Freasdail Wind Farm
Construction and Environmental Management Plan (CEMP)

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Revision History

Issue	Date	Author	Nature And Location Of Change
01	20 May 2015	Scott Manning	First Created

CONTENTS

ANNEXES

1.0 INTRODUCTION

This Construction and Environmental Management Plan (CEMP) is submitted by RES Ltd (RES). The principal objective of this document is to provide information on the methodologies to construct and decommission Freasdail Wind Farm, to assist in discharging the pre-construction planning conditions (Planning Application Ref: 12/02150/PP and Planning Appeal Reference: PPA-130-2036); particularly Planning Condition 07.

At the time of preparing this CEMP, RES were yet to appoint a wind turbine manufacturer or contractors to undertake the electrical or civil engineering works. The contractor(s) appointed to construct the project will prepare individual method statements to construct the works which will incorporate the details outlined in this CEMP.

All annexes referred to in the CEMP are included on the CD accompanying this Report.

1.1 Project Description

The Freasdail Wind Farm consent allows for the construction of 11 wind turbines with a maximum height to blade tip of 100m, and associated infrastructure including on-site substation, site tracks, crane hardstandings, electrical cables, a permanent met mast, and temporary infrastructure to facilitate the construction works. Relevant drawings of the proposed works are included as Annex 1.

1.2 Conditions of Consent

Consent for the construction and operation of Freasdail Wind Farm was granted on appeal by the Scottish Ministers on 15th April 2014, subject to condition compliance, under the Town and Country Planning (Scotland) Act 1997 (as amended). For ease of reference, the sections of this document which relate to specific Planning Conditions are outlined in Table 1.

RES acknowledges that, unless otherwise agreed with Argyll & Bute Council through the CEMP approval process, the development shall be carried out in accordance with the approved plans and conditions.

1.3 Design Basis

RES has employed a mix of internal specialists and external consultants to develop and validate an appropriate design associated with the site specific conditions for the project.

Table 1- Freasdail Planning Conditions and Relevant Supporting Information

No.	Planning Condition	CEMP Section
07	At least two months prior to the commencement of any works, a full site-specific Construction and Environmental Management Plan (CEMP) shall be submitted for the written approval of the planning authority and all work shall be carried out in accordance with the approved plan. The required documents shall take account of matters set out in the environmental statement including details of all on-site construction works, post-construction reinstatement, drainage, mitigation, and other restoration, together with details of the timetabling and shall include the following:	
	a. Traffic Management Plan	Annex 7
	b. Site Waste Management Plan	Annex 8
	c. Sustainable drainage system (SuDS) design concept including run-off and sediment control measures; and flood risk management	Annex 3
	d. Dust management including cleaning arrangements for the site entrance and the adjacent public road (the A83)	Section 2.3.6
	e. Pollution prevention and control measures	Annex 5
	f. Arrangements for on-site storage of fuel and other chemicals	Section 3.1.1

No.	Planning Condition	CEMP Section
	g. Ecological monitoring over construction period including all necessary preconstruction surveys	Annex 9
	h. Details of foul drainage arrangements	Section 3.5
	i. Details of temporary site illumination	Section 2.3.4
	j. Details of any temporary diversions of access routes and associated signage	Annex 7
	k. Details of any water course engineering works including any stream crossings	Annex 4
	l. Details of the methods to be adopted to reduce the effects of noise occurring during the construction period to the lowest practicable level and in accordance with BS5228	Section 2.3.5
	m. Post-construction restoration/reinstatement of the working areas	Section 2.9
	n. Spoil management plan, including management of any peat generated from site works	Annex 6
08	Prior to commencement of development, the developer shall appoint an independent ecological clerk of works acceptable to the planning authority. The terms of appointment shall be submitted to and approved in writing by the planning authority, and will cover the periods of: a. wind farm construction, including micro-siting and finalisation of the wind farm layout, as well as subsequent post-construction restoration; and, in due course, b. wind farm decommissioning In relation to (a) the terms of appointment shall be submitted prior to the commencement of the development and in relation to (b), prior to the commencement of any decommissioning works.	Annex 9
09	The ecological clerks of works required under the terms of condition 8 above shall have a duty to: a. Carry out pre-construction surveys to inform the Construction Environmental Management Plan required in terms of Condition 7; and thereafter, b. Monitor compliance with ecological and hydrological aspects of the Construction Environmental Management Plan required in terms of Condition 7, and the Decommissioning Method Statement required in terms of Condition 4. The ecological clerks of works shall have a duty to report promptly to the developer's nominated construction project manager (during the construction period) or decommissioning project manager (during decommissioning) any non-compliance with the hydrological or ecological aspects of the construction method statement and other relevant approved schemes and proposals or the ultimate restoration plan, respectively.	Annex 9
10	The Peat Management Plan accompanying the application shall be implemented in full for the duration of construction works, unless any intended revisions are submitted to and are approved in writing in advance by the planning authority in consultation with the Scottish Environment Protection Agency.	Annex 6
12	In terms of condition 7g, prior to the commencement of development, a management plan for the protection of hen harriers during the construction period, shall be submitted to and approved in writing by the planning authority in consultation with Scottish Natural Heritage in respect of those areas within the application site which are to be cleared of trees in order to facilitate the development herby approved. Thereafter the management plan shall be implemented and the site managed in accordance with the provisions of the duly approved plan.	Annex 9

No.	Planning Condition	CEMP Section
13	In terms of condition 7g, no development shall commence until a pre-construction survey for otters has been undertaken by a suitably qualified person covering all watercourse crossings including a 100m zone upstream and downstream and other areas of potentially suitable habitat within 250m from all infrastructure and tracks. The outcome of the survey and any proposed mitigation measures shall be submitted to and approved by the planning authority in consultation with Scottish Natural Heritage. The plan, including any approved mitigation measures, shall be implemented for the full duration of the construction phase of the development.	Annex 9
14	In terms of condition 7g, no development shall commence until a suitably qualified person has undertaken a pre-construction red squirrel survey. The outcome of the survey and any proposed mitigation measures shall be submitted to and approved by the planning authority in consultation with Scottish Natural Heritage. The plan including any approved mitigation measures shall be implemented for the full duration of the construction phase of the development.	Annex 9
15	The hours of operation of the construction phase of the development and any traffic on the site associated with the construction of the development hereby permitted shall be limited to 0700 hours to 1900 hours on Monday to Saturday and no work shall take place on Sundays or public holidays unless previously approved by the planning authority. Outwith these hours, development at the site shall be limited to turbine delivery and erection, commissioning, maintenance, and pouring of concrete foundations (provided that the developer notifies the planning authority of any such works within 24 hours if prior notification is not possible). In addition, access for security reasons, emergency responses or to undertake any necessary environmental controls is permitted outwith these hours.	Section 2.2
25	No development shall be commenced until a written scheme for archaeological investigation and a programme of archaeological works has been submitted to and approved in writing by the planning authority in consultation with the West of Scotland Archaeology Service. Thereafter the developer shall ensure that the programme of archaeological works is fully implemented and that all recording and recovery of archaeological resources within the development site is undertaken to the satisfaction of the planning authority in agreement with the West of Scotland Archaeology Service unless any subsequent variation thereof is agreed in advance in writing by the planning authority.	Annex 10
30	No development shall commence until there has been submitted to the planning authority details of a nominated representative for the development to act as a point of contact for local residents (in connection with conditions 27 – 28) together with the arrangements for notifying and approving any subsequent change in the nominated representative. The nominated representative shall have responsibility for liaison with the planning authority in connection with any noise complaints made during the construction, operation and decommissioning of the wind farm.	Section 2.1
31	In terms of condition 7l, prior to the commencement of development, the developer shall agree with the planning authority the overall development programme and operating times to be employed during the construction phase. The development shall be implemented in accordance with the duly approved details or any subsequent revisions agreed thereto.	Section 2.2

No.	Planning Condition	CEMP Section
33	Any vehicular gates to be erected at the site access shall be set back a minimum distance of 20 metres from edge of public road to the satisfaction of the planning authority.	Drawing Reference 02564D2313-01

2.0 MANAGEMENT OF THE WORKS

Freasdail Wind Farm will be constructed in accordance with the Environmental Statement 2012 and the Supplementary Environmental Information 2013, prepared during the development stage of the project.

Throughout the development of the project, the overarching design philosophy has been to ensure the design:

- Minimises the extent of infrastructure;
- Avoids sensitive habitats;
- Minimises environmental impacts; and
- Maximises health and safety.

Where appropriate and practicable, local plant and materials will be used in order to maximise the benefit of the wind farm project to the local economy.

2.1 Community Liaison

Throughout the construction period of the project, RES will maintain an open dialogue with local residents and all other interested parties. RES will ensure the local community is provided with regular updates on the progress of construction and upcoming activities through appropriate channels such as dedicated meetings, letters, and websites.

A dedicated Community Relations Manager has been appointed to provide a key contact between RES and the community. Additionally, and in line with **Planning Condition 30**, the Community Relations Manager is the nominated point of contact for local residents in connection with perceived noise complaints during construction, operation and decommissioning of the wind farm. This person is:

Kirsten Sweeney
Community Relations Manager
RES UK & Ireland Ltd
e: Kirsten.sweeney@res-ltd.com
t: 0141 404 5578
m: 07876 825 192

Any change to the appointed Community Relations Manager shall be communicated to the planning authority with at least 14 days notice.

2.2 Timescale

Table 2 highlights the projected key dates and timescale for construction activities at this time.

Table 2- Outline Project Programme

Task	Anticipated Start	Anticipated End	Approximate Duration
Mobilisation to commence wind farm construction	September 2015		
On-site tracks	September 2015	June 2016	9 months
Site entrance works	October 2015	November 2015	2 months
Control building & substation	February 2016	February 2017	13 months
Crane hardstandings	March 2016	August 2016	6 months
Turbine foundations	March 2016	October 2016	3 months
On-site cable installation	May 2016	July 2016	2 months

Task	Anticipated Start	Anticipated End	Approximate Duration
Turbine deliveries	September 2016	October 2016	2 months
Turbine erection and commissioning	October 2016	March 2017	6 months
Operational take over	March 2017		

In accordance with **Planning Condition 15**, the hours of operation of the construction phase of the development, and any traffic on the site associated with the construction of the development, shall be limited to 0700 hours to 1900 hours on Monday to Saturday and no work shall take place on Sundays or public holidays unless previously approved by the planning authority.

Outwith these hours, development at the site shall be limited to turbine delivery and erection, commissioning, maintenance, and pouring of concrete foundations (provided that the planning authority is notified of any such works within 24 hours if prior notification is not possible). In addition, access for security reasons, emergency responses or to undertake any necessary environmental controls is permitted outwith these hours.

2.3 Environmental Management

Specific procedures to ensure that the local environment is protected during construction works are managed through our Environmental Management System Procedures and Policies which is certified to ISO 14001.

2.3.1 Contractors Requirements

Details of the environmental management and emergency procedures to be adopted by Contractors during the construction phase are contained within the RES management system procedure Environmental Requirements of Contractors – 01226R00016 (Annex 2).

2.3.2 Surface and Ground Water Management

In accordance with **Planning Condition 7c**, a sustainable drainage system (SuDS) will be implemented to provide a series of surface water management techniques to mitigate any adverse impact on the hydrology of the site.

The Freasdail SuDS Design Statement details the design criteria and philosophy for the SuDS system. This document is included as Annex 3.

With reference to **Planning Condition 7k**, the above document also makes reference to the design of watercourse crossing, and an inventory of identified watercourse crossings locations is included as Annex 4.

2.3.3 Water Quality Monitoring

Any potential pollution incident on site that may impact water quality will be dealt with in accordance with the RES management system procedure "Procedure in the Event of a Contaminant Spill" (Annex 5).

Water quality monitoring will be undertaken on discharge waters during the construction phase to ensure that the development does not impact on local watercourses and rivers.

A bespoke water monitoring strategy will be prepared and implemented by a specialist consultant, detailing monitoring locations, sampling frequency and the methodology for chemical and biological analyses. Site sensitivity will be taken into account when deciding on the level and periodicity of sampling and the proposed monitoring plan discussed and agreed with SEPA prior to implementation.

The exact location of each sampling point would be determined during a walkover survey, and would reflect the point on all relevant controlled waters closest to the proposed active

construction areas. Sampling points up- and down-stream of the construction activity would be selected to provide a full profile of the controlled waters.

A baseline report will be prepared following initial pre-construction water quality monitoring. This report will provide details of any contamination concentrations recorded and will be used to depict "uncontaminated background pollution levels" for the site.

In the event of a potential pollution incident, all relevant monitoring points would be visited and re-sampled to determine any changes relative to the baseline data. A report detailing the findings would be prepared for each incident and recommendations provided for further monitoring and / or requisite mitigation measures.

Following completion of the construction of the wind farm, all sample points would be revisited, re-sampled and analysed for a full suite of analytical parameters and a further report prepared discussing any impacts upon water quality arising from the construction process.

2.3.4 Temporary Lighting

Temporary lighting will be required at the construction compounds for security purposes and to ensure that a safe working environment is provided to construction staff. In addition, temporary lighting may be required to ensure safe working conditions at track, control building and turbine locations during construction.

All temporary lighting installations will be downward facing and all lights will be switched off during daylight hours.

2.3.5 Noise Management

The sources of construction noise are temporary and vary both in location and their duration as the different elements of the wind farm are constructed, and arise primarily through the operation of large items of plant and equipment such as bulldozers, diesel generators, vibration plates, concrete mixer trucks, rollers etc. Noise also arises due to the temporary increase in construction traffic near the site. The level of noise varies depending on the different elements of the wind farm being constructed.

BS 5228-1:2009 'Noise control on construction and open sites; Part 1 – Noise' is identified as being suitable for the purpose of giving guidance on appropriate methods for minimising noise from construction activities.

For all activities, measures shall be taken to reduce noise levels with due regard to practicality and cost as per the concept of 'best practicable means' as defined in Section 72 of the Control of Pollution Act 1974.

In accordance with **Planning Condition 7l**, the following noise mitigation measures will be implemented where appropriate and in line with further guidance from BS 5228-1:

- Consideration will be given to noise emissions when selecting plant and equipment to be used on site. Where appropriate, quieter items of plant and equipment will be given preference;
- All equipment should be maintained in good working order and fitted with the appropriate silencers, mufflers or acoustic covers where applicable;
- Stationary noise sources shall be sited as far as reasonably possible from residential properties and, where necessary and appropriate, acoustic barriers installed to further reduce the impact;
- The movement of vehicles to and from site will be controlled; and
- Employees will be instructed to ensure compliance with the noise control measures adopted.

Should it be considered necessary to further reduce noise levels mitigation measures would be considered and appropriate measures will be undertaken.

There are many strategies that could be employed to reduce construction noise levels; BS 5228-1 also states that the 'attitude to the contractor' is important in minimising the likelihood of complaints and therefore consultation with the local community should occur along with letter drops to inform residents of intended activity. Non-acoustic factors, such as mud on roads and dust generation which can also influence the overall level of complaints, will also be controlled as detailed elsewhere in the CEMP.

In the event any noise complaints are received the senior RES onsite staff member will contact the complainant and if required visit the property to discuss the complaint and subjectively assess the noise levels. If the noise complaint is found to be merited additional mitigation measures will be put in place.

In the event a resolution cannot be reached between RES and the complainant the planning authority will be informed in order that they can carry out their own subjective assessment and if required agree any additional mitigation.

All noise complaints will be recorded along with actions taken to resolve the issue. These records will be available to the Council on request.

2.3.6 Dust Management

The potential issue of dust creation during the works will be weather and season dependant, therefore detailed dust management methods will be subject to the works programme and contractor working methods.

Dust management will be carried out at all times in accordance with industry best practice to ensure that any local sensitive receptors are not affected by nuisance levels of dust from the works.

With reference to **Planning Condition 7d**, the following methods of dust suppression will be implemented during the construction phase of the wind farm as required:

- Site tracks to be damped down using bowser or other suitable system;
- Road sweeper to be used to remove loose material from adjacent public roads during construction;
- Cleaning of vehicles, including provision of waterless wheel washing facilities, prior to exiting site onto the public road;
- Soil erosion control measures;
- Speed limits to be put in place to ensure low vehicle speeds;
- Vehicle loads to be covered;
- Damping of dry excavations and cutting activities which generate dust; and
- Sequencing of works to minimise the time that soils are exposed.

2.4 Utilities

Existing utilities are known to exist in the proximity of the proposed site entrance onto the A83(T). The proposed details for the protection or relocation of these services will be agreed with the individual utility providers. The expected junction arrangement is shown on the site entrance drawing included in Annex 1 (drawing reference 02564D2313-01).

2.5 Site Won Materials

In the absence of detailed geotechnical information for the site area, preliminary analysis of published geological information and experience gained from site visits determines that material excavated from the lower strata may not be suitable for construction use within the development.

Therefore, it is assumed at this time that all stone for tracks, compounds, substation and crane hardstandings will be imported from appropriate local sources, with associated traffic

movements being managed in line with the Freasdail Wind Farm Traffic Management Plan as detailed below.

Detailed geotechnical site investigation works were undertaken throughout spring 2015 and the results will assist in the classification of materials arising from construction activities and identify appropriate uses for any site won materials. Should testing of this material deem it suitable for use in track or hardstand construction, this would result in a corresponding reduction in the quantity of imported material necessary for construction of these infrastructure elements.

Soil mixing, strengthening and compacting may occur with materials available in the upper soil strata and will be performed in-situ to the extent possible.

Excavated material at locations such as the turbine foundations, crane hardstandings and building platforms may be processed such that it is suitable for use as an engineering fill within the site.

2.6 Landscaping and Spoil Management

In line with **Planning Condition 7n** and **Planning Condition 10**, the Outline Peat Management Plan provided as Supplementary Environmental Information to the Environmental Statement is contained in Annex 6. This document sets out the principles which should be adhered to during stripping, storage and re-use of peat material. However, until site investigation works and detailed infrastructure design have been completed it is not possible to provide further details of peat volumes to be excavated or locations for its re-use.

In accordance with **Planning Condition 10**, if required, a revised Peat Management Plan shall be prepared and submitted to the planning authority for written approval once further exploration and design tasks have been completed.

2.7 Public Highway Works

There are no off-site public highway works required for delivery of any materials or components associated with the construction of the Freasdail Wind Farm.

The Wind Farm Access onto the A83(T) will be constructed in line with Drawing Reference 02564D2313-01, the Design Manual for Roads and Bridges (DMRB) and the requirements of **Planning Condition 33**. Prior to these works being undertaken, a Minute of Agreement in accordance with the Road Traffic Act 1988 will be entered into with Transport Scotland and the works shall be undertaken in accordance with that Agreement. Any required traffic management proposals shall be submitted to and agreed with Transport Scotland, and the trunk road operator BEAR Scotland.

2.8 Traffic Management

In accordance with **Planning Condition 7a**, details of the proposed traffic management arrangements are contained in the Freasdail Wind Farm Traffic Management Plan (TMP) in Annex 9.

Any operations not covered by the TMP will be performed in accordance with local and national standards and specifications.

2.9 Temporary Management of Materials and Reinstatement of Construction Areas

During construction of the infrastructure elements (detailed in Section 3), the vegetated layer will be stripped over the area of the excavation and stored locally with the growing side up. The remaining organic topsoil and subsoils will be excavated down to formation level, or a suitable stratum, and again will be stored local to the point of excavation, but shall remain segregated to avoid mixing of materials.

Temporary storage areas shall take cognisance of all identified buffer areas and be stripped of vegetation prior to stockpiling in line with best working practices. As construction is progressed the effectiveness of the buffer zones will be reviewed and if necessary adjusted.

Alternatively the construction procedure may be reviewed and altered or additional control measures put in place.

Post-construction reinstatement will be undertaken as work progresses to minimise the period of time any organic material is stockpiled. With reference to **Planning Condition 7m,** subsoils shall be used in landscaping and backfilling around structures while the vegetated layer and/or topsoil will be used to reinstate storage and working areas, road verges, drainage swales and embankments. In addition, following the completion of the works, a final inspection of the wind farm site will be undertaken and in circumstances where reinstatement using vegetation and/or topsoil is unsuccessful alternative methods will be considered.

Upon completion of all construction works, the temporary construction compounds will be reinstated to their approximate pre-wind farm condition. All temporary structures and construction equipment will be removed and the granular material that forms the hardstandings will be taken up and either moved to areas agreed with the landowner or removed from site . Following this, the areas will be backfilled with material stripped and stored during the construction of the wind farm and reseeded as required.

In line with construction best practice and to suit the ground conditions anticipated on site, the track and hardstanding design has endeavoured to minimise spoil generated during construction..

2.10 Health and Safety Management

The Principal Contractor will be responsible for ensuring that a construction phase health and safety plan is prepared and implemented on site. All work will be carried out in accordance with:

- The Health and Safety at Work etc. Act 1974;
- The Construction (Design and Management) Regulations 2015; and
- All applicable third party safety guidelines.

2.11 Environmental Monitoring

A programme of ecological monitoring has already been established on site and the appointed Ecological Clerk of Works (ECoW) fully engaged in preparatory works that have been undertaken to date with their terms of appointment extended throughout the construction period into the operational period. The agreed terms of appointment (agreed by ABC 10 February 2015) are included as Annex 9.

A Written Scheme of Investigation (WSI) has been prepared by Headland Archaeology and will continue to be applied across the site. The agreed WSI (agreed by ABC on 22 January 2015) is included as Annex 10.

3.0 DESIGN PHILOSOPHY & CONSTRUCTION METHOD

3.1 Temporary Construction Compounds, Site Tracks and Crane Hardstandings

3.1.1 Temporary Construction Compounds

Temporary construction compounds are required for the provision of site offices, welfare facilities and storage arrangements for materials, plant and equipment. There are a total of two temporary construction compounds required for different areas and stages of the project.

The temporary construction compounds will be constructed at the locations indicated on Drawing 02564D1001-05 in Annex 0 subject to the micro-siting allowances as set out within **Planning Condition 6**.

The enabling works compound will be built for use during construction of the access tracks to the main construction compound. The compound will subsequently be used as the site entrance gatehouse and as a car park for operatives working on the wind farm.

The main construction compound will then provide welfare and storage facilities for the remainder of the construction phase.

The compounds will be fenced around their perimeter and secured with locked gates outside working hours.

A covered, impermeable bunded area will be provided within the compound (where required) for the storage of fuel oils. Refuelling will be undertaken in line with the requirements as outlined in the Environmental Requirements of Contractors.

3.1.2 Site Tracks

The running width of the tracks will typically be up to 5m on straight sections; increasing at bends and passing places to accommodate the swept path of turbine delivery vehicles. Additional 250mm wide shoulders will be provided to each side of the track. The track corridor will be kept to the minimum required allowing for working area, safe access, drainage and electrical works.

Site tracks will consist of a compacted stone structure. Where tracks cross over existing utilities, they will be designed after consultation with the relevant authority and in accordance with their specific requirements.

A number of track designs have been considered, the final choice of which will be determined during detailed design dependent on the ground conditions encountered on site; but all are expected to be built as cut tracks founded on suitable load bearing strata.

Track drainage will be incorporated within the design in accordance with SuDS design principles. Where the road alignment crosses existing drainage channels, crossings appropriate to the location will be designed in accordance with the relevant guidelines and as per the watercourse crossings inventory included as Annex 4.

A buffer zone in accordance with the relevant guidance from SEPA will be maintained around watercourses as detailed within the Approved Environmental Statement. The exceptions to these buffers will be where the existing tracks are located within the buffer zone, at existing watercourse crossings, or where works are in close proximity to identified Ground Water Dependant Terrestrial Ecosystems. Land take in such areas has been minimised in line with the requirements of **Planning Condition 11**. Site personnel will be made aware of the buffer zones through the site induction and specific tool box talks.

3.1.3 Crane Hard standings

The main crane hard standing area will not exceed 40m x 30m at each Turbine. There will be additional temporary hardstanding areas required for the erection of the main crane and lay down of materials and turbine components.

A 15m x 15m hardstanding will be required at the control building for the installation and maintenance of electrical equipment.

The main crane hardstanding area will be left uncovered for the operational lifetime of the wind farm in line with Scottish National Heritage guidance "Good Practice during Windfarm Construction". Temporary crane hardstanding elements will be reinstated post construction.

All crane hardstandings will consist of a compacted stone structure bearing directly on suitable formation strata.

3.1.4 General Construction Method

Where competent soils exist close to the existing ground surface the following construction method will typically be followed:

- Track alignments will be established from the construction drawings and marked out with ranging rods, timber posts or steel pins.
- Track corridors shall be pegged out 500 - 1000m in advance of operations.
- Where possible, upgraded access tracks will re-use the structure of the existing track to reduce construction requirements.
- Material will be excavated and stored in line with the details in Section 4.8.
- Cut track construction will be used in areas where a suitable bearing stratum is identified as being shallow. This cut track system will likely consist of a suitable capping layer overlaid with a surface layer. The design of these layers will be optimised to the stiffness of the bearing stratum encountered. Imported stone material shall either be spread by a dozer or placed by hydraulic excavator prior to being compacted in layers by vibratory rollers. If ground conditions dictate a geotextile membrane will be applied.
- Floating track construction may be adopted where the ground conditions dictate, although preliminary investigation suggest that this method of construction is unlikely to be required. This system involves installing a geogrid membrane directly onto the organic vegetated layer and placing layers of suitable stone and additional geogrid layers (if required by the design) above. If ground conditions require a geotextile membrane may be applied also.
- The thickness of individual stone layers and amount of compaction required will be dictated by the design, which will take account of the characteristics of the bearing stratum, the imported stone material, and the compaction plant to be used.
- Where the load bearing properties of the underlying soils are insufficient, ground stabilisation may be carried out to provide adequate bearing capacity and stiffness of the formation level. Specific construction methods shall be selected at detailed design stage in consultation with specialist contractors. Any track design based on ground improvement techniques will be performed in accordance with a project specific specification for ground improvement works.
- Drainage swales will be excavated adjacent to the tracks where required. Surface water runoff will not be allowed to discharge directly into existing watercourses but will be routed through a Sustainable Drainage System (SuDS).
- A surface water cut off ditch may be installed on the slope above the earthworks footprint where achievable given the topography.
- Where the road alignment crosses existing drainage channels, crossings appropriate to the location will be designed in accordance with the relevant guidelines.
- Depending on depth and type of material, cut slopes are anticipated to be between 1:1 to 1:3.
- Post-construction reinstatement shall be in line with the details of Section 2.9.

The wind farm owner shall take responsibility for the upkeep of the on-site access tracks to the standard required for the operation of the wind farm during its operational life. Monitoring of the condition of the tracks will be carried out by the wind farm owner by visual inspection and any necessary repairs carried out by a suitably skilled and qualified contractor.

3.2 Site Entrance

On construction of the new site entrance, all traffic associated with construction of the wind farm will access the site from the A83 entrance in accordance with the TMP.

Wheel cleaning facilities will be set up at the main entrance to remove mud from the wheels of vehicles leaving the site during the construction phase. Public roads will be inspected daily and a road sweeper will be employed to remove any mud or debris transferred onto the roads from site activities.

3.2.1 General Construction Method

The site entrance will be constructed in accordance with the design drawings as follows:

- Traffic management to be installed;
- Topsoil shall be removed and carefully stockpiled;
- New drainage will be installed taking care to ensure that existing drainage will not be compromised;
- Embankments will be constructed to tie in with existing road / verge;
- Edge restraints where required in the design will be installed;
- Road pavement works completed to the design requirements; and
- Line marking, signage, fencing and vehicle restraint systems required as part of the design will be installed.

3.3 Turbine Foundations

Foundations will be designed in accordance with the relevant design standards. Due account will be taken of guidance provided in appropriate codes and standards such as Eurocodes, British Standards and other specialist design documents.

Due to the anticipated load bearing capacity of the near surface soils, gravity base turbine foundations are expected to be used to support the wind turbines.

3.3.1 General Gravity Base Construction Method

The gravity base foundation general construction method would generally be as follows:

- The topsoil will be excavated and stored to one side for reuse during the landscaping round the finished turbine;
- Excavation will be undertaken to competent material. Excavated subsoil material may be stockpiled temporarily adjacent to the excavation for later use as backfill or stored elsewhere on site. Temporary & permanent drainage shall be installed at the same time as the excavation works;
- In the case where competent material is lower than the required formation level the foundation will likely be over-excavated to competent material and compacted engineering fill placed to the required level;
- Where excavation is required to extend below the water table or in material which does not drain freely, appropriate pumping will be employed to keep the excavation dry. Water pumped from an excavation shall not be discharged directly to any watercourse;
- A layer of concrete blinding will be laid directly on top of the newly exposed formation, finished to ensure a flat and level working surface;

- Steel reinforcement, the turbine anchorage system and cable ducts will be fixed in place and formwork erected around the steel cage;
- Concrete will be placed using a crane, pump or other suitable lifting device and compacted using vibrating pokers;
- Upon completion of the concreting works the foundation will be covered and allowed to cure, following the curing period any formwork around the foundation will be stripped;
- The foundation will be backfilled with suitable material, and landscaped using the vegetated soil layer set aside during the initial excavation; and
- A gravel path will be built leading from the access track or crane hardstanding to the turbine door or access steps and around the turbine for maintenance.

3.4 Cabling Works

All electricity and other service cables between the turbines and the substation / wind farm control building will be placed underground.

The detailed construction and trenching specifications will depend on the ground conditions encountered but typically cables will be directly buried inside a trench, except at road crossings when cables will be ducted.

3.4.1 General Construction Method

The following construction method will typically be used:

- Trenches will be excavated and a suitable bedding material placed for which to lay the cables upon. The ground is trenched typically using a mechanical digging machine. Where excavations are to be left open overnight, wildlife ramps will be installed;
- The cables shall be laid directly onto the bedding material;
- The trench will then be backfilled and compacted with suitable material up to the required level and finished with a layer of topsoil to aid in the trench reinstatement;
- A suitable marking tape is installed between the cables and the surface; and
- The cables will be terminated on the switchgear at each turbine and at the substation.
- Cable routes will be identified using appropriate marker posts.

3.5 Control Building and Substation Compound

Cables will transfer power from the wind turbines to the on-site substation compound and control building before export to Crossaig substation for connection to the wider electricity network. The location of the control building and substation compound is shown on 02546D1001-05 in Annex 0.

The specification for the control building is subject to a number of design inputs and is dependent on the specific model of wind turbine selected for the project. It is likely to consist of one of the following methods of construction –

- Pre-fabricated steel or GRP unit with pitched or flat roof;
- Masonry cavity wall structure with traditional pitched roof construction; or
- Steel portal frame structure with traditional pitched roof construction;

Whichever building construction method is selected, finishes for wall cladding, roof tiles, doors and windows, shall be agreed with the local authority.

The design of the foundations for the building will vary depending on the above, but will likely consist of concrete foundations, in the form of part-strip footing and part-semi basement raft for cable trenches; and a ground bearing concrete floor slab. The foundations will be insulated and tanked in accordance with best practice.

Foul drainage will be provided in agreement with the relevant authorities and most likely involve the installation of a septic tank and soakaway.

3.5.1 General Construction Method

The control building and substation compound will generally be constructed in accordance with the following:

- The plan area of the substation control building and compound will be set out and the top soil stripped and removed to a temporary stockpile;
- The building foundations will be excavated and concrete poured;
- Dwarf walls will be built up from the footings to damp proof course level and the floor slab constructed, having first located and incorporated any ducts or trenches required by the follow on contractors;

  And then either –

- The prefabricated building will be delivered to site, lifted into position and secured to the concrete footings;

  Or -

- The walls will be raised to the appropriate level; and
- The roof trusses will be lifted into position using an adequately sized mobile crane, felted, battened, tiled;

  Or –

- Steel portal frame elements will be erected and fixed in position using an adequately sized mobile crane; and
- Purlin rails and wall and roof cladding panels will be fixed to the completed steel frame;

Once windows and doors are installed and the structure is wind and water tight, internal fit out of the building will commence, including wind farm switching and control panels and any domestic services.

3.6 Turbines and Turbine Transformers

3.6.1 Turbines

In line with **Planning Condition 6**, the overall height of the wind turbines shall not exceed 100 metres to tip of the blades when the turbine is in a vertical position, measured from natural ground conditions immediately adjacent to the turbine base.

In reference to **Planning Condition 17**, the turbine will be supplied with a matt grey white colour (RAL9002 or RAL 7035 or such other colour as may be agreed in writing with the planning authority).

The turbines shall not carry any symbols, logos or other lettering except where required under other legislation. However, RES propose to add turbine numbers to the base of each tower to aid service engineers during the operational phase of the wind farm.

In line with Health and Safety best practice, turbine manufacturers have indicated a preference to locate a passive infra-red (PIR) detector and light above each turbine door. It should be noted that this lamp will not be permanently lit and would only be switched by the PIR when personnel approach a particular turbine.

Specific locations for the turbines are as per drawing 02546D1001-05 in Annex 0.

3.6.2 Turbine Transformers

Depending on the model of turbine finally chosen for the site, turbine transformers will either be placed internally or externally in close proximity to the turbine.

Oil cooled transformers will be supplied full of oil and will not require topping up on site. The transformers will be sealed and will be inspected for any damage prior to offloading. Air cooled or cast resin transformers do not require cooling oil.

If the transformers are external to the turbine tower, they will be installed on concrete plinths and within secure enclosures which shall be accessible by authorised personnel only. Appropriate high voltage warning signs will be displayed on each transformer cabinet.

3.6.3 General Turbine Erection Method

The following general steps will be undertaken in order to erect the turbines on site:

- Some turbine components will be pre-delivered in sections to the site and offloaded at the crane hardstandings;
- The remaining turbine components will be delivered on just-in-time basis and be lifted directly from vehicle trailers;
- Turbine components will be lifted by adequately sized cranes (one main crane and one smaller tail crane) and positioned on the foundations / other turbine sections until the entire turbine is erected;
- Upon completion of the erection all fasteners will be tightened and the internal fit out of the turbine undertaken;
- The turbines will then be connected to the wind farm substation; and finally
- Turbine testing and commissioning will be undertaken before the turbines will be handed over as complete.

3.7 Anemometry & Communication masts

Two types of mast have permission to be erected; permanent lattice and temporary guyed tubular masts. In total six masts may be required for the development as follows:

- one permanent anemometry mast;
- four temporary site calibration and power performance masts; and
- one communication mast.

The locations of permanent and temporary masts are identified in Drawing 02546D1001-05 in Annex 0..

3.7.1 Permanent Anemometry Mast

The mast will require its own reinforced concrete foundation and crane pad to enable erection, plus associated electrical and communication plant that service the mast. The foundation construction and mast erection will follow a similar approach to that of the turbines.

3.7.2 Temporary Site Calibration & Power Performance Masts

Temporary site calibration & power performance masts have planning permission to be erected during construction and will continue to function for a period of up to 5 years while accurate wind speed measurements are taken

3.7.3 Communication Mast

The mast will require its own reinforced concrete foundation and crane pad to enable erection, plus associated electrical and communication plant that service the mast. The foundation construction and mast erection will follow a similar approach to that of the turbines.

4.0 DECOMMISSIONING

Prior to decommissioning, a site restoration scheme will be provided to the Local Planning Authority for written approval.

Outlined in the following sections are the general procedures to be followed in the decommissioning of the wind farm.

4.1 Site Tracks & Hardstanding Areas

New site tracks and hardstanding areas constructed during development of the wind farm will be reinstated to the approximate pre-wind farm condition, unless otherwise agreed with the Local Planning Authority. Areas to be reinstated would be treated in the following way:

- The material used to construct the tracks will be taken up and removed to areas identified in the site restoration scheme;
- The areas will be backfilled with suitable fill material, covered with topsoil and reseeded as required; and
- Backfilling of access tracks will be carefully planned in advance to avoid having to unnecessarily move plant and equipment on freshly reinstated land.

Any tracks which were upgraded during the development of the wind farm would be left unchanged from the conditions used during the operation phase of the wind farm.

4.2 Wind Turbines

The decommissioning of the wind turbines will be the reverse of the erection process involving similar lifting plant and equipment:

- Wind turbines will be disconnected from the cabling and internal components stripped and taken off site;
- It is anticipated that the turbine nacelle would then be taken down and loaded straight onto the back of transport vehicles and removed from site for reconditioning or scrap; and
- The turbine towers and blades would be taken down and either transported directly off site or broken down into smaller components if required.

4.3 Turbine Foundations

It is widely accepted that there is no appreciable effect on the local environment from buried reinforced concrete structures left in-situ due to the inert state of concrete. Therefore the foundations will be reinstated as follows:

- Following the removal of the wind turbine, topsoil and subsoil will be excavated to expose the top of the foundation and set aside for reuse;
- The reinforced concrete foundation will then be broken out to an agreed depth below existing the ground level and the material will be taken up and removed as identified in the site restoration scheme; and
- The excavation will be then backfilled with suitable fill material, covered with topsoil and reseeded as required.

4.4 Control Building and Substation Compound

The control building and substation compound will be decommissioned by disconnecting and dismantling all the surface plant. Solid structures such as the building and equipment plinths will be demolished and the foundation will be removed to an agreed depth below ground level. Ducting and cabling that is within the depth to be cleared will be removed.

The fence surrounding the compound will be removed and the area landscaped so it can revert to its original state.

4.5 Electrical Equipment

The electrical equipment will be decommissioned in the reverse of the installation method involving similar plant. The equipment will be dismantled, removed from site and disposed of in an appropriate manner.

4.5.1 Turbine Transformers

If external turbine transformers are present, they will be decommissioned, removed from site and either disposed of or refurbished by a company certified to handle such materials. This specialist company will also dispose of any oil or residual waste products in line with applicable regulations.

4.5.2 Cabling

Cables will be removed where they are within a reasonably accessible depth. Trenches will be backfilled with material removed during the cable removal process, covered with topsoil and reseeded as required.

5.0 RECORDS

Records, as-built drawings, specifications, operational maintenance manuals and residual risks will be collated and filed in the Project Health & Safety file based upon the requirements of the Construction (Design & Management) Regulations 2015.

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ANNEX 1 DRAWINGS

The following is a list of drawings relevant to this document, which are referenced in the planning appeal decision notice.

Title	*Drawing Number*
Detail Plan	02564D2230-01
Site Entrance	02564D2313-01
Crane Hardstanding General Arrangement	01608D2312-01
Typical Track Details	02564D2227-01
Enabling Works Compound / Gatehouse	02564D2226-01
Temporary Construction Compound Layout	02564D2306-02
Control Building and Compound Layout	02564D2307-01
Control Building and Compound Elevation	02564D2305-01
Typical Wind Turbine Foundation	02564D2303-01
Typical Masts	02564D2304-02

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ANNEX 2 ENVIRONMENTAL REQUIREMENTS OF CONTRACTORS

Document Reference – 01226R00016

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ANNEX 3 FREASDAIL WIND FARM SUDS MANAGEMENT PLAN

Document Reference - MCL115-48_DG01

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ANNEX 4 FREASDAIL WIND FARM WATERCOURSE CROSSINGS INVENTORY

Document Reference – 02564-003532

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ANNEX 5 PROCEDURE IN THE EVENT OF A CONTAMINANT SPILL

Document Reference – 01276R00001

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ANNEX 6 OUTLINE PEAT MANAGEMENT PLAN

Document Reference - 02564-001591

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ANNEX 7 FREASDAIL WIND FARM TRAFFIC MANAGEMENT PLAN

Document to follow following further discussions with Transport Scotland and Argyll and Bute Council

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ANNEX 8 SITE WASTE MANAGEMENT PLAN PROCEDURE

Document Reference – 01157-000163

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ANNEX 9 ECOLOGICAL CLERK OF WORKS TERMS OF APPOINTMENT

Document Reference – 02564-002476

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ANNEX 10 ARCHAEOLOGICAL WRITTEN SCHEME OF INVESTIGATION

Document Reference – 02564 -002360

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