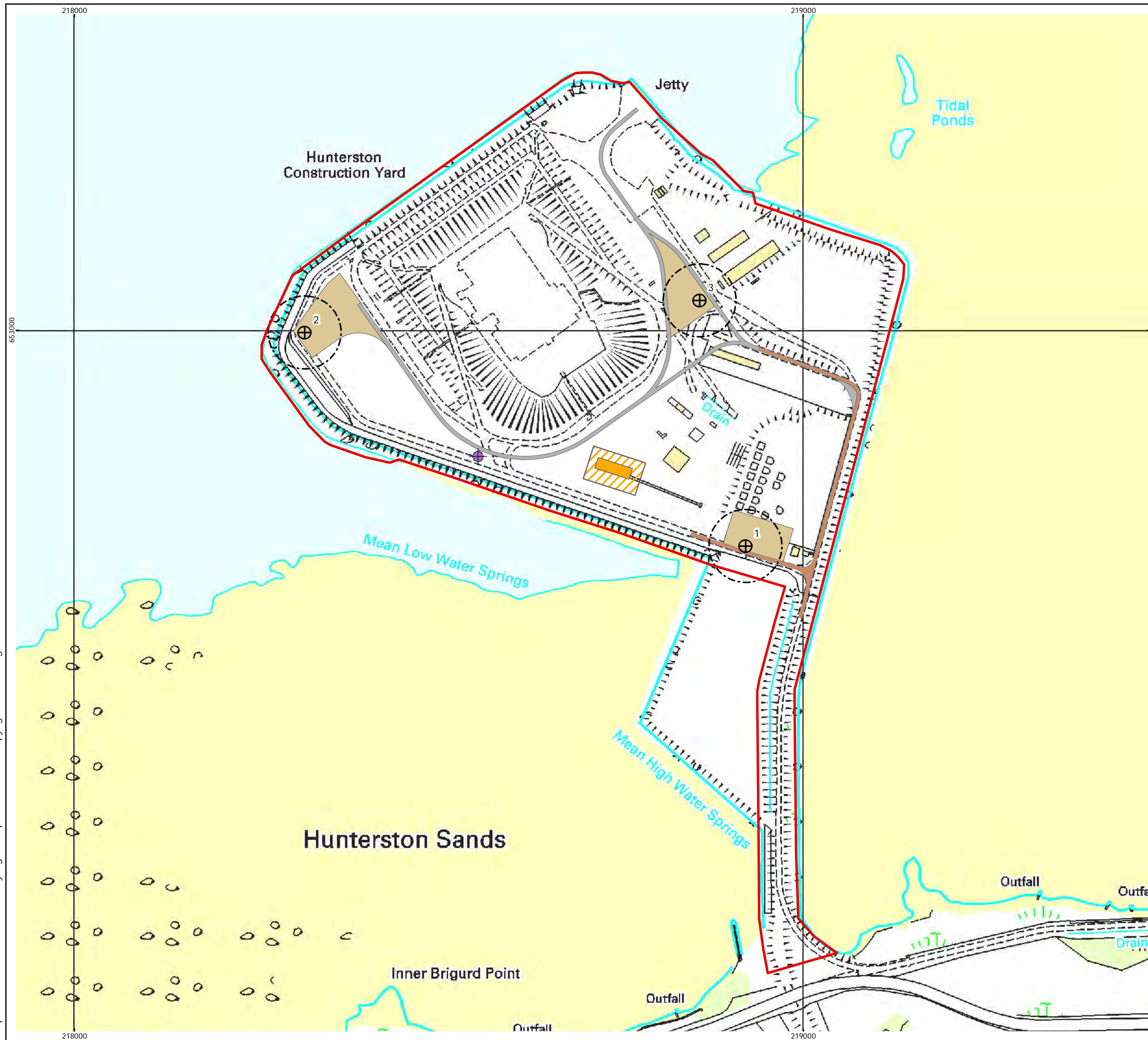


Produced: SC	
Reviewed: PM	
Approved: JS	
Ref: 573/ES/001	Revision: A
Date: 28/09/2011	

Site Location
Figure 1

Hunterston NOWTTF
Environmental Statement

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Key

- ⊕ Proposed Turbine Location
- Site Boundary
- 50 m Radius of Turbine Location
- Meteorological Mast
- New Track
- Upgraded Track
- Hardstanding
- Substation
- Substation Compound

1:5,000 Scale @ A3
0 100 200 m



Produced: SC	
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Indicative Layout
Figure 2

Hunterston NOWTTF
Environmental Statement