TECHNICAL APPENDIX 6 – NOISE AND VIBRATION

TA6.1: Operational Noise Report

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Technical Appendix
6.1

Operational Noise Report

Strathy South Wind Farm

SSE Renewables

13584-002-R2
14th May 2020

Quality Assurance

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Executive Summary

TNEI Services was commissioned by SSE Renewables Development (UK) Limited (the 'Developer') on behalf of SSE Generation Limited (the 'Applicant') to undertake predictions of the wind turbine noise that would be emitted by the operation of the Strathy South Wind Farm (hereinafter referred to as the Proposed Varied Development). In 2018 the Applicant received consent from the Scottish Ministers to construct and operate 39 wind turbines with a tip height of up to 135 m on a site located around 12 km south of Strathy village in Sutherland. This noise assessment relates to a Section 36C Application to increase the turbine tip height from up to 135 m to up to 200 m ('the Proposed Varied Development'). The noise predictions were used to assess the potential impact of operational noise from the Proposed Varied Development on the nearest noise sensitive receptors.

The Scottish Government's web based renewables advice on *'Onshore Wind Turbines'* states: *'The Report, "The Assessment and Rating of Noise from Wind Farms" (Final Report, Sept 1996, DTI), (ETSU-R-97), describes a framework for the measurement of wind farm noise, which should be followed by applicants and consultees, and used by planning authorities to assess and rate noise from wind energy developments, until such time as an update is available. This gives indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable burdens on wind farm developers, and suggests appropriate noise conditions.'* Whilst the advice then goes on to state: *'The Institute of Acoustics (IOA) has since published Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise* [IOA GPG]. *The document provides significant support on technical issues to all users of the ETSU-R-97 method for rating and assessing wind turbine noise, and should be used by all IOA members and those undertaking assessments to ETSU-R-97. The Scottish Government accepts that the guide represents current industry good practice.'* The guidance contained within ETSU-R-97 and current good practice has been used to assess the potential operational noise impact of the Proposed Varied Development.

The noise assessment has been undertaken in three stages:

1) setting the Total ETSU-R-97 Noise Limits (which are applicable to noise from all wind turbines in the area operating concurrently) at noise sensitive receptors;
2) predicting the likely effects (undertaking a cumulative noise assessment where required) to determine whether noise immissions at noise sensitive receptors will meet the Total ETSU-R-97 Noise Limits; and
3) setting Site Specific Noise Limits for the Proposed Varied Development.

A total of three noise sensitive receptors were chosen as noise assessment locations. The assessment locations were chosen to represent the closest noise sensitive receptors to the Proposed Varied Development and other nearby schemes in order to consider the cumulative noise impacts.

Due to the large separation distances between the Proposed Varied Development and the closest receptors, background noise monitoring was not required and instead, the assessment relies on the simplified assessment approach detailed within ETSU-R-97.

Predictions of wind turbine noise for the Proposed Varied Development were made based upon the sound power level data for the loudest candidate wind turbine under consideration for the site; the Siemens Gamesa-SG 5.0-145, 5.0 MW. This wind turbine model has been chosen in order to allow a representative assessment of the noise impacts. Whatever the final turbine choice is, the Proposed Varied Development would have to meet the noise limits determined and contained within any condition imposed.

For the other schemes, predictions have been undertaken using sound power level data for the installed turbines or a suitable candidate. The model of turbine was either identified through an online search, or through the use of Highland Council's Planning Application Portal.

Modelling was undertaken using the ISO 9613: 1996 'Acoustics – Attenuation of sound during propagation outdoors Part 2: General method of calculation' noise prediction model which accords with current good practice and is considered to provide a realistic impact assessment.

The likely cumulative assessment shows that the Proposed Varied Development can operate concurrently with the proposed, consented and operational wind farms, whilst still meeting the Total ETSU-R-97 Noise limits at all receptors.

Site Specific Noise Limits have also been derived that take account (where required) of the other wind farm developments. Apportionment of the Total ETSU-R-97 Noise Limits was undertaken in accordance with current good practice.

Predicted noise levels indicate that at all noise assessment locations the wind turbine noise immissions were below the Site Specific Noise Limits. The use of Site Specific Noise Limits would ensure that the Proposed Varied Development could operate concurrently with other proposed, consented and operational turbines in the area and would also ensure that the Proposed Varied Development 's individual contribution could be measured and enforced if required.

Should Consent be granted for the Proposed Varied Development it would be appropriate to include a set of noise related planning conditions, which detail the noise limits applicable to the Proposed Varied Development. A proposed draft condition has been included within this report.

There are a number of wind turbine makes and models that may be suitable for the Proposed Varied Development. Should the Proposed Varied Development receive consent the final choice of turbine would be subject to a competitive tendering process. As such, predictions of wind turbine noise are for information only. The final choice of turbine would, however, have to meet the noise limits determined and contained within any condition imposed.

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1 Introduction

1.1 Brief

1.1.1 TNEI was commissioned by SSE Renewables Development (UK) Limited (the 'Developer') on behalf of SSE Generation Limited (the 'Applicant') to undertake an operational noise impact assessment for the proposed Strathy South Wind Farm (hereinafter referred to as the Proposed Varied Development). The following steps summarise the noise assessment process:

- Determine the 'Total ETSU-R-97 Noise Limits' applicable to all wind turbines in the area with reference to existing Government Guidance and the recommendations of the Department of Trade and Industry (DTI) Noise Working Group on Noise from Wind Turbines (WGNWT), which are contained within ETSU-R-97 *'The Assessment and Rating of Noise from Wind Farms'* (1) and *'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'* (2) (IOA GPG), which represents current good practice;
- Assess and undertake a cumulative noise assessment, where required, to take account of other proposed, consented or operational schemes near to the Proposed Varied Development;
- Suggest 'Site Specific Noise Limits' for the Proposed Varied Development, suitable for inclusion in a noise related planning condition, should Scottish Ministers be minded to grant consent for the Proposed Varied Development;
- Undertake predictions of the operational wind turbine noise immissions from the Proposed Varied Development that will be incident at neighbouring noise sensitive receptors (NSRs);
- Compare predictions of the operational wind turbine noise immissions from the Proposed Varied Development against the Site Specific ETSU-R-97 Noise Limits that will be incident at neighbouring NSRs; and
- Assess the impact of noise from the Proposed Varied Development with reference to existing Government Guidance and the recommendations of the DTI NWGNWT, which are contained within ETSU-R-97 and the IOA GPG.

1.2 Background

1.2.1 The Proposed Varied Development is located around 12 km south of Strathy village in Sutherland. The OS Grid Reference for the approximate site centre is 279500, 949500 and the proposed layout can be seen in Figure A1.1a in Annex 1.

1.2.2 In 2018 the Applicant received consent from the Scottish Ministers to construct and operate 39 wind turbines with a tip height of up to 135 m on the site. This noise assessment relates to a Section 36C Application to increase the turbine tip height from *up to 135 m* to *up to 200 m* ('the Proposed Varied Development').

1.2.3 In the absence of a confirmed turbine model, this noise assessment models a candidate turbine, the Siemens Gamesa-SG 5.0-145, 5.0 MW. This turbine has been selected as it is representative of the turbine type which could be installed at the site.

1.2.4 There are a number of proposed, consented and operational wind farm developments in proximity to the Proposed Varied Development, which include the following:

- Strathy North Wind Farm 33 turbines (operational; Ref: 07/00020/S36SU)
- Strathy Wood Wind Farm 13 turbines (in planning; Ref: 13/04469/S36)
- Bettyhill Wind Farm 2 turbines (operational; Ref: 07/00448/FULSU)
- Ackron Wind Farm 12 turbines (in scoping; Ref: 19/04756/SCOP)
- Armadale Wind Farm 23 turbines (in scoping; Ref: 19/05231/SCOP)

1.2.5 Figure A1.1b in Annex A details the location of the above developments and the Proposed Varied Development.

1.2.6 Strathy North Wind Farm was consented with noise limits of background noise plus 5 dB (as defined in ETSU-R-97) at the closest receptors of Braerathy Lodge and Dallangwell (extract of decision notice included in Annex 2). It should be noted, however, that those properties are uninhabited and financially involved with the Proposed Varied Development and will be vacant for the lifetime of the Strathy South Wind Farm. Therefore, these properties have been scoped out of this noise assessment.

1.2.7 The ETSU-R-97 simplified limit of 35 dB has been utilised as the Total ETSU-R-97 Noise Limit for all of the NSRs considered in this report.

1.2.8 For the purposes of assessing the above schemes in conjunction with the Proposed Varied Development the following terms have been referred to throughout;

- 'Total ETSU-R-97 Noise Limits'; defined as being the limit that should not be exceeded from the cumulative operation of all wind farm developments, including the Proposed Varied Development; and
- 'Site Specific Noise Limits'; defined as being the limit that is specific to the Proposed Varied Development only, and derived through the apportionment (where required), of the 'Total ETSU-R-97 Noise Limits' in accordance with current good practice.

- 'Cumulative noise'; defined as the noise immission levels from the combined operation of the Proposed Varied Development and all of the developments detailed in 1.2.4.

1.2.9 Note that in this report, the term 'noise emission' relates to the sound power level radiated from each wind turbine, whereas the term 'noise immission' relates to the sound pressure level (the received noise) at any receptor location due to the operation of the wind turbines.

2 Noise Planning Policy and Guidance

2.1 Overview of Noise Planning Policy and Guidance

2.1.1 In assessing the potential noise impacts of the Proposed Varied Development the following guidance and policy documents have been considered:

- Local Policy;
- National Planning Policy[3];
- Web Based Renewables Advice: *'Onshore Wind Turbines'*[4];
- Planning Advice Note PAN 1/2011: *'Planning and Noise'*[5];
- ETSU-R-97 *'The Assessment and Rating of Noise from Wind Farms'*; and
- Institute of Acoustics *'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'* (IOA GPG) May 2013.

2.2 Local Policy

2.2.1 In determining an application for planning permission the 'starting point' for decision makers is to consider the compliance of a proposal against the proposed Development Plan taken as a whole. Plans often have policies tailored specifically to control certain kinds of proposed development and such policies should carry more weight and be more dominant in the minds of decision makers.

2.2.2 When considering planning applications, decision makers should have regard to any adopted Structure Plan Policies, Local Plan (or Local Development Plan) Policies and any accompanying Supplementary Planning Guidance. In determining planning applications due regard should be had to all other material considerations, including National Planning Policy.

The Highland-wide Local Development Plan

2.2.3 The Highland-wide Local Development Plan (HwLDP) was adopted by The Highland Council (THC) on 5 April 2012. The HwLDP sets out the overarching vision statement, spatial strategy and general planning policies for the whole of the Highland Council area (with the exception of the area covered by the Cairngorms National Park Local Plan, which is subject to a separate Development Plan).

2.2.4 Preparation of the second HwLDP is underway, with preparatory stages such as the Main Issues Report complete and published. However, there is no anticipated date that the HwLDP 2 is to be adopted as THC has indicated that further review of the current HwLDP will be postponed until after the implications of the Scottish Planning Bill (2017) are better understood. The current HwLDP is therefore considered to be a relevant Local Development Plan, but that the overall weight to be attached to it is decreased as it is over 5 years old.

2.2.5 Policy 67 of the HwLDP relates to Renewable Energy Development. The policy is supportive of such schemes where the Council is satisfied that they are located, sited and designed such that they will not be significantly detrimental overall, having regard to a number of effects including the safety and amenity of any regularly occupied buildings and the grounds that they occupy having regard to, amongst other things, the likely effect of noise generation.

2.3 The Highland Council's 'Onshore Wind Energy Supplementary Guidance (2016)

2.3.1 The Highland Council's 'Onshore Wind Energy Supplementary Guidance' (2016) details how onshore wind energy development proposals would be managed. The guidance has a section that sets out the assessment methods and key guiding principles that should form the basis of the noise assessment. The guidance states that a noise assessment for proposed large-scale wind turbine development should be undertaken in accordance with ETSU-R-97 and the IOA GPG.

2.3.2 The guidance goes on to state that due to the undeveloped nature of the Highlands, proposals should aim to achieve noise limits at the lower end of ranges given in national guidance at sensitive locations.

2.3.3 With regard to the cumulative effects of noise from wind farms, THC states: *"Where noise from more than one wind turbine development may have a cumulative impact at any noise sensitive location, applicants must ensure this is adequately assessed in accordance with best practice, which includes consideration of both predicted and consented levels".*

2.4 National Planning Policy

2.4.1 Scottish Planning Policy (SPP) was published in 2014. It states (paragraph 169) that proposals for energy infrastructure should take account of spatial frameworks for wind farms (where relevant) and that considerations may include noise impacts on communities and individual dwellings.

Planning Advice Note PAN 1/2011: Planning and Noise

2.4.2 PAN 1/2011 provides advice on the role of the planning system in helping to prevent and limit the adverse effects of noise. Paragraph 29 contains some specific information on noise from wind farms and states the following:

'There are two sources of noise from wind turbines - the mechanical noise from the turbines and the aerodynamic noise from the blades. Mechanical noise is related to engineering design. Aerodynamic noise varies with rotor design and wind speed, and is generally greatest at low speeds. Good acoustical design and siting of turbines is essential to minimise the potential to generate noise. Web based planning advice on renewable technologies for Onshore wind turbines provides advice on 'The Assessment and Rating of Noise from Wind Farms' (ETSU-R-97) published by the former Department of Trade and Industry [DTI] and the findings of the Salford University report into Aerodynamic Modulation of Wind Turbine Noise.'

2.5 Web Based Planning Advice – Onshore Wind Turbines

2.5.1 The 'Onshore Wind Turbines' web-based document describes the types of noise (mechanical and aerodynamic) that wind turbines generate. Mechanical noise is generated by the gearbox and generator and other parts of the drive train, which can be radiated as noise through the nacelle, gear box, tower and supporting structures, together with the aerodynamic noise generated by the action of the blades rotating through the air. The document states '*there has been significant reduction in the mechanical noise generated by wind turbines through improved turbine* design' and goes on to note:

'The Report, "The Assessment and Rating of Noise from Wind Farms" (Final Report, Sept 1996, DTI), (ETSU-R-97), describes a framework for the measurement of wind farm noise, which should be followed by applicants and consultees, and used by planning authorities to assess and rate noise from wind energy developments, until such time as an update is available. This gives indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable burdens on wind farm developers, and suggests appropriate noise conditions.'

2.5.2 The web-based document then refers to the IOA GPG as a source, which provides:

'significant support on technical issues to all users of the ETSU-R-97 method for rating and assessing wind turbine noise, and should be used by all IOA members and those undertaking assessments to ETSU-R-97. The Scottish Government accepts that the guide represents current industry good practice.'

2.5.3 The document also refers to the role of PAN1/2011 'Planning and Noise' to:

'provide advice on the role of the planning system in helping to prevent and limit the adverse effects of noise. The associated Technical Advice Note provides guidance which may assist in the technical evaluation of noise assessment.'

2.5.4 Examination of the Technical Advice Note[6] confirms it provides no further advice on wind farms other than referring to ETSU-R-97 and relevant parameters for modelling identified in the Institute of Acoustics Bulletin March 2009, on page 37. This has been superseded by the introduction of the IOA GPG in May 2013.

2.6 ETSU-R-97 The Assessment and Rating of Noise from Wind Farms

2.6.1 As wind farms started to be developed in the UK in the early 1990's, it became apparent that existing noise standards did not fully address the issues associated with the unique characteristics of wind farm developments and there was a need for an agreed methodology for defining acceptable noise limits for wind farm developments. This methodology was developed for the former DTI by the WGNWT.

2.6.2 The WGNWT comprised a number of interested parties including, amongst others, Environmental Health Officers, wind farm operators, independent acoustic consultants and legal experts who:

'…between them have a breadth and depth of experience in assessing and controlling the environmental impact of noise from wind farms.'

2.6.3 In this way it represented the views of all the stakeholders that are involved in the assessment of noise impacts of wind farm developments. The recommendations of the WGNWT are presented in the DTI Report – ETSU-R-97 *'The Assessment and Rating of Noise from Wind Farms (1996).'*

2.6.4 The basic aim of the WGNWT in arriving at the recommendations was the intention to provide:

'Indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable restrictions on wind farm development or adding to the costs and administrative burdens on wind farm developers or local authorities.'

2.6.5 ETSU-R-97 makes it clear from the outset that any noise restrictions placed on a wind farm must balance the environmental impact of the wind farm against the national and global benefits that would arise through the development of renewable energy sources:

'The planning system must therefore seek to control the environmental impacts from a wind farm whilst at the same time recognising the national and global benefits that would arise through the development of renewable energy sources and not be so severe that wind farm development is unduly stifled.'

2.6.6 Where noise at the nearest NSRs is limited to an $L_{A90,10min}$ of 35 dB(A) up to wind speeds of 10 ms^{-1} at a height of 10 m, then it does not need to be considered in the noise assessment, as protection of the amenity of these properties can be controlled through a simplified noise limit. In this regard ETSU-R-97 states that:

'For single turbines or wind farms with very large separation distances between the turbines and the nearest properties, a simplified noise condition may be suitable. If the noise is limited to an $L_{A90,10min}$ of 35 dB(A) up to wind speeds of 10 m/s at 10 m height, then this condition alone would offer sufficient protection of amenity, and background noise surveys would be unnecessary.'

2.6.7 The ETSU-R-97 assessment procedure specifies that where noise is greater than the simplified limit of 35 dB L_{A90} noise limits should be set relative to existing background noise levels at the nearest receptors. These limits should reflect the variation in both turbine source noise and background noise with wind speed. Absolute lower limits, different for daytime and night-time, are applied where low levels of background noise are measured. The wind speed range that should be considered ranges between the cut-in wind speed for the turbines (usually about 2 to 3 ms^{-1}) and up to 12 ms^{-1}, where all wind speeds are referenced to a 10 metre measurement height.

2.6.8 Separate noise limits apply for daytime and for night-time. Daytime limits are chosen to protect a property's external amenity, and night-time limits are chosen to prevent sleep disturbance indoors, with windows open.

2.6.9 The daytime noise limit is derived from background noise data measured during so-called 'quiet periods of the day', which comprise weekday evenings (18:00 to 23:00), Saturday afternoons and evenings (13:00 to 23:00) and all day and evening on Sundays (07:00 to 23:00). Multiple samples of 10 minute background noise levels using the $L_{A90,10min}$ measurement index are logged continuously over a range of wind speed conditions. These measured noise levels are then plotted against concurrent wind speed data and a 'best fit' curve is fitted to the data to establish the background noise level as a function of wind speed. The ETSU–R-97 daytime noise limit, sometimes referred to as a 'criterion curve', is then set at a level 5 dB(A) above the best fit curve over the desired wind speed range; subject to an appropriate daytime fixed minimum limit:

'For wind speeds where the best fit curve to the background noise data lies below a level of 30 - 35 dB(A) the criterion curve is set at a fixed level in the range 35 - 40 dB(A). The precise choice of criterion curve level within the range 35 - 40 dB(A) depends on a number of factors: the number of noise affected properties, the likely duration, the level of exposure and the potential impact on the power output of the wind farm. The quiet daytime limits have been set in ETSU-R-97 on the basis of protecting the amenity of residents whilst outside their dwellings in garden areas.'

2.6.10 The night-time noise limit is derived from background noise data measured during the night-time periods (23:00 to 07:00), with no differentiation being made between weekdays and weekends. The 10 minute L_{A90} noise levels measured over the night-time periods are plotted against concurrent wind speed data and a 'best fit' correlation is established. The night-time noise limit is also based on a level 5 dB(A) above the best fit curve over the 0 - 12 ms^{-1} wind speed range, with a fixed minimum limit of 43 dB L_{A90}.

2.6.11 The exception to the setting of both the daytime and night-time fixed minimum limits occurs where a property occupier has a financial involvement in the wind farm development. Paragraph 24 of ETSU-R-97 states:

'The Noise Working Group recommends that both day and night-time lower fixed limits can be increased to 45 dB(A) and that consideration should be given to increasing the permissible margin above background where the occupier of the property has some financial involvement in the wind farm.'

2.6.12 ETSU-R-97 provides a robust basis for determining the noise limits for wind turbine(s) and since its introduction has become the accepted standard for such developments across the UK.

2.7 Current Good Practice

A Good Practice Guide on the Application of ETSU-R-97

2.7.1 In May 2013, the Institute of Acoustics issued *'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'* (IOA GPG). The document provides guidance on background data collection, data analysis and limit derivation, noise predictions, cumulative issues, reporting requirements and other matters such as noise related planning conditions.

2.7.2 The Authors of the IOA GPG sets out the scope of the document in Section 1.2:

'This guide presents current good practice in the application of the ETSU-R-97 assessment methodology for all wind turbine developments above 50 kW, reflecting the original principles within ETSU-R-97, and the results of research carried out and experience gained since ETSU-R-97 was published. The noise limits in ETSU-R-97 have not been examined as these are a matter for Government.'

2.7.3 The guidance document was endorsed, on behalf of Scottish Government by the Cabinet Secretary for Finance, Employment and Sustainable Growth, Mr John Swinney MSP[7]. The recommendations included in the IOA GPG have been considered and applied throughout this noise assessment for the Proposed Varied Development.

2.7.4 The IOA GPG refers to six Supplementary Guidance Notes and where applicable these have also been considered in this report.

2.7.5 The guidance contained within ETSU-R-97 and the IOA GPG has therefore been used to assess and rate the operational noise emissions from the Proposed Varied Development.

3 Potential Impacts

3.1 Operational Noise Sources

3.1.1 Wind turbines may emit two types of noise. Firstly, aerodynamic noise is a more natural sounding 'broad band' noise, albeit with a characteristic modulation, or 'swish', which is produced by the movement of the rotating blades through the air. Secondly, mechanical noise may emanate from components within the nacelle of a wind turbine. Potential sources of mechanical noise include gearboxes or generators.

3.1.2 Aerodynamic noise is usually perceived when the wind speeds are fairly low although at very low wind speeds the blades do not rotate, or rotate very slowly, and so negligible aerodynamic noise is generated. In higher winds aerodynamic noise may be masked by the normal sound of wind blowing through the trees and around buildings. The level of this natural 'masking' noise relative to the level of wind turbine noise is one of the several factors that determine the subjective audibility of the wind turbines [(11)].

3.2 Infrasound, Low Frequency Noise and Vibration

3.2.1 The term infrasound is usually defined as the frequency range below 20 Hz, while low frequency noise (LFN) describes sound in the frequency range 20 – 200 Hz. An average young healthy adult has an audible range from 20 Hz to 20,000 Hz, although the sensitivity of the ear varies with frequency and is most sensitive to sounds with frequencies between 500 Hz and 4,000 Hz. Wind turbines do produce low frequency sounds [(9)], but our threshold of hearing at such low frequencies is relatively high and they therefore go unnoticed. Infrasound from wind turbines is often at levels below that of the noise generated by wind around buildings and other obstacles.

3.2.2 In 2004, the former DTI commissioned The Hayes McKenzie Partnership to report on claims that infrasound or LFN emitted by wind turbine generators (WTGs) were causing health effects. Of the 126 wind farms operating in the UK, five had reported LFN problems, therefore, such complaints are an exception, rather than a general problem that exists for all wind farms. Hayes McKenzie investigated the effects of infrasound and LFN at three wind farms for which complaints had been received and the results were reported in May 2006 [(10)]. The report concluded that:

- *'infrasound associated with modern wind turbines is not a source which will result in noise levels which may be injurious to the health of a wind farm neighbour;*
- *low frequency noise was measurable on a few occasions but below the existing permitted Night Time Noise Criterion. Wind turbine noise may result in internal noise levels within a dwelling that is just above the threshold of audibility, however at all sites it was always lower than that of local road traffic noise;*

- *that the common cause of complaint was not associated with LFN, but the occasional audible modulation of aerodynamic noise especially at night. Data collected showed that the internal noise levels were insufficient to wake up residents at these three sites. However once awoken, this noise can result in difficulties in returning to sleep.'*

3.2.3 The Applied and Environmental Geophysics Research Group at Keele University was commissioned by the Ministry of Defence (MOD), the DTI and the British Wind Energy Association (BWEA) to undertake microseismic and infrasound monitoring of LFN and vibrations from wind farms for the purposes of siting wind farms in the vicinity of Eskdalemuir in Scotland. Whilst the testing showed that vibration can be detected several kilometres away from wind turbines, the levels of vibration from wind turbines were so small that only the most sophisticated instrumentation can reveal their presence and they are almost impossible to detect. Nevertheless, the Renewable Energy Foundation alleged potential adverse health effects and when that story was picked up in the popular press, notably the Scotsman, the report's authors expressed concern over the way in which their work had been misinterpreted and issued a rebuttal statement [(11)] in August 2005:

'Vibrations at this level and in this frequency range will be available from all kinds of sources such as traffic and background noise – they are not confined to wind turbines. To put the level of vibration into context, they are ground vibrations with amplitudes of about one millionth of a millimetre. There is no possibility of humans sensing the vibration and absolutely no risk to human health.'

3.2.4 In response to concerns that wind turbines emit infrasound and cause associated health problems, Dr Geoff Leventhall, Consultant in Noise Vibration and Acoustics and author of the Defra Report on Low Frequency Noise and its Effects, said in the article in the Scotsman ('Wind farm noise rules 'dated'- James Reynolds, 5 August 2005'):

'I can state quite categorically that there is no significant infrasound from current designs of wind turbines.'

3.2.5 An article [(12)] published in the IOA Bulletin (March/April 2009) concluded that there is no robust evidence that either low frequency noise (including 'infrasound') or ground-borne vibration from wind farms, has an adverse effect on wind farm neighbours.

3.2.6 Work [(13)] by Dr Leventhall looked at infrasound levels within the ear compared to external sources and concluded:

'The conclusion is that the continuous inner ear infrasound levels due to internal sources, which are in the same frequency range as wind turbine rotational frequencies, are higher than the levels produced in the inner ear by wind turbines, making it unlikely that the wind turbine noise will affect the vestibular systems, contrary to suggestions made following the measurements at Shirley. The masking effect is similar to that in the abdomen (Leventhall 2009). The body, and vestibular systems, appear to be built to avoid disturbance from the high levels of infrasound which are produced internally from the heartbeat and other processes. In fact, the hearing mechanisms and the balance mechanisms, although in close proximity, have developed to minimise interaction (Carey and Amin 2006).'

3.2.7 More recently during a planning Appeal (PPA-310-2028, Clydeport Hunterston Terminal Facility, approximately 2.5 km south-west of Fairlie, 9 Jan 2018), the health impacts related to LFN associated with wind turbines were considered at length by the appointed Reporter (Mr M Croft). The Reporter considered evidence from Health Protection Scotland and the National Health Service. In addition, he also considered LFN surveys undertaken by the Appellant and the Local Authority, both of which demonstrated compliance with planning conditions and did not identify any problems attributable to the turbine operations; some periods with highest levels of low frequency noise were in fact recorded when the turbines were not operating.

3.2.8 The Reporter concluded that:

- The literature reviews by bodies with very significant responsibilities for the health of local people found insufficient evidence to confirm a causal relationship between wind turbine noise and the type of health complaints cited by some local residents.
- The NHS's assessment is that concerns about health impact are not supported by good quality research.
- Although given the opportunity, the Community Council failed to provide evidence that can properly be set against the general tenor of the scientific evidence.

3.2.9 It is therefore not considered necessary to carry out specific assessments of LFN and it has not been considered further in the noise assessment.

3.3 Amplitude Modulation of Aerodynamic Noise (AM)

3.3.1 In the context of wind turbine noise amplitude modulation describes a variation in noise level over time; for example, observers may describe a 'whoosh whoosh' sound, which can be heard close to a wind turbine as the blades sweep past. Amplitude Modulation of aerodynamic noise is an inherent characteristic of wind turbine noise and was noted in ETSU-R-97, on page 68:

'The modulation or rhythmic swish emitted by wind turbines has been considered by some to have a characteristic that is irregular enough to attract attention. The level and depth of modulation of the blade noise is, to a degree, turbine-dependent and is dependent upon the position of the observer. Some wind turbines emit a greater level of modulation of the blade noise than others. Therefore, although some wind turbines might be considered to have a character that may attract one's attention, others have noise characteristics which are considerably less intrusive and unlikely to attract one's attention and be subject to any penalty.

This modulation of blade noise may result in a variation of the overall A-weighted noise level by as much as 3dBA (peak to trough) when measured close to a wind turbine. As distance from the wind turbine [or] wind farm increases, this depth of modulation would be expected to decrease as atmospheric absorption attenuates the high frequency energy radiated by the blade.'

3.3.2 In recent times the Acoustics community has sought to make a distinction between the AM discussed within ETSU-R-97, which is expected at most wind farms and as such may be considered as 'Normal Amplitude Modulation' (NAM), compared to the unusual AM that has sometimes been heard at some wind farms, hereinafter referred to as 'Other Amplitude Modulation' (OAM). The term OAM is increasingly used to describe an unusual feature of aerodynamic noise from wind turbines, where a greater than normal degree of regular fluctuation in sound level occurs at blade passing frequency, typically once per second. In some appeal decisions it may also be referred to as 'Excess Amplitude Modulation' (EAM). It should be noted that the noise assessment and rating procedure detailed in ETSU-R-97 fully takes into account the presence of the intrinsic level of NAM when setting acceptable noise limits for wind farms.

3.3.3 On 16 December 2013, RenewableUK (RUK) released six technical papers [14] on AM, which reflected the outcomes of research commissioned over the previous three years, together with a template planning condition. Whilst this research undoubtedly improved understanding of Other Amplitude Modulation (OAM) and its effects, it should be noted that at the time of writing it has not been endorsed by any relevant body such as the Institute of Acoustics (IOA).

3.3.4 On 22 January 2014, the IOA released a statement regarding the RUK research and the proposed planning condition to deal with the issue of amplitude modulation from a wind turbine and stated:

'This research is a significant step forward in understanding what causes amplitude modulation from a wind turbine, and how people react to it. The proposed planning condition, though, needs a period of testing and validation before it can be considered to be good practice. The IOA understands that RenewableUK will shortly be making the analysis tool publicly available on their website so that all interested parties can test the proposed condition, and the IOA will review the results later in the year. Until that time, the IOA cautions the use of the proposed planning condition.'

3.3.5 Research regarding amplitude modulation continued. In April 2015, the IOA issued a discussion document entitled *'Methods for Rating Amplitude Modulation in Wind Turbine Noise'*. The document presented three methods that can be used to quantify the level of AM at a given measurement location. After extensive consultation a preferred method of measuring OAM, which provides a framework for practitioners to measure and rate AM, was recommended by the IOA.

3.3.6 On 3 August 2015, the Department for Energy and Climate Change (DECC), now the Department for Business, Energy and Industrial Strategy (BEIS), commissioned independent consultants WSP Parsons Brinkerhoff to carry out a literature review on OAM (which they refer to simply as AM). The stated aims were as follows:

- *To review the available evidence on Amplitude Modulation (AM) in relation to wind turbines, including but not limited to the research commissioned and published by RenewableUK in December 2013;*
- *To work closely with the Institute of Acoustics' AM working group, who are expected to recommend a preferred metric and methodology for quantifying and assessing the level of AM in a sample of wind turbine noise data;*
- *To review the robustness of relevant dose response relationships, including the one developed by the University of Salford as part of the RenewableUK study, on which the correction (or penalty) for amplitude modulation proposed as part of its template planning condition is based;*
- *To consider how, in a policy context, the level(s) of AM in a sample of noise data should be interpreted, in particular determining at what point it causes a significant adverse impact;*
- *To recommend how excessive AM might be controlled through the use of an appropriate planning condition; and*
- *To consider the engineering/cost trade-offs of possible mitigation measures.*

3.3.7 Their report, which was released in October 2016, concluded that there is sufficient robust evidence that excessive AM leads to increased annoyance from wind turbine noise and recommended that excessive AM is controlled through a suitably worded planning condition, which will control it during periods of complaint. Those periods should be identified by measurement using the metric proposed by the work undertaken by the IOA, and enforcement action would rely upon professional judgement by Local Authority Environmental Health Officers based on the duration and frequency of occurrence.

3.3.8 It is not clear within the body of the report which evidence the authors relied upon to arrive at their conclusions, although the Executive Summary states (page 4);

"It is noted that none of the Category 1 or 2 papers have been designed to answer the main aim of the current review in its entirety. The Category 1 studies have limited representativeness due to sample constraints and the artificiality of laboratory environments, whereas the Category 2 studies generally do not directly address the issue of AM WTN exposure-response. A meta - analysis of the identified studies was not possible due to the incompatibility of the various methodologies employed. Notwithstanding the limitations in the evidence, it was agreed with DECC that the factors to be included in a planning condition should be recommended based on the available evidence, and supplemented with professional experience".

3.3.9 The report [13] states that any planning condition must accord with existing planning guidance, and should be subject to legal advice on a case by case basis. Existing guidance would include compliance with the six tests of a planning condition embodied in Circular 4/98. The report's authors did not dictate a particular condition to be used but did suggest that any condition should include the following elements (p5):

- *"The AM condition should cover periods of complaints (due to unacceptable AM);*
- *The IoA-recommended metric should be used to quantify AM (being the most robust available objective metric);*
- *Analysis should be made using individual 10-minute periods, applying the appropriate decibel 'penalty' to each period, with subsequent analysis;*
- *The AM decibel penalty should be additional to any decibel penalty for tonality;* [tonality means mechanical sound already covered by ETSU noise limits]*; and*
- *An additional decibel penalty is proposed during the night time period to account for the current difference between the night and day limits on many sites to ensure the control method works during the most sensitive period of the day."*

3.3.10 At the time of writing there has been no official response to those recommendations from the IOA Noise Working Group and, as yet, no endorsement from any Scottish Government Minister or Department. The recommendation to impose a planning condition and the associated penalty scheme is at odds with the advice from the IOA GPG, which currently states (paragraph 7.2.10):

'7.2.1 The evidence in relation to "Excess" or "Other" Amplitude Modulation (AM) is still developing. At the time of writing, current practice is not to assign a planning condition to deal with AM.'

3.3.11 On that basis Amplitude Modulation has not been considered further in this assessment.

4 Methodology

4.1 Assessing Operational Noise Impact

4.1.1 As is detailed in Section 2.6.6 above, ETSU-R-97 states that where there are very large separation distances between turbines and the closest receptors then a simplified noise condition may be suitable. Due to the large separation distances between the Proposed Varied Development and the nearest receptors (>4 km) the simplified assessment methodology has been adopted for this assessment.

4.1.2 To undertake an assessment of the operational noise impact in accordance with the requirements of ETSU-R-97 and the IOA GPG, the following steps are required:

- Specify the location of the wind turbines for the Proposed Varied Development;
- Identify the locations of all nearby NSRs and select a sample of relevant Noise Assessment Locations (NALs);
- Establish for each NAL the 'Total ETSU-R-97 Noise Limits' through consideration of the noise limit already allocated to other schemes in the area;
- Specify the likely noise emission characteristics of the wind turbines for the Proposed Varied Development and all nearby cumulative wind turbines;
- Calculate the likely noise immission levels due to the cumulative operation of all relevant wind turbines and compare it to the Total ETSU-R-97 Limits;
- If required, determine the 'Site Specific Noise Limits' which take allowance of the noise immissions due to other schemes; and
- Calculate the likely noise immission levels due to the operation of the Proposed Varied Development on its own and compare it to the Proposed Varied Development 's 'Site Specific Noise Limits'.

4.1.3 In order to consider the steps outlined above the assessment has been split into three separate stages:

- Stage 1 – establish the Total ETSU-R-97 Noise Limits for each NAL - As detailed in Section 1.2.6 the ETSU-R-97 simplified limit of 35 dB has been utilised as the Total ETSU-R-97 Noise Limit for all NALs;
- Stage 2 – undertake a cumulative assessment, where required, to determine whether the Proposed Varied Development can operate concurrently with the other proposed, consented or operational wind farm developments; and
- Stage 3 – establish the Site Specific Noise Limits for the Proposed Varied Development (at levels below the Total ETSU-R-97 Noise Limits, where limit apportionment is required) and compare the noise predictions from the Proposed Varied Development operating on its own against these proposed limits.

4.1.4 There are a range of turbine makes and models that may be appropriate for the Proposed Varied Development. The final selection of turbine will follow a competitive tendering process and thus the final model of turbine may differ from those on which this assessment has been based. However, the final choice of turbine will comply with the noise limits that have been established for the site.

4.2 Consultation

Scoping Opinion (dated July 2019)

4.2.1 Energy Consents Unit, Scottish Government (ECU) and THC requested that an updated operational noise assessment should be undertaken for the Proposed Varied Development in line with ETSU-R-97 and the IOA GPG. This report details that updated assessment.

Highland Council EHO Consultation (dated November 2019)

4.2.2 The approach to the operational noise assessment was confirmed. This included scoping out of the financially involved properties to be vacant for the lifetime of the wind farm (Braerathy Lodge and Dallangwell) and the cumulative assessment to include the application of site-specific limits to Strathy South. Due to the distances to receptors involved the use of proxy noise monitoring locations, should compliance monitoring be required, was also agreed (this is included in the draft noise conditions included in Annex 5).

4.3 Setting the Total ETSU-R-97 noise limits (Stage 1)

Identifying Existing Noise Limits

4.3.1 ETSU-R-97 noise limits were established for Strathy North Wind Farm as background noise plus 5 dB limits for Braerathy Lodge and Dallangwell, the closest properties to the wind farm. These properties, however, are financially involved with the Proposed Varied Development and will be vacant for the lifetime of the Strathy South Wind Farm. The nearest remaining NSRs to the Proposed Varied Development (and Strathy North Wind Farm) do not have any existing noise limits imposed therefore, the ETSU-R-97 simplified limit of 35 dB has been assumed for this assessment.

4.3.2 An extract of the Decision Notice containing the Strathy North noise conditions are included in Annex 2 for information.

Noise Impact Criteria in ETSU-R-97

4.3.3 The acceptable limits for wind turbine operational noise are clearly defined for all time periods by the application of the ETSU-R-97 methodology. Consequently, the test applied to operational noise is whether or not the predicted wind turbine noise immission levels at nearby noise sensitive properties lie below the ETSU-R-97 noise limits. Depending on the levels of background noise, the satisfaction of the ETSU-R-97 derived limits can lead to a situation whereby, at some locations under some wind conditions and for a certain proportion of the time, the wind turbine noise would be audible.

4.4 Assessment of likely effects and the requirement for a cumulative assessment (Stage 2)

4.4.1 The IOA GPG includes a detailed section on cumulative noise and provides guidance on where a cumulative assessment is required. Section 5.1.4 and 5.1.5 of the GPG state:

'During scoping of a new wind farm development consideration should be given to cumulative noise impacts from any other wind farms in the locality. If the proposed wind farm produces noise levels within 10 dB of any existing wind farm/s at the same receptor location, then a cumulative noise impact assessment is necessary.

Equally, in such cases where noise from the proposed wind farm is predicted to be 10 dB greater than that from the existing wind farm (but compliant with ETSU-R-97 in its own right), then a cumulative noise impact assessment would not be necessary.'

4.4.2 Accordingly, the predicted levels from the Proposed Varied Development will be compared to the noise immission levels from the other neighbouring schemes. The calculated difference between noise levels will determine whether a cumulative noise assessment is required.

Noise Prediction / Propagation Model

4.4.3 The ISO 9613-2: 1996 *'Acoustics – Attenuation of sound during propagation outdoors Part 2: General method of calculation'*[8] model algorithm provides a robust prediction method for calculating the noise immission levels at the nearest receptors.

4.4.4 The use of ISO 9613-2 is discussed in the IOA GPG which states, in Section 4.1.4:

'ISO 9613-2 standard in particular, which is widely used in the UK, can be applied to obtain realistic predictions of noise from on-shore wind turbines during worst case propagation conditions (i.e. sound speed gradients due to downwind conditions or temperature inversions), but only provided that the appropriate choice of input parameters and correction factors are made.'

4.4.5 There is currently no standard approach to specifying error bands on noise predictions. Table 5 of ISO 9613-2 suggests, at best, an estimated of accuracy of ± 3 dB(A). The work undertaken as part of the EC research study concluded that the ISO 9613-2 algorithm reliably predicted noise levels that would generally occur under downwind propagation conditions.

4.4.6 The ISO 9613-2 model can take account of the following factors that influence sound propagation outdoors:

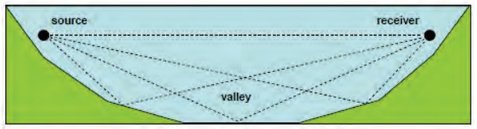
- Geometric divergence;
- Atmospheric absorption;
- Reflecting obstacles;
- Screening;
- Vegetation; and
- Ground attenuation.

4.4.7 The model uses as its acoustic input data the octave band sound power output of the turbine and calculates, on an octave band basis, attenuation due to the factors above, as appropriate.

4.4.8 The IOA GPG quotes a comparative study undertaken in Australia that indicated ISO 9613-2 can, in some conditions, under-predict ground attenuation effects and the potential for additional reflection paths 'across a valley', whilst slightly over-predicting on flat terrain. It should be noted, however, that the wind farm layouts studied were untypical for the UK, with rows of turbines spreading over 10 km on an elevated ridge. It also should be noted that no correction for background contribution was undertaken and the monitoring locations were located as far as 1.7 km from the nearest turbine, where turbine noise may be at similar levels to background noise and therefore difficult to differentiate. For the study's modelling work topographic height data was included as an input, which is consistent with ISO 9613-2 methodology generally, but use of topographic data is only used to consider the propagation path between source and receiver, and to test for topographic effects as detailed below in accordance with the IOA GPG.

4.4.9 The IOA GPG states that a *'further correction of +3 dB should be added to the calculated overall A-weighted level for propagation 'across a valley', i.e. a concave ground profile or where the ground falls away significantly between a turbine and the receiver location.'* The potential reflection paths are illustrated in Schematic 4.1 below.

Schematic 4.1: Multiple reflection paths for sound propagation across concave ground



Source: IOA GPG, page 21, Figure 5

4.4.10 A formula from the JOULE Project JOR3-CT95-0051 dated 1998 is suggested for determining whether a correction is required.

$$h_m \geq 1.5 \times (abs\ (h_s - h_r) / 2)$$

where h_m is the mean height above the ground of the direct line of sight from the receiver to the source (as defined in ISO 9613-2, Figure 3), and h_s and h_r are the heights above local ground level of the source and receiver respectively).

4.4.11 The calculation of h_m requires consideration of the digital terrain model and needs to be performed for each path between every turbine and every receiver. Interpretation of the results of the calculation above and the subsequent inclusion of a concave ground profile correction requires careful consideration with any topographical variation considered in the context of a site.

4.4.12 The IOA GPG also discusses the potential for topographical screening effects of the terrain surrounding a wind farm and the nearby NSRs. Although barrier screening effects in ISO 9613-2 can make corrections of up to 15 dB, the IOA GPG states that where there is no line of sight between the highest point on the rotor and the receiver location a reduction of no more than 2 dB may be applied.

4.4.13 The modelling parameters used for this assessment are detailed in Section 6.3.

4.5 Setting the Site Specific Noise Limits (Stage 3)

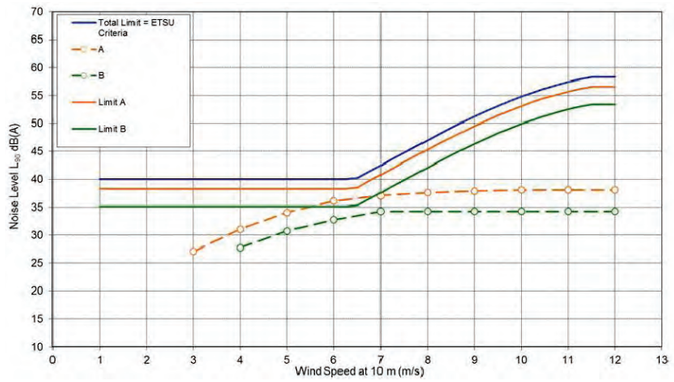
4.5.1 Summary Box 21 of the IOA GPG states:

'Whenever a cumulative situation is encountered, the noise limits for an individual wind farm should be determined in such a way that no cumulative excess of the total ETSU-R-97 noise limit would occur.'

4.5.2 In order to determine site specific noise limits at receptors in proximity to the Proposed Varied Development limit apportionment has been undertaken. The limit apportionment has considered the noise limit already allocated to other wind farms in the area.

4.5.3 This approach is demonstrated in Graph 4.1 below. In this example the total limit (shown in blue) is shared between a consented wind farm (A) and a Proposed Varied Development (B). The two noise limits for a given receptor (the solid orange and green lines) when added together equate to the Total ETSU-R-97 noise limit, and the predicted levels for each wind farm (the dashed lines) meet the specific limits established for consented wind farm and the Proposed Varied Development.

Graph 4.1: Limit Apportionment Example



4.5.4 The limit derivation can also be undertaken with consideration to the amount of headroom between another schemes(s) predictions and the Total Noise Limit. With regard to this Section 5.4.11 of the IOA GPG states:

'In cases where there is significant headroom (e.g. 5 to 10 dB) between the predicted noise levels from the existing wind farm and the Total Noise Limits, where there would be no realistic prospect of the existing wind farm producing noise levels up to the Total Noise Limits, agreement could be sought with the LPA as to a suitable predicted noise level (including an appropriate margin to cover factors such as potential increases in noise) from the existing wind farm to be used to inform the available headroom for the cumulative assessment without the need for negotiation or cumulative conditioning. This may be the case particularly at low wind speeds.'

4.5.5 Where no significant headroom is identified then Site Specific limits set 10 dB below the existing Total Noise Limit (the ETSU-R-97 simplified limit of 35 dB in this case) would ensure that the Proposed Varied Development would have a negligible impact upon cumulative noise levels[1].

4.5.6 Further information on the approach to apportionment is provided in Section 6.6 below.

[1] For clarity, this is because of the logarithmic way in which the decibel is expressed, adding one noise level 10 dB lower than another results in an insignificant increase e.g. 40 dB + 30 dB ~ 40 dB (it is actually 40.4 dB but the increase is considered to be negligible).

5 Baseline

5.1.1 Due to the distances between the Proposed Varied Development and the NALs, background noise monitoring has not been undertaken for the Proposed Varied Development. Rather, the assessment adopts the ETSU-R-97 simplified limit of 35 dB for all of the NALs. This is a conservative approach that adopts the lowest of the available ETSU-R-97 noise level limits.

5.1.2 It should be noted that if a baseline survey were to be undertaken the resulting noise level limits may be higher than 35 dB depending on the measured sound levels.

6 Noise Assessment Results

6.1 Noise Assessment Locations (NALs)

6.1.1 NALs refer to the position on the curtilage denoted by the blue house symbol on Figure A1.1a (Annex 1). A total of three NSRs were chosen as representative NALs. The NALs chosen were the closest receptors to the Proposed Varied Development. Predictions of wind turbine noise have been made at each of the NALs as detailed in Table 6.1.

6.1.2 This approach ensures that the report models the worst case (loudest) noise immission level expected at each group of NSRs, as, generally speaking, sound levels decrease due to the attenuating factors described in Section 6.3 and thus the closer to a noise source, the higher the noise level.

Table 6.1 NALs

Noise Assessment Location (NAL)	Easting (m)	Northing (m)	Elevation (m Above Ordnance Datum)	Approximate Distance to Nearest Strathy South Turbine (m)
NAL1 – Bowside Cottage	283050	960898	53	8237
NAL2 – Bowside Lodge	282917	960980	44	8278
NAL3 - Rhifail	273021	949390	54	4386

6.2 Noise Emission Characteristics of the Wind Turbines

6.2.1 There are a range of wind turbine models that may be suitable for installation at the Proposed Varied Development. This assessment considers the Siemens Gamesa-SG 5.0-145, 5.0 MW with a 127.5 m hub height. For the cumulative assessment the turbines used are summarised in Annex 4.

6.2.2 Noise data for the various cumulative schemes considered in this assessment have been obtained from the manufacturers data or taken from the values quoted within the individual schemes ES and have been analysed in detail by TNEI. Due to the differences in the way in which levels are provided by the different manufacturers, TNEI has accounted for uncertainty using the guidance contained within Section 4.2 of the IOA GPG (2013). Details of the sound power level and octave data used for the turbines considered in this assessment are included in Annex 3.

6.2.3 Manufacturer data is usually supplied based on a specific hub height though values are presented as standardised to 10 m height. The noise model used in this assessment alters turbine noise data to account for different hub heights where applicable. The hub height considered for the Proposed Varied Development is 127.5 m. The hub heights considered for the other wind farm developments are summarised in Annex 4.

6.2.4 The location of the wind turbines are shown on Figure A1.1b and grid references are included in Annex 4.

6.3 Noise Propagation Parameters

6.3.1 As detailed in Section 4.4 above, the full version of the ISO 9613-2 model has been used to calculate the noise immission levels at the nearest receptors.

6.3.2 For the purposes of the present assessment, all noise level predictions have been undertaken using a receiver height of 4 m above local ground level, mixed ground (G=0.5) and air absorption coefficients based on a temperature of 10 °C and 70 % relative humidity to provide a realistic impact assessment. The modelling parameters reflect current good practice as detailed within the IOA GPG.

6.3.3 The wind turbine noise immission levels are based on the $L_{A90,10\ minute}$ noise indicator in accordance with the recommendations in ETSU-R-97, which were obtained by subtracting 2 dB from the turbine sound power level data (L_{Aeq} indicator).

6.3.4 A topographical assessment has been undertaken between each NAL and each wind turbine location to determine whether any concave ground profiles exist between the source and receiver (noise sensitive receptor). Analysis undertaken using a combination of CadnaA[9] and an Excel model found that if the formula in the IOA GPG is applied directly a +3 dB correction is required for some turbines at a number of receptors and this is summarised in Annex 4.

6.3.5 In addition, an assessment has been undertaken to determine whether any topographical screening effects of the terrain occur where there is no direct line of sight between the highest point on the turbine rotor and the NAL. Upon analysis of each NAL it was found that a barrier correction of -2 dB could be applied for some turbines at a number of receptors and this is also detailed in Annex 4. In reality, there is significant screening at some of the locations so more attenuation may occur in practice and the use of a 2 dB value is therefore considered to be conservative. All corrections have been applied, where necessary, in all of the Tables and Graphs in this report.

6.3.6 The need to include a concave ground/screening correction may change depending on the final location of the turbines (following micrositing) and the final turbine hub height. Nevertheless, turbine noise levels will have to meet the noise limits established in this report regardless of any increases in noise propagation caused by topography. Therefore, should consent be granted for the Proposed Varied Development, the need to apply a concave slope correction will need to be considered by the Applicant prior to the final selection of a turbine model for the Proposed Varied Development.

6.3.7 The cumulative assessment has taken into account directivity effects in line with good practice. The directivity of wind turbines has been recognised for some time. Building on earlier work by NASA, in 1988 Wyle Laboratories studied sound propagation using an omnidirectional loudspeaker source elevated 80 ft above ground, in upwind, downwind and cross wind situations, and in both flat and hilly terrain, then compared those measurements to measured data from actual wind turbines. Their study quantified directivity factors for a limited frequency range, but was unable to conclusively demonstrate the anticipated directivity effects on real wind turbines. It also highlighted, but was unable to explain, measured differences observed between flat and hilly terrain.

6.3.8 Hubbard (1990) described a number of factors believed to influence propagation and directivity, notably refraction caused by vertical wind and temperature gradients. In the downwind direction the wind gradient causes the propagating sound to bend towards the ground, whereas in the upwind direction the sound will curve upwards, away from the ground. Upwind of the turbine this results in a region of increased attenuation termed the ‘shadow zone’. The excess attenuation is frequency dependent, with lowest frequencies least attenuated. Relating this to the earlier NASA studies, Hubbard noted that the distance from the source to the edge of the shadow zone is relative to the wind speed gradient and the elevation of the source, which for a typical turbine source was calculated to be approximately 5 times the source height.

6.3.9 This observation was adopted in the IOA GPG, which states (4.4.2) ‘Such reductions (due to “shadow zone” refraction effects) will in practice only progressively come into play at distances of between 5 and 10 turbine tip heights’.4.4.3 of IOA GPG provides graphical examples of increasing broadband directivity with increasing tip height scaling in both flat and hilly terrain without qualifying either of those designations.

6.3.10 The IOA GPG recommends (Section 4.4.1) that directivity attenuation factors adopted in any assessment should be clearly stated. The TNEI noise model can consider the effect of directivity, and in line with current good practice the attenuation values used are in detailed in Table 6.2. These are based upon the examples given in the IOA GPG (Section 4.4.2), using interpolation where required, and adopt a single attenuation value for receptors located more than 5 tip heights from a receiver.

Table 6.2 Wind Directivity Attenuation Factors used in Modelling

Direction (º)	0	15	30	45	60	75	90	105	120	135	150	165
Attenuation, dB	-10	-9.9	-9.3	-8.3	-6.7	-4.6	-2	0	0	0	0	0
Direction (º)	180	195	210	225	240	255	270	285	300	315	330	345
Attenuation, dB	0	0	0	0	0	0	-2	-4.6	-6.7	-8.3	-9.3	-9.9

6.4 Total ETSU-R-97 Noise Limits (Stage 1)

6.4.1 The Total ETSU-R-97 Noise Limits have been established for each of the NALs detailed in Table 6.1 above. The Total ETSU-R-97 Noise Limits were derived based on the simplified 35 dB criteria detailed in ETSU-R-97.

6.4.2 The Total ETSU-R-97 Noise limits are summarised in Table 6.3 below.

Table 6.3 Total ETSU-R-97 Noise Limits (Applicable to all times of the day)

Location	Wind Speed (ms^{-1}) as standardised to 10m height											
	1	2	3	4	5	6	7	8	9	10	11	12
NAL1 – Bowside Cottage	35	35	35	35	35	35	35	35	35	35	35	35
NAL2 – Bowside Lodge	35	35	35	35	35	35	35	35	35	35	35	35
NAL3 - Rhifail	35	35	35	35	35	35	35	35	35	35	35	35

6.5 Predicting likely effects and the requirement for a cumulative assessment (Stage 2)

6.5.1 In order to protect residential amenity, the IOA GPG (2013) recommendations are that cumulatively, all schemes operate within the 'Total ETSU-R-97 Noise Limits'. This can be found in summary box SB21 of the IOA GPG (2013) which states:

'Whenever a cumulative situation is encountered, the noise limits for an individual wind farm should be determined in such a way that no cumulative excess of the total ETSU-R-97 noise limit would occur.'

6.5.2 Modelling was undertaken to consider the cumulative developments nearby compared to the Total ETSU-R-97 Noise Limit.

6.5.3 The predictions of the likely cumulative noise levels are summarised in Table 6.4 (overleaf). The table shows that the noise immission levels from the Proposed Varied Development operating concurrently with all other proposed, consented and operational wind farms are within the Total ETSU-R-97 Noise limits at the three NALs.

6.5.4 A series of graphs to show the predicted cumulative wind turbine noise from all schemes compared to the Total ETSU-R-97 Noise Limits are included as Figures A1.2a through to Figure A1.2c (Annex 1). A set of graphs are provided for each of the NALs and these show the Total ETSU-R-97 Noise Limit (solid red line), the total cumulative noise (green dashed line), the predicted wind turbine noise from the Proposed Varied Development (solid brown line) and predicted levels for individual schemes (solid lines, various colours).

Table 6.4 ETSU-R-97 Compliance Table – Likely Cumulative Noise – All times of the day

Location		Wind Speed (ms^{-1}) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1 – Bowside Cottage	Total ETSU-R-97 Noise Limit	35	35	35	35	35	35	35	35	35	35	35	35
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	-	-	30.7	34.3	34.7	34.7	34.7	34.7	34.7	34.7
	Exceedance Level L_{A90} (all schemes)	-	-	-	-	-4.3	-0.7	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
NAL2 – Bowside Lodge	Total ETSU-R-97 Noise Limit	35	35	35	35	35	35	35	35	35	35	35	35
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	-	-	30.5	34	34.4	34.4	34.4	34.4	34.4	34.4
	Exceedance Level L_{A90} (all schemes)	-	-	-	-	-4.5	-1	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
NAL3 - Rhifail	Total ETSU-R-97 Noise Limit	35	35	35	35	35	35	35	35	35	35	35	35
	Predicted Cumulative Wind Turbine Noise L_{A90}	-	-	-	-	23	27.2	28.3	28.3	28.3	28.3	28.3	28.3
	Exceedance Level L_{A90} (all schemes)	-	-	-	-	-12	-7.8	-6.7	-6.7	-6.7	-6.7	-6.7	-6.7

Note: For the cumulative noise predictions the noise model considers the range of noise data available for each turbine type modelled. For some turbines noise data was not available for wind speeds less than 5 ms^{-1} therefore no cumulative predictions are included for wind speeds less than 5 ms^{-1}.

6.6 Derivation of Site-Specific Noise Limits (Stage 3)

6.6.1 The difference between the predicted levels for the operational Strathy North Wind Farm and the simplified 35 dB noise limit was less than 5 dB at NAL1 and NAL2, therefore, there was not significant headroom. On that basis it was determined that at NAL1 and NAL2, Strathy North could potentially use the entire Total ETSU-R-97 Noise Limit. Accordingly, the Site-Specific Noise Limit for the Proposed Varied Development at these assessment locations has been set as 25 dB i.e. 10 dB below the Total ETSU-R-97 Noise Limit.

6.6.2 At NAL3 Rhifail all cumulative developments modelled were predicted to be greater than 10 dB below the predicted levels of the Proposed Varied Development. Therefore, the Site-Specific Noise Limit for the Proposed Varied Development has been set at 35 dB at NAL3.

6.6.3 Table 6.5 details the Site-Specific Noise Limits, the noise predictions for the Proposed Varied Development and the exceedance level. A negative exceedance demonstrates compliance with the Site-Specific Noise Limits.

Table 6.5 Site Specific Noise Limits Compliance Table – All Times of the Day

Location		Wind Speed (ms^{-1}) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1 – Bowside Cottage	Site Specific Noise Limit	25	25	25	25	25	25	25	25	25	25	25	25
	Predicted Wind Turbine Noise L_{A90}	-	-	-	-	18.2	22.5	23.6	23.6	23.6	23.6	23.6	23.6
	Exceedance Level L_{A90}	-	-	-	-	-6.8	-2.5	-1.4	-1.4	-1.4	-1.4	-1.4	-1.4
NAL2 – Bowside Lodge	Site Specific Noise Limit	25	25	25	25	25	25	25	25	25	25	25	25
	Predicted Wind Turbine Noise L_{A90}	-	-	-	-	18	22.3	23.4	23.4	23.4	23.4	23.4	23.4
	Exceedance Level L_{A90}	-	-	-	-	-7	-2.7	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6
NAL3 - Rhifail	Site Specific Noise Limit	35	35	35	35	35	35	35	35	35	35	35	35
	Predicted Wind Turbine Noise L_{A90}	-	-	-	-	22.3	26.6	27.7	27.7	27.7	27.7	27.7	27.7
	Exceedance Level L_{A90}	-	-	-	-	-12.7	-8.4	-7.3	-7.3	-7.3	-7.3	-7.3	-7.3

6.6.4 The predicted wind turbine noise immission levels meet the Site-Specific Noise Limits under all conditions and at all locations for all times of the day. A series of graphs to show the predicted wind turbine noise from the Proposed Varied Development compared to the Site-Specific Noise Limits are included as Figures A1.3a - A1.3c (Annex 1). The graphs show the Total ETSU-R-97 Noise Limit (solid red line), the Site-Specific Noise Limit (dashed red line) and the predicted wind turbine noise from the Proposed Varied Development (solid green line).

6.7 Micrositing

6.7.1 It should be noted that the need to include a concave ground profile correction and/or barrier correction may change depending on the final location of the turbines (following micrositing) and the final turbine hub height. Nevertheless, turbine noise levels will have to meet the noise limits established in this report regardless of any changes in noise propagation caused by topography. Should consent for the Proposed Varied Development be granted, the need to apply a concave ground profile/ barrier correction will need to be considered by the Applicant prior to the final selection of a turbine model for the site.

7 Conclusions

7.1.1 This report has assessed the potential impact of operational noise from the Proposed Varied Development on the residents of nearby residential receptors. The guidance contained within ETSU-R-97 and current good practice (IOA GPG) has been used to assess the potential noise impact of the Proposed Varied Development.

7.1.2 A cumulative assessment was undertaken at three NALs, which were selected because they are the closest to the Proposed Varied Development and other nearby schemes. The cumulative assessment results show that the predicted cumulative wind farm noise immission levels would meet the 'Total ETSU-R-97' derived noise limits at receptor locations surrounding the Proposed Varied Development.

7.1.3 'Site Specific Noise Limits' have also been derived that take account of the other wind farms. The Site Specific Noise Limits assume that all consented turbines and proposed turbines are built, that all existing turbines continue to operate for the lifetime of their consent and that their noise immissions are as per the levels considered in this assessment.

7.1.4 An assessment was undertaken to determine whether the Proposed Varied Development could operate within the Site-Specific Noise Limits and it was found that at all receptors the predicted wind turbine noise immissions were below these limits when considering the Siemens Gamesa-SG 5.0-145, 5.0 MW as a candidate turbine.

7.1.5 At some locations, under some wind conditions and for a certain proportion of the time, operational wind farm noise from the Proposed Varied Development could be audible; however, it would be at an acceptable level in relation to the ETSU-R-97 guidelines.

7.1.6 There are a number of wind turbine makes and models that may be suitable for the Proposed Varied Development. Should consent be received the final choice of turbine would be subject to a competitive tendering process. The final choice of turbine would, however, have to meet the noise limits determined and contained within any conditions imposed. A set of suggested operational noise conditions are included within Annex 5.

8 Glossary of Terms

AOD: Above Ordnance Datum is the height above sea level.

Amplitude Modulation: a variation in noise level over time; for example observers may describe a 'whoosh whoosh' sound, which can be heard close to a wind turbine as the blades sweep past.

Attenuation: the reduction in level of a sound between the source and a receiver due to any combination of effects including: distance, atmospheric absorption, acoustic screening, the presence of a building façade, etc.

Background Noise: the noise level rarely fallen below in any given location over any given time period, often classed according to daytime, evening or night-time periods. The L_{A90} indices (see below) is often used to represent the background noise level.

Bin: subset or group into which data can be sorted; in the case of wind speeds, bins are often centred on integer wind speeds with a width of 1 m/s. For example the 4 m/s bin would include all data with wind speeds of 3.5 to 4.5 m/s.

Dawn Chorus: noise due to birds which can occur at sunrise.

Broadband Noise: noise with components over a wide range of frequencies.

Decibel (dB): the ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. A logarithmic scale is used in noise level measurements because of this wide range. The scale used is the decibel (dB) scale which extends from 0 to 140 decibels (dB) corresponding to the intensity of the sound level.

dB(A): the ear has the ability to recognise a particular sound depending on its pitch or frequency. Microphones cannot differentiate noise in the same way as the ear, and to counter this weakness the noise measuring instrument applies a correction to correspond more closely to the frequency response of the human ear. The correction factor is called 'A Weighting' and the resulting measurements are written as dB(A). The dB(A) is internationally accepted and has been found to correspond well with people's subjective reaction to noise. Some typical subjective changes in noise levels are:

- a change of 3 dB(A) is just perceptible;
- a change of 5 dB(A) is clearly perceptible;
- a change of 10 dB(A) is twice (or half) as loud.

Directivity: the property of a sound source that causes more sound to be radiated in one direction than another.

Frequency: the pitch of a sound in Hz or kHz. See Hertz.

Ground Effects: the modification of sound at a receiver location due to the interaction of the sound wave with the ground along its propagation path from source to receiver. Described using the term 'G', and ranges between 0 (hard), 0.5 (mixed) and 1 (soft).

Hertz (Hz): sound frequency refers to how quickly the air vibrates, or how close the sound waves are to each other (in cycles per second, or Hertz (Hz)).

L_w: is the sound power level. It is a measure of the total noise energy radiated by a source of noise, and is used to calculate noise levels at a distant location. The L_{WA} is the A-weighted sound power level.

L_{eq}: is the equivalent continuous sound level, and is the sound level of a steady sound with the same energy as a fluctuating sound over the same period. It is possible to consider this level as the ambient noise encompassing all noise at a given time. The $LA_{eq,T}$ is the A-weighted equivalent continuous sound level over a given time period (T).

L_{90}: index represents the noise level exceeded for 90 percent of the measurement period and is used to indicate quieter times during the measurement period. It is often used to measure the background noise level. The $L_{A90,10min}$ is the A-weighted background noise level over a ten minute measurement sample.

Noise emission: the noise energy emitted by a source (e.g. a wind turbine).

Noise immission: the sound pressure level detected at a given location (e.g. the nearest dwelling).

Night-Time Hours: ETSU-R-97 defines the night-time hours as 23.00 to 07.00 every day.

Quiet Daytime Hours: ETSU-R-97 defines the amenity hours as 18.00 to 23.00 Monday to Friday, 13.00 to 23.00 on Saturdays and 07.00 to 23.00 on Sundays.

Sound Level Meter: an instrument for measuring sound pressure level.

Sound Power Level: the total sound power radiated by a source, in decibels.

Sound Pressure Level: a measure of the sound pressure at a point, in decibels**.**

Standardised Wind Speed: a wind speed measured at a height different than 10 m (generally measured at the turbine hub height) which is expressed to a reference height of 10 m using a roughness length of 0.05 for standardisation purpose (in accordance with the IEC 61400-11 standard).

Tonal Noise: noise which covers a very restricted range of frequencies (e.g. a range of ≤20 Hz). This noise can be more annoying than broadband noise.

Wind Shear: the increase of wind speed with height above the ground.

9 References

1. **ETSU for the DTI (Department of Trade and Industry.** *The Working Group on Noise from Wind Turbines ETSU-R-97 The Assessment and Rating of Noise from Wind Farms'.* 1996.

2. **Institute of Acoustics.** *Good Practice Guidance on the application of ETSU-R-97 for wind turbine noise assessment.* 2013.

3. **The Scottish Government.** Scottish Planning Policy (SPP) http://www.gov.scot/Publications/2014/06/5823. [Online] 2014.

4. **The Scottish Government.**—. Web Based Renewables Advice: 'Onshore Wind Turbines' – http://www.scotland.gov.uk/Resource/0045/00451413.pdf. [Online] 28 May 2014.

5. **The Scottish Government.**—. Planning Advice Note PAN 1/2011: Planning and Noise - http://www.scotland.gov.uk/Resource/Doc/343210/0114180.pdf. [Online] 2011.

6. **The Scottish Government.**—. Technical Advice Note Assessment of Noise (http://www.scotland.gov.uk/Resource/Doc/343341/0114220.pdf). [Online]

7. **Letter John Swinney, MSP Cabinet Secretary for Finance, Employment and Sustainable Growth to Prof B Shield.** http://www.ioa.org.uk/pdf/scottish-government-endorsement-of-ioa-gpg.pdf. [Online]

8. **International Standards Organisation.** *ISO9613:1996 'Acoustics – Attenuation of sound during propagation outdoors' – Part 2: General method of calculation.* 1996.

9. **DataKustik Gmbh.** CadnaA Version 4.4.

Annex 1 – Figures

NAL1 Bowside Cottage

NAL2 Bowside Lodge

NAL3 Rhifail

Strathy Forest

Legend

- Noise Assessment Location
- Proposed Turbine Location

0 1,000 2,000 Metres

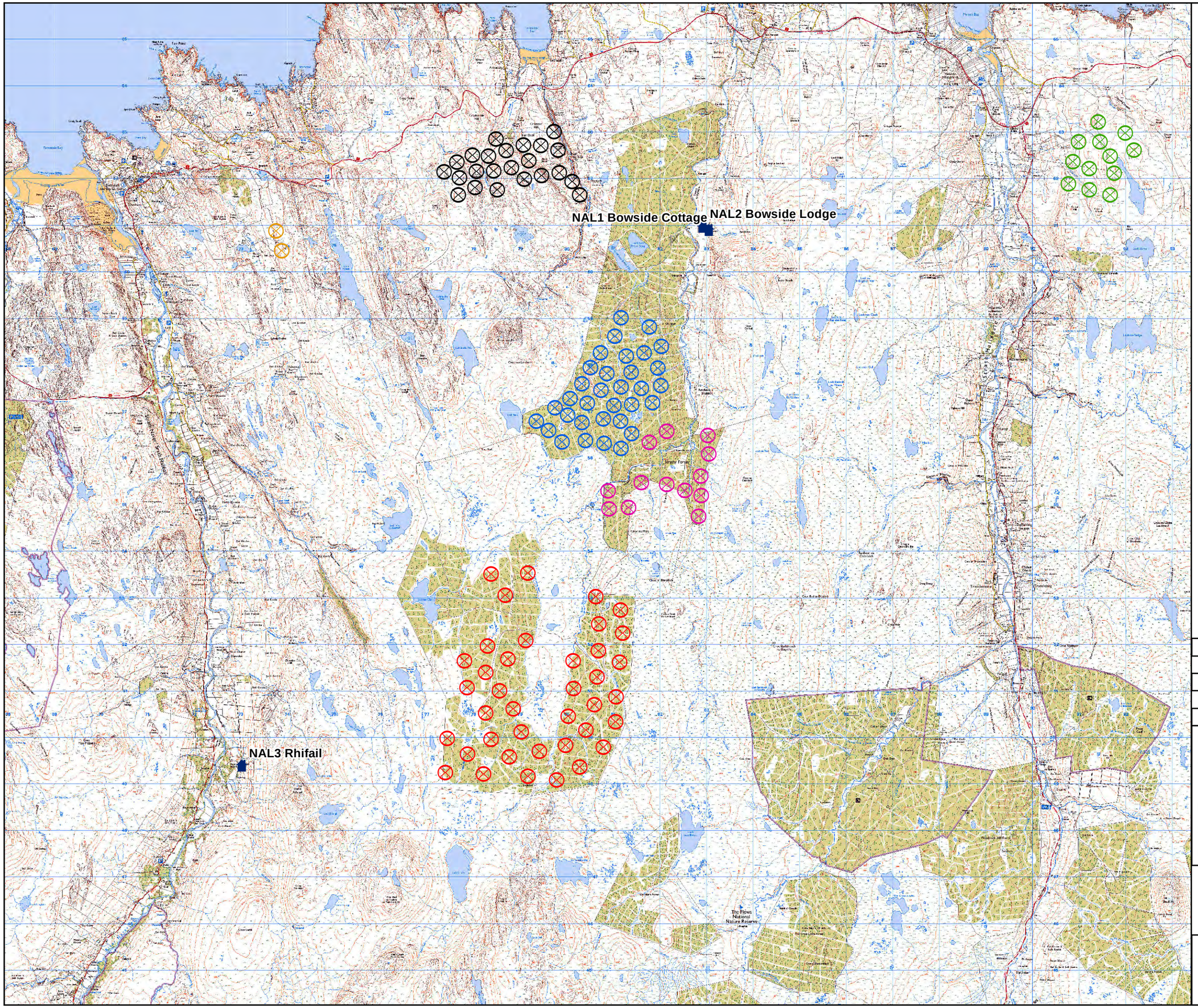
N

REV.	DETAILS	DRAWN	CHK'D	APP'D	DATE
R1	FIRST ISSUE	MCL	JS	JS	26/02/2020

Project	Strathy South Wind Farm
Client	SSE
Title	Noise Assessment Locations
Figure No.	A1.1a
Scale	1:50,000 @A3
Doc. Ref.	13584-003

sse Renewables

tnei



Legend

- Noise Assessment Location
- Strathy South
- Ackron Wind Farm
- Armadale Wind Farm
- Bettyhill Wind Farm
- Strathy North Wind Farm
- Strathy Wood Wind Farm

0 1,500 3,000 Metres

N

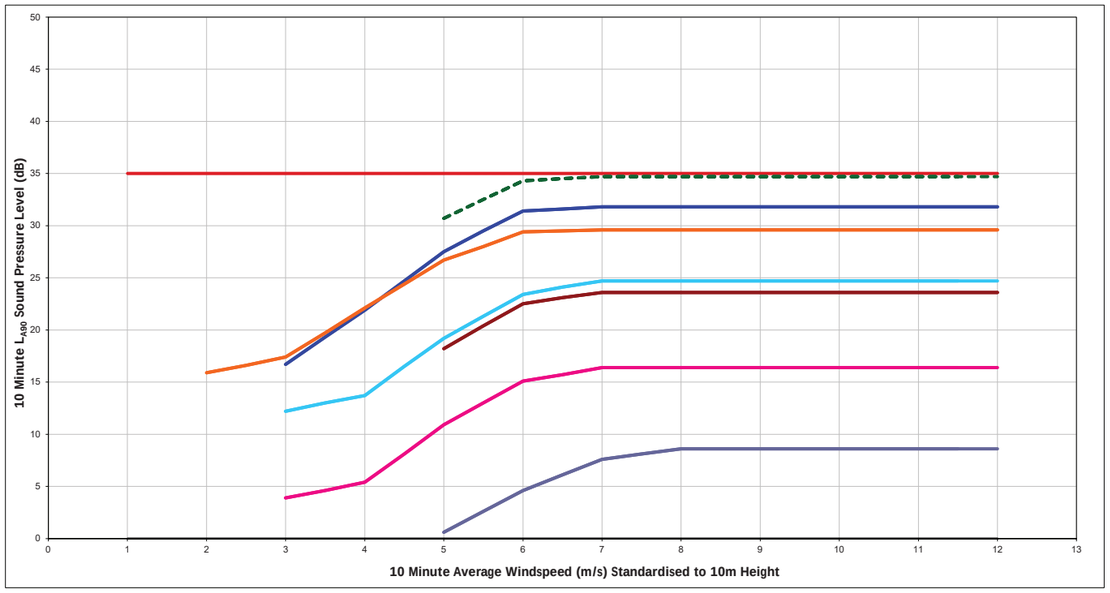
REV.	DETAILS	DRAWN	CHK'D	APP'D	DATE
R1	FIRST ISSUE	MCL	JS	JS	26/02/2020

Project	Strathy South Wind Farm
Client	SSE
Title	Cumulative Turbine Locations
Figure No.	A1.1b
Scale	1:75,000 @A3
Doc. Ref.	13584-004

sse Renewables

tnei

Quiet Daytime - Bowside Cottage (NAL1)



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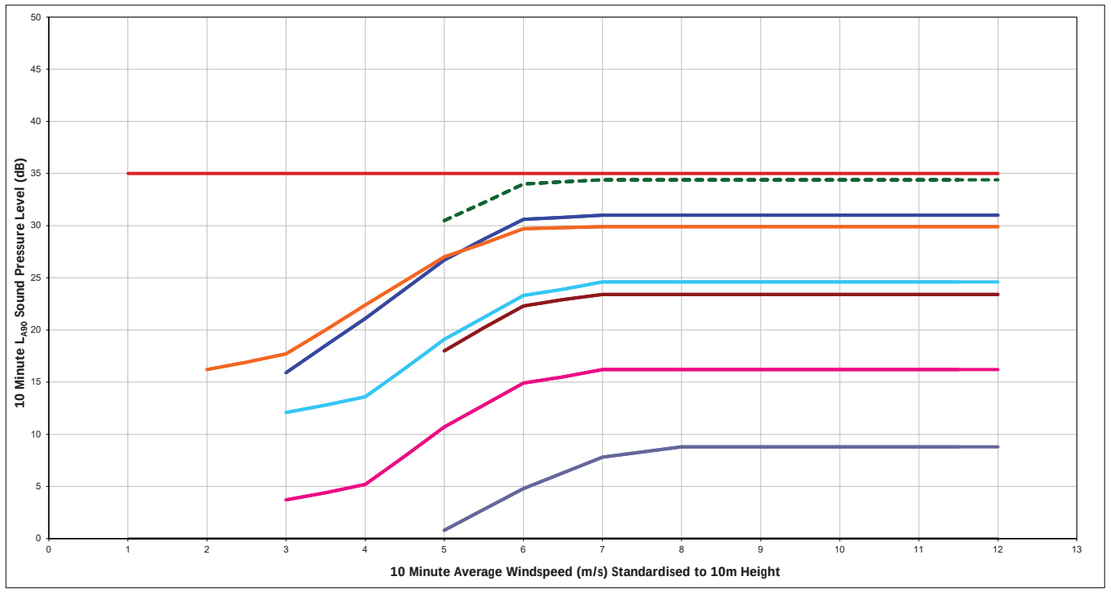

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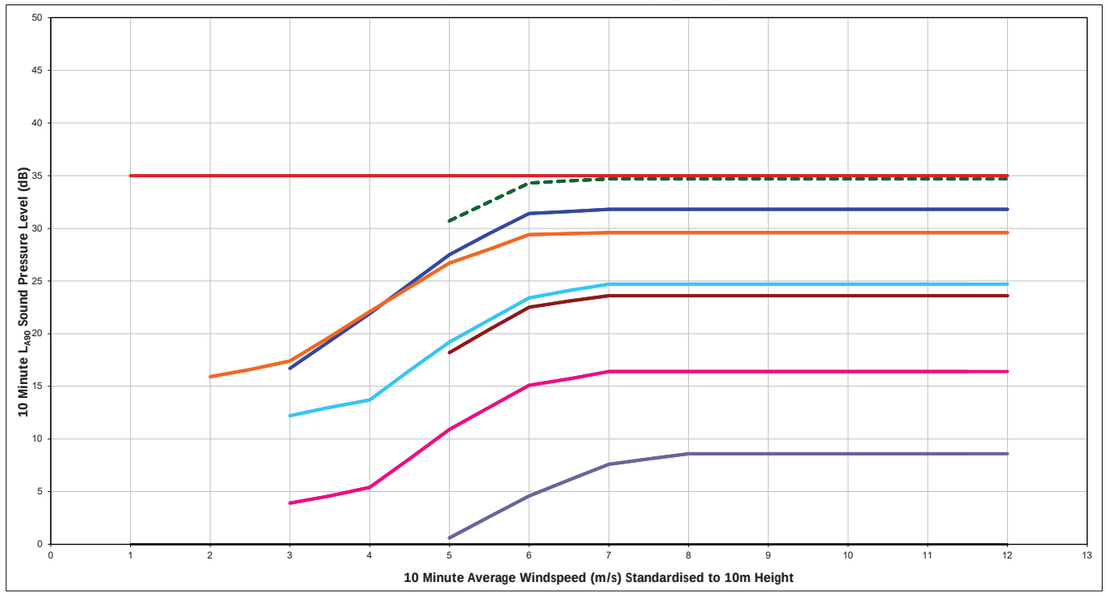
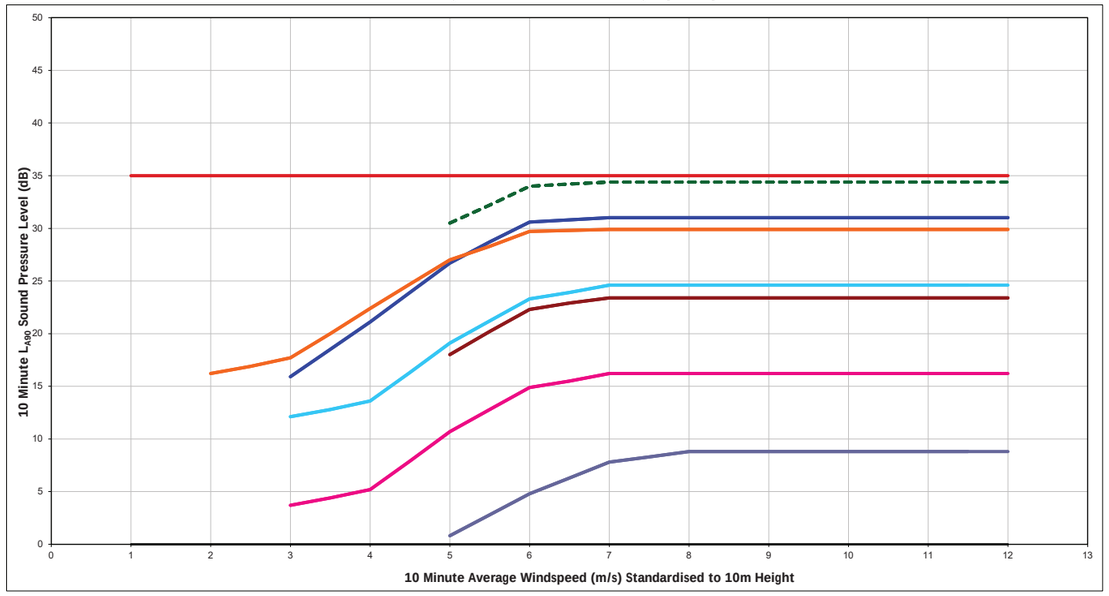


Night Time - Bowside Lodge (NAL2)



Legend:

- Total ETSU-R-97-Limit
- All schemes
- Strathy South SG 5.0-145 5.0MW
- Strathy North MM82
- Strathy Wood N133
- Ackron N133
- Bettyhill E82
- Armadale V136

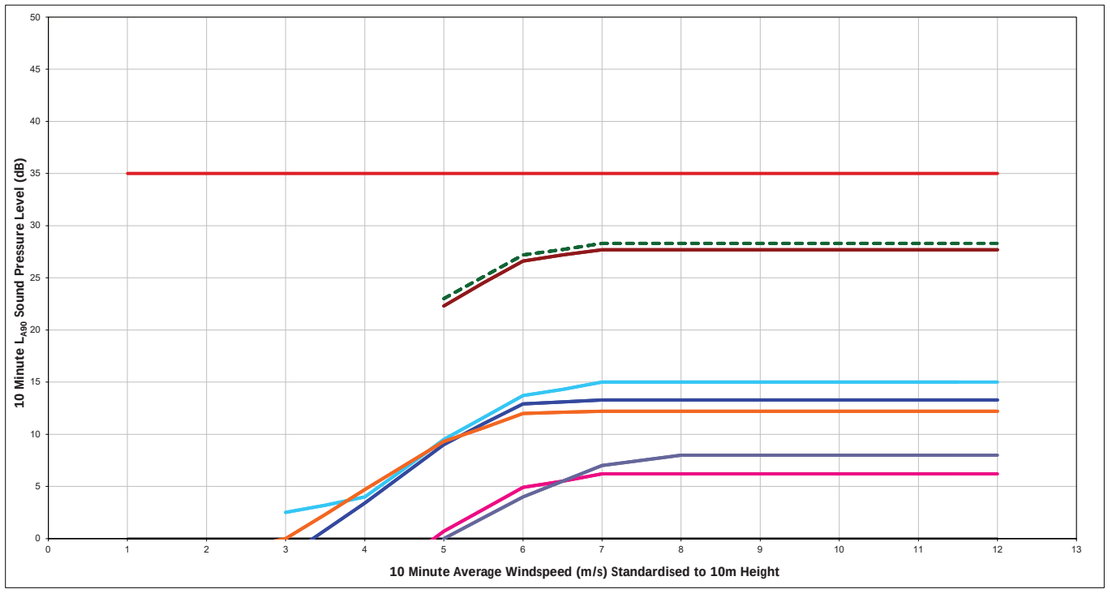
Project	Strathy South
Client	SSE
Title	Noise Assessment Bowside Cottage (NAL1)
Figure Number	Figure A1.2a
Scale	NTS
Drawn	MCL
Checked	JS
Date	10/02/2020
Document Reference	13584-Models

Legend:

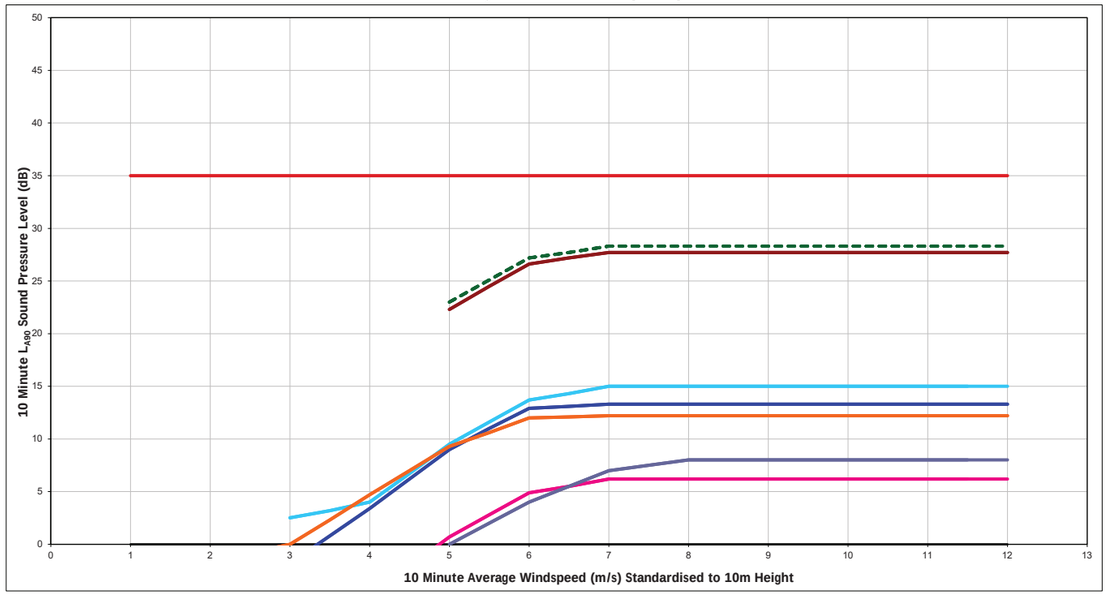
- Total ETSU-R-97-Limit
- All schemes
- Strathy South SG 5.0-145 5.0MW
- Strathy North MM82
- Strathy Wood N133
- Ackron N133
- Bettyhill E82
- Armadale V136

Project	Strathy South
Client	SSE
Title	Noise Assessment Bowside Lodge (NAL2)
Figure Number	Figure A1.2b
Scale	NTS
Drawn	MCL
Checked	JS
Date	10/02/2020
Document Reference	13584-Models

Quiet Daytime - Rhifail (NAL3)



Night Time - Rhifail (NAL3)

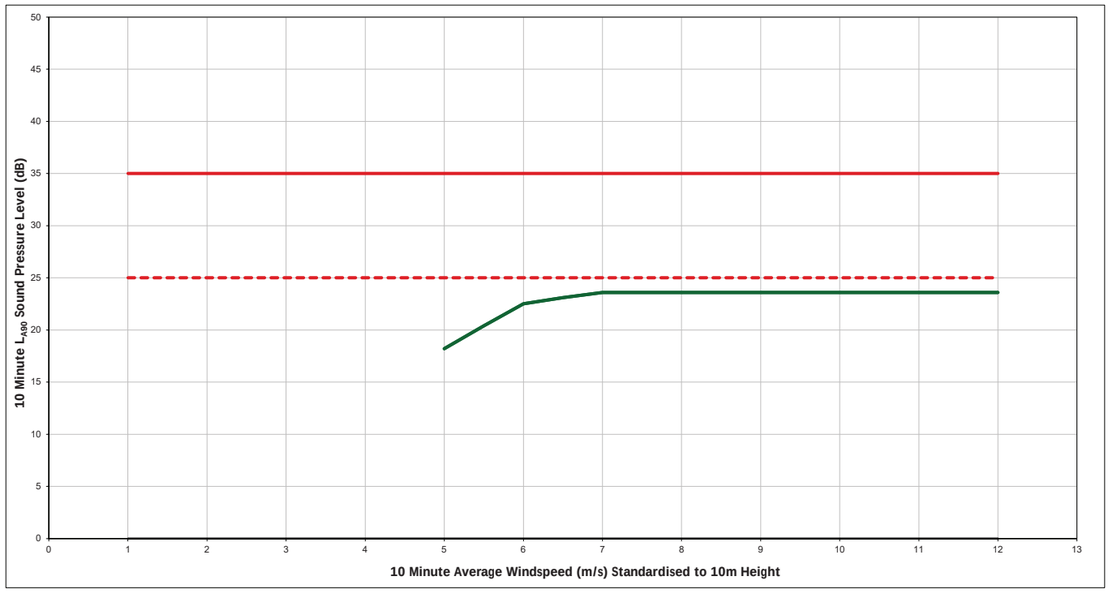


Legend:

- Total ETSU-R-97-Limit
- All schemes
- Strathy South SG 5.0-145 5.0MW
- Strathy North MM82
- Strathy Wood N133
- Ackron N133
- Bettyhill E82
- Armadale V136

Project	Strathy South
Client	SSE
Title	Noise Assessment Rhifail (NAL3)
Figure Number	Figure A1.2c
Scale	NTS
Drawn	MCL
Checked	JS
Date	10/02/2020
Document Reference	13584-Models

Quiet Daytime - Bowside Cottage (NAL1)



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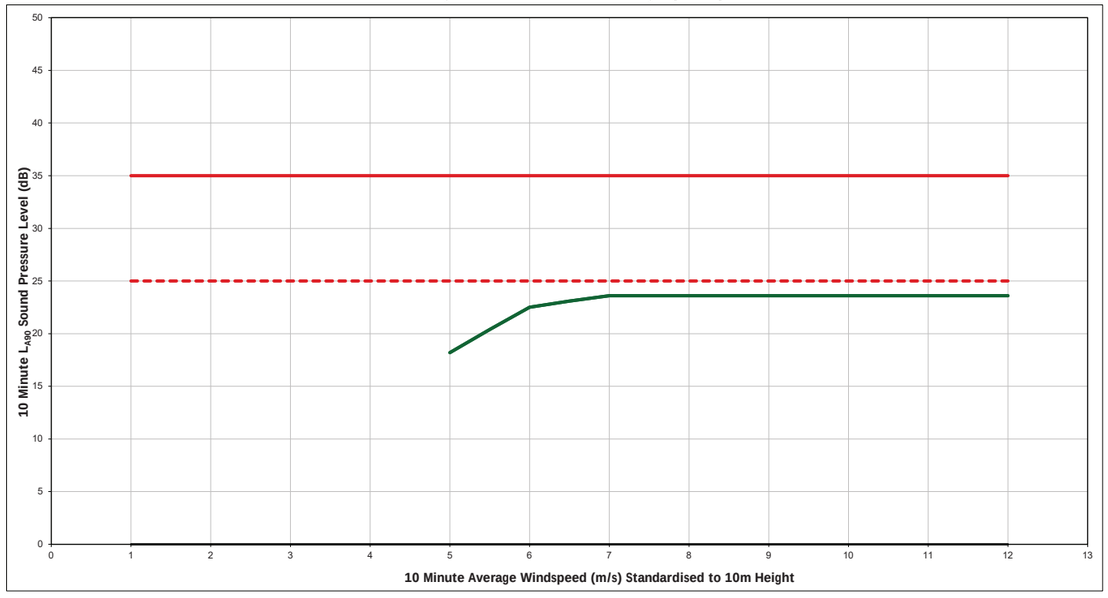
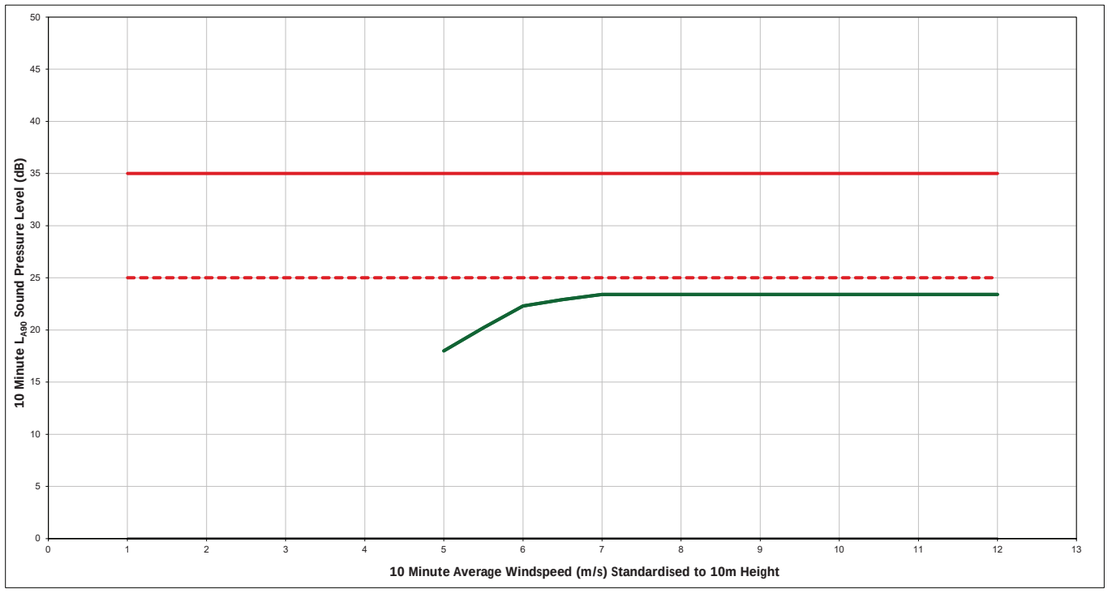


Legend:

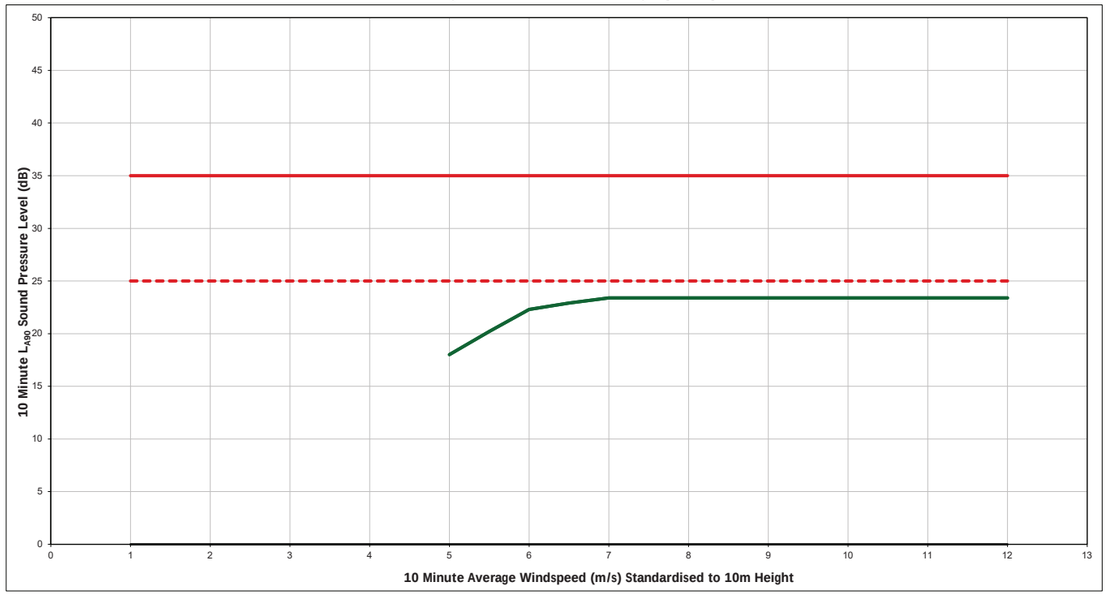
- Total ETSU-R-97-Limit
- Site Specific Limits (-10dB)
- Strathy South SG 5.0-145 5.0MW

Project	Strathy South
Client	SSE
Title	Noise Assessment Bowside Cottage (NAL1)
Figure Number	Figure A1.3a
Scale	NTS
Drawn	MCL
Checked	JS
Date	10/02/2020
Document Reference	13584-Models

Quiet Daytime - Bowside Lodge (NAL2)



Night Time - Bowside Lodge (NAL2)

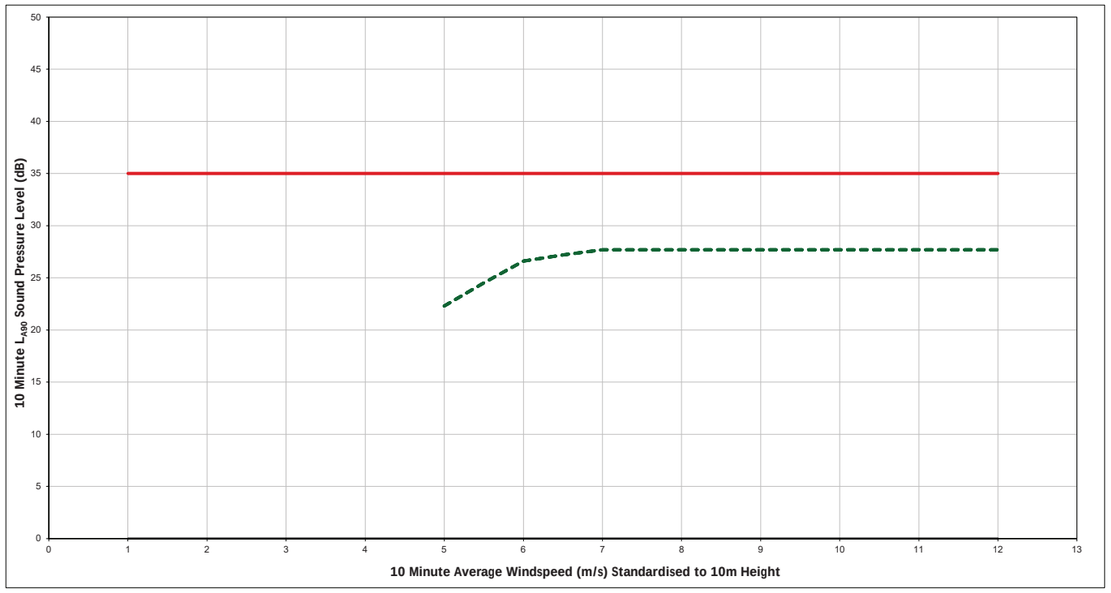


Legend:

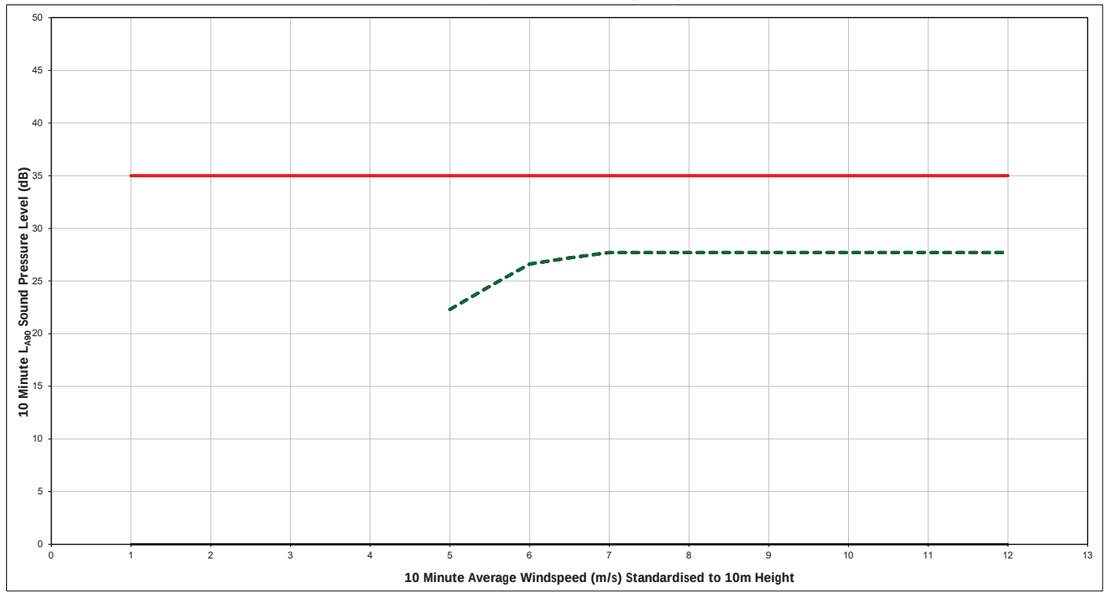
- Total ETSU-R-97-Limit
- Site Specific Limits (-10dB)
- Strathy South SG 5.0-145 5.0MW

Project	Strathy South
Client	SSE
Title	Noise Assessment Bowside Lodge (NAL2)
Figure Number	Figure A1.3b
Scale	NTS
Drawn	MCL
Checked	JS
Date	10/02/2020
Document Reference	13584-Models

Quiet Daytime - Rhifail (NAL3)



Night Time - Rhifail (NAL3)



Legend:

- Total ETSU-R-97-Limit (and Site Specific Limit)
- Strathy South SG 5.0-145 5.0MW

Project	Strathy South
Client	SSE
Title	Noise Assessment Rhifail (NAL3)
Figure Number	Figure A1.3c
Scale	NTS
Drawn	MCL
Checked	JS
Date	10/02/2020
Document Reference	13584-Models

Annex 2 – Extract of Noise Condition for Strathy North Wind Farm

Reason: *For the protection of construction employees, highway safety and road users.*

15. The Company shall log Wind Speed and wind direction data continually and shall retain the data which has been obtained for twelve months and after the initial twelve months retain such data for a period of no less than the previous 12 months. The data shall include the average Wind Speed in metres per second for each 10 minute period. The measuring periods shall be set to commence on the hour or in 10 minute increments thereafter. The Wind Speed data shall be made available to the Planning Authority on request. The data shall be provided on a Microsoft Excel spreadsheet in electronic format. In the case where the Wind Speed is measured at a height other than 10 metres, the data shall be supplemented by adjusted values which allow for wind shear, normalised to 10 metre height. Details of the wind shear calculation shall be provided to the Planning Authority on request.

At Wind Speeds not exceeding 12 metres/second, as measured or calculated at a height of 10 metres above ground level at the wind farm at a grid reference or grid references to be approved by the Planning Authority, the Wind Turbine Noise Level at any dwelling or other noise sensitive premises shall not exceed:-

- During Night Hours, 38dB LA90, 10min, or the Night Hours LA90, 10min Background Noise Level plus 5 dB(A), whichever is the greater;
- During Quiet Waking Hours, 35dB LA90,10min or the Quiet Waking Hours LA90,10min Background Noise Level plus 5dB(A), whichever is the greater.

Providing that this condition shall only apply to dwellings or other Noise Sensitive Premises existing at the date of this Planning Permission.

At the request of the Planning Authority, following a valid complaint to the Planning Authority relating to noise emissions from the wind turbines, the Company shall measure, at its own expense, the level of noise emissions from the wind turbines.

The measurement and calculation of noise levels shall be undertaken in accordance with "The Assessment and Rating of Noise from Wind Farms", September 1996, ESTU report number ETSU-R-97; having regard to paragraphs 1-3 and 5-11 inclusive, of The Schedule, pages 95-97 and Supplementary Guidance Notes to the Planning Obligation, pages 99 to 109, or as updated. In comparing measured Wind Turbine Noise Levels with Background Noise Levels, regard shall be had to the prevailing Background Noise Levels as measured at specified properties and shown by the best fit curves in the Environmental Statement submitted with this planning application. In the event of a complaint from a property other than one of the specified properties in the Environmental Statement, the measured Wind Turbine Noise Levels at that other property shall be compared to the prevailing Background Noise Levels at the specified property which is most likely to have similar background noise levels.

Wind Turbine Noise Level means the rated noise level due to the combined effect of all the Wind Turbines, excluding existing background noise level but including any tonal penalty incurred under the methodology described in ETSU-R-97, pages 99-109.
Background Noise Level means the ambient noise level already present within the environment (in the absence of noise generated by the Development) as measured and correlated with Wind Speeds.
Wind Speeds means Wind Speeds measured or calculated at a height of 10 metres above ground level on the Site at a specified Ordnance Survey grid reference agreed with the Planning Authority.
Night Hours means 23:00 – 07:00 hours on all days
Quiet Waking Hours means 18:00 – 23:00 hours on all days, plus 07:00 – 18:00 on Sundays and 13:00- 18:00 hours on Saturdays.
Noise Sensitive Premises means existing premises, the occupants of which could be exposed to noise from the wind farm and includes hospitals, residential homes, nursing homes, etc.

Should the noise levels be exceeded, the Company shall take immediate steps to ensure that noise emissions from the Wind Farm are reduced to the aforementioned noise levels or less, and provide factual evidence to the Planning Authority to show that the reduction of noise levels has been achieved.

Reason: *in order to ensure satisfactory noise control arising from the operation of the Development.*

16. Prior to the erection of any turbines on the Development the Company will set out a scheme to be adopted by the operator of the wind farm which will ensure that noise levels at Dallangwell and Bracrathy Lodge will not exceed the limits as set out in Condition 16 above. This is expected to include proposals for turbine shut down during periods of low rainfall and Wind Speeds are high unless otherwise agreed with the owners of these properties.

Annex 3 – Summary of Wind Turbine Noise Source Data

Noise data for the turbines has not been included due to data confidentiality. Detailed noise data would be available upon request following the signing of the appropriate Non Disclosure Agreement

Annex 4 – Topographical Corrections and Wind Turbine Summary

Noise Prediction Adjustment Table. -2 when no line of sight and +3 when concave profile. Other corrections may apply.

Date:

Initials:

Layout:

Notes/Comments

a Requirement to include a concave ground profile correction of +3dB has been calculated in accordance with section 4.3.9 of the IOA GPG

b A barrier correction of -2dB is included where the landform completely obscures a turbine at the noise assessment location

c Where analysis indicates that both are required the barrier correction take precedence and a correction of -2dB is applied

Assessment Locations

Wind Farm	Hub	T ID	1	2	3
Strathy North	69	1	3	0	0
Strathy North	69	2	3	3	0
Strathy North	69	3	3	0	0
Strathy North	69	4	3	3	0
Strathy North	69	5	0	0	0
Strathy North	69	6	3	0	0
Strathy North	69	7	3	3	0
Strathy North	69	8	0	0	0
Strathy North	69	9	3	3	0
Strathy North	69	10	3	3	0
Strathy North	69	11	3	3	0
Strathy North	69	12	0	0	0
Strathy North	69	13	3	0	0
Strathy North	69	14	3	3	0
Strathy North	69	15	3	3	0
Strathy North	69	16	3	3	0
Strathy North	69	17	0	0	0
Strathy North	69	18	0	0	0
Strathy North	69	19	3	0	0
Strathy North	69	20	3	0	0
Strathy North	69	21	3	3	0
Strathy North	69	22	0	0	0
Strathy North	69	23	0	0	0
Strathy North	69	24	0	0	0
Strathy North	69	25	0	0	0
Strathy North	69	26	0	0	0
Strathy North	69	27	3	0	0
Strathy North	69	28	0	0	-2
Strathy North	69	29	0	0	-2
Strathy North	69	30	0	-2	-2
Strathy North	69	31	0	0	0
Strathy North	69	32	0	-2	0
Strathy North	69	33	0	0	0
Strathy Wood	110	34	0	0	0
Strathy Wood	110	35	0	0	0
Strathy Wood	110	36	0	0	0
Strathy Wood	110	37	0	0	0
Strathy Wood	110	38	0	0	0
Strathy Wood	110	39	0	0	0
Strathy Wood	110	40	0	0	-2
Strathy Wood	110	41	0	0	0
Strathy Wood	110	42	0	0	0
Strathy Wood	110	43	0	0	-2
Strathy Wood	110	44	0	0	0
Strathy Wood	110	45	0	0	-2
Strathy Wood	110	46	0	0	0
Ackron	91	47	-2	-2	0
Ackron	91	48	-2	-2	0
Ackron	91	49	-2	-2	0
Ackron	91	50	-2	-2	0
Ackron	91	51	-2	-2	0
Ackron	91	52	-2	-2	0
Ackron	91	53	-2	-2	0
Ackron	91	54	-2	-2	0
Ackron	91	55	-2	-2	0
Ackron	91	56	-2	-2	0
Ackron	91	57	-2	-2	0
Ackron	91	58	-2	-2	0
Bettyhill	79	59	-2	-2	0
Bettyhill	79	60	-2	-2	0
Armadale	101	61	0	0	0
Armadale	101	62	0	0	0
Armadale	101	63	0	0	0
Armadale	101	64	0	0	0
Armadale	101	65	0	0	0
Armadale	101	66	0	0	0
Armadale	101	67	3	0	0
Armadale	101	68	3	3	0
Armadale	101	69	0	0	0
Armadale	101	70	0	0	0
Armadale	101	71	0	0	0
Armadale	101	72	0	0	0
Armadale	101	73	0	0	0
Armadale	101	74	0	0	0
Armadale	101	75	0	0	0
Armadale	101	76	0	0	0
Armadale	101	77	0	0	0
Armadale	101	78	0	0	0
Armadale	101	79	0	0	0
Armadale	101	80	0	0	0
Armadale	101	81	0	0	0
Armadale	101	82	0	0	0
Armadale	101	83	0	0	0
Strathy South	110	84	0	0	-2
Strathy South	110	85	0	0	-2
Strathy South	110	86	0	0	-2
Strathy South	110	87	0	0	-2
Strathy South	110	88	0	0	-2
Strathy South	110	89	0	0	-2
Strathy South	110	90	0	0	-2
Strathy South	110	91	0	0	-2
Strathy South	110	92	0	0	-2
Strathy South	110	93	0	0	-2
Strathy South	110	94	0	0	-2
Strathy South	110	95	0	0	-2
Strathy South	110	96	0	0	-2
Strathy South	110	97	0	0	-2
Strathy South	110	98	0	0	-2
Strathy South	110	99	0	0	-2
Strathy South	110	100	0	0	-2
Strathy South	110	101	0	0	-2
Strathy South	110	102	0	0	-2
Strathy South	110	103	0	0	-2
Strathy South	110	104	0	0	-2
Strathy South	110	105	0	0	-2
Strathy South	110	106	0	0	-2
Strathy South	110	107	0	0	-2
Strathy South	110	108	0	0	-2
Strathy South	110	109	0	0	-2
Strathy South	110	110	0	0	-2
Strathy South	110	111	0	0	-2
Strathy South	110	112	0	0	-2
Strathy South	110	113	0	0	-2
Strathy South	110	114	0	0	-2
Strathy South	110	115	0	0	-2
Strathy South	110	116	0	0	-2
Strathy South	110	117	0	0	-2
Strathy South	110	118	0	0	-2
Strathy South	110	119	0	0	-2
Strathy South	110	120	0	-2	-2
Strathy South	110	121	0	0	-2
Strathy South	110	122	0	-2	-2

Turbine Number	Type	Easting	Northing	Height	Turbine height AGL
Strathy North	MM82-69hub	281169	959011	121	69
Strathy North	MM82-69hub	281779	958826	125	69
Strathy North	MM82-69hub	281032	958623	139	69
Strathy North	MM82-69hub	282035	958402	117	69
Strathy North	MM82-69hub	280726	958261	129	69
Strathy North	MM82-69hub	281276	958197	140	69
Strathy North	MM82-69hub	281660	958259	133	69
Strathy North	MM82-69hub	280512	957942	153	69
Strathy North	MM82-69hub	280858	957825	170	69
Strathy North	MM82-69hub	281380	957847	151	69
Strathy North	MM82-69hub	281960	957933	123	69
Strathy North	MM82-69hub	280325	957604	170	69
Strathy North	MM82-69hub	280734	957463	175	69
Strathy North	MM82-69hub	281161	957529	169	69
Strathy North	MM82-69hub	281599	957502	141	69
Strathy North	MM82-69hub	282019	957552	134	69
Strathy North	MM82-69hub	280073	957282	145	69
Strathy North	MM82-69hub	280441	957181	158	69
Strathy North	MM82-69hub	281015	957139	172	69
Strathy North	MM82-69hub	281396	957155	155	69
Strathy North	MM82-69hub	281838	957192	156	69
Strathy North	MM82-69hub	279745	957078	144	69
Strathy North	MM82-69hub	280022	956925	144	69
Strathy North	MM82-69hub	280329	956762	152	69
Strathy North	MM82-69hub	280786	956843	151	69
Strathy North	MM82-69hub	281155	956798	159	69
Strathy North	MM82-69hub	281390	956531	153	69
Strathy North	MM82-69hub	279346	956794	151	69
Strathy North	MM82-69hub	279617	956597	141	69
Strathy North	MM82-69hub	279901	956348	134	69
Strathy North	MM82-69hub	280399	956371	132	69
Strathy North	MM82-69hub	280803	956321	122	69
Strathy North	MM82-69hub	281164	956208	133	69
Strathy Wood	Nordex-N133 4.8MW	283048	956085	130	110
Strathy Wood	Nordex-N133 4.8MW	282148	956574	121	110
Strathy Wood	Nordex-N133 4.8MW	282534	955309	122	110
Strathy Wood	Nordex-N133 4.8MW	282879	955612	125	110
Strathy Wood	Nordex-N133 4.8MW	281771	956335	121	110
Strathy Wood	Nordex-N133 4.8MW	282886	955204	136	110
Strathy Wood	Nordex-N133 4.8MW	281330	954932	135	110
Strathy Wood	Nordex-N133 4.8MW	282836	954754	128	110
Strathy Wood	Nordex-N133 4.8MW	282151	955443	132	110
Strathy Wood	Nordex-N133 4.8MW	280893	955302	112	110
Strathy Wood	Nordex-N133 4.8MW	283030	956487	121	110
Strathy Wood	Nordex-N133 4.8MW	280912	954904	119	110
Strathy Wood	Nordex-N133 4.8MW	281599	955475	124	110
Ackron	Nordex-N133 4.8MW	291458	962797	121	110
Ackron	Nordex-N133 4.8MW	290875	962365	86	110
Ackron	Nordex-N133 4.8MW	291670	962487	143	110
Ackron	Nordex-N133 4.8MW	291224	962220	105	110
Ackron	Nordex-N133 4.8MW	291755	962118	155	110
Ackron	Nordex-N133 4.8MW	291670	961659	128	110
Ackron	Nordex-N133 4.8MW	291228	961765	91	110
Ackron	Nordex-N133 4.8MW	290774	961901	92	110
Ackron	Nordex-N133 4.8MW	290999	962797	91	110
Ackron	Nordex-N133 4.8MW	291993	962988	140	110
Ackron	Nordex-N133 4.8MW	291411	963226	138	110
Ackron	Nordex-N133 4.8MW	292184	962615	152	110
Bettyhill	Enercon-E82 3MW	273875.7	960461.6	122	85
Bettyhill	Enercon-E82 3MW	273749.7	960882.2	110	85
Armadale	VESTAS-V136-4.2MW	278509	961767	109	112
Armadale	VESTAS-V136-4.2MW	278429	962176	110	112
Armadale	VESTAS-V136-4.2MW	278321	962489	64	112
Armadale	VESTAS-V136-4.2MW	278808	962246	141	112
Armadale	VESTAS-V136-4.2MW	279182	962393	93	112
Armadale	VESTAS-V136-4.2MW	278480	962848	62	112
Armadale	VESTAS-V136-4.2MW	279084	961997	162	112
Armadale	VESTAS-V136-4.2MW	279460	962067	158	112
Armadale	VESTAS-V136-4.2MW	279813	962612	60	112
Armadale	VESTAS-V136-4.2MW	279839	962132	85	112
Armadale	VESTAS-V136-4.2MW	279725	963016	70	112
Armadale	VESTAS-V136-4.2MW	279073	962733	70	112
Armadale	VESTAS-V136-4.2MW	280116	961943	74	112
Armadale	VESTAS-V136-4.2MW	280283	961651	90	112
Armadale	VESTAS-V136-4.2MW	278698	962600	102	112
Armadale	VESTAS-V136-4.2MW	279439	962718	81	112
Armadale	VESTAS-V136-4.2MW	277972	962510	77	112
Armadale	VESTAS-V136-4.2MW	278034	961816	115	112
Armadale	VESTAS-V136-4.2MW	278064	962170	107	112
Armadale	VESTAS-V136-4.2MW	277669	961656	151	112
Armadale	VESTAS-V136-4.2MW	277696	962028	138	112
Armadale	VESTAS-V136-4.2MW	277369	962159	124	112
Armadale	VESTAS-V136-4.2MW	277643	962355	119	112
Strathy South	SG 5.0-145	280619	953031	148	127.5
Strathy South	SG 5.0-146	281155	952737	179	127.5
Strathy South	SG 5.0-147	280687	952437	155	127.5
Strathy South	SG 5.0-148	281205	952237	175	127.5
Strathy South	SG 5.0-149	280675	951871	155	127.5
Strathy South	SG 5.0-150	281141	951618	164	127.5
Strathy South	SG 5.0-151	280139	951650	138	127.5
Strathy South	SG 5.0-152	280653	951295	159	127.5
Strathy South	SG 5.0-153	280144	951050	146	127.5

Strathy South	SG 5.0-154	281058	950872	172	127.5
Strathy South	SG 5.0-155	280598	950707	164	127.5
Strathy South	SG 5.0-156	281049	950334	184	127.5
Strathy South	SG 5.0-157	280030	950461	149	127.5
Strathy South	SG 5.0-158	280413	950162	166	127.5
Strathy South	SG 5.0-159	279973	949829	153	127.5
Strathy South	SG 5.0-160	280781	949792	183	127.5
Strathy South	SG 5.0-161	280279	949361	183	127.5
Strathy South	SG 5.0-162	279786	949085	156	127.5
Strathy South	SG 5.0-163	279022	950112	161	127.5
Strathy South	SG 5.0-164	279413	949703	156	127.5
Strathy South	SG 5.0-165	279165	949159	167	127.5
Strathy South	SG 5.0-166	277397	949254	191	127.5
Strathy South	SG 5.0-167	278217	949225	193	127.5
Strathy South	SG 5.0-168	277866	949638	179	127.5
Strathy South	SG 5.0-169	277431	949983	190	127.5
Strathy South	SG 5.0-170	278375	949964	176	127.5
Strathy South	SG 5.0-171	278763	949581	178	127.5
Strathy South	SG 5.0-172	278263	950529	176	127.5
Strathy South	SG 5.0-173	278855	950613	155	127.5
Strathy South	SG 5.0-174	278555	951001	169	127.5
Strathy South	SG 5.0-175	277856	951064	177	127.5
Strathy South	SG 5.0-176	278264	951400	180	127.5
Strathy South	SG 5.0-177	277806	951652	170	127.5
Strathy South	SG 5.0-178	278297	951962	179	127.5
Strathy South	SG 5.0-179	278737	951687	162	127.5
Strathy South	SG 5.0-180	279119	952086	148	127.5
Strathy South	SG 5.0-181	278372	953507	160	127.5
Strathy South	SG 5.0-182	278683	953059	174	127.5
Strathy South	SG 5.0-183	279165	953538	132	127.5

Annex 5 – Suggested Noise Conditions

Noise

1) The rating level of noise immissions from the combined effects of the wind turbines hereby permitted (including the application of any tonal penalty), when determined in accordance with the attached Guidance Notes, shall not exceed the values for the relevant integer wind speeds set out in or derived from Table 1 attached to these conditions and:

A) Prior to the operation of the wind farm, the wind farm operator shall submit to the Local Authority for written approval a list of proposed independent consultants who may undertake compliance measurements in accordance with this condition. Amendments to the list of approved consultants shall be made only with the prior written approval of the Local Authority.

B) Within 21 days from receipt of a written request of the Local Authority, following a complaint to it alleging noise disturbance at a dwelling, the wind farm operator shall, at its expense, employ an independent consultant approved by the Local Authority to assess the level of noise immissions from the wind farm at the complainant's property (or a suitable alternative location agreed in writing with the Local Authority) in accordance with the procedures described in the attached Guidance Notes. The written request from the Local Authority shall set out at least the date, time and location that the complaint relates to. Within 14 days of receipt of the written request of the Local Authority made under this paragraph (B), the wind farm operator shall provide the information relevant to the complaint logged in accordance with paragraph (H) to the Local Authority in the format set out in Guidance Note 1(e).

C) Where there is more than one property at a location specified in Tables 1 and 2 attached to this condition, the noise limits set for that location shall apply to all dwellings at that location. Where a dwelling to which a complaint is related is not identified by name or location in the Tables attached to these conditions, the wind farm operator shall submit to the Local Authority for written approval proposed noise limits to be adopted at the complainant's dwelling for compliance checking purposes. The proposed noise limits are to be those limits selected from the Tables specified for a listed location which the independent consultant considers as being likely to experience the most similar background noise environment to that experienced at the complainant's dwelling. The submission of the proposed noise limits to the Local Authority shall include a written justification of the choice of the representative background noise environment provided by the independent consultant. The rating level of noise immissions resulting from the combined effects of the wind turbines when determined in accordance with the attached Guidance Notes shall not exceed the noise limits approved in writing by the Local Authority for the complainant's dwelling.

D) Prior to the commencement of any measurements by the independent consultant to be undertaken in accordance with these conditions, the wind farm operator shall submit to the Local Authority for written approval the proposed measurement location identified in accordance with the Guidance Notes where measurements for compliance checking purposes shall be undertaken. Where the proposed measurement location is close to the wind turbines, rather than at the complainants property (to improve the signal to noise ratio), then the operators submission shall include a method to calculate the noise level from the wind turbines at the complainants property based on the noise levels measured at the agreed location (the alternative method). Details of the alternative method together with any associated guidance notes deemed necessary, shall be submitted to and agreed in writing by the Local Authority prior to the commencement of any measurements. Measurements to assess compliance with the noise limits set out in the Tables attached to these conditions or approved by the Local Authority pursuant to paragraph (C) of this condition shall be undertaken at the measurement location approved in writing by the Local Authority.

E) Prior to the submission of the independent consultant's assessment of the rating level of noise immissions pursuant to paragraph (F) of this condition, the wind farm operator shall submit to the Local Authority for written approval a proposed assessment protocol setting out the following:

i) the range of meteorological and operational conditions (the range of wind speeds, wind directions, power generation and times of day) to determine the assessment of rating level of noise immissions.

ii) a reasoned assessment as to whether the noise giving rise to the complaint contains or is likely to contain a tonal component.

The proposed range of conditions shall be those which prevailed during times when the complainant alleges there was disturbance due to noise, having regard to the information provided in the written request of the Local Authority under paragraph (B), and such others as the independent consultant considers necessary to fully assess the noise at the complainant's property. The assessment of the rating level of noise immissions shall be undertaken in accordance with the assessment protocol approved in writing by the Local Authority and the attached Guidance Notes.

F) The wind farm operator shall provide to the Local Authority the independent consultant's assessment of the rating level of noise immissions undertaken in accordance with the Guidance Notes within 2 months of the date of the written request of the Local Authority made under paragraph (B) of this condition unless the time limit is extended in writing by the Local Authority. The assessment shall include all data collected for the purposes of undertaking the compliance measurements, such data to be provided in the format set out in Guidance Note 1(e) of the Guidance Notes. The instrumentation used to undertake the measurements shall be calibrated in accordance with Guidance Note 1(a) and certificates of calibration shall be submitted to the Local Authority with the independent consultant's assessment of the rating level of noise immissions.

G) Where a further assessment of the rating level of noise immissions from the wind farm is required pursuant to Guidance Note 4(c) of the attached Guidance Notes, the wind farm operator shall submit a copy of the further assessment within 21 days of submission of the independent consultant's assessment pursuant to paragraph (F) above unless the time limit for the submission of the further assessment has been extended in writing by the Local Authority.

H) The wind farm operator shall continuously log power production, wind speed and wind direction, all in accordance with Guidance Note 1(d) of the attached Guidance Notes. The data shall be retained for a period of not less than 24 months. The wind

farm operator shall provide this information in the format set out in Guidance Note 1(e) of the attached Guidance Notes to the Local Authority on its request within 14 days of receipt in writing of such a request.

Note: For the purposes of this condition, a "dwelling" is a building within Use Classes 7, 8 and 9 of the Town and Country Planning (Use Classes) (Scotland) Order 1997 which lawfully exists or had planning permission at the date of this permission.

Table 1 – All times of the Day - Noise level dB $L_{A90,\ 10\text{-}minute}$

Location (easting, northing grid coordinates)	**Standardised wind speed at 10 metres height (m/s) within the site averaged over 10-minute periods**											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
	L_{A90} Decibel Levels											
Bowside Cottage (283050, 960898)	25	25	25	25	25	25	25	25	25	25	25	25
Bowside Lodge (282917, 960980)	25	25	25	25	25	25	25	25	25	25	25	25
Rhifail (273021, 949390)	35	35	35	35	35	35	35	35	35	35	35	35

Note 1 to Table 1: The geographical coordinates references set out in these tables are provided for the purpose of identifying the general location of dwellings to which a given set of noise limits applies. The standardised wind speed at 10 metres height within the site refers to wind speed at 10 metres height derived from those at hub height, calculated in accordance with the method given in the Guidance Notes.

Guidance Notes for Noise Condition

These notes are to be read with and form part of the noise condition. They further explain the condition and specify the methods to be employed in the assessment of complaints about noise immissions from the wind farm. The rating level at each integer wind speed is the arithmetic sum of the wind farm noise level as determined from the best-fit curve described in Note 2 of these Guidance Notes and any tonal penalty applied in accordance with Note 3 with any necessary correction for residual background noise levels in accordance with Note 4. Reference to ETSU-R-97 refers to the publication entitled "The Assessment and Rating of Noise from Wind Farms" (1997) published by the Energy Technology Support unit (ETSU) for the Department of Trade and Industry (DTI).

Note 1

(a) Values of the $L_{A90,10\text{-}minute}$ noise statistic should be measured at the complainant's property (or an approved alternative representative location as detailed in Note 1(b)), using a sound level meter of EN 60651/BS EN 60804 Type 1, or BS EN 61672 Class 1 quality (or the equivalent UK adopted standard in force at the time of the measurements) set to measure using the fast time weighted response as specified in BS EN 60651/BS EN 60804 or BS EN 61672-1 (or the equivalent UK adopted standard in force at the time of the measurements). This should be calibrated before and after each set of measurements, using a calibrator meeting BS EN 60945:2003 "Electroacoustics – sound calibrators" Class 1 with PTB Type Approval (or the equivalent UK adopted standard in force at the time of the measurements) and the results shall be recorded. Measurements shall be undertaken in such a manner to enable a tonal penalty to be calculated and applied in accordance with Guidance Note 3.

(b) The microphone shall be mounted at 1.2 - 1.5 metres above ground level, fitted with a two-layer windshield or suitable equivalent approved in writing by the Local Authority, and placed outside the complainant's dwelling. Measurements should be made in "free field" conditions. To achieve this, the microphone shall be placed at least 3.5 metres away from the building facade or any reflecting surface except the ground at the approved measurement location. In the event that the consent of the complainant for access to his or her property to undertake compliance measurements is withheld, the wind farm operator shall submit for the written approval of the Local Authority details of the proposed alternative representative measurement location prior to the commencement of measurements and the measurements shall be undertaken at the approved alternative representative measurement location.

(c) The $L_{A90,10\text{-}minute}$ measurements should be synchronised with measurements of the 10-minute arithmetic mean wind speed and wind direction data and with operational data logged in accordance with Guidance Note 1(d) and rain data logged in accordance with Note 1(f).

(d) To enable compliance with the conditions to be evaluated, the wind farm operator shall continuously log arithmetic mean wind speed in metres per second (m/s) and arithmetic mean wind direction in degrees from north in each successive 10-minutes period in a manner to be agreed in writing with the planning authority. Each 10 minute arithmetic average mean wind speed data as measured or calculated at turbine hub height shall be 'standardised' to a reference height of 10 metres as described in ETSU-R-97 at page 120 using a reference roughness length of 0.05 metres. It is this standardised 10 metre height wind speed data which is correlated with the noise measurements determined as valid in accordance with Note 2(b), such correlation to be undertaken in the manner described in Note 2(c). All 10-minute periods shall commence on the hour and in 10-minute increments thereafter synchronised with Greenwich Mean Time and adjusted to British Summer Time where necessary.

(e) Data provided to the Local Authority in accordance with paragraphs (E) (F) (G) and (H) of the noise condition shall be provided in comma separated values in electronic format with the exception of data collected to asses tonal noise (if required) which shall be provided in a format to be agreed in writing with the Local Authority.

(f) A data logging rain gauge shall be installed in the course of the independent consultant undertaking an assessment of the level of noise immissions. The gauge shall record over successive 10-minute periods synchronised with the periods of data recorded in accordance with Note 1(d).

Note 2

(a) The noise measurements should be made so as to provide not less than 20 valid data points as defined in Note 2 paragraph (b).

(b) Valid data points are those measured during the conditions set out in the assessment protocol approved by the Local Authority under paragraph (E) of the noise condition but excluding any periods of rainfall measured in accordance with Note 1(f).

(c) Values of the $L_{A90,10\text{-minute}}$ noise measurements and corresponding values of the 10-minute standardised ten metre height wind speed for those data points considered valid in accordance with Note 2(b) shall be plotted on an XY chart with noise level on the Y-axis and wind speed on the X-axis. A least squares, "best fit" curve of an order deemed appropriate by the independent consultant (but which may not be higher than a fourth order) shall be fitted to the data points to define the wind farm noise level at each integer speed.

Note 3

(a) Where, in accordance with the approved assessment protocol under paragraph (E) of the noise condition, noise immissions at the location or locations where compliance measurements are being undertaken contain or are likely to contain a tonal component, a tonal penalty shall be calculated and applied using the following rating procedure.

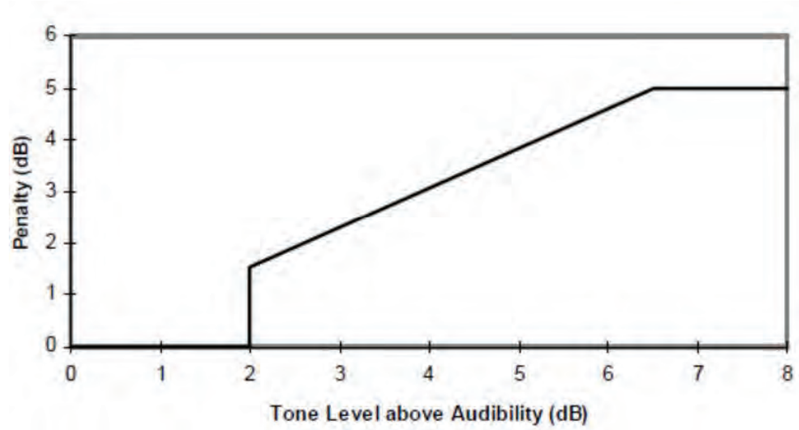
(b) For each 10-minute interval for which $L_{A90,10\text{-minute}}$ data have been determined as valid in accordance with Note 2, a tonal assessment shall be performed on noise immissions during 2-minutes of each 10-minute period. The 2-minute periods should be spaced at 10-minute intervals provided that uninterrupted uncorrupted data are available ("the standard procedure"). Where uncorrupted data are not available, the first available uninterrupted clean 2-minute period out of the affected overall 10-minute period shall be selected. Any such deviations from the standard procedure shall be reported.

(c) For each of the 2-minute samples the tone level above audibility shall be calculated by comparison with the audibility criterion given in Section 2.1 on pages 104 -109 of ETSU-R-97.

(d) The tone level above audibility shall be plotted against wind speed for each of the 2-minute samples. Samples for which the tones were below the audibility criterion or no tone was identified, a value of zero audibility shall be substituted.

(e) A least squares "best fit" linear regression shall then be performed to establish the average tone level above audibility for each integer wind speed derived from the value of the "best fit" line fitted to values within ± 0.5m/s of each integer wind speed. If there is no apparent trend with wind speed then a simple arithmetic mean shall be used. This process shall be repeated for each integer wind speed for which there is an assessment of overall levels in Note 2.

(f) The tonal penalty is derived from the margin above audibility of the tone according to the figure below derived from the average tone level above audibility for each integer wind speed.



Note 4

(a) If a tonal penalty is to be applied in accordance with Note 3 the rating level of the turbine noise at each wind speed is the arithmetic sum of the measured noise level as determined from the best fit curve described in Note 2 and the penalty for tonal noise as derived in accordance with Note 3 at each integer wind speed within the range set out in the approved assessment protocol under paragraph (E) of the noise condition.

(b) If no tonal penalty is to be applied then the rating level of the turbine noise at each wind speed is equal to the measured noise level as determined from the best fit curve described in Note 2.

(c) If the rating level at any integer wind speed lies at or below the values set out in the Tables attached to the conditions or at or below the noise limits approved by the Local Authority for a complainant's dwelling in accordance with paragraph (C) of the noise condition then no further action is necessary. In the event that the rating level is above the limit(s) set out in the Tables attached to the noise conditions or the noise limits for a complainant's dwelling approved in accordance with paragraph (C) of the noise condition, the independent consultant shall undertake a further assessment of the rating level to correct for background noise so that the rating level relates to wind turbine noise immission only.

(d) The wind farm operator shall ensure that all the wind turbines in the development are turned off for such period as the independent consultant requires to undertake the further assessment. The further assessment shall be undertaken in accordance with the following steps:

i. Repeating the steps in Note 2, with the wind farm switched off, and determining the background noise (L_3) at each integer wind speed within the range set out in the approved noise assessment protocol under paragraph (E) of this condition.

ii. The wind farm noise (L_1) at this speed shall then be calculated as follows where L_2 is the measured level with turbines running but without the addition of any tonal penalty:

$$L_1 = 10\log\left[10^{L_2/10} - 10^{L_3/10}\right]$$

iii. The rating level shall be re-calculated by adding the tonal penalty (if any is applied in accordance with Note 3) to the derived wind farm noise L_1 at that integer wind speed.

iv. If the rating level after adjustment for background noise contribution and adjustment for tonal penalty (if required in accordance with note (iii) above) at any integer wind speed lies at or below the values set out in the Tables attached to the conditions or at or below the noise limits approved by the Local Authority for a complainant's dwelling in accordance with paragraph (C) of the noise condition then no further action is necessary. If the rating level at any integer wind speed exceeds the values set out in the Tables attached to the conditions or the noise limits approved by the Local Authority for a complainant's dwelling in accordance with paragraph (C) of the noise condition then the development fails to comply with the conditions.

TECHNICAL APPENDIX 7 – CULTURAL HERITAGE

TA7.1: Proposed Visualisations for Assessing Potential Impacts on the Setting of Cultural Heritage Features

TA7.2: Settings Assessment

TA7.3: Heritage Assets Gazetteer

TA 7.4: Cultural Heritage Plates

TA7.1: Proposed Visualisations for Assessing Potential Impacts on the Setting of Cultural Heritage Features

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Ruth Cameron
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Historic Environment Scotland
Salisbury Place
Edinburgh
EH9 1SH

Our ref: AOC_24924
Case ID: 300037303
Your Ref: ECU00001849

12th July 2019

Dear Ms Cameron

Strathy South Wind Farm: Proposed Visualisations for Assessing Potential Impacts on the Settings of Cultural Heritage Features

SSE Generation Limited has consent for the construction and operation of Strathy South Wind Farm, which is composed of 39 wind turbines with a height tip of up to 135m, on land 12km south of Strathy.

As set out in the recent Scoping Report that you responded to on 20th May (your reference: 300037303), SSE Generation Limited is seeking to amend their current planning consent to be able to construct wind turbines with a tip height of up to 200m in height. AOC Archaeology Group is currently undertaking the cultural heritage assessment which will assess the potential impact of the proposed amendment of the maximum tip height, and we are writing to seek your opinion on our proposed list of visualisations.

Archaeology and Cultural Heritage Assessment

A copy of the comparative Zone of Theoretical Visibility (ZTV) (see appended figure 1) shows the ZTV of the consented 135 m Strathy South Wind Farm compared to the proposed amended tip height of 200m. Our initial assessment of this ZTV indicates that, in general, there would be a slight increased visibility of the 200m tip height wind turbines compared to those with a maximum tip height of 135m. Overall, the 200 m tip height turbines would have greater intervisibility to the north, east and west, with less intervisibility to the south. This initial assessment has identified three Scheduled Monuments that were previously not within the ZTV: Halladale Bridge (SM3304) c.13.65km north east; Rosdale, deserted township (SM2510), c.11.06km south west; and Armadale Burn, broch (SM13678), c.8.35km north of the Site.

The table below provides details of the visualisations that we intend to include within the Environmental Impact Assessment as an aid to assessing potential impacts on the settings of designated assets.

Site Name	AOC Site No	Scheduled Monument /HB Number	Easting	Northing	Visualisation
Ben Griam Beg, fort	15	1836	282962	941092	Photomontage from central point of fort towards Wind Farm.
Armadale Burn, broch	61	13678	279933	962670	Wireframe from the south side of the broch towards Wind farm. His would confirm theoretical visibility.
Halladale Bridge	32	3304	289989	963537	Wireframe from centre of hut circles.
Rosdale, deserted township	56	2510	268912	941636	Wireframe from centre of deserted township.
Dalmor, homestead	10	271686	199300	955393	Wireframe from centre of homestead to compare previous wireline with wind turbines of 135m and 200m maximum tip height.
The Tulloch', fortified enclosure	11	10503	269725	944944	Wireframe from north east side of monument. ZTV suggests increased intervisibility.
Achargary, chambered cairn and ring cairns	12	1760	271926	954996	Wireframe from south east side of monument. ZTV suggests increased intervisibility.
Fiscary cairns and chambered cairn	13	1790	273112	962602	Wireframe from south eastern cairn. ZTV suggests increased intervisibility.
Skelpick Lodge chambered cairn and Skelpick, long cairn	14, 50	1816 1815	272492, 272256	956047, 956732	Wireframe from south eastern cairn. Monument within 5km of wind farm. View towards windfarm similar from both monuments.
The Borg, broch	16	1839	289943	950958	Wireframe from western side of monument. ZTV suggests increased intervisibility.

Site Name	AOC Site No	Scheduled Monument /HB Number	Easting	Northing	Visualisation
Cnoc Carnachadh, broch	17	1850	272136	952695	Wireframe from eastern side of monument. ZTV suggests increased intervisibility.
Lochan Druim an Duin, broch and Invernaver cairns, cists, hut circles and field system	18 & 21	1879 & 2842	269736 270048	960979 961104	Wireframe from centre of Lochan Druim. Monuments within 200m of each other. One wireline from high point will show max intervisibility. ZTV suggests increased intervisibility.
Cnoc na Gamhna, hut circles	19	2514	269114	936194	Wireframe from north western area of monument. SMC has been granted as of 28/11/2018 for tree felling around monument. ZTV suggests increased intervisibility.
Allt Ceann na Coille, hut circles & field clearance cairns	20	2521	267193	941585	Wireframe from central area.

I would be grateful if you could let me know if you are content with the above proposed list or if there are any additional heritage assets for which you would like to see visualisations included within the cultural heritage assessment.

Kind Regards

Lisa Bird

Project Officer

TA7.2: Settings Assessment

Technical Appendix 7.2: Settings Assessment

7.1. Table 7.2.1 details the settings assessment of designated assets previously assessed within the 2007 Environmental Statement (ES), and, where applicable the 2013 ES Addendum, in relation to the Proposed Varied Development. The methodology, detailed within the EIAR Volume 2: Chapter 7 (section Assessment of Residual Effects, paragraphs 7.4.15- 7.4.32) has been used for the setting assessment. The judgement of settings effect is noted in each case, where assets were not re-assessed as part of the 2013 ES Addendum this has been noted. Table 7.2.1 also details the relative sensitivity of the designated assets within the ZTV as judged by this assessment. A judgement of the magnitude of setting impact and the significance of effect is also provided. The Effect Significance highlighted in **bold** are judged to be Significant in EIA terms. All plates referenced in the text are contained within EIAR Volume 4: Technical Appendix 7.4: Cultural Heritage Plates. Given the emphasis SNH places on significant effects, cumulative effects have only been considered for those assets where the effects upon the setting from the Proposed Varied Development, alone, have been judged to be an effect of Minor-moderate level or greater (EIAR Volume 2: Chapter 7: Cultural Heritage, paragraph 7.6.27).

Table 7.2.1: Settings Assessment									
Site Number[1]	**Site Name**	**2007 ES**	**2013 ES Addendum**	**Distance from nearest turbine**	**Number of theoretically visible turbines**	**Other factors Affecting Visibility**	**Relative Sensitivity**	**Magnitude of Setting Impact**	**Significance of Effect**
10	Dalmor, homestead	Imperceptible magnitude and Minor significance	Not reassessed	6.95 km northwest of T69	1-5	The site is located in Strathnaver and its setting is related to that valley setting.	Low	Low	Negligible
11	The Tulloch', fortified enclosure	No impact	Not reassessed	8.802 km southeast of T35	1-5	The site is located in Strathnaver and its setting is related to that valley setting.	Low	Negligible	Neutral
12	Achargary, chambered cairn and ring cairns	No impact	Not reassessed	6.617 km WNW of T69	11-20	The site is located in Strathnaver and its setting is related to that valley setting.	Low	Low	Negligible
13	Fiscary cairns and chambered cairn	Imperceptible magnitude and Minor significance	Not reassessed	10.54 km north of T69	36-39	-	High	Low	Minor-Moderate
14	Skelpick Lodge chambered cairn	Imperceptible magnitude and Minor significance	Not reassessed	6.4 km northwest of T69	26-39	The site is located in Strathnaver and its setting is related to that valley setting.	Low	Low	Negligible
16	The Borg, broch	Imperceptible magnitude and Minor significance	Not reassessed	8.90 km east of T15	36-39	-	High	Negligible	Minor
17	Cnoc Carnachadh, broch	No impact	Not reassessed	5.76 km west of T52	1-5	The site is located in Strathnaver and its setting is related to that valley setting.	Low	Negligible	Negligible
18	Lochan Druim an Duin, broch	Imperceptible magnitude and Minor significance	Not reassessed	11.425 km north west of T69	0-15	The site is located in Strathnaver and its setting is related to that valley setting.	Low	Negligible	Negligible
19	Cnoc na Gamhna, hut circles	No impact	Not reassessed	15.495 km south west of T36	0-20	On a north facing slope. The hut circles are located on the north western side of the hill.	Low	Negligible	Neutral
20	Allt Ceann na Coille, hut circles & field clearance cairns	No impact	Not reassessed	12.745 km south east of T36	11-15	Modern forestry plantation	Low	Negligible	Neutral
21	Invernaver cairns, cists, hut circles and field system	No impact	Not reassessed	11.265 km north west of T69	1-15	The site is located in Strathnaver and its setting is related to that valley setting.	Low	Negligible	Neutral
22	Stathy Former Church- Category C	No impact	Not reassessed	12.43 km northeast of T72	6-10	-	Low	Negligible	Neutral

[1] Refer to EIAR Volume 3a: Figure 7.2

Table 7.2.1: Settings Assessment									
Site Number[1]	**Site Name**	**2007 ES**	**2013 ES Addendum**	**Distance from nearest turbine**	**Number of theoretically visible turbines**	**Other factors Affecting Visibility**	**Relative Sensitivity**	**Magnitude of Setting Impact**	**Significance of Effect**
23	Strathy Free Church- Category C	Low magnitude and Negligible significance	Not reassessed	12.8 km northeast of T1	36-39	Understood as a group of three related structures (Site 23-25)	Medium	Negligible	Negligible
24	Strathy Former Free Church Manse- Category C	Low magnitude and Negligible significance	Not reassessed	12.8 km northeast of T1	36-39	Understood as a group of three related structures (Site 23-25)	Medium	Negligible	Negligible
25	Strathy Former Free Church School- Category C	No impact	Not reassessed	12.8 km northeast of T1	36-39	Understood as a group of three related structures (Site 23-25)	Medium	Negligible	Negligible
26	Bettyhill Ivy Cottage and steading- Category C	No impact	Not assessed	10.575 km NWN of T69	1-5	Local topography	Medium	None	None

Minor-Moderate

7.2. The Scheduled Fiscary chambered cairn and cairns (Site 13) are composed of two large stone cairns, one of which is thought to be chambered (Plate 7.16). The cairns occupy upland improved pasture, surrounded by post medieval and modern farms on a ridge of high ground. To the north lies the North Sea and to the west lies the settlement known as Bettyhill. Beyond the agricultural land to the east and southeast exposed rock and grassy hills are crossed by a single line OHL. To the south, in the near distance, is a large area of woodland, in the middle distance is mixed agricultural land and in the far distance are larger hills and mountains. Two wind turbines, known as the Bettyhill Wind Farm, are located to the south of the cairns and are visible to their full height (Figure 7.2.1). The cairns (Site 13) have been positioned to be prominent features in the local landscape and as such are judged to be of High relative sensitivity to change.

7.3. The Proposed Varied Development would be located ESE at a distance of c. 10.5 km and would appear behind the two aforementioned Bettyhill Wind Farm turbines (Plate 7.17; Figure 7.2.1). Whilst the cairns (Site 13) are prominent features and would have been designed to be seen across the landscape, it is unlikely that they were designed to be seen from distances of over 10 km and indeed are not visible at this distance today and were unlikely visible at such a distance at the time of their construction. As such the Proposed Varied Development would have a limited impact on views towards the cairns. The views from the cairns, towards the hills to the south, may have been of importance to the siting of the cairns (Site 13), as the only uplands features in the wide environment. As shown on Figure 7.2.1., these hills would be partially obscured by the Proposed Varied Development and would consequently appear as less prominent landscape features when viewed from the cairns. However, the Proposed Varied Development would be located within the distant wider setting of the cairns (Site 13), behind extant turbines. The turbines would occupy only a small proportion of the overall view from the cairns in an arc to southeast of the cairns (Site 13-Figure 7.2.1). The view from Fiscary cairns (Site 13) of the surrounding area to the north, east and west including the north coastline would not be altered by the Proposed Varied Development and as such the magnitude of change would be Low. The overall significance of effect would be Minor-Moderate. The significance of effect is not considered to be significant in EIA terms.

7.4. As a potential Minor-Moderate level of effect on the setting of the Scheduled Fiscary cairns (Site 13) has been identified, an assessment on the cumulative effect on the setting of Fiscary cairns (Site 13) has been undertaken. As shown on Figure 7.2.1 the existing Bettyhill Wind Farm is visible from the Scheduled Monument (Site 13- Plate 7.17). Six full height turbines, ten turbine hubs and 23 blade tips of the Proposed Varied Development would be visible to the ESE, at a distance of c.10.5 km. The Proposed Varied Development turbines are thus located in the same arc of view as the Bettyhill Wind Farm turbines. The two Bettyhill turbines would appear much larger than those of the Proposed Varied Development as they are located in closer proximity to the cairn. Distant views of the Proposed Varied Development behind these turbines would marginally increase the proportion of view occupied by turbine development. However, there would be no increased impact on the ability to understand and appreciate the cairn in its current setting and as such the cumulative effect would be at the same level as that identified for the Proposed Varied Development. The significance of cumulative effect would therefore be Minor-Moderate and not significant in EIA terms.

7.5. The Scheduled Dalmor, homestead (Site 10) is composed of substantial earthwork remains of a roughly circular enclosure, with ditch and rampart on a knoll on a steeply downward sloping, east facing slope of Strathnaver at approximately 40 m AOD. It is believed that within the enclosure are the remains of at least two buildings, and that within the eastern Scheduled area clearance heaps with potential indications of field plots and banks survive. Dalmor homestead (Site 10) is believed to date to the Iron Age and has been previously described as a broch and dun. The earthwork remains were found to be overgrown during the site visit. The land to the west of the monument (Site 10) continues to steeply rise to the west, to the ridgeline of Strathnaver (Plate 7.11). The position of Dalmor homestead (Site 10) provides good views along the strath, north, east and south, which must have been intentional during construction and occupation. It is likely that the monument (Site 10) was positioned with the knowledge that a number of brochs or indeed other defended homesteads existed, on a similar contour along Strathnaver, such as Allt a'Chaisteil, broch (Site 52) to the northeast, on the opposite side of Strathnaver, and Cnoc Carnachadh, broch (Site 17) to the south. Strathnaver is roughly north-south orientated and is presently occupied by a post-medieval and modern agricultural landscape. It is likely that this landuse predates the post-medieval period, and that the present outlook of the monument (Site 10) is not too dissimilar to its original outlook (Plate 7.11). Evidence of the long durée of activity within the valley is evidence by chambered cairns (Site 12, 14 & 50) on the banks of the River Naver or the Skelpick Burn to the east which suggests continued use of the valley since the Neolithic. Modern intrusions are limited to the road, the B871, dispersed agricultural settlements which are most likely located by or on earlier antecedents and small overhead lines (OHL's). Dalmor homestead (Site 10) has been clearly located upslope on an east facing slope, with clear views along Strathnaver, which has been interpreted for defence. It may also be the case that the homestead (Site 10) was afforded good views over the fertile land around river, which it was farming and settlement high above the agricultural land and floodplain. As such Dalmor homestead (Site 10) is judged to have a High relative sensitivity to change within the Strathnaver and a Low relative sensitivity to change outwith Strathnaver.

7.6. The Proposed Varied Development would be located c.6.95 km west of the monument (Site 10) (Plate 7.11), and indeed the wireline from the monument clearly shows the Proposed Varied Development beyond the eastern ridgeline of Strathnaver (Figure 7.2.2). This would constitute a Low magnitude of impact to the setting, being peripheral to key sightlines, along Strathnaver and being a slight alteration to the setting beyond those elements of the setting which directly contribute to the understanding of the monument (Site 10). Overall, this would result in a Minor significance of effect. The significance of effect is not judged to be significant in EIA terms.

7.7. A broch, known as The Borg (Site 16) is located on the eastern side of the Strath Halladale, on a rocky knoll (Plate 7.12). The broch walls survive to a height of approximately 1.5 m and an internal passage or cell was visible within the surviving walls. The southern side of the broch may have been remodelled for use as a twinning pen. The broch occupies a grassy and moorland platform on the west facing slopes of Strath Halladale with open views to the north, west and south. Views westward, on the western side of the Halladale River are partially terminated by a plantation of modern forestry, although the land on the western side of the River Halladale is relatively flat and a good distance is visible to the west from the broch remains. It is likely that views further westward were obtainable when the broch (Site 16) was in use. The A897 is located west of the broch (Site 16) and a large OHL is located to the east. Further east lies a modern forestry plantation. The broch appears to have been built to enable visibility along Strath Halladale and to the west, with upward rising land to the east, which is associated with the defensive nature often attributed to brochs. As such the broch (Site 16) is judged to have a High relative sensitivity to change.

7.8. The Proposed Varied Development would be visible as turbine tips and hubs to the west of the broch (Site 16) beyond the undulating edge of Strath Halladale to the west (Plate 7.13; Figure 7.2.3). The Proposed Varied Development being located outwith the strath would not materially alter an observer's ability to

understand and experience the broch (Site 16) and its setting and as such the magnitude of change is considered to be Low and the overall significance of effect Minor. The significance of effect is not considered Significant in EIA terms.

7.9. Loch Druim (Site 18) is a Scheduled broch located on the western slopes of Strathnaver. The broch is protected on three sides by steep rocky slopes and can be approached from higher ground to the west across a low saddle between higher ground (Plate 7.14). The broch (Site 18) has been cleared in the past and the interior consolidated. The entrance to the broch (Site 18) is located to the north. Views north and northeast from the broch (Site 18) are limited by a prominent ridge between higher peaks on the North Sea coast and on the western side of Strathnaver although the North Sea is visible. Views eastward include Strathnaver, occupied by improved land and the River Naver, and the settlements at Bettyhill and Invernaver. The view southwards along Strathnaver is limited by the steep rocky slopes to the south which protrude further than the slope on which the broch (Site 18) is situated. The broch appears to have been constructed with limited accessibility, furthering the potential interpretation of the broch as a defensive site. The broch also appears to have clear views of the Naver estuary north eastwards. At the bottom of the slopes on which Loch Drium (Site 18) is located lie the remains of the Scheduled Invernaver cairns, cists hut circles and field system (Site 21), a mixed prehistoric domestic, funerary and agricultural settlement which was sealed in the sand until the 19th century. It is possible that the broch (Site 18) and Site 21 may have been contemporary, and Site 21 may be the domestic settlement associated with the defensive broch although they may also have been used and constructed at different times and have no relationship to one another. As such the broch (Site 18) is judged to have a High relative sensitivity to change within Strathnaver and along the coast, and a Low relatively sensitivity to changes outwith Strathnaver.

7.10. The Proposed Varied Development would be located 11.51 km southeast of the broch and would be visible from the broch (Site 18-Figue 7.2.4). A wireline from the broch (Figure 7.2.4) also indicates that the tips of Strathy Wood and Strathy North Windfarms may be intervisible. However, the Proposed Varied Development is located beyond Strathnaver and beyond the area the broch (Site 18) was designed to have views over (Plates 7.14 & 7.15). Therefore, the magnitude of change would be Negligible and overall significance of effect would be Minor. The significance of effect is not considered to be significant in EIA terms.

Negligible

7.11. Archargary chambered cairn and rings cairns is a Scheduled Monument (Site 12) on the western, upper terrace of the River Naver on a relatively flat plateau of improved grassland (Plate 7.18). The chambered cairn measures approximately 22 m in diameter and survives up to 2 m in height and appears to be aligned northwest, southeast. Several ring cairns were visible to the west of the chambered cairn during a site visit. It is though that cairns were constructed to be visible in the landscape, however these cairns (Site 12) are located on a relative low lying position and would not have been visible from great distances, although the cairns (Site 12) would have been visible from the River Naver and from the adjacent western and eastern slopes of Strathnaver. It is possible that the cairns would have been visible from the Scheduled Dalmor Homestead (Site 10) to the north, whether or not they were contemporary with the settlement. Dalmor homestead (Site 10) is located on the eastward facing slope of Strathnaver, with views downslope towards the River Naver and along the strath and therefore it highly likely as the cairns (Site 12) are visible monuments today that they would have been intervisible at the time the homestead was constructed. It is argued that water and stone (in the form of chambered cairns) were two substances associated with transformation and the realms of the living and the dead during the Neolithic (Cummings & Fowler, 2015:119; McLean, 2016) and therefore the location of the cairns (Site 12) on the upper floodplains of the River Naver may hold some significance. Whilst the cairns have a High relative sensitivity to changes within Strathnaver, the cairns (Site 12) have a Low sensitivity to change outwith the strath.

7.12. The Proposed Varied Development would be located 6.617 km ESE of the cairns (Site 12) and the ZTV indicates that the cairns (Site 12) would have intervisibility of 11-20 turbines, which would appear beyond the eastern ridge of Strathnaver (Plate 7.19). A wireline from the monument (Site 12) shows the Proposed Varied Development would be visible as over ten tips rising behind the eastern ridgeline of Strathnaver (Figure 7.2.5). As the turbines would be located beyond what is understandable as the setting of the cairns (Site 12), the strath, the magnitude of change would be Low and the overall significance of effect Negligible. The significance of effect is not considered significant in EIA terms.

7.13. The Scheduled Skelpick Lodge Chambered Cairn (Site 14) survives as a mound of stones, crossed by a wooden fence line (Plate 7.9) c. 6.14 km ESE of the Proposed Varied Development. The Highlands HER describes the monument (Site 14) as a horned cairn. The cairn (Site 14) is located on an area of high ground, with the Skelpick burn located to the east and the River Naver to the west. An area of woodland is located west of the site. To the south views are funnelled down Strathnaver and to the north views extended along Strathnaver to the North Sea. The immediate and views north and southwards are dominated by agricultural land, and in effect present an idea of a post medieval and modern agricultural landscape, which is largely unchanged from the prehistoric period. It is possible that when constructed, Skelpick Chambered Cairn (Site 14) was intervisible with Skelpick Long Cairn (Site 50) to the north west, on the eastern lower terrace of the Skelpick Burn. Skelpick Long Burn was designed to be seen and be prominent within Strathnaver and as such has a High relative sensitivity to change within the strath setting. However, the cairn (Site 14) is less sensitive to changes outwith the strath and has a Low relative sensitivity to change outwith Strathnaver.

7.14. The Proposed Varied Development located ESE of the cairn (Site 14) would be located beyond the eastern ridge of the strath (Plate 7.10; Figure 7.2.6) and thereby beyond the elements of setting which directly contributes to the understanding of the cairn (Site 14). As such the Proposed Varied Development would constitute a Low magnitude of change which would result in a Negligible significance of effect. The significance of effect is not considered significant in EIA terms.

7.15. Cnoc Carnachadh broch (Site 17) is located on the 50 m contour of the eastward facing slope of Strathnaver (Plate 7.3). The broch consists of the overgrown, substantial remains of a broch and surrounding ditch. The land to the west of the broch continues to rise steeply upwards to the ridgeline of the eastern side of Strathnaver. Views north and southwards extend along the strath and the land is occupied by improved fields often used for pasture and individual residential dwellings. Views westward are limited by the western ridgeline of Strathnaver. The fertile strath which the River Naver created would most likely have provided the agricultural land for the broch (Site 17) and Strathnaver is well known as a fertile valley in the post medieval period. The outlook from the broch does not appear to have substantially altered from the Iron Age. It is possible that prior to the erection of trees to the north west by Skelpick Lodge Chambered Cairn (Site 14) that the cairn would have been intervisible with the broch. It is also likely that another broch, on the western slopes of Strathnaver, Allt a'Chaisteil (Site 52) would have been visible from Site 17 when both were constructed, or that each broch had knowledge of the former's existence as it cannot be assumed that they were contemporary. The broch's setting is Strathnaver and the broch (Site 17) appears to have been designed to dominate views across the Strath and would have been visible from the valley floor when looking

southwest. As such the broch (Site 17) has a High relative sensitivity to change within Strathnaver and a Low relative sensitivity to change outwith the strath.

7.16. The Proposed Development would be located c.5.79 km east of the broch (Site 17), beyond the eastern ridgeline of Strathnaver, and therefore beyond the setting of the broch (Site 17- Plate 7.4). A wireline (Figure 7.2.7) produced from the broch (Site 17) indicates that the extreme tips of three turbines of the Proposed Varied Development may be visible beyond the strath, which may appear as moving objects beyond the ridgeline. The magnitude of change would be Negligible and the overall significance of effect Negligible. The significance of effect is not considered significant in EIA terms.

7.17. A group of three Category C Listed Buildings; the 1845 Strathy Free Church (Site 23-Plate 7.5); the 1862 Strathy Former Free Church Manse (Site 24-Plate 7.6); and the mid 19th century Strathy Former Free Church School (Site 25- Plate 7.7) are located c. 12.8 km north of the Proposed Varied Development. The buildings represent a collection of 19th century religious structures which served the settlement at Strathy and as such are considered as a group of associated buildings rather than as individual structures. The Listed Buildings (Sites 23-25) are located on a slightly southward facing slope, with views to the south, although northern views towards the coast are available from northern elevations of each building. Collectively the Category C Listed Buildings (Site 23-25) are considered to be of Medium relative sensitivity to change in the wider environment.

7.18. Due to the distance between the Category C Listed Buildings (Sites 23-25) and the Proposed Varied Development, the Proposed Varied Development would have a negligible effect on the setting of the collection of Category C Listed Buildings nor on a viewer's ability to appreciate the buildings (Site 23-25) nor their setting. The magnitude of change is judged to be Negligible and the overall significance of effect Negligible, which is not considered to be significant in EIA terms.

Neutral

7.19. The Tulloch fortified enclosure (Site 11) is composed of a sub-circular enclosure which appears partially re-built or altered to the southeast. A substantial ditch and bank survive around the outer edge of the enclosure (Plate 7.1). HES (2019) note that The Tulloch (Site 11) is medieval in date. The enclosure (Site 11) is presently located on the east side of the B871, within Strathnaver, in an improved field which appears to be used as pasture. Further east lies a natural or non-intensive area of woodland surrounding the River Naver and to the west is a post medieval farmhouse and single pole OHL. The enclosure (Site 11) has long views along Strathnaver, only curtailed by post-medieval enclosure walls and divisions. It is likely that when the enclosure was constructed that it occupied a relatively flat, upper terrace of the River Naver with views along Strathnaver. As such the defensive nature of the monument (Site 11) is understandable in its present setting. The Tulloch fortified enclosure (Site 11) has a High relative sensitivity to change within Strathnaver, although due to its location on the upper terrace of the River Naver, the enclosure (Site 11) was clearly not designed to have visibility outwith the strath. As such the monument has a Low relative sensitivity to change outwith Strathnaver.

7.20. The Proposed Varied Development, at a distance of c. 8.802 km southwest of the enclosure (Site 11), would be located beyond the eastern ridgeline of Strathnaver (Plate 7.2). The Proposed Varied Development being located outwith the strath would not materially alter an observer's ability to understand and experience the enclosure (Site 11). A wireline (Figure 7.2.8) from the monument (Site 11) suggests that visibility of the Proposed Varied Development would be limited to the extreme tip of a single turbine. As such the magnitude of change is considered to be Negligible and the overall significance of effect Neutral. The significance of effect is not considered significant in EIA terms.

7.21. Cnoc na Gamhna (Site 19) is a Scheduled Area located in plantation forestry within Naver Forest. The Scheduled area (Site 19) encompasses a large area to the north and west upper slopes of a hill which has not been subject to intensive planted forestry. The monument (Site 19) consists of the remains of a potentially prehistoric settlement including hut circles, a burnt mound and clearance cairns. The remains are visible as mounds on the hillside although potentially due to the long grass the remains were not obvious. The monument (Site 19) has been built away from the valley floor, on the slopes of a hill with clear views north and westward towards Strathnaver. Modern forestry, which is in the process of partially being felled encircles the hill on which the monument (Site 19) is located. It is unclear other than wide views mainly westward what the original outlook of the monument (Site 19) may have been. The monument is judged to be of Low relative sensitivity to change. As the Proposed Varied Development would be located to the northeast of the monument (Site 19) only partial views of the Proposed Varied Development would be obtained from the northeastern most boundary of the monument (Site 19). This direction was likely of little importance when the monument (Site 19) was constructed as it sits on a west facing slope. A wireline from the Scheduled Monument (Site 19) indicates that there would be no intervisibility with the Proposed Varied Development (Figure 7.2.9), from the centre if the monument, although partial views may be obtained from the periphery of the Scheduled area. As such there would be a Negligible magnitude of change and the overall significance of effect Neutral. The significance of effect is not considered to be significant in EIA terms.

7.22. A group of Scheduled hut circles and field clearance cairns, known as Allt Ceann na Coille (Site 20) are located southwest of the Proposed Varied Development. The monument (Site 20) is located on the eastward facing slopes of Strathnaver, in an area of modern forestry plantation. The ZTV suggests that there would be intervisibility between the Scheduled Monument (Site 20) and between 11-15 turbines of the Proposed Varied Development. However, a site visit found the area around Site 20 to be occupied by modern forestry plantations and ongoing forestry works were noted in the area. A wireline (Figure 7.2.10) from the monument (Site 20) indicates that the tips of the Proposed Varied Development would be visible as a discreet group behind a ridgeline. The relative sensitivity of the monument (Site 20) is judged to be Low, being domestic in function and the magnitude of change is considered to be Negligible. Overall, the significance of effect would be Neutral. The significance of effect is not considered to be significant in EIA terms.

7.23. The Scheduled Invernaver cairns, cists, hut circles and field systems (Site 21) are located c. 11.265km south east of the Proposed Varied Development. The Scheduled area is located on the western side of the River Naver estuary on a gravelly plateau. The area contains at least eight hut circles, cairns and burial evidence and the monument has a combined domestic and funerary in function. The monument (Site 21) is considered to be pre-Medieval in date. It is possible that if the monument (Site 21) were contemporary with the broch to the west, on the upper slopes of the Naver valley, Loch Druim (Site 18) it may be the domestic settlement (Site 18) associated with the defensive broch (Site 18). Due to the location of the monument (Site 21) it appears to have been positioned to take advantage over a raised plateau, near the sea, potentially to protect from flooding. As such the monument (Site 21) is considered to have a High sensitivity to change in its immediate environment and to the west to Loch Druim broch (Site 18), but a Low sensitivity to change beyond its immediate landscape. The Proposed Varied Development, being located at such as distance would only be visible as turbine tips beyond the eastern ridge of Strathnaver (Figure 7.2.11) and therefore would in no way impede the ability of an observer to understand and appreciated the monument (Site 21). As such the magnitude of change is considered to be Negligible, and the overall significance of effect is judged to be Neutral, a significance of effect which is not considered to be significant in EIA terms.

7.24. The 1826 parliamentary Strathy Church (Site 22) is located on an elevated promontory to the south of the modern settlement of Strathy. The land to the north slopes downwards to the coast. The land to the south of the Church (Site 22) plateau's before rising to a ridgeline. The Church (Site 22) was built for the settlement of Strathy and to be a visible building from that settlement. Churches are often located on prominent places to "overlook" and "call" a congregation. The ridgeline to the south acts a natural barrier to the of the area of influence of Strathy Church (Site 22) and as such the Church has a Low relative sensitivity to changes to the south. The Proposed Varied Development is located 12.43 km south west of the Category C Listed Building (Site 22) and the ZTV produced for this assessment indicates that there may be intervisibility with 6-10 turbines, however these would be located beyond the ridgeline to the south of the Church (Site 22) and therefore appreciably beyond the designed area of influence of the Church (Site 22). As such the Proposed Varied Development would constitute a Negligible magnitude of a change and an overall Neutral significance of effect. The significance of effect is not considered to be significant in EIA terms.

No Impact

7.25. Bettyhill Ivy Cottage and steading (Site 26), a 19th century domestic Category B Listed Building located on the north side of the A836, on a plateau of a deep valley gorge, which slopes steeply downwards to the south of the A836. The land to the south of the cottage (Site 26) is heavily wooded. Whilst the ZTV suggests there would be intervisibility between the Category B Listed Building and 1-5 turbines, a site visit indicated that there would be no intervisibility between the cottage (Site 26) and the Proposed Varied Development due to the location of the woodland and as such the cottage (Site 26) has been excluded from further assessment.

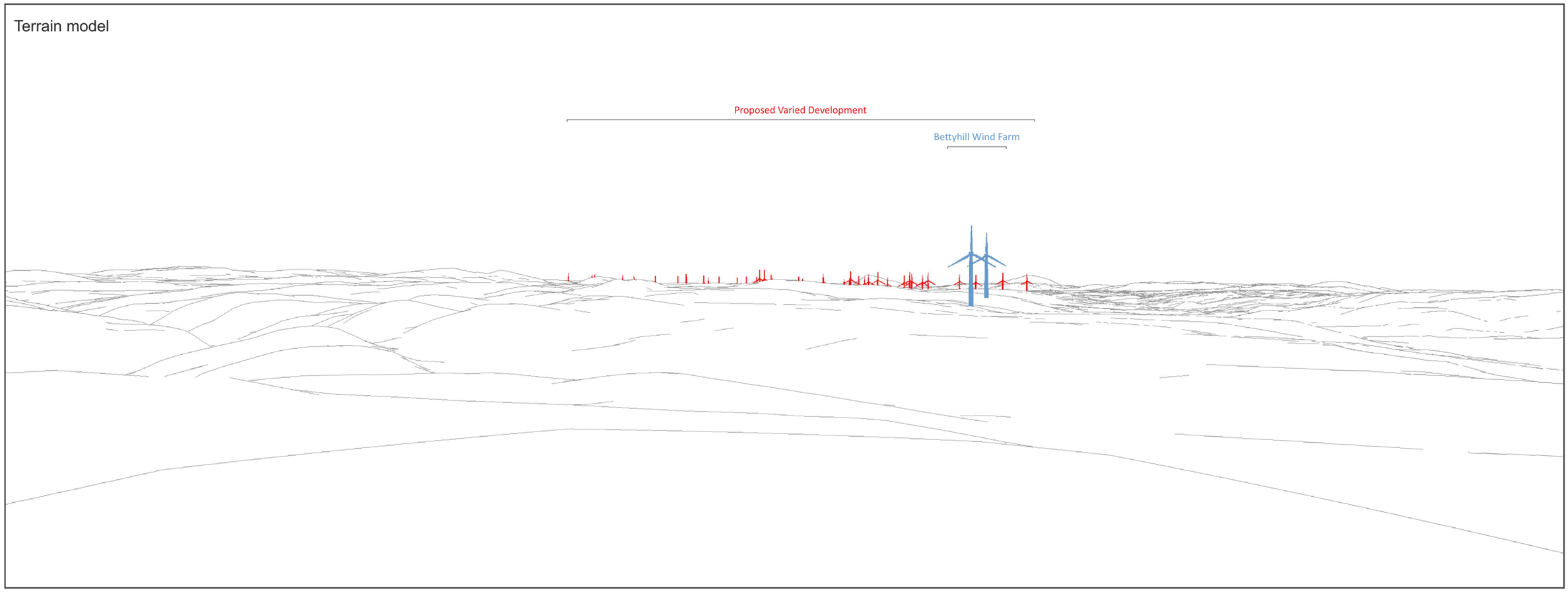

FIGURE 7.2.1: View from Fiscary cairns and chambered cairn (Site 13)

OS reference: 273112 E 962602 N Distance to development: 10.5km Ground level: 123.7m AOD Viewer Height 1.5m Direction of view: 150.90°

Proposed Varied Development Wind Turbine

Operational / Under Construction Wind Turbine

Consented Wind Turbine

Application / Appeal Wind Turbine

Scoping Wind Turbine

The image contained on this page is not representative of scale and distance from the actual viewpoint and shows the wind farm development in its wider landscape context only.

Drawing No. - 119008-D-AVP7.2.1
Revision - 1.0.0
Date - 12/02/2020

Terrain model

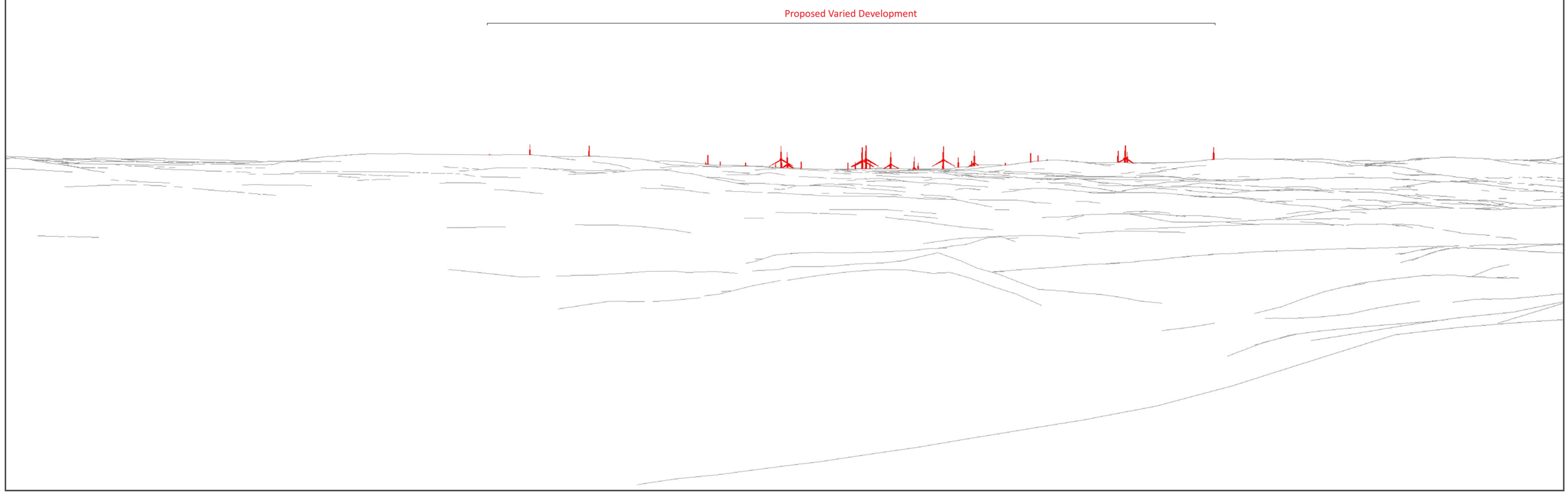

FIGURE 7.2.2: View from Dalmor, homestead (Site 10)

OS reference: 271686 E 955393 N Distance to development: 6.9km Ground level: 46.2m AOD Viewer Height 1.5m Direction of view: 117.60°

Proposed Varied Development Wind Turbine
Operational / Under Construction Wind Turbine
Consented Wind Turbine
Application / Appeal Wind Turbine
Scoping Wind Turbine

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Drawing No. - 119008-D-AVP7.2.2
Revision - 1.0.0
Date - 12.02.2020

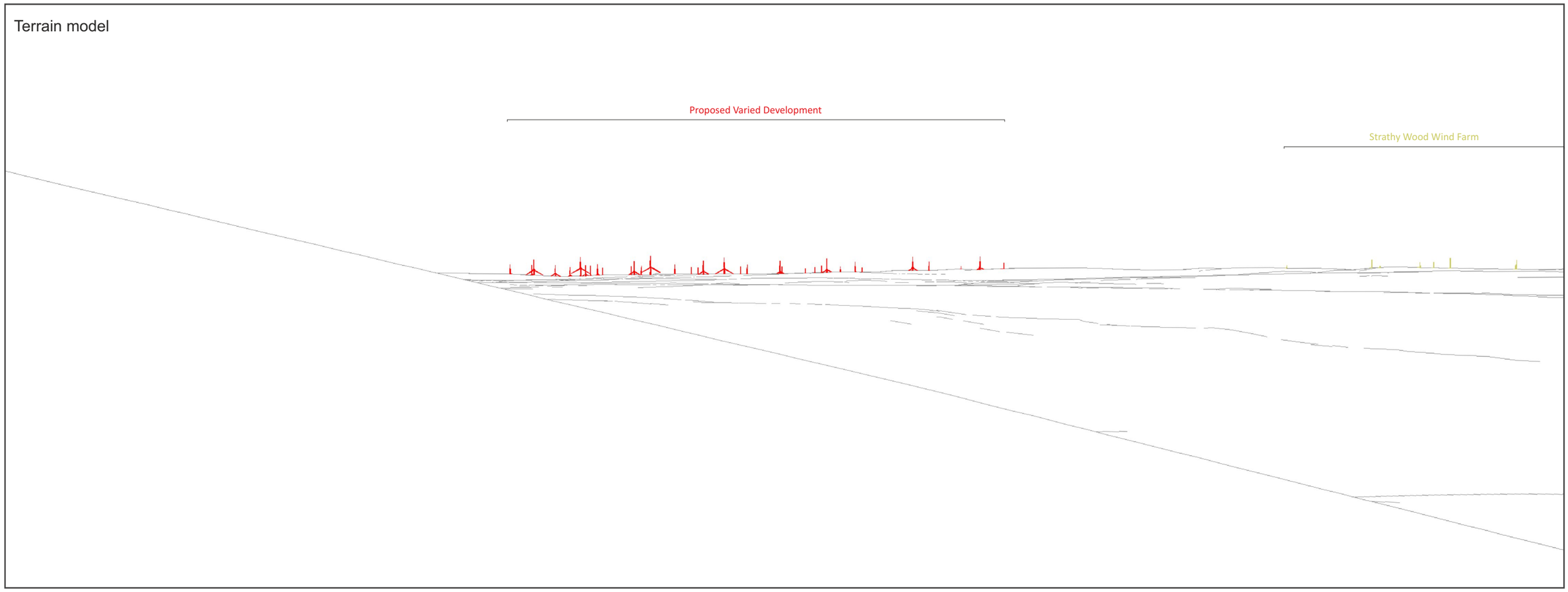

FIGURE 7.2.3: View from The Borg, broch (Site 16)

OS reference: 289943 E 950958 N Distance to development: 8.8km Ground level: 82.4m AOD Viewer Height 1.5m Direction of view: 272.30°

Proposed Varied Development Wind Turbine | Operational / Under Construction Wind Turbine | Consented Wind Turbine | Application / Appeal Wind Turbine | Scoping Wind Turbine

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Drawing No. - 119008-D-AVP7.2.3
Revision - 1.0.0
Date - 12/02/2020

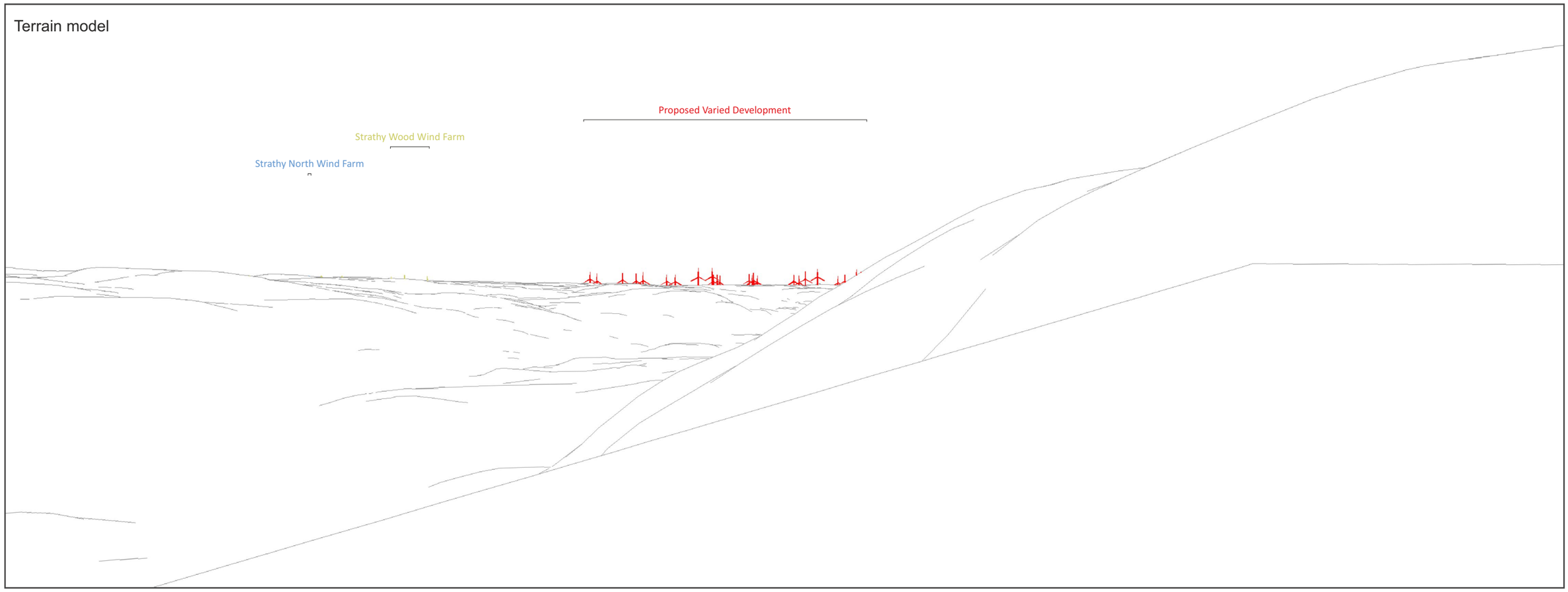

FIGURE 7.2.4: View from Loch Druim an Duin, broch (Site 18) and Invernaver cairns, cist, hut circles and field systems (Site 21)

OS reference: 269736 E 960979 N Distance to development: 11.4km Ground level: 86.1m AOD Viewer Height 1.5m Direction of view: 134.93°

Proposed Varied Development Wind Turbine | Operational / Under Construction Wind Turbine | Consented Wind Turbine | Application / Appeal Wind Turbine | Scoping Wind Turbine

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Drawing No. - 119008-D-AVP7.2.4
Revision - 1.0.0
Date - 12/02/2020

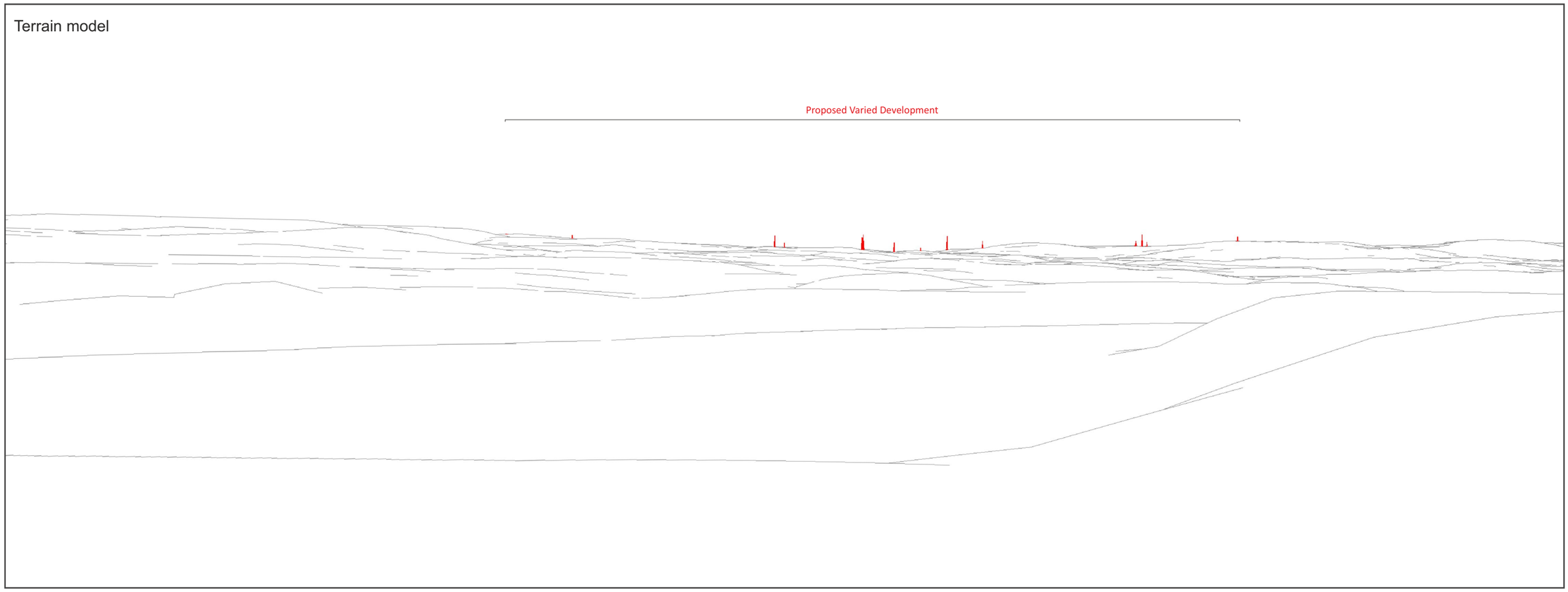

FIGURE 7.2.5: View from Achargary, chambered cairn and ring cairns (Site 12)

OS reference: 271926 E 954996 N Distance to development: 6.6km Ground level: 22.3m AOD Viewer Height 1.5m Direction of view: 115.93°

Proposed Varied Development Wind Turbine

Operational / Under Construction Wind Turbine

Consented Wind Turbine

Application / Appeal Wind Turbine

Scoping Wind Turbine

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Drawing No. - 119008-D-AVP7.2.5
Revision - 1.0.0
Date - 12/02/2020

Terrain model

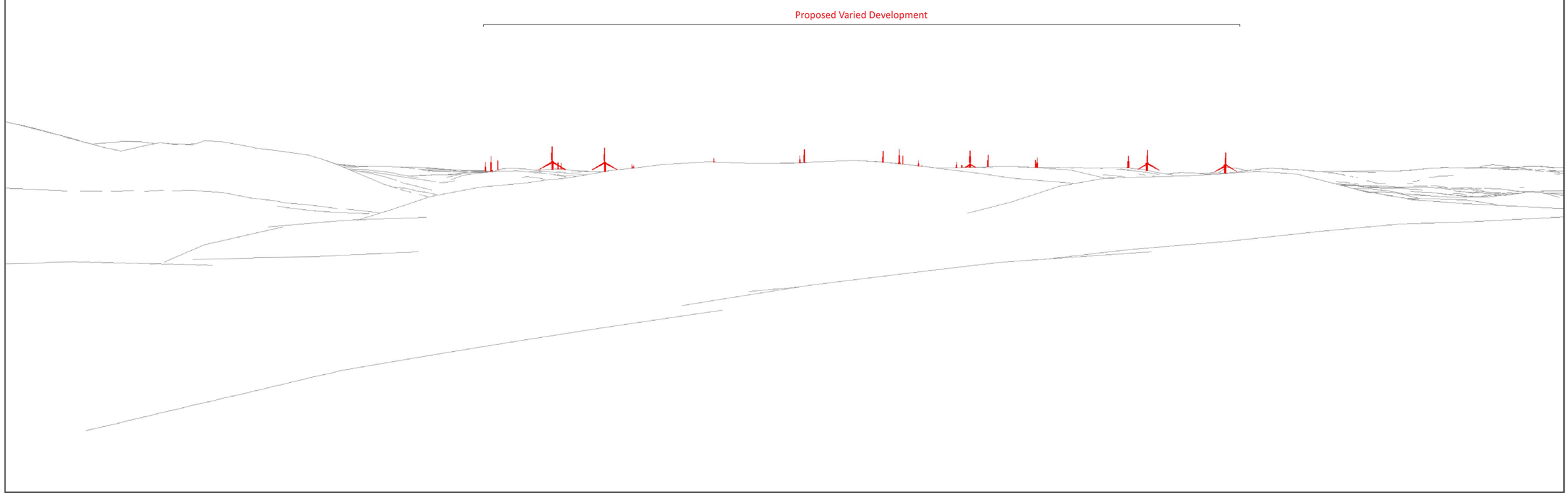

FIGURE 7.2.6: View from Skelpick Lodge chambered cairn (Site 14) Skelpick, long cairn (Site 50)

OS reference: 272492 E 956047 N Distance to development: 6.4km Ground level: 73.2m AOD Viewer Height 1.5m Direction of view: 124.19°

Proposed Varied Development Wind Turbine

Operational / Under Construction Wind Turbine

Consented Wind Turbine

Application / Appeal Wind Turbine

Scoping Wind Turbine

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Drawing No. - 119008-D-AVP7.2.6
Revision - 1.0.0
Date - 12/02/2020

Terrain model

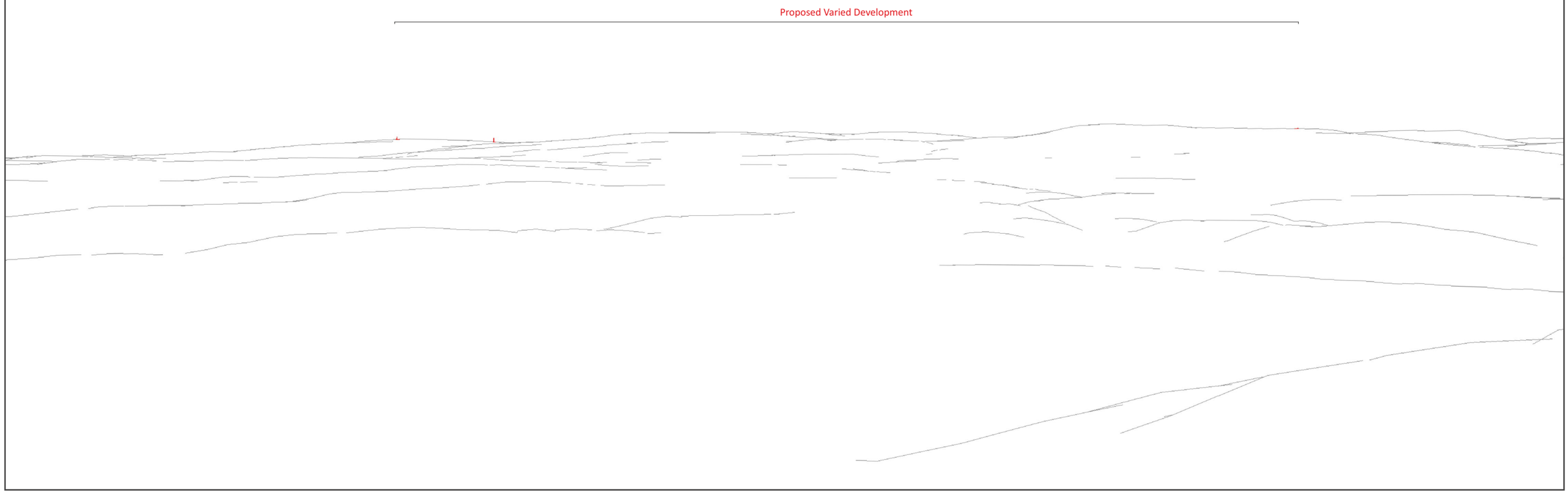

FIGURE 7.2.7: View from Cnoc Carnachadh, broch (Site 17)

OS reference: 272136 E 952695 N Distance to development: 5.7km Ground level: 52.3m AOD Viewer Height 1.5m Direction of view: 100.29°

Proposed Varied Development Wind Turbine

Operational / Under Construction Wind Turbine

Consented Wind Turbine

Application / Appeal Wind Turbine

Scoping Wind Turbine

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Drawing No. - 119008-D-AVP7.2.7
Revision - 1.0.0
Date - 12/02/2020

Terrain model

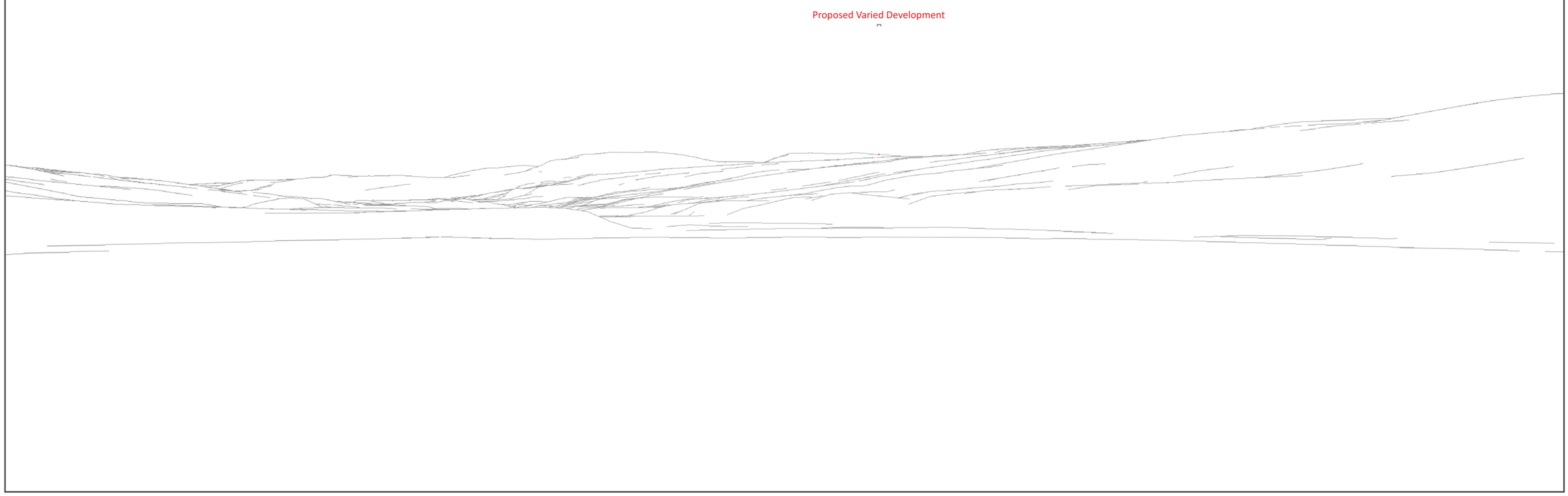

FIGURE 7.2.8: View from The Tulloch, fortified enclosure (Site 11)

OS reference: 269725 E 944944 N Distance to development: 8.8km Ground level: 47.5m AOD Viewer Height 1.5m Direction of view: 56.23°

Proposed Varied Development Wind Turbine

Operational / Under Construction Wind Turbine

Consented Wind Turbine

Application / Appeal Wind Turbine

Scoping Wind Turbine

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Drawing No. - 119008-D-AVP7.2.8
Revision - 1.0.0
Date - 12/02/2020

FIGURE 7.2.9: View from Cnoc na Gamhna, hut circles (Site 19)

OS reference: 269114 E 936194 N Distance to development: 15.4km Ground level: 167.6m AOD Viewer Height 1.5m Direction of view: 33.99°

Proposed Varied Development Wind Turbine

Operational / Under Construction Wind Turbine

Consented Wind Turbine

Application / Appeal Wind Turbine

Scoping Wind Turbine

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Drawing No. - 119008-D-AVP7.2.9
Revision - 1.0.0
Date - 12/02/2020

Terrain model

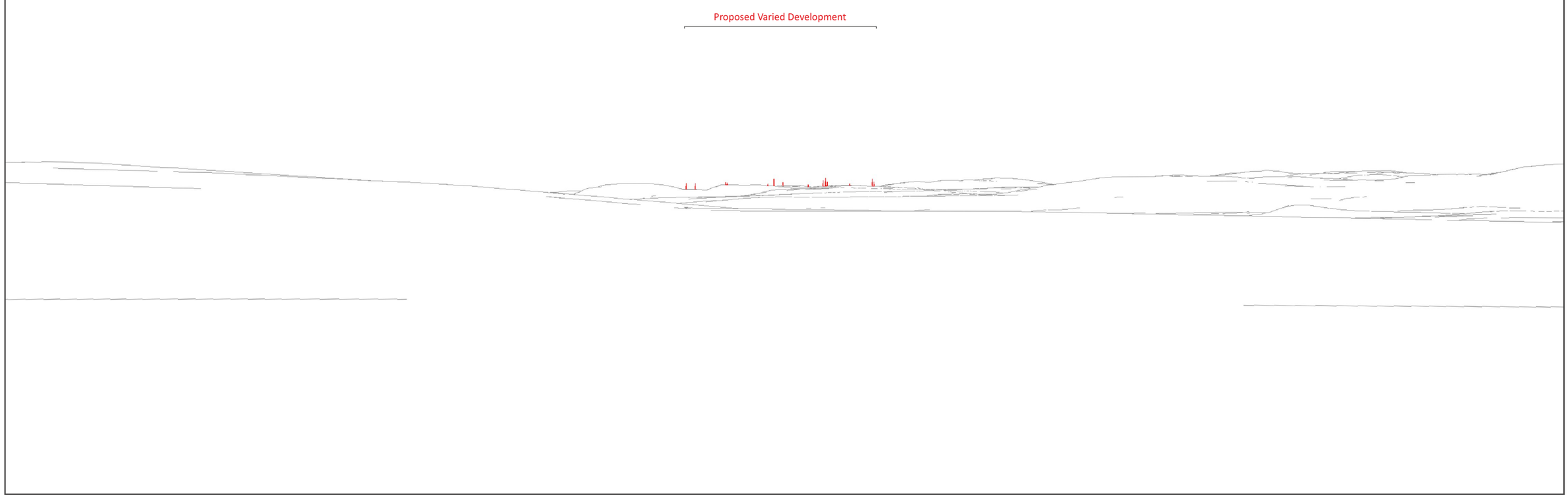

FIGURE 7.2.10: View from Allt Ceann na Coille, hut circles and field clearance cairns (Site 20) **OS reference: 267193 E 941585 N Distance to development: 12.7km Ground level: 118.4m AOD Viewer Height 1.5m Direction of view: 51.14°**

Proposed Varied Development Wind Turbine

Operational / Under Construction Wind Turbine

Consented Wind Turbine

Application / Appeal Wind Turbine

Scoping Wind Turbine

The image contained on this page is not representative of scale and distance from the actual viewpoint and shows the wind farm development in its wider landscape context only.

Drawing No. - 119008-D-AVP7.2.10
Revision - 1.0.0
Date - 12/02/2020

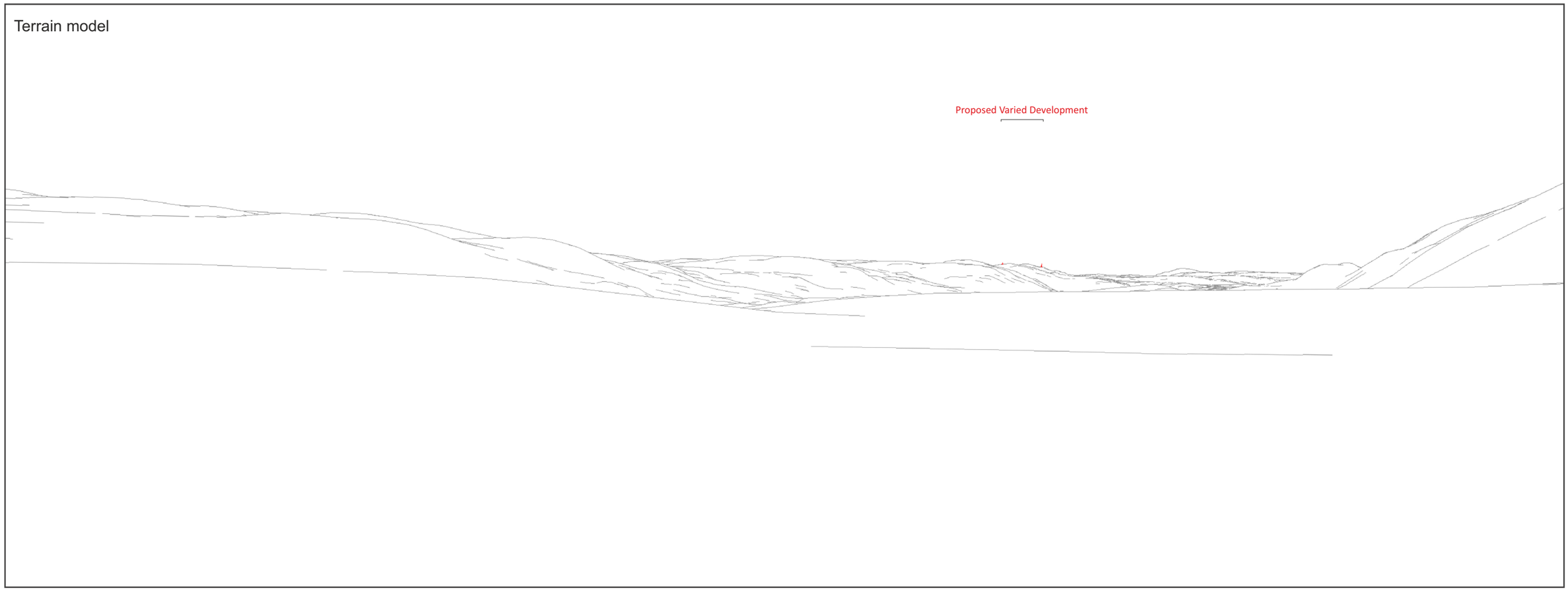

FIGURE 7.2.11: View from Invernaver cairns, cist, hut circles and field systems (Site 21)

OS reference: 270048 E 961104 N Distance to development: 11.2km Ground level: 13.3m AOD Viewer Height 1.5m Direction of view: 136.24°

Proposed Varied Development Wind Turbine

Operational / Under Construction Wind Turbine

Consented Wind Turbine

Application / Appeal Wind Turbine

Scoping Wind Turbine

The image contained on this page is not representative of scale and distance from the actual viewpoint and shows the wind farm development in its wider landscape context only.

Drawing No. - 119008-D-AVP7.2.11
Revision - 1.0.0
Date - 12/02/2020

TA7.3: Heritage Assets Gazetteer

Site Gazetteer

Site Number	1
Site Name	Sheiling
Type of Site	Sheiling
NMRS Number	NC75SE 2
HER Number	MHG17651
Status	Non designated
Easting	277490
Northing	953150
Parish	
Council	Highlands
Description	

What may be a single unroofed shieling-hut is depicted on the 1st edition of the OS 6-inch map (Sutherland 1878, sheet xxvii). It is not shown on the current edition of the OS 1:10,560 map (1961).

Information from RCAHMS (SAH) 21 August 1995

CFA, 2007
"A small, unroofed square structure located on the north side of the burn issuing from Loch nan Clach is depicted on the 1st and 2nd edition OS maps. The structure was not detected on vertical aerial photographs. Field survey located the very denuded remains of this structure on a low knoll within an unplanted strip following the burn. It measures c. 6m by 4m with turf wall standing up to 0.5m high."
Judged to be of Local importance, CFA 2007.

Site Number	2
Site Name	Milepost
Type of Site	Milepost
NMRS Number	
HER Number	
Status	Non designated
Easting	280790
Northing	952570
Parish	
Council	Highlands
Description	CFA, 2007 "The 2nd edition OS map depicts a milepost annotated ‘M.P. Strathy 9’ on the east side of the access road to Lochstrathy. Field survey found no trace of this feature, which was probably disturbed when the access track was upgraded to a forest road."

Site Gazetteer

Site Number	3
Site Name	Building
Type of Site	Building
NMRS Number	
HER Number	
Status	Non designated
Easting	280650
Northing	952500
Parish	
Council	Highlands
Description	CFA, 2007 "The 2nd edition OS map depicts a single roofed building on the west side of the access road to Lochstrathy. Field survey detected no trace of this structure, its site now in dense plantation."

Site Number	4
Site Name	Sheepfold
Type of Site	Sheepfold
NMRS Number	
HER Number	
Status	Non designated
Easting	280550
Northing	951680
Parish	
Council	Highlands
Description	CFA, 2007 "The 2nd edition 6” OS map depicts a sub-circular sheepfold on the north bank of the Allt Badain. Field survey detected no physical remains of this structure, although a circular grassed area within heather moorland was identified that may mark its former location, within what is now an unplanted corridor along the Allt Badain."

Site Number	5
Site Name	Building
Type of Site	Building
NMRS Number	
HER Number	
Status	Non designated
Easting	280900
Northing	951330
Parish	
Council	Highlands

Description	CFA, 2007 "The 2nd edition 6” OS map depicts a roofed building on an east-west alignment located on the north bank of the Allt Badain a little east of the access road to Lochstrathy. Field survey found that this building has been entirely demolished apart from the mortared east gable end, which incorporated a chimney stack and a fireplace. The gable end stands c. 2m high, and stands in an open area within the plantation." Judged to be of Local importance, CFA 2007.

Site Number	6
Site Name	Milepost
Type of Site	Milepost
NMRS Number	
HER Number	
Status	Non designated
Easting	280750
Northing	951040
Parish	
Council	Highlands
Description	CFA, 2007 "The 2nd edition 6” OS map depicts a milepost annotated ‘M.P. Strathy 10’ on the east side of the access track to Lochstrathy. Field survey found no trace of this feature, which was probably disturbed when the access track was upgraded to a forest road."

Site Number	7
Site Name	Sheepfold
Type of Site	Sheepfold
NMRS Number	NC85SW 6
HER Number	
Status	Non designated
Easting	280556
Northing	951679
Parish	Farr
Council	Highlands
Description	CFA, 2007 "The 1st edition OS map depicts a sheepfold on the north side of the confluence of the River Strathy and an unnamed tributary. Field survey detected no trace of this structure, its site now in dense plantation." Field Visit (2012) A desktop survey was conducted as part of a management plan for a c8000ha area of existing forestry in North Sutherland and West Caithness. The following unrecorded archaeological sites were noted: NC 8055 5168 Sheepfold; NC 9885 4616 Sheepfold; NC 8197 5897 Cairn ; NC 9987 4515 Sheepfold; NC 8253 5924 Field system (possible); NC 9936 4436 Farmstead; NC 7935 4896 Farmstead; NC 9339 4292 Standing stone/cairn; NC 7983 5004 Sheepfold; ND 0092

Site Gazetteer

	4572 Farmstead; NC 8261 6027 Farmstead; ND 0086 4593 Sheepfold; NC 93865 47557 Sheepfold; ND 0863 4829 Farmstead; Report: RCAHMS Funder: Fountains Forestry Ltd Stuart Farrell, 2012

Site Number	8
Site Name	Milepost
Type of Site	Milepost
NMRS Number	
HER Number	
Status	Non designated
Easting	279960
Northing	949690
Parish	
Council	Highlands
Description	CFA, 2007 "The 2nd edition OS map depicts a milepost annotated ‘M.P. Strathy 11’ on the east side of the access track to Lochstrathy. Field survey found no trace of this feature, which was probably disturbed when the access track was upgraded to a forest road." Noted as potentially being of greater antiquity than the OS map by CFA, 2007 Mitigation-fencing off to prevent accidential incursion and disturbance during construction

Site Number	9
Site Name	Hunting Lodge/Building at Lochstrathy
Type of Site	Building
NMRS Number	
HER Number	
Status	Non designated
Easting	279300
Northing	948900
Parish	
Council	Highlands
Description	CFA, 2007 "This settlement is likely to have been established after the mid 18th century, as it is not recorded on Roy’s map of 1747-55, which is the most detailed and accurate early map of the area. Of the maps examined the settlement is first depicted on Burnett and Scott’s map of 1855, based upon survey data collected 1831-2, where it is named ‘Karstich Eulay’. The 1st

edition OS map depicts a settlement of three roofed buildings (b) and a series of enclosures extending along either side of the River Strathy for c. 200m length (d). A track is depicted within the settlement, but does not extend beyond the limits of the settlement. The 2nd edition OS map indicates that the character of the settlement had changed substantially. Three roofed buildings and a garden enclosure, named Lochstrathy, had been constructed to the north of the earlier buildings (a). The two earlier buildings on the north bank of the river had been either replaced or reused within a cluster of four buildings annotated on the map as kennels (b and c). The earlier enclosures and building south of the river continued to be mapped (d). The settlement was approached from the north by a new road from Strathy, over 11 miles distant. It appears that in the later 19th century Lochstrathy had been developed as a hunting lodge. The hunting lodge buildings, but not the kennels, are visible on vertical aerial photographs taken in 1946, whereas only a single building is visible on the 1988 aerial photographs examined. The current OS map depicts no buildings to be present at Lochstrathy.

Field survey identified;
a) Lochstrathy– a slate roofed, stone and mortar building measuring c.15m by c.5.5m by c.6m tall. It is currently in use as a bothy. This building does not correspond with any of the buildings depicted on the 2nd edition OS.
b) A drystone building measuring c.20m by 5m and up to 0.5m high. This building corresponds with the original Lochstrathy building depicted on the 1st edition OS map. A smaller structure measuring c.4m by c.2m was recorded within this building and may be a bothy, built from the stone of the ruinous building. The walls of this building survive to a maximum height of 1m.
d) A turf bank, c.1m wide and 0.5m wide. It appears to be the remains of the large enclosure shown on the 1st and 2nd edition map. Parts of the west, south and north banks were visible. An entrance c2m wide is visible along the west side. It survives as a revetting wall along the river bank, up to 1m high otherwise it is visible as a turf bank.
e) A turf bank c.0.75m high and 1m wide.
The track shown on the 2nd edition OS map has been upgraded for use as a forestry track. A short length of the original access track is still visible running from the upgraded access track northwards to the bothy and a short distance beyond. It is visible as a track 1.5m wide with low banks running parallel on either side, covered with grass and heather."

Judged to be of Local importance, CFA 2007.

Site Number	10
Site Name	E1- Dalmor, homestead 300m W of
Type of Site	Scheduled Monument
NMRS Number	SM10500
HER Number	
Status	Scheduled Monument
Easting	271686
Northing	955393
Parish	Farr
Council	Highland
Description	The monument comprises a prehistoric homestead, visible today as a substantial earthwork.

Site Gazetteer

The monument is situated on a knoll some 300m W of the village of Dalmor and 120m W of the River Naver, on the NE slope of Cnoc Dalveghouse, at a height of about 40m OD. The site has commanding views to the N, S and E overlooking Strath Naver.

The homestead consists of a stone-walled enclosure defended by a massive ditch and outer rampart. The enclosure is roughly circular in form with a maximum internal diameter of 12m. It is enclosed by a wall which stands up to 1.5m high but has become spread up to 3m across. Originally the enclosure wall was probably surmounted by a timber palisade and the interior probably contained one or more buildings.

The configuration of the causeway entrance in the SE is unlike any other so far encountered in Sutherland. The passage is 5.8m long, flanked by intermittent slabs on edge, and continues into the enclosure interior rather than ceasing on the regular boulder-lined inner face.

A massive ditch, from 6.5-8m wide and up to 2.2m deep, encircles the S and NW sides of the enclosure, while an outer rampart still stands up to 1m high. Both the ditch and the outer rampart are broken in the W. The site is protected on the NE side by the natural slope. Clearance heaps with indications of field plots and banks, probably contemporary with the homestead, lie nearby to the E (at NC 717 552).

The monument probably dates to the later Iron Age (from about the time of Christ up to c. 500 AD). It has previously been classified as a broch or a dun (and, indeed, is called a dun on the OS map), but more recent research points to its identification as a small defended settlement or homestead.

The area proposed for scheduling comprises the remains described and an area around them within which related material may be expected to survive. It is circular in plan with a diameter of 70m, as marked in red on the accompanying map.
Statement of National Importance
The monument is of national importance because of its potential to contribute to an understanding of prehistoric settlement and economy. Its archaeological potential is significant given its excellent state of preservation and its importance is increased by its proximity to other monuments of potentially contemporary date for the purposes of comparative study; its causeway entrance arrangement, for example, is unusual in this locality.
References
Bibliography

RCAHMS records the monument as NC 75 NW 14.

Bibliography:

Horsburgh, J. (1870) 'Notes of cromlechs, duns, hut-circles, chambered cairns, and other remains, in the County of Sutherland', Proceedings of the Society of Antiquaries of Scotland, Vol. 7, 274.

McCullagh, R. P. J. and Tipping, R. (1998) The Lairg project: the evolution of an archaeological landscape in northern Scotland, 1988-1996. STAR Monograph Series No. 3, Edinburgh, 67-72, fig. 119.

Site Number	11
Site Name	E2-The Tulloch', fortified enclosure, 177m north-east of Langdale
Type of Site	Scheduled Monument
NMRS Number	SM10503
HER Number	
Status	Scheduled Monument

Easting	269725
Northing	944944
Parish	Farr
Council	Highland
Description	The monument comprises a small fortified enclosure, known locally as 'The Tulloch', of probable medieval date, which is visible as a substantial earthwork. The monument is situated on the edge of the river terrace W of the River Naver, about 4m above the flat valley floor, at a height of about 45m OD. It commands extensive views to the NE and SW along Strath Naver. The monument is circular in form, with an internal diameter of about 18m, and consists of an enclosure defended by a substantial ditch on its W side. The height of the enclosing rampart is 1.7m from internal ground level to its summit, and about 3 - 3.5m high on the W side of the monument. Several large boulders exposed in the inner slope of the turf-covered rampart in the W arc may be the remains of an inner retaining wall. The massive ditch, 12.5m wide, is breached by a causeway in the SW arc and there is another gap on the NE side, which indicates that there were two entrances. The ditch would have formerly extended all the way around the perimeter. There is no gap in the rampart corresponding with the causeway across the ditch in the SW arc, which indicates that the defences may have been to some extent re-built at a later phase. The date of the enclosure is uncertain, but both its position and form suggest that it may be a medieval fortification, rather than a prehistoric one. The area proposed for scheduling comprises the remains described and an area around them within which related material may be expected to survive. It is almost circular on plan, with a maximum diameter of 80m, but truncated on its NW side by the B871 road, as marked in red on the accompanying map. Statement of National Importance The monument is of national importance as an unusual fortification of probable medieval date, which has the potential to contribute to our understanding of a period of which little is currently known in this area. Its importance is enhanced by the fact that it may be of more than one phase and that it is reasonably well preserved. References Bibliography RCAHMS records the monument as NC 64 SE 30. Bibliography: Cooke, G. A. (1810) Topographical Description of Northern Division of Scotland, 60. RCAHMS (1911) The Royal Commission on the Ancient and Historical Monuments and Constructions of Scotland. Second report and inventory of monuments and constructions in the county of Sutherland, Edinburgh, 64, No. 194.

Site Number	12
Site Name	E3- Achargary, chambered cairn and ring cairns 380m NNW of
Type of Site	Scheduled Monument
NMRS Number	SM1760
HER Number	
Status	Scheduled Monument

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Easting	271926
Northing	954996
Parish	Farr
Council	Highland
Description	The monument comprises a Neolithic chambered burial cairn set on a river terrace W and SW of the River Naver, with several smaller mounds, probably Bronze Age ring cairns, nearby. The large cairn was originally scheduled in 1938, but an inadequate area was included fully to protect the archaeological remains. This scheduling extension expands the protected area to cover all of the large cairn and includes the smaller cairns for the first time. The chambered cairn is roughly circular, about 22m in diameter and stands up to 2m high. Large stones protrude from the centre, indicating the position of the burial chamber, which has probably been disturbed in the past. About 18m to the SW is a group of five smaller ring cairns, probably of Bronze Age date (around 1500 BC). These vary in diameter, but are about 4m across on average. The area now to be scheduled is irregular on plan, measuring a maximum of 88m SW-NE by 60m transversely, to include the chambered cairn and the ring cairns and an area around them in which related archaeological remains are likely to survive. The area is indicated in red on the accompanying map.

Site Number	13
Site Name	E4-Fiscary cairns and chambered cairn north-east of
Type of Site	Scheduled Monument
NMRS Number	SM1790
HER Number	MHG44885
Status	Scheduled Monument
Easting	273112
Northing	962602
Parish	Farr
Council	Highland
Description	No Bibliography entries for this designation Described as "Brough (remains of)" on 2nd ed OS - HAW 01/2004 NC76SW 5 731 626. ('A':NC 7310 6263) Cairn (NR) ('B':NC 7311 6260) Chambered Cairn (NR) OS 6"map, (1964) The descriptions of these two cairns have been transposed on the OS 6"map. 'A' (N cairn) is chambered and 'B', as far as is known, is unchambered. 'A' is an Orkney-Cromarty type, round cairn with a Camster type tripartite chamber (Henshall 1963), and was excavated by Kerr in 1891. It is free of vegetation and measures 16m diameter and 1.5m high. The centre is mutilated but it is still possible to identify the tops of eight upright slabs of chamber, which was entered from WSW. entrance passage has collapsed. 'B' appears to be intact 20m diameter and 2.7m high. A 'platform' of stones, 8m broad and 25m long, now mainly turf-covered, stretches from base of this cairn towards 'A'. It appears to be an original feature but its purpose is uncertain. (cf NH79SE 1 and 2). Surveyed at 1:2500. C Kerr 1892; RCAHMS 1911, visited 1909; A S Henshall 1963; Visited by OS (J L D) 27 April 1960 and (R L) 8 July 1971. These cairns are as described by previous authorities. The 'platform of stones' joining cairns is well consolidated and of the usual 'cairn-like' rubble stones. This complex may be a 'waisted'

long cairn of two distinct periods.
A S Henshall 1972

Revised at 1/10,000.
Visited by OS (N K B) 2 August 1977.

N end of 'A' has traces of three faced steps within cairn material and parallel with outer edge of cairn. 'B' is of the same loose boulder construction as 'A' and has a small portion of corbelling visible. Both cairns would appear to have been enclosed within a large trapezoidal cairn.
R J Mercer 1981.

Site Number	14
Site Name	E5-Skelpick Lodge chambered cairn 400m ENE of
Type of Site	Scheduled Monument
NMRS Number	SM1816
HER Number	MHG11074
Status	Scheduled Monument
Easting	272492
Northing	956047
Parish	Farr
Council	Highland
Description	No Bibliography entries for this designation NC75NW 10 7249 5605. Horned Cairn (NR) OS 6"map, (1964) A short, horned cairn of bare stone, situated in rough grazing on a terrace above the valley floor. The body of the cairn is about 8ft high and 43ft in diameter. Although it has been robbed and disturbed, and is now crossed by a wall and fence. No structure is visible within the cairn and the chamber may well be intact. The horns are well-defined, radiating to approximately the cardinal points. RCAHMS 1911, visited 1909; A S Henshall 1963. A short horned cairn as described. Visited by OS (JLD) 2 5 1960. No change. Visited by OS (J B) 1 August 1977. Donald Mackay & John Stuart, 1875, 'Notice of excavations in cairns in Strathnaver, Sutherlandshire.', Proc Soc Antiq Scot Vol. 10 1874, p.519-23, 519-23 (Text/Publication/Article). SHG3013. RCAHMS, 1911, The Royal Commission on the Ancient and Historical Monuments and Constructions of Scotland. Second report and inventory of monuments and constructions in the county of Sutherland, 82, No. 238 (Text/Report). SHG2657. Henshall, A S, 1963, The chambered tombs of Scotland, Volume 1, 330, SUT 55 (Text/Publication/Monograph). SHG357.

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Site Number	15
Site Name	E6- Ben Griam Beg, fort, Forsinard
Type of Site	Scheduled Monument
NMRS Number	SM1836
HER Number	
Status	Scheduled Monument
Easting	282962
Northing	941092
Parish	Kildonan
Council	Highland
Description	No Bibliography entries for this designation

Site Number	16
Site Name	E7- The Borg, broch 1600m N of Forsinain Bridge, Strath Halladale
Type of Site	Scheduled Monument
NMRS Number	SM1839
HER Number	
Status	Scheduled Monument
Easting	289943
Northing	950958
Parish	Farr
Council	Highland
Description	The monument is a broch, a complex stone-built substantial roundhouse, dating from the Iron Age (between 600BC and AD 400). The broch is visible as a substantial upstanding structure with surviving walling, entrance and intermural cells, crowning a large rocky knoll. The broch is located on an elevated position on the valley floor overlooking the River Halladale. It lies around 80m above sea level. The broch measures approximately 20m in diameter with the internal diameter approximately 10m. The entrance lies on the east southeast side with the remains of an intramural cell directly off of the entrance. The broch wall stands up to 3m in height with sections of inner and outer faces visible. A stone defined enclosure is attached to the northeast side of the broch and is probably a later feature though it has been suggested that it could be contemporary with the broch. The scheduled area is circular on plan measuring 80m in diameter, to include the remains described above and an area around them within which evidence relating to the monument's construction, use and abandonment is expected to survive, as shown in red on the accompanying map. The monument was first scheduled in 1938, but the designated area was not adequately defined: the present amendment rectifies this. Statement of National Importance This monument is of national importance because it has an inherent potential to make a significant addition to our understanding of the past, in particular of Iron Age society in Sutherland and the function, use and development of brochs. This is a well-preserved example of a broch with identifiable architectural features including the entrance, at least one intramural cell and wall facings. The broch adds to our understanding of settlement patterns and social structure during the Iron Age in Strath Halladale and this potential is enhanced by

the numerous broadly contemporary monuments in the vicinity. The loss of the monument would significantly diminish our future ability to appreciate and understand the development, use and re-use of brochs, and the nature of Iron Age society, economy and social hierarchy in the north of Scotland.
References
Bibliography

CANMORE: http://canmore.org.uk/ CANMORE ID 6813

Local Authority HER/SMR Reference: MHG9639

MacKie, E W (2007) The Roundhouses, Brochs and Wheelhouses of Atlantic Scotland c.700 BC-AD 500: architecture and material culture, the Northern and Southern Mainland and the Western Islands, BAR British series 444(II), 444(1), 2 V. Oxford: 647.

Mercer, R J (1980) Archaeological field survey in northern Scotland, 1976-1979, University of Edinburgh, Department of Archaeology, Occasional Paper No. 4. Edinburgh: 103.

RCAHMS (1911) The Royal Commission on the Ancient and Historical Monuments and Constructions of Scotland. Second report and inventory of monuments and constructions in the county of Sutherland. Edinburgh: 62, No. 186.

Young, A (1964) 'Brochs and duns , Proc Soc Antiq Scot, vol. 95, 1961-2: 185, No. 28.

Site Number	17
Site Name	E8-Cnoc Carnachadh, broch 1400m N of Carnachy
Type of Site	Scheduled Monument
NMRS Number	SM1850; NC75SW 8
HER Number	
Status	Scheduled Monument
Easting	272136
Northing	952695
Parish	Farr
Council	Highland
Description	The monument comprises the remains of a broch, a fortified dwelling place of Iron Age date. It is surrounded by a low bank and a ditch, and stands on the edge of a natural terrace on the W side of Strathnaver. The broch was originally scheduled in 1938, but an inadequate area was included to protect the broch and the surrounding wall and ditch were ommitted entirely. The scheduling extension rectifies that situation. The remains of the broch are much reduced, with the walls standing no more than 0.75m high; but details of the plan survive, including stretches of the inner and outer wall faces and a possible intra-mural chamber on the W. The broch appears to have had an internal diameter of about 7m, within walls 3-4m wide. The site of the entrance is not apparent on the W (upslope)side, while a low bank, representing the tumbled remains of a stone wall, can be traced most of the way around the broch. The area now to be scheduled is circular in shape, with a diameter of 60m, to include the broch, outer area, ditch and ruined wall, as marked in red on the accompanying map. Statement of National Importance The monument is of national importance as the remains of a broch, a significant type of late prehistoric fortified dwelling place. It has the potential to provide important information about

late prehistoric domestic and defensive architecture, economy and contemporary land use.
References
Bibliography

RCAHMS records the monument as NC75SW 8.

Site Number	18
Site Name	E9- Lochan Druim an Duin, broch 320m E of
Type of Site	Scheduled Monument
NMRS Number	SM1879; NC 66 SE 2
HER Number	
Status	Scheduled Monument
Easting	269736
Northing	960979
Parish	Farr
Council	Highland
Description	The monument consists of a broch or dun in a high location on a rocky bluff. The broch or dun is protected on three sides by steep rocky slopes and is approached from the W across a low saddle. The broch or dun evidently has a massive enclosing wall but the inner face has been rebuilt in the recent past and this has obscured the original structure. In 1867 the inner face of the wall was visible for the whole circumference and records suggest that a scarcement ledge survived. The outer face of the wall was visible on the S and NE sides and this gave an internal diameter of about 8.5m and a wall thickness of 4m. The entrance was probably in the W arc, and a possible lintel slab is exposed in the rubble. There are traces of an outer wall which provided further defense to the entrance. This wall probably extended to connect with the natural outcrops on the NW and SW. The area to be scheduled measures 60m E-W by 55m N-S, to include the broch or dun and an area around in which traces of activities associated with its construction and use may survive, as shown in red on the plan. Statement of National Importance This monument is of national importance for its potential contribution to our understanding of prehistoric defensive fortification and domestic life. References Bibliography The monument is recorded in the RCAHMS as NC 66 SE 2.

Site Number	19
Site Name	E10-Cnoc na Gamhna, hut circles, burnt mound and clearance cairns, Naver
Type of Site	Scheduled Monument
NMRS Number	SM2514
HER Number	MHG32018
Status	Scheduled Monument
Easting	269114

Northing	936194
Parish	Farr
Council	Highland
Description	No Bibliography entries for this designation

SMC consented applications for Tree Felling and tree removal

NC63NE 14 688 363.

(NC 688 365) Enclosures (NR) (five shown) (NC 689 362) Enclosures (NR) (four shown)

OS 6"map, (1963)

On the shoulder of Cnoc na Gamhna are numerous mounds with a few hut circles interpersed among them.

RCAHMS 1911, visited 1909.

There are nine hut circles in association with field clearance heaps.

Visited by OS (E G C) 8 May 1961.

This is a settlement of ten hut circles (A-J), including a newly recognised one (J) at NC 6997 3619, situated on a west-facing hillside. Re-afforestation of the general area obscures or has destroyed many of the field clearance heaps.

Huts A, C-E and I have all been mutilated to some extent by deep-ploughing and tree-planting - recoverable details of the last one in particular are very scant; the remaining huts are in clearings. Excepting 'F', they are circular and internal dimensions range between 7.0 and 12.0m diameter; an entrance to most is still intact, and is from the south quarter - in 'B's case the entrance is clubbed, with a lining slab evident in its west side. The walls are generally reduced to a low, overgrown spread 2.0 - 2.5m broad, but in two noticeably robust huts (B and C) stand 1.2m high, in the east arc, and 0.6m high respectively. 'F' is very well-defined and measures 12.0 by 10.5m within a boulder-faced heather-covered wall, 0.8m high and an estimated 1.5m main width. The entrance from the SSE is on the line of the longer axis and is splayed; the passage is perhaps 2.6m long and opposing edging slabs give a width 0.8m inside increasing to 2.0m outside.

Revised at 1/10,000.

Hut J - Surveyed at 1:10 560.

Visited by OS (J M) 29 March 1977.

Site Number	20
Site Name	E11-Allt Ceann na Coille,hut circles & field clearance cairns,Naver Forest
Type of Site	Scheduled Monument
NMRS Number	SM2521
HER Number	
Status	Scheduled Monument
Easting	267193
Northing	941585

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Parish	Farr
Council	Highland
Description	No Bibliography entries for this designation

hut circles & field clearance cairns,Naver Forest

Site Number	21
Site Name	E12-Invernaver cairns, cists, hut circles and field system 1000m north-west of
Type of Site	Scheduled Monument
NMRS Number	SM2842
HER Number	
Status	Scheduled Monument
Easting	270048
Northing	961104
Parish	Farr
Council	Highland
Description	No Bibliography entries for this designation

Prehistoric domestic and defensive: field or field system; hut circle, roundhouse, Prehistoric ritual and funerary: cairn (type uncertain); cist

NC66SE 3 699 611.

(Centred NC 699 611), Enclosure (NR) (5 times), Cairn (NR) (4 times), Cists (NR) Hut Circle (NR) OS 6"map, (1964)

There is a gravelly plateau called Baile Mhargait on the W bank of the River Naver, near its outlet and opposite Bettyhill. Devoid of vegetation, it is elevated c. 20' above the river, and measures about 1/2 mile long by 1/3 mile broad. On it are numereous constructions of various kinds; stony mounds abound, mostly small and circular, as well as numbers of cairns and hut circles. No remains of brochs are observable. The sand on the surface of the plateau is constantly shifting, disclosing various remains.
The plateau called Baile Mhargait (Margaret's Town) was inhabited until 1780 when encroaching sand drove the tenants away. In early 1900 after a stormy winter which blew away much of the sand, numerous structures of various shapes and sizes - evidently 18th century buildings - were exposed.
RCAHMS 1911, visited 1909; A Mackay 1906; H Morrison 1883.

A settlement of at least 8 stone-walled huts (A-H) and a contemporary field system, centred at NC 700 612 on a raised beach eroded to the original gravel and interspersed with occasional sand dunes. On vantage points within the field system are at least 3, possibly 6 burial cairns (I-IV). There are also 3 isolated cits (a-c). There is no evidence of Medieval occupation. Erosion has exposed inner and outer wall faces with rubble infill as a feature of all the huts.
Hut 'A' is 11.5 diameter within a wall 2.1m thick. The annexe described by the previous investigator in the S arc is now mutilated. The entrance is not evident. There are traces of a possible hearth near the centre of the hut.
Hut 'B' measures c. 11.0m diameter within a wall 1.5m thick, and is partly obscured by blown sand. The entrance is not evident. A clearance heap lies against the SE wall. A stone setting 7.0m in diameter, now flat, in the interior, was described previously as a hut circle.
Hut 'C' is circular, measuring 8.6m within a wall 1.3m thick. The W arc is covered by a sand dune from which two transverse slabs 1.4m apart protrude, possibly the sides of the entrance. Abutting onto the N and SE arcs of the hut and apparently with access to it are two identical

circular annexes 3.0m diameter within a wall 0,7m thick. About 10.0m E of the hut are the amorphous traces of another structure. Pieces of iron slag were found outside the hut by the field investigator and there are marked concentrations of iron slag on the ground surface about 45.0m N, and also at NC 7015 6071 (NC76SW 12).
Hut 'D' measures internally 11.0m E-W within a wall 1.6m thick. N and S arcs are obscured by sand and it is uncertain whether the hut is circular or oval. The entrance is not evident.
Hut 'E' is oval, measuring 12.0m N-S by 11.0m transversely within a wall 1.5m thick. The entrance is not evident. No trace of the internal square setting of stones noticed by the previous investigator.
Hut 'F' measures 14.5m overall diameter. The outer face is well defined and what little can be seen of the inner face in the SW, and possibly SE, indicated a wall thickness of about 3.0m. The entrance is not evident.
Hut 'G' is 8.5m in diameter between the centres of a wall spread to 2.0m.The outer face is evident in the N but sand partly obscures the wall elsewhere. The entrance is not evident.
Hut 'H' is buried under a sand dune, with only the NE segment protruding showing several outer facing stones, and appears to be about 10.0m in diameter. About 20.0m NW is another circular structure measuring c.14.5m in overall diameter, but mainly overlaid by a sand dune. It may be a hut but the quantity of stone visible in the sand dune suggests it is more likely a cairn (VI).
The fields, where free of blown sand, are well defined cleared areas occasionally bounded by banks of heaped stones and clearance heaps, and measure approximately between 35.0 x 20.0 and 15.0 x 10.0m.
Cairn 'I', 7.5m in diameter and 0.7m high, is surrounded by a kerb of stones on edge. In the centre is a cist 1.0 x 0.5m and about 0.6m deep oriented E-W with a displaced capstone. An intrusive cist of similar proportions, but minus its capstone and W end slab, is inserted into the W edge of the cairn.
Cairn 'II' is 6.8m in diameter and 1.6m high with an intermittent boulder kerb. It is evidently undisturbed.
Cairn 'III' is a stony mound 3.8m in diameter and 0.4m high with larger stones round the perimeter, possibly a kerb. Uncertainly a cairn or a clearance heap.
Cairn 'IV' is 7.6m in diameter and 1.0m high with a kerb of stones on edge around the perimeter. It is apparently undisturbed.
Cairn 'V' described and surveyed by the previous investigator appears to be a clearance heap. There is now no sign of the kerb noted by him. Cist 'a' situated on the S side of a gravelly knoll, is oriented NE-SW and measures 0.7m by 0.4m. The cover slab lies close by.
Cist 'b' is on a gravel ridge and is oriented N-S. It measures 0.8m by 0.6m.
Cist 'c', situated on lower ground within a field of the field system, is oriented NW-SE and measures 1.4m by 0.4m. There is no sign of the end slabs; the other two sides are each formed by three stones on edge. Surveyed at 1/2500 (D,G,H,II,IV,VI).
Visited by OS (J L D) 26 April 1960 and (I S S) 7 July 1971.

As described above.
1/2500 survey reviser.
Visited by OS (N K B) 2 August 1977.

Additional features within the complex comprise three cairns and two platforms.
(NC 7008 6114) Cairn VII is a robbed round cairn 6m in diameter and 1.5m high.
(NC 7009 6141) Cairn VIII is 5m in diameter and 2m high, now overgrown but with stone still visible on the N side.
(NC 7019 6116) Cairn IX is a robbed round cairn 7m in diameter and 1.8m high.
(NC 6989 6110)A rectangular stone platform 10m N-S by 3.5m across and 0.1m high.
(NC 6991 6108) A rectangular stone platform 5m N-S by 3.5m across and 0.1m high.
Cist 'a' is rectangular, sanded up and measures 1m by 0.5m high, with the cover-slab dislodged.
Cist 'c' is rectangular, 1m N-S by 0.5m across by 0.3m high, and is enclosed by the possible remains of a cairn surround. (The 'huts' noted by OS are invariably referred to as 'enclosures' by Mercer).
Hut 'A' is 0.2m high with a rectangular area of stones 5m by 3m attached to the NE. The central stone feature measures 1m by 0.5m.
Hut 'B' is 0.1m high.
Hut 'C' is 0.2m high witth rectangular structures about 10m by 4m attached to the N and E.
Hut 'E' is 0.3m high with kerbing visible on the inside of the N arc, and two central depressions

Site Gazetteer

1m by 0.5m. It is set directly on the raised beach.
Hut 'F' is 0.2m high with a possible entrance in the S and stone kerbing remaining on the NE. There is no apparent central feature.
Hut 'G' is 0.2m high, sub-circular with sand covering the NE arc.
(NC 7009 6098) Cairn VI is 14m in diameter and 2m high, grass-covered but with stone kerbing visible on the S.
R J Mercer 1981.

Of the additional features described and planned by Mercer :-
Cairn VII is a robbed stone clearance heap with no kerb or cist apparent. Apart from the robbing it is indistinguishable from other clearance heaps in the area.
Cairn VIII, a probable cairn as described by Mercer, but largely overlaid by a sand dune. Only the NE side is exposed, revealing what may be a kerb.
Surveyed at 1:2500.
Cairn IX a clearance heap identical to VII. The 'stone platforms' (Mercer nos 10 and 11) are low, flat collections of stones situated on the edge of ground cleared of stones, and are probably clearance heaps. There is no trace of structures within them.
The cists are as described but there is no evidence of a cairn around 'c'.
The hut circles are as described by previous OS investigators.
Visited by OS (N K B) 10 August 1981.

Sutherland Survey 1980, R Mercer Nos. 6, 8-22
No. 6 Cairn NC 700 610
8 Enclosure NC 699 612
9 Enclosure NC 699 610
10-11 Platforms NC 699 611
12 Enclosure NC 700 610
13 Cist NC 699 610
14 Cist NC 700 610
15 Cairn NC 700 610
16 Enclosure NC 699 610
17 Enclosure NC 700 610
18 Cairn NC 700 611
19 Cairn NC 700 614
20 Enclosure NC 702 612
21 Cairn NC 702 611
22 Cairn NC 700 610

Site Number	22
Site Name	E13-the Category C(s) Listed Buildings of Strathy Former Church of Scotland
Type of Site	Listed Building
NMRS Number	LB7143
HER Number	
Status	Listed Building- Category C
Easting	283510
Northing	965196
Parish	Farr
Council	Highland
Description	Thomas Telford, 1826. T-plan Parliamentary Church, now converted to private dwelling. Rubble, tooled ashlar dressings. Paired depressed arched windows in centre north (front) elevation with similar detailed flanking smaller windows. Similar large windows in east and west Gables, and in rear (south) centre wing. Centre entrance in rear wing. 6-pane glazing. Bellcote with stumpy finials at west apex, ball finial at east; concrete tiled roof. Enclosed by

coped drystone wall.
Statement of Special Interest

Slight deviation in normal Telford plan, with rear entrance and small flanking north elevation outer bay windows, in place of usual paired doors. Strathy a "populous rural hamlet" in 1858.

This is now a private house and is not open to the public.
References
Bibliography

TELFORD ATLAS (1838) pp.58-9. IMPERIAL GAZETTEER OF SCOTLAND, i, (c. 1858) p.638. ibid., ii, p.768.

Site Number	23
Site Name	E14- Strathy Free Church
Type of Site	Listed Building
NMRS Number	LB7144
HER Number	
Status	Listed Building- Category C
Easting	284387
Northing	965268
Parish	Farr
Council	Highland
Description	1845, with Minister's porch dated 1881. Simple single storey, 5-bay building with projecting gabled porch in centre, south bay. Rubble, tooled dressings. Gabled porch at west gable with Caithness slab roof. Art Nouveau style glazing (1881); West Highland slate roof. Coped rubble walls. Statement of Special Interest Building in ecclesiastical use as such. Strathy a "populous rural hamlet" in 1858. References Bibliography IMPERIAL GAZETTEER OF SCOTLAND, i, (circa 1858) p.638 ibid., ii, p.768; Ewing, ANNALS OF THE FREE CHURCH, ii, (1914) p.223

Site Number	24
Site Name	E15- Strathy Former Free Church Manse
Type of Site	Listed Building
NMRS Number	LB7145
HER Number	
Status	Listed Building- Category C
Easting	284422
Northing	965274
Parish	Farr
Council	Highland
Description	Circa 1862. 2-storey, 2-bay south facing house with projecting single storey, single bay wing at SW forming L-plan, with entrance in Re-entrant. Rubble, tooled dressings; 12-pane glazing, coped end stacks; slate roof. Coped rubble garden walls. Minister settled at Strathy in 1862. Ewing, ANNALS OF THE FREE CHURCH, ii, (1914) p.223

Site Number	25
Site Name	E16-Strathy Former Free Church School
Type of Site	Listed Building
NMRS Number	LB7146
HER Number	
Status	Listed Building- Category C
Easting	284361
Northing	965268
Parish	Farr
Council	Highland
Description	Former school: mid 19th century, small single storey, 3-bay building entrance in west gable; mainly 12-pane glazing; end stacks; slate roof. Coped rubble wall.

Site Number	26
Site Name	E17- Bettyhill Ivy Cottage and steading
Type of Site	Listed Building
NMRS Number	LB7158
HER Number	
Status	Listed Building- Category B
Easting	272535
Northing	962330
Parish	Farr
Council	Highland
Description	Earlier 19th century, 2-storey, 3-bay cottage. Squared rubble, tooled rubble dressings. Centre corniced door in slightly advanced and gabled centre bay, with 1st floor window above. 12- and 16-pane glazing; end stacks; tiled roof with projecting eaves at gables. Steading; small single storey rubble L-plan steading to rear. Statement of Special Interest Said to have been the house built for the first factor of the Sutherland Estates. By 1813 the entire parish of Farr was property of the Sutherland family. References Bibliography Donald Omand, editor, THE SUTHERLAND BOOK (1981) p.201.

Site Number	27
Site Name	Dun Chealamy,broch
Type of Site	Scheduled Monument
NMRS Number	SM5632; NC 75 SW 9
HER Number	
Status	Scheduled Monument
Easting	271976
Northing	951391
Parish	Farr
Council	Highland
Description	The monument consists of the remains of a broch and outworks situated on a spur to the S of the Carnachy Burn. The broch has an internal diameter of about 7m and a wall between 3.7m and 4.3m wide. There is no clear indication of the location of the entrance, but a mural gallery is exposed in the rubble of the broch's SW arc. The broch is naturally defended on all sides except the SW, which has outworks consisting of a double rampart with traces of 2 ditches. The ditches are 12m wide and about 2m deep. There are gaps between the natural slopes and the ends of the outer defences. The ditch contains the footings of a subrectangular structure, which is about 12m by 4m. The area to be scheduled measures 80m WSW-ENE by 70m N-S, to include the broch, the defensive ramparts and an area around in which traces of activities associated with the construction and use of the monument may survive, as shown in red on the accompanying map. Statement of National Importance The monument is of national importance for its potential to contribute to an understanding of prehistoric defensive architecture and domestic life. References Bibliography RCAHMS records the monument as NC 75 SW 9.

Site Number	28
Site Name	Baligill,mill
Type of Site	Scheduled Monument
NMRS Number	SM4265
HER Number	
Status	Scheduled Monument
Easting	285563
Northing	965637
Parish	Farr
Council	Highland
Description	Industrial: mill, factory

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Site Number	29
Site Name	Baligill Burn,limekilns
Type of Site	Scheduled Monument
NMRS Number	SM4290
HER Number	
Status	Scheduled Monument
Easting	285548
Northing	966002
Parish	Farr
Council	Highland
Description	Industrial: kiln, furnace, oven

Site Number	30
Site Name	Blar na Fola & Breac Dubh,hut circles,Naver Forest
Type of Site	Scheduled Monument
NMRS Number	SM2522
HER Number	
Status	Scheduled Monument
Easting	269523
Northing	939939
Parish	Farr
Council	Highland
Description	Prehistoric domestic and defensive: hut circle, roundhouse

Site Number	31
Site Name	Red Priest's Stone and burial ground 500m NNE of
Type of Site	Scheduled Monument
NMRS Number	SM2721
HER Number	
Status	Scheduled Monument
Easting	271486
Northing	947224
Parish	Farr
Council	Highland
Description	The monument consists of the remains of a pre-Reformation chapel and burial ground, the only surviving upstanding evidence of which is a cross-incised pillar, known as 'Clach an t-Sagairt Ruidhe', 'the Red Sone of the Priest' (ONB 1873) or 'the Stone of the Red Priest'. The

burial ground and the incised stone were scheduled separately in 1968. The rescheduling will combine both the burial ground and the inscribed stone under one scheduling.

The monument comprises a small unenclosed and slightly raised area of rough pasture in the corner of a field. A number of stones can be seen through the rough grass. There are no markings on these stones and no indication as to whether they are gravestones or a scatter of field stones. 'The Red Priest's Stone' is situated to the E of the site and is 0.7m high and 0.3m in width, with a roughly incised, almost equal-armed cross with a rounded head, on its north face.

'The Red Priest' was one of the names given to St. maelrubha (d.722), from which it is assumed that the chapel was dedicated to him. Nothing further is known of the site except that it was described as a chapel by Pennant in 1774 and its stones are said to have been removed c.1825 to form the embankment of the river Naver opposite Riloisk. The outline of the burial ground is shown as triangular in 1873 (OS 6"map, Sutherland, 1st ed., 1873).

The area to be scheduled is a circle measuring 30m in diameter, as indicated in red on the map. It includes the graveyard and the cross-incised stone and an area around it, within which related material may be expected to be found.
Statement of National Importance

The monument is nationally important as the site of a pre-reformation chapel and burial ground. The cross incised stone, and the association of the site with St Maelrubha is suggestive of an early ecclesiastical site.
References
Bibliography

RCAHMS records the monument as NC74NW 2.

References:

Allen J R and Anderson J 1903, THE EARLY CHRISTIAN MONUMENTS OF SCOTLAND: A CLASSIFIED ILLUSTRATED DESCRIPTIVE LIST OF THE MONUMENTS WITH AN ANALYSIS OF THEIR SYMBOLISM AND ORNAMENTATION, Edinburgh, Pt. 3, 55.

Joass J M 1865, 'Notes of various objects of antiquity in Strathnaver', PROC SOC ANTIQ SCOT 5, 359.

Mackay A 1906, 'Notes on a slab with incised cresentic design, stone mould for casting spear-heads, a cup-marked stone, holy-water stoup, and other antiquities in Strathnaver, Sutherlandshire' PROC SOC ANTIQ SCOT 40, 131.

ORDNANCE SURVEY (NAME BOOK), Inverness, 1874, Original Name Books of the Ordnance Survey Book No. 20, 250.

OPS 1855, ORIGINES PAROCHIALES SCOTIAE: THE ANTIQUITIES ECCLESIASTICAL AND TERRITORIAL OF THE PARISHES OF SCOTLAND, 2, 2, Edinburgh, 708.

Pennant T 1774, A TOUR IN SCOTLAND; MDCCLXIX, Warrington, 345, 3rd ed.

Site Number	32
Site Name	Halladale Bridge,hut circles 670m NE of,on banks of Giligill Burn
Type of Site	Scheduled Monument
NMRS Number	SM3304
HER Number	NC86SE 3
Status	Scheduled Monument

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Easting	289989
Northing	963537
Parish	Farr
Council	Farr
Description	Prehistoric domestic and defensive: hut circle, roundhouse

NC86SE 3 899 636.
(NC 8995 6363) Hut Circles (NR) (NC 8995 6353) Enclosure (NR) - 'A'. OS 6"map, (1964)

A settlement of four stone-walled huts (A - D) with a few stone clearance heaps (most evident to W) and several other structures of uncertain date.
'A' measures 13.5m diameter within a well-preserved boulder-faced wall averaging 1.6m thick. The entrance in SW, of which only NW side is preserved, faces into a probably contemporary stone-walled enclosure adjoining W arc. There are traces of at least one later rectangular building within hut. Abutting on E arc of hut is an elongated structure measuring 16m long by a maximum of 5.5m wide in N narrowing to 3.5m in S. Outside N arc are traces of two or three small stone structures of uncertain plan and date.
'B', is oval measuring 10.5m NW-SE by 8.5m transversely within a mutilated wall spread to 2.5m. There are two turf-covered heaps of stones in the interior.
'C' can scarcely be recognised as a hut. It survives as a grassy, hummocky area some 12m diameter edged by traces of a wall and occupied within by denuded later constructions of uncertain plan. Immediately N is an ill-defined rectangular structure 19.5m by 7m with bowed walls and rounded ends (? long house). A similar foundation, 14m by 7m, lies to SW.
'D' is 6m NNW-SSE by 4m within a wall obscured by peat. It has an ill-defined entrance in SSE.
At NC 8981 6356 ('E') on a rise on W edge of area of clearance heaps, is a mound about 7m diameter and 0.4m high whose position suggests it may be a cairn rather than a clearance heap.
Surveyed at 1:2500 (OS {A A} 1 11 1972)
RCAHMS 1911, visited 1909; Visited by OS (WDJ) 5 May 1960 and (A A) 1 November 1972.

This settlement is generally as described above. Huts B and D are oval and of simple form, but A and C are more complex, each with an associated enclosure or partial enclosure formed by a single line of boulders on edge abutting the W side. A field, 35m by 26m, bounded by a wall of boulder construction occurs 40m NE of hut 'A'. The amorphous 'rectangular building' within A must be considered later, but the date and purpose of the sub-rectangular structures adjacent to A and C, or their association with the huts, remains unclear. They are less well-defined than the huts; the walls are at best 0.5m high with no trace of facing-stones. The suggestion that they may be long-houses is valid.
The possible cairn at NC 8981 6356 is as described. The ground around the huts is relatively smooth suggesting former cultivation, but no measurable field plots apart from the aforementioned field are discernible.
Revised at 1:2500. Visited by OS (N K B) 30 August 1977.

'A' is referred to as a dun.
R J Mercer 1980.

'A' does not resemble a dun; the quality and quantity of material remaining does not indicate a wall of massive proportions and the situation is non-defensive. However, it differs from hut circles B - D of this site, and other huts in Highlands, in that it is unusually large and well-preserved, with both wall-faces exposed around most of circumference, yet the wall is thin in relation to the internal diameter and it does not display the splayed or bulbous entrance of the complex hut circle typified by the excavated hut V and Kilphedir (NC91NE 25). The site is difficult to interpret due to the intrusion of other structures some of which are probably of fairly recent date, but it appears to be some form of round-house of prehistoric date.
Visited by OS (N K B) 29 July 1981.

RCAHMS, 1911, The Royal Commission on the Ancient and Historical Monuments and Constructions of Scotland. Second report and inventory of monuments and constructions in the county of Sutherland, 77, No. 226 (Text/Report). SHG2657.

Mercer, R. J. & Howell, J.M., 1980, Archaeological field survey in northern Scotland, 1976-1979, 144, BIG 17 (Text/Report/Fieldwork Report). SHG2510.

Sources/Archives (2)
--- Text/Report/Fieldwork Report: Mercer, R. J. & Howell, J.M.. 1980. Archaeological field survey in northern Scotland, 1976-1979. University of Edinburgh. 30/01/1980. Paper and Digital. 144, BIG 17.
--- Text/Report: RCAHMS. 1911. The Royal Commission on the Ancient and Historical Monuments and Constructions of Scotland. Second report and inventory of monuments and constructions in the county of Sutherland. . 77, No. 226.

Site Number	33
Site Name	Dalvina Lodge,hut circles 320m SE and 450m SE of
Type of Site	Scheduled Monument
NMRS Number	SM5564
HER Number	
Status	Scheduled Monument
Easting	269987
Northing	943746
Parish	Farr
Council	Highland
Description	The monument consists of the remains of 3 hut circles and traces of cultivation on a W-facing hill slope. The W hut circle measures about 12m in diameter within a low wall. The central hut circle is 10.5m in diameter within a more substantial wall and has an entrance to the SE. There are traces of other prehistoric enclosures and cultivation in the vicinity of this hut. The E hut circle is largely destoyed by later cultivation, with only its E section surviving. The hut appears to be overlain by narrow cord-rig cultivation, which may itself be of prehistoric date. The area to be scheduled measures about 220m NW-SE by 85m SW-NE, to include the hut circles, the prehistoric cultivation and an area around these structures in which traces of activities associated with their construction and use may survive, as shown in red on the accompanying map. Statement of National Importance The monument is of national importance for its potential contribution to an understanding of prehistoric domestic life and farming practices. References Bibliography RCAHMS records the monument as NC64SE 10 and NC74SW 3.

Site Number	34
Site Name	Dalvina Lodge,settlements 700m SSE of and 1050m S of

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Type of Site	Scheduled Monument
NMRS Number	SM5565
HER Number	
Status	Scheduled Monument
Easting	269870
Northing	943222
Parish	Farr
Council	Highland
Description	This monument consists of two prehistoric hut circles and the remains of two distinct, but adjacent, cleared settlements. One hut circle, which measures 12m in diameter, lies within the fields of the S cleared settlement. The second hut circle is about 10m in diameter and lies to the SSW of the N cleared settlement. The two post medieval settlements, Auchenrach and Achupresh, were both outlying settlements connected with the township of Rosal. It has been suggested that they originated as a result of the land reclamation which was occurring at the time of the Clearances. Auchenrach consists of an enclosure containing four acres, a long-house, an outhouse and a yard. There are possible indications of earlier buildings on this site. At Achupresh the enclosure contains six acres, two long houses, a corn-drying kiln, at least one outhouse and a yard. A third enclosure to the SW of Achupresh contains possible traces of cultivation, but no buildings. The two settlements were presumably cleared at the same time as Rosal, in 1814-18. The area to be scheduled measures a maximum of 570m N-S by 600m NE-SW, but excludes the modern road and the fence line to the W of the road. The area includes the hut circles, the cleared settlements and an area around in which traces of activities associated with the construction and occupation of these structures may survive, as shown in red on the accompanying map. Statement of National Importance The monuments are of national importance for their potential to contribute to an understanding of prehistoric and post medieval domestic life and agricultural practice. The post medieval settlements also have potential to add to the understanding of the process of the Clearances in this area of Scotland. Their value is enhanced by their documented association with the well-studied settlement at Rosal. References Bibliography RCAHMS records the monuments as NC64SE 40, NC64SE 2-4 and NC74SW 1.

Site Number	35
Site Name	Dalvina Lodge,hut circle and field system 1130m SSW of
Type of Site	Scheduled Monument
NMRS Number	SM5627
HER Number	
Status	Scheduled Monument
Easting	269354
Northing	942842
Parish	Farr

Council	Highland
Description	This monument consists of a prehistoric settlement on a NW-facing hill slope. The settlement consists of a single hut circle and associated field system. The hut circle measures 11m NE-SW by 10m NW-SE within a stone wall spread to 2.5m wide and up to 0.9m high. The entrance to the hut circle is in the SW. The field system consists of clearance cairns and lynchets in the area surrounding the hut circle. The area to be scheduled measures 105m N-S by 80m E-W, to include the hut circle, the field system and an area around in which traces of activities associated with the construction and use of the settlement may survive, as shown in red on the accompanying map. Statement of National Importance The monument is of national importance for its potential contribution to an understanding of prehistoric domestic life and agricultural practices. References Bibliography RCAHMS records the monument as NC64SE 24.

Site Number	36
Site Name	Dalvina Lodge,hut circle 1300m S of
Type of Site	Scheduled Monument
NMRS Number	SM5628
HER Number	
Status	Scheduled Monument
Easting	269717
Northing	942670
Parish	Farr
Council	Highland
Description	The monument consists of a prehistoric house, a hut circle on a low knoll in fairly level moorland. The hut circle is oval in shape, measuring 12.5m N-S by 10m E-W. It is defined by a wall 0.2m maximum height and 1.7m wide. There are slight indications of an entrance to the S. The area to be scheduled measures 50m in diameter, to include the hut circle and an area around in which traces of activities associated with its construction and use may survive, as shown in red on the accompanying map. Statement of National Importance The monument is of national importance for its potential contribution to an understanding of prehistoric domestic life and farming practices. References Bibliography RCAHMS records the monument as NC64SE 6.

Site Number	37

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Site Name	Cracknie,souterrain and settlement
Type of Site	Scheduled Monument
NMRS Number	SM5663
HER Number	
Status	Scheduled Monument
Easting	266561
Northing	950941
Parish	Farr
Council	Highland
Description	The monument consists of a souterrain and a post medieval settlement on a NE-facing slope. The souterrain is almost intact. The entrance is marked by a hollow and a number of large stones, including one fallen cap stone. The full length of the souterrain is about 14.3m. It is an average of about 1.3m high and 1.1m wide, but the inner end is pear-shaped. The walls are carefully built without mortar and it is roofed with slabs overlapping each other. The post medieval settlement includes a long house, kiln barn and an area of enclosed infield with traces of rig and furrow. The souterrain is located within the enclosed infield of this settlement. The area to be scheduled measures 270m NNW-SSE, by 105m WSW-ENE, to include the souterrain, post medieval buildings, enclosed infield and an area around in which traces of activities associated with the construction and use of the souterrain and settlement may survive, as shown in red on the accompanying map. Statement of National Importance The monument is of national importance for its potential contribution to an understanding of prehistoric and post medieval domestic life and architecture. References Bibliography RCAHMS records the monument as NC 65 SE 1.

Site Number	38
Site Name	Skail, homestead
Type of Site	Scheduled Monument
NMRS Number	SM10501
HER Number	
Status	Scheduled Monument
Easting	271363
Northing	947452
Parish	Farr
Council	Highland
Description	The monument comprises a prehistoric homestead, visible today as a substantial turf-covered earthwork. The monument is situated on the NE slope of a steep valley, some 300m W of the River Naver and about 700m N of the hotel at Skail. The site sits at about 50m OD and has commanding views to the N, S and E overlooking Strath Naver. This small defended settlement occupies the summit of a steep-sided spur connected to the hill-slope to the W by a narrow saddle. It comprises the scant remains of an encircling wall,

which surrounds a sub-oval fairly level area measuring c.20m NW-SE by 15m NE-SW with a slight counterscarp 0.3m high on the W arc.

This once-substantial stone wall has been robbed away but may represent the base of what was originally a thick-walled roundhouse; alternatively, this wall may have enclosed an area containing smaller buildings.

On the W side, across the saddle at the only practical point of access, is a substantial defensive ditch, 1.2m deep and up to 9m wide. The entrance was most probably located on the SW side. A gully extending into the summit area from the SE may be a later feature.

The monument appears to date to the later Iron Age, from around the time of Christ up to about 500 AD. Previously classified as a possible broch, more recent research suggests that it is more accurately described as a homestead.

The area proposed for scheduling comprises the remains described and an area around them within which related material may be expected to be found. It is circular in plan with a diameter of 60m, as marked in red on the accompanying map.
Statement of National Importance

The monument is of national importance because of its potential to contribute to an understanding of prehistoric settlement and economy. Its archaeological potential is significant given its good state of preservation and its importance is increased by its proximity to other monuments of broadly contemporary date in the general vicinity.
References
Bibliography

RCAHMS records the monument as NC74NW 20.

References:

McCullagh R P J and Tipping R (1998) THE LAIRG PROJECT: THE EVOLUTION OF AN ARCHAEOLOGICAL LANDSCAPE IN NORTHERN SCOTLAND 1988-1996, STAR Monograph Series No. 3, Edinburgh, 67-72, fig. 119.

Site Number	39
Site Name	Cladh Rivigill, burial ground and possible chapel site
Type of Site	Scheduled Monument
NMRS Number	SM10513
HER Number	
Status	Scheduled Monument
Easting	272920
Northing	949464
Parish	Farr
Council	Highland
Description	The monument comprises Cladh Rivigill burial ground, alternatively known as Cladh Righ-Geal, which is an early Christian burial ground and the possible site of an associated chapel, visible as an earthwork. The monument is situated on a gentle slope some 450m from the E bank of the River Naver, at about 45m OD. The burial ground was erected on one of several natural mounds in the area; the low-lying area to the S was probably part of the flood plain of the river at one time. The mound measures 33m NW-SE by 30m NE-SW at its maximum extent and the summit measures 13.5m NW-SE by 11.5m NE-SW. A number of uninscribed graveslabs have been exposed on the surface of the mound in the past. These ranged in size from about 1m to 1.9m by 0.3 to 0.5m, and some of them had header and footer stones. This type of graveslab indicates an early Christian date for the monument. The remains of an enclosing wall survive around the summit of the mound. This wall stands 2-3 courses high in places and was stone-faced with a rubble core. A chapel may have been sited at one of two possible locations suggested by areas of stone scatter: one on the N arc; and another on the SE arc of the enclosing wall. A circular stony area below the S side of the mound could denote the presence of either structural remains or turf-covered field stones. The lower W arc of the mound appears to have been quarried which has caused slumping in a number of places. The area proposed for scheduling comprises the remains described and an area around them within which related evidence may be expected to survive. It is an irregular circular shape in plan, with maximum dimensions of 54m NW-SE by 50m NE-SW, as marked in red on the accompanying map. A modern access track runs along the N boundary of the monument, heading E towards Rhifail. The surface and top 30cm of this track is excluded from the scheduling to allow for its routine maintenance. Statement of National Importance The monument is of national importance as a relatively undisturbed single-period ecclesiastical site, dating from the early Christian period. It has the potential to contribute to an understanding of early Christianity in this part of Scotland, where this type of site is relatively rare. The apparent presence of undisturbed graves adds to the high archaeological potential of the monument. References Bibliography RCAHMS records the monument as NC 74 NW 1. Bibliography: Horsburgh, J. (1870) 'Notes of cromlechs, duns, hut-circles, chambered cairns, and other remains, in the county of Sutherland', Proceedings of the Society of Antiquaries in Scotland. Vol. 7, 274. Original Name Books of the Ordnance Survey, Vol. 20, 255. OPS (1855) Origines parochials Scotiae: the antiquities ecclesiastical and territorial of the parishes of Scotland, Vol. 2, 708. RCAHMS (1911) Second report and inventory of monuments and constructions in the county of Sutherland, No. 257, 88.

Site Number	40
Site Name	Cladh Langdale burial ground and possible chapel site
Type of Site	Scheduled Monument
NMRS Number	SM10834
HER Number	
Status	Scheduled Monument

Easting	269908
Northing	945206
Parish	Farr
Council	Highland
Description	The monument comprises the remains of Cladh Langdale burial ground and possible chapel site. The monument was in use in the Early Christian period and later. It is visible as an earthwork within an enclosing wall, situated on the broad, NW bank of the River Naver in the Strathnaver steep-sided valley, at about 45m O.D.. Cladh Langdale is long-disused; it is first documented in 1769 and a burial apparently took place there at the beginning of the 19th century. A chapel at 'Langdale' or 'Langwell' is referred to in 19th-century accounts and it has been suggested that faint traces are discernible as a depression in the centre of the burial ground though there are a number of such features. The elevated irregularly-shaped burial ground has maximum dimensions of 28m WSW-ENE by 21m NNW-SSE overall and is enclosed by a drystone revetment with square N and E corners but those at the SW end are more rounded in form. There may have been an entrance at the N corner indicated by the presence here of two flat slabs which, at one time, may have functioned as steps. A shallow ditch surrounds the enclosure; its better definition on the SW side may suggest that the burial ground had been extended in this direction. This may be contemporaneous with the revetment and may explain the increased gradient and irregular shape of the burial ground in this locality. A number of graveslabs and header and footer stones have been identified within the enclosure. The area proposed for scheduling comprises the remains described and an area around them within which related material may be found. It is irregular on plan with maximum dimensions of 43m SW-NE and 23m from the north-westmost conrenr to the south-eastmost, as marked in red on the accompanying map extract. The boundaries are defined by the outside edge of the bank that encloses the burial ground. Statement of National Importance The monument is of national importance because of its potential to contribute to our understanding of an Early Christian and Medieval ecclesiastical site. It is an unusual example of a substantial burial enclosure that preserves complex phases of extension. Its importance is also increased by its high archaeological potential given its early abandonment and this resource is worthy of protection given the lack of the documentary sources available. References Bibliography RCAHMS records the monument as Cladh Langdale, NC46NE 1. References: Henderson I (1987) 'Early Christian monuments of Scotland displaying crosses but no other ornament'. In Small A ed. 1987, THE PICTS: A NEW LOOK AT OLD PROBLEMS, Dundee, 45-58. Hooper J (2002) CHAPEL SITES IN CENTRAL STRATHNAVER, unpublished. Joass J M (1965) 'Notes of various objects of antiquity in Strathnaver', PROC SOC ANTIQ SCOT 5, 357-360, 359. Lelong O (2000) WRITING PEOPLE INTO THE LANDSCAPE: APPROACHES TO THE ARCHAEOLOGY OF BADENOCH AND STRATHNAVER, Unpublished PhD thesis, University of Glasgow, 213. ORDNANCE SURVEY NAME BOOK (SUTHERLAND) (1874) Original Name Books of the Ordnance Survey, Book 20, 267. OPS (1855), ORIGINES PAROCHIALES SCOTIAE: THE ANTIQUITIES ECCLESIASTICAL AND

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TERRITORIAL OF THE PARISHES OF SCOTLAND, Edinburgh, Vol. 2, No. 2, 708.

Pope A (1774), 'OF CAITHNESS, STRATHNAVER, AND SUTHERLAND', App. V in A Pennant, Tour in Scotland 1769, Warrington, 318-346, 325.

RCAHMS (1911) SECOND REPORT AND INVENTORY OF MONUMENTS AND CONSTRUCTIONS IN THE COUNTY OF SUTHERLAND, Edinburgh, No. 255, 87.

Romilly J and Anderson J (1903) THE EARLY CHRISTIAN MONUMENTS OF SCOTLAND, Edinburgh, Vol. 2.

Site Number	41
Site Name	Inshlampie, broch 1175m NE of
Type of Site	Scheduled Monument
NMRS Number	SM11123
HER Number	
Status	Scheduled Monument
Easting	272015
Northing	947329
Parish	Farr
Council	Highland
Description	The monument consists of the remains of an Iron Age broch, a drystone-built fortified dwelling, situated on the edge of a rocky escarpment in rough grazing land on the eastern slopes of Strathnaver at around 80m OD. The monument survives as the grassed-over remains of the broch and its outworks. The broch has stone wall footings approximately 4m thick enclosing an area 8.3m in diameter, giving an overall dimension of around 16.5m. The wall has been reduced to near ground level. The broch is surrounded by what appears to be a double rampart with intervening ditches, with an entrance through the outworks is to the SE. On either side of this entrance, along the inner face of the inner rampart, are the discontinous remains of a stone retaining wall. An arc of walling, 4.2m long, against the inner face of the same rampart immediately W of the entrance, possibly represents the remains of a domestic structure, probably later in date than the rampart. The inner of the two ditches is up to 8.5m wide and 3m deep, whilst the outer is up to 6m wide and 1.2m deep. A secondary boulder-built enclosure, measuring 21m x 6m, has been built within the inner ditch to the NE and partially overlies the entrance causeway. The area to be scheduled is circular on plan, approximately 100m in diameter. This includes all the features described as well as an outer area within which evidence relating to the construction, occupation and abandonment of the site may be expected to survive, as marked in red on the accompanying map extract. Statement of National Importance This monument is of national importance as the remains of an Iron Age broch, being of the 'mound-on-mound' type common to Caithness and Sutherland. It offers the potential to provide information on the nature of settlement and defensive architecture during this period of prehistory. References Bibliography The monument is recorded by RCAHMS as NC74NW 3.00 (broch) and NC74NW 3.01 (enclosure).

Site Number	42
Site Name	Rosal, hut circles and clearance cairns, Naver Forest, Strathnaver
Type of Site	Scheduled Monument
NMRS Number	SM2515
HER Number	
Status	Scheduled Monument
Easting	268759
Northing	940754
Parish	Farr
Council	Highland
Description	The monument comprise the remains of at least 16 hut circles and a number of associated field clearance cairns, representing a late prehistoric settlement. The monument was last scheduled in 2000. Since then there has been extensive forest clearance revealing a series of associated clearance cairns and evidence for field systems in close proximity to a number of hut circles. One previously scheduled hut circle has been destroyed without a trace. The current scheduling rectifies both issues. The hut circles are scattered across a wide area of forest and open moor. Eleven lie within cleared areas of former forest, one on the edge of the forest and 4 in the moorland. There are 3 loose groupings. A group of 9 is scattered 700m E-W along a low rise, with the most westerly immediately beside the River Naver. A second grouping is over 1000m to the NE, with 5 hut circles located on rising ground. The third grouping, to the N and E of these, consists of 3 hut circles widely spaced along the E side of the Syre-Kinbrace road. Individual hut circles vary from 10m to 15m in diameter, and several display expansions of the wall in the vicinity of the entrance. Entrances, where detectable, are in the SE-SW sector. A number of the hut circles, particularly in the SW grouping, have suffered from plough damage at the time the forest was established in the 1960s. There are a substantial number of field clearance cairns around and among the hut circles. At six hut circles, centred on National Grid References NC 7013 4129, NC 7013 4173, NC 6998 4209, NC 6998 4225, NC 6902, 4063 and NC 6837 4080, the area to be scheduled is a circle 30m in diameter, centred on the centre of the hut circle. A further three hut circles, centred on National Grid Reference NC 6989 4169 are included within a group to be scheduled as a rectangle 200m NE-SW by 73m transversely, to include the hut circles and associated field clearance cairns. A further group of seven hut circles and associated field clearance cairns centred on position NC 6875 4076 are to be scheduled as an irregular shape with maximum dimensions 300m E-W and 140 N-S. The areas are marked in red on the accompanying map. Statement of National Importance The site is of national importance as a series of well-preserved examples of a prehistoric settlements with associated elements of field systems which have the potential to enhance considerably our understanding of prehistoric settlement and agriculture. References Bibliography The monument is recorded by RCAHMS as NC64SE 7, NC64SE 15, NC64SE 16, NC64SE 20, NC74SW 1 and NC74SW 2.

Site Number	43
Site Name	Borgie Bridge,homestead 250m E of

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Type of Site	Scheduled Monument
NMRS Number	SM2134
HER Number	
Status	Scheduled Monument
Easting	267117
Northing	958721
Parish	Farr
Council	Highland
Description	This monument is a defended homestead of probable Iron Age date situated on the edge of a natural escarpment overlooking the Borgie valley. The monument consists of a semi-circular ditch averaging 8m wide and 2m deep from which material has gone to form a flat-topped mound about 18m in diameter and 2m high. The ditch stops short of the escarpment at both ends where there are slight counterscarps. A causeway crosses the ditch in the SE. Eccentrically placed on the top of the mound is an amophous stone walled circular structure, possibly a prehistoric round house. The area to be scheduled measures 60m E-W by 50m N-S, to include the defended homestead, internal stone structure and an area around in which traces of activities associated with the building and use of the homestead may survive, as shown in red on the attached map. Statement of National Importance This monument is of national importance for its potential contribution to an understanding of prehistoric defensive construction and domestic life. References Bibliography The monument is RCAHMS number NC 65 NE 1.

Site Number	44
Site Name	Farr Churchyard,cross slab
Type of Site	Scheduled Monument
NMRS Number	SM1889
HER Number	
Status	Scheduled Monument
Easting	271428
Northing	962255
Parish	Farr
Council	Highland
Description	Crosses and carved stones: cross slab

Site Number	45
Site Name	Borve Castle
Type of Site	Scheduled Monument
NMRS Number	SM2112
HER Number	

Status	Scheduled Monument
Easting	272530
Northing	964108
Parish	Farr
Council	Highland
Description	Secular: castle

Site Number	46
Site Name	Leathad Carnaich,hut circles,clearance cairns,N of Dalhalvaig School
Type of Site	Scheduled Monument
NMRS Number	SM1876
HER Number	
Status	Scheduled Monument
Easting	289404
Northing	955484
Parish	Farr
Council	Highland
Description	Prehistoric domestic and defensive: field clearance cairn, cairnfield; hut circle, roundhouse

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Site Number	47
Site Name	Skail, chambered cairn 90m N of
Type of Site	Scheduled Monument
NMRS Number	SM1776
HER Number	
Status	Scheduled Monument
Easting	271296
Northing	946899
Parish	Farr
Council	Highland
Description	The monument comprises a prehistoric chambered burial cairn, known locally as 'the Temple'. The cairn was originally scheduled in 1961, but an inadequate area was included fully to protect the archaeological remains. This scheduling extension rectifies the situation. The chambered cairn is situated some 90m N of Skail, on the alluvial plain W of the River Naver at a height of about 125m OD. The cairn has been disturbed in antiquity, but was originally a round cairn about 18m in diameter, of Orkney-Cromarty type. Most of the smaller stones making up the body of the cairn have been removed, revealing a chamber of polygonal form with a transverse subdivision. The entrance to the chamber has probably been from the NE. Low turf-covered banks mark the perimeter of the mound which once covered the cairn, and a few larger stones hint at an external kerb. Although disturbed, the site retains the potential for important archaeological material to survive beneath the chamber and under the remains of the body of the cairn.

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The area now to be scheduled is circular, 40m in diameter, to include the remains described and an area around them in which related archaeological evidence is likely to survive. The scheduled area is indicated in red on the accompanying map. The above-ground portion of the modern walkway and information panel are excluded from scheduling, to facilitate maintenance.

Site Number	48
Site Name	Clach an Righ, stone circle 400m NNW of Dalharrold
Type of Site	Scheduled Monument
NMRS Number	SM1779
HER Number	
Status	Scheduled Monument
Easting	267936
Northing	939033
Parish	Farr
Council	Highland
Description	The monument comprises a stone circle of prehistoric date. It is being rescheduled to rectify the map location of the scheduled area. The monument lies in a clearing in a coniferous plantation at around 75m OD. The stone circle is approximately 7m in diameter, and surrounds a low cairn about 5m in diameter. Only two of the circle's stones remain upright, the most northerly measuring about 1.75m high by 0.2m thick by 0.8m wide at the base tapering to 0.4m, while the southerly one measures about 2.5m high by 0.15m thick by 1m wide tapering to 0.3m. A smaller stone abuts the latter at right angles to its northern face. There are four fallen stones visible, measuring between 0.75-2.5m long by 0.5-1m wide. Three of the fallen stones form an arc 6m to the SW of the upright stones. Other fallen stones may survive in the vicinity, hidden beneath the undergrowth. The area proposed for scheduling comprises the remains described and an area around them within which related material may be expected to survive. It is a circle, 30m in diameter, minus a chord on the E side where it is cut by a forestry track, as marked in red on the accompanying map extract. Statement of National Importance The monument is of national importance because of its potential to contribute to our understanding of prehistoric ritual and religious practices. References Bibliography The monument is recorded by RCAHMS as NC 63 NE 11.

Site Number	49
Site Name	Achcoillenaborgie, cairns 500m N of Lochan Duinte
Type of Site	Scheduled Monument
NMRS Number	SM1781
HER Number	
Status	Scheduled Monument

Easting	271538
Northing	959030
Parish	Farr
Council	Highland
Description	The monument comprises two long cairns; funerary and ritual monuments dating from the Neolithic period (c. 5000-2000 BC). It was originally scheduled in 1934 and only the above ground structures of the cairns themselves were covered by this scheduling. This rescheduling takes in a larger area to ensure that all the archaeological remains likely to be associated with the cairns are protected. The monument lies in rough grazing land overlooking the River Naver at around 15m OD. The cairns are set roughly in line, aligned NNW-SSE. Both were excavated at least twice during the late 19th century. The southern cairn measures a maximum of 75m long by 24m wide, narrowing to 13m at the S end, with a maximum height of approximately 3m. The Victorian excavations exposed a chamber near the northern end which measures approximately 8m by 2m by 1.5m deep. This chamber is set at a slight angle to the axis of the cairn and at least two lintel stones are still in position. There are forecourts at both ends of the cairn, defined by horns built out of the body of the cairn, and the fragmentary remains of facades made up of large orthostats. The northern cairn comprises two sections; a heel-shaped, horned cairn containing a roughly circular chamber to the north, and a long cairn to the south. These sections are separated by a gap approximately 2m wide, and it is probable that the two sections once formed a continuous whole, measuring approximately 60m long by 17m wide. The presence of forecourts at either end of this unified monument, following the same pattern as the southern cairn, further strengthens the argument that the two sections once formed one cairn. The area proposed for scheduling comprises the remains described and an area around them in which material relating to their construction and use may be expected to survive. It is irregular in outline, with maximum dimensions of 150m NNW-SSE by 40m transversely, bounded on the N by a fence, as marked in red on the accompanying map extract. Statement of National Importance The monument is of national importance because of its potential to contribute to our understanding of prehistoric funerary and ritual practices. It may be expected to contain material relating to its mode of construction and use. The cairns are unique in the north of Scotland in their use of upright stones in the façade, and the development and use of these cairns may have continued through most of the third millennium BC. References Bibliography The monument is recorded in the RCAHMS as NC 75 NW 3.

Site Number	50
Site Name	Skelpick, long cairn 350m NE of
Type of Site	Scheduled Monument
NMRS Number	SM1815
HER Number	
Status	Scheduled Monument
Easting	272256
Northing	956732
Parish	Farr

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Council	Highland
Description	The monument comprises an Orkney-Cromarty type chambered long cairn of Neolithic date. The monument is situated on a low terrace at around 32m OD, in rough grassland 70m E of the Skelpick Burn. It is patchily covered by heather. The monument was first scheduled in 1934, but an inadequate area was included to protect all the archaeological remains. The present scheduling rectifies this. The monument is approximately 71m at its longest, running NNW-SSE, and is 20m at its widest. The edges of the cairn are indistinct, confused by tumbled stone and covered with heather and turf. The monument is horned at either end, the northern horns the larger and framing the entrance to a bipartite polygonal chamber. The interior structure is constructed using large stone orthostats and roofed with dry-stone corbelling, consisting of a brief passage leading to a small antechamber, approximately 3m E-W and 2.5m N-S, and then into a main chamber, approximately 3.5m E-W and 4m N-S. The passage is built with long, prone slabs up to 2.5m long and is roofed with a substantial lintel stone. A further large lintel stone divides the two chamber compartments, which is significantly higher than the height of the passage at around 1.5m high. To the SE of the cairn is a small sub-rectangular enclosure, probably built from the cairn material. The area now to be scheduled is irregular on plan, measuring a maximum of 100m SE-NW by 40m transversely, as marked in red on the accompanying map extract. Statement of National Importance This monument is of national importance as a Neolithic chambered long cairn of Orkney-Cromarty type. Although one of the two chamber compartments was excavated by Horseburgh in 1867, it maintains considerable potential to provide a valuable insight into the funerary and ritual practices of this period. It is a particularly striking example of its kind. References Bibliography The cairn is recorded by RCAHMS as NC75NW 7.

Site Number	51
Site Name	Achcoillenaborgie,broch,Strathnaver
Type of Site	Scheduled Monument
NMRS Number	SM1824
HER Number	
Status	Scheduled Monument
Easting	271408
Northing	959424
Parish	Farr
Council	Highland
Description	Prehistoric domestic and defensive: broch

Site Number	52
Site Name	Allt a'Chaisteil,broch E of Rhinovie,Strathnaver
Type of Site	Scheduled Monument
NMRS Number	SM1828

HER Number	
Status	Scheduled Monument
Easting	272361
Northing	957523
Parish	Farr
Council	Highland
Description	Prehistoric domestic and defensive: broch

Site Number	53
Site Name	Carnachy,hut circles,Strathnaver
Type of Site	Scheduled Monument
NMRS Number	SM1845
HER Number	
Status	Scheduled Monument
Easting	271989
Northing	951546
Parish	Farr
Council	Highland
Description	Prehistoric domestic and defensive: hut circle, roundhouse

Site Number	54
Site Name	Dun Viden,broch 700m NE of Carnachy
Type of Site	Scheduled Monument
NMRS Number	SM1860
HER Number	
Status	Scheduled Monument
Easting	272650
Northing	951881
Parish	Farr
Council	Highland
Description	Prehistoric domestic and defensive: broch

Site Number	55
Site Name	Inshlampie,broch 230m NE of
Type of Site	Scheduled Monument
NMRS Number	SM1867
HER Number	

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Status	Scheduled Monument
Easting	271591
Northing	946575
Parish	Farr
Council	Highland
Description	Prehistoric domestic and defensive: broch

Site Number	56
Site Name	Rosal,deserted township,Naver Forest,Strathnaver
Type of Site	Scheduled Monument
NMRS Number	SM2510
HER Number	
Status	Scheduled Monument
Easting	268912
Northing	941636
Parish	Farr
Council	Highland
Description	Secular: settlement, including deserted and depopulated and townships

Site Number	57
Site Name	Bad an Leathaid,deserted township,Strathnaver
Type of Site	Scheduled Monument
NMRS Number	SM2511
HER Number	
Status	Scheduled Monument
Easting	270184
Northing	936054
Parish	Farr
Council	Highland
Description	Secular: settlement, including deserted and depopulated and townships

Site Number	58
Site Name	Meall a Choire Bhuidhe,hut circles,Naver Forest
Type of Site	Scheduled Monument
NMRS Number	SM2517
HER Number	
Status	Scheduled Monument

Easting	269349
Northing	938747
Parish	Farr
Council	Highland
Description	Prehistoric domestic and defensive: hut circle, roundhouse

Site Number	59
Site Name	Dalharrold, hut circle 380m NNW of
Type of Site	Scheduled Monument
NMRS Number	SM2516
HER Number	
Status	Scheduled Monument
Easting	267881
Northing	938994
Parish	Farr
Council	Highland
Description	The monument comprises a hut circle of later prehistoric date. The original scheduling for this monument incorporated another hut circle which has now been destroyed by quarrying, making rescheduling necessary to clarify the area protecting the surviving elements of the monument. The monument lies in moorland on a spur of land overlooking the River Naver, at around 70m OD. It is an oval building with internal measurements of approximately 7m E-W by 11m transversely. Its walls survive as heather-covered stone banks up to 2m wide by 0.8m in height. The entrance is in the S and is partially blocked with stones. There is a stone clearance heap to the E and two clearance cairns to the WNW. The area proposed for scheduling is a clipped circle on plan, to include the remains described and an area around within which material related to the construction and use of the hut circle may be expected to survive, as shown in red on the attached map extract. The scheduling extends up to, but excludes the fenceline on the NE, to allow for its maintenance. Statement of National Importance The monument is of national importance because of its potential to contribute to our understanding of upland prehistoric settlement and economy. It will provide evidence for the nature and date of construction and occupation. Its importance is increased by its proximity to other monuments of potentially contemporary date. References Bibliography The monument is recorded by NMRS as NC 63 NE 9. Original scheduling file no. SC 25571/1A This hut circle was originally scheduled with NC 63 NE 7: however, the latter has now been destroyed by a forestry road and is to be de-scheduled. This re-scheduling will ensure that only the remaining hut circle is scheduled under index no. 2516.

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Site Number	60
Site Name	Millburn, Strath Halladale, barrows 340m NNE of
Type of Site	Scheduled Monument
NMRS Number	SM13622
HER Number	
Status	Scheduled Monument
Easting	289033
Northing	955881
Parish	Farr
Council	Highland
Description	The monument is a prehistoric burial monument probably dating to the 2nd millennium BC (Bronze Age). It survives as a prominent, circular, grass-covered mound, built mainly of earth but with some stone visible in its sides, with a smaller secondary barrow to the east. The monument is situated on raising ground to the east of the Halladale River, at around 40m above sea level. The main burial monument appears to be a bowl barrow with an external ditch and bank. The central mound, which probably contains one or more burials, is approximately 6.5m in diameter and stands 0.5m high. It is surrounded by a ditch, approximately 1.6m wide, and an external bank approximately 2m wide and standing up to 0.5m high. The ditch and bank are well-defined but the bank has been disturbed by later activity around its south east arc. Immediately to the east there is a low mound which is approximately 5m in diameter and stands 0.5m high, and is likely to be a second barrow. The scheduled area is circular on plan, 30m in diameter. It includes the remains described above and an area around them within which evidence relating to the monument's construction, use and abandonment is expected to survive, as shown in red on the accompanying map. Statement of National Importance The monument is of national importance as a prehistoric burial mound with an inherent potential to make a significant addition to our understanding of the past, particularly the design and construction of burial monuments, the nature of burial practices, and their significance in Bronze Age and later society. The Millburn barrows are of particular importance in that one appears to be a well-preserved, rare type of burial monument – a bowl barrow with distinctive field characteristics. This type of barrow is more commonly associated with pre-historic ritual and funerary landscapes in central southern England and may indicate social influences or cultural connections between communities in northern Scotland and central southern England. The monument has an inherent potential to contribute to our understanding of the form, function and distribution of Bronze Age burial monuments. Such monuments are important for our understanding of the form and nature of the prehistoric landscapes of the Highlands. Due to the rare nature of this type of burial monument in Scotland, its loss would very significantly diminish our ability to understand Bronze Age burial practices and society more widely. References Bibliography The Highland Council Historic Environment Record reference: MHG24911 (http://her.highland.gov.uk/SingleResult.aspx?uid=MHG24911). Accessed 12/10/15.

Site Number	61
Site Name	Armadale Burn, broch 1420m SE of Armadale House.

Type of Site	Scheduled Monument
NMRS Number	SM13678;NC76SE 3
HER Number	
Status	Scheduled Monument
Easting	279933
Northing	962670
Parish	Farr
Council	Highland
Description	The monument is a broch, a substantial stone-built roundhouse, dating from the Iron Age (between 600BC and AD 400). The broch is visible as a dry stone structure sitting atop a large knoll with surviving walling, an entrance and some internal features. It is defended by natural scree and cliff around its eastern side and by a conjoining circuit of low drystone walling running from the north of the broch around its west, south and southeast sides. The broch is located on the west side of a steep ravine to the south of Armadale Bay at approximately 60m above sea level. The broch is approximately 17m in overall diameter with its walling up to 4.5m thick. The entrance is located on the southeast side and has a well-preserved passage leading inwards. Around the southwest quadrant up to fifteen stone courses are visible and overall the broch survives up to approximately 4m in height. The interior is obscured by vegetation but records indicate the presence of chambers within the thickness of the enclosing wall. An outer wall extends from the river cliff north of the broch around the west side, rejoining the cliff in the southeast. There is an entrance through this outer wall in the northern half, opposing the inner broch entrance in its southern half. There are structural remains at the bottom of the west side of the knoll, the form of which indicates that it is a prehistoric domestic structure. The scheduled area is circular on plan measuring 70m in diameter, to include the remains described above and an area around them within which evidence relating to the monument's construction, use and abandonment is expected to survive, as shown in red on the accompanying map. Statement of National Importance Cultural Significance The cultural significance of the monument has been assessed as follows: Intrinsic Characteristics The monument comprises the structural remains of an Iron Age broch with surviving architectural features. The broch survives as low, drystone structure, with a well-preserved entrance passageway in the southeast quadrant leading to the interior. The interior appears to be relatively undisturbed and archaeological features, artefacts and ecofacts are likely to have been sealed by the collapse of sections of the interior wall. The outer defensive wall and an adjacent structure at the bottom of the natural knoll upon which the broch sits adds the site's significance. By analogy with a number of excavated brochs, the broch and its outer-works are likely to contain deposits rich in occupation debris, artefacts and palaeoenvironmental evidence that can tell us about how people lived, their trade and exchange contacts, and their social status, as well as providing information about broch architecture and construction methods. Brochs in Sutherland and Caithness are typically thought to date from the mid-first millennium BC through to the early part of the first millennium AD. The presence of outer-works and structure beyond these outer-works indicates that this site may have had an extended development sequence. Scientific study of the site would allow us to develop a better understanding of the chronology of the site, including its date of origin, state of completeness and any possible development sequence.

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Brochs are a specific and complex type of Atlantic roundhouse. They were large structures that could accommodate an extended family or a small community. There would likely have been a social hierarchy within the community living here, however, the construction of these elaborate towers is often understood in terms of elite settlement. Other interpretations have stressed their likely role as fortified or defensive sites, possibly serving a community across a wider area. Brochs are complex structures likely to have had numerous purposes in prehistoric society.

Contextual Characteristics

Brochs are a widespread class of monument across northern Scotland with notable concentrations in Caithness, Sutherland, Orkney, Shetland, the Western Isles and the northwest Highlands. In this part of northern Scotland, they are clustered along the coastline and, in the case of this example, within the major north-south straths. These river valleys would have served as important communication corridors. This broch is located midway between two local clusters of similar sites around Torrisdale Bay and beside the River Naver, to the west and, Melvich Bay and Strath Halladale to the east.

Links between neighbouring brochs such as within this local cluster are likely and these links suggest broader community interests at the time of the construction and use. This example therefore has the potential to broaden our understanding of prehistoric society and community across northern Scotland.

The broch sits on a prominent natural knoll and is well defended because of the steep slopes of the knoll. Theses natural defences appear to have been accentuated by an outer defensive work. The knoll with the broch on its summit is a prominent landscape feature with extensive views southwards and along the River Naver. It may have been deliberately sited here to control the local topography and to be seen as a prominent landmark.

Associative Characteristics

There are no known associative characteristics which contribute to the site's cultural significance.

Statement of National Importance

This monument is of national importance because it makes a significant addition to our understanding of the past, in particular of Iron Age society in Sutherland and, the function, use and development of brochs. This is a well-preserved example with identifiable architectural features including an entrance passage and internal features. Significant archaeological deposits are likely to survive in and around the broch, indicating activity and materials used in the broch's construction, occupation and abandonment. The broch's location on a prominent knoll and the associated outerworks are aspects of the importance of this site, demonstrating how topography was exploited and accentuated by those building brochs. The site also can add to our understanding of settlement patterns, social structure and economic circumstances prevalent during the Iron Age in northern Scotland.

References

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CANMORE: http://canmore.org.uk/ CANMORE ID 6393

Local Authority HER/SMR Reference: MHG10748

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Canmore

https://canmore.org.uk/site/6393/

Site Number	62
Site Name	Bighouse Farm Steading
Type of Site	Listed Building
NMRS Number	LB7140
HER Number	
Status	Listed Building- Category C
Easting	289399
Northing	964972
Parish	Farr
Council	Highland
Description	Later 19th century, U-plan single storey steading with south facing court enclosed by later semi-circular coped rubble wall. Ground slopes to west, allowing for lower ground floor with access in west gable. Blocked cart arches; slate roof. Statement of Special Interest Semi-circular enclosing wall added after 1873; appears on 2nd edition OS of circa 1906.

Site Number	63
Site Name	Smigel Mill
Type of Site	Listed Building
NMRS Number	LB7141
HER Number	
Status	Listed Building- Category B
Easting	289535
Northing	957690
Parish	Farr
Council	Highland
Description	Circa 1850. Simple rectangular mill, harl pointed rubble, tooled rubble dressings. 4-bay frontage (west) with off-centre door; 1 window each floor in 2 right bays. Kiln to left, with small 1st floor window front and rear. Centre rear loft door rising through wallhead into pienided gablet. Flat skews; shaped apex finials; graded Caithness slate roof with stone ridge and simple ridge kiln vent. Overshot wood and iron wheel at south gable. Statement of Special Interest De-Scheduled 05-Nov-03. Lade turfed over. Mill built as a co-operative venture.

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p.316.

Site Number	64
Site Name	Strath Halladale Mission Church
Type of Site	Listed Building
NMRS Number	LB7142
HER Number	
Status	Listed Building- Category C
Easting	289518
Northing	957803
Parish	Farr
Council	Highland
Description	1845; simple rectangular harled rubble church with long-4-bay elevation facing road to west. Small Minister's room and entrance at north gable; corrugated iron porch at south gable; lattice-pane glazing; apex ball finial (at south, missing at north); slate roof. Simple interior. Statement of Special Interest Ecclesiastical building in use as such. References Bibliography IMPERIAL GAZETTEER OF SCOTLAND, ii, (circa 1858) p.39; Groome's ORDNANCE GAZETTEER OF SCOTLAND, vi, (1885) p.241; Ewing, ANNALS OF THE FREE CHURCH, ii (1914) p.223.

Site Number	65
Site Name	Syre Church
Type of Site	Listed Building
NMRS Number	LB7147
HER Number	
Status	Listed Building- Category C
Easting	269367
Northing	943929
Parish	Farr
Council	Highland
Description	Late 19th century, small corrugated-iron church with long 3-bay elevations N and S. All painted with contrasting margins. Small gabled porch with centre pointed headed entrance at E gable; pointed-headed windows in side elevations with decorative leaded glazing. Corrugated-iron

roof with simple cast-iron ridge brattishing and apex

finials. Dry stone walled enclosure; granite monument on stepped base.
Statement of Special Interest

Ecclesiastical building in use as such. Good example of corrugated iron as building material.

Site Number	66
Site Name	Armadale House
Type of Site	Listed Building
NMRS Number	LB7155
HER Number	
Status	Listed Building- Category C
Easting	279005
Northing	963749
Parish	Farr
Council	
Description	Probably David Bryce, 1845; 2-storey, 3-bay house; all harled with tooled ashlar margins. Centre door in south facing slightly advanced and gabled centre bay; outer 1st floor windows barely break wallhead within small gables; single ground and 1st floor windows in return elevations; single storey and attic, 2-bay wing to rear with later additions. Lying pane glazing coped end stacks; slate roofs. Statement of Special Interest Armadale purchased by Countess of Sutherland in 1813 from William Honeyman of Graemsay (Orkney) who had inherited it from his mother. References Bibliography Ed. Donald Omand, THE SUTHERLAND BOOK, (1892) p. 201; Valerie Fiddes & Alistair Rowan, DAVID BRYCE, 1803-1876, (1976), p. 113

Site Number	67
Site Name	Strathnaver Museum, Clachan
Type of Site	Listed Building
NMRS Number	LB7156
HER Number	
Status	Listed Building- Category B
Easting	271450
Northing	962248
Parish	Farr
Council	Highland
Description	1774. Interior altered 1882. Tall rectangular church, harled with painted ashlar reveals (some rendered). Symmetrical south elevation with 2 long centre windows with mulit-pane glazing.

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Flanking ground floor and gallery windows. Single long window, detailed as in south elevation, in centre north elevation with flanking ground floor windows; 12-pane glazing; 1st floor gallery entrances in east and west gables,

reached by forestairs over-sailing similar ground floor entrances.

Bellcote at east gable; ball finial at west; slate roof with small triangular vent in south.

Interior: imposing hexagonal panelled pulpit dated 1774, with panelled backboard and hexagonal sounding board with deeply moulded rim. Backboard contained within fluted Corinthian pilasters, with centre round-headed keystoned blind arch supported on half pilasters; carved baluster to stair with end ball finials. Flanking late 19th century

oil lamps on decorative brass wall brackets.

Burial Ground: rubble walled burial ground with interesting 18th and 19th century tomb stones.
Statement of Special Interest

No longer in ecclesiastical use; serves as Farr Museum. Seating Removed. Pulpit initialled and dated: MGM 1774 for Master George Munro. The Rev. George Munro graduated at King's College, Aberdeen (denoted by the title Master) and was the Minister of Farr at the time the church was built, dying there in 1779. There is a memorial to him in the

burial ground. Former galleries removed and party walls inserted reducing the size of the interior, in 1882. Very fine collection of 17th and 18th century tomb stones from church yard housed in church. Cross slab in burial ground is Scheduled Ancient Monument No 1889.
References
Bibliography

THE STATISTICAL Account (1790-1) (re-published 1979, editors

D.J. Witherington and I.R. Grant) p.413;

George Hay, THE ARCHITECTURE OF THE SCOTTISH POST-REFORMATION CHURCHES

(1957) pp.80, 87, 187;

FASTI ECCLESIAE SCOTICANAE, vii, (1928)

Site Number	68
Site Name	Farr Bay Inn, Clachan
Type of Site	Listed Building
NMRS Number	LB7157
HER Number	
Status	Listed Building- Category C
Easting	271580
Northing	962274
Parish	Farr
Council	Highland
Description	Dated 1819. 2-storey and attic house, 3 bays. Harled with painted rendered margins. Projecting gabled porch masks centre door; 2 gabletted dormers. 2-and 12-pane glazing; corniced end stacks; slate roof. Rear wing at right angles to main building with additional 2-storey and attic extension parallel to front range.

Interior: much altered; upstairs rear room has hand painted flowers decorating the window shutters.
Statement of Special Interest

Datestone with joint Sutherland/Stafford Arms.
References
Bibliography

THE NEW STATISTICAL ACCOUNT, xv, (1834) p.76.

Site Number	69
Site Name	Bighouse
Type of Site	Listed Building
NMRS Number	LB7159
HER Number	
Status	Listed Building- Category B
Easting	289115
Northing	964815
Parish	Farr
Council	Highland
Description	Mid/later 18th century, with earlier/mid 19th century alterations and additions, and further additional west wing of circa 1900. Austere mansion of 2 storeys over raised basement, 5 bays with centre slightly advanced and pedimented bay and additional advanced, wide by at west

with canted bay window rising full height. Large double pile rear wing of 3 storeys and attic, of which the centre portion is probably earlier than that to east. All harled with tooled ashlar dressings. Original wide centre door with Gothic fanlight with intersecting glazing, masked by later projecting bowed porch with side windows and bowed, piended platform roof and centre corniced entrance with long-short detailing approached by flight of steps. Tall, narrow, raised ground floor windows; smaller at 1st floor linked by lintel/eaves band. Wide bay

to west with bipartites in ground and 1st floors. 4-pane glazing in south front, 12-pane to rear. Paired gabletted dormers rise through rear wing wallhead. Large corniced end and ridge panelled stacks; slate roofs.

Interior: plain interior with centre stone scale and plat staircase with moulded risers and symmetrical original floor plan in oldest portion of the house.

Garden walls; coped rubble wall encloses west and north, including rear service court and offices.

Gate piers; pair square mid-18th century chanelled ashlar gate piers with cornice and square caps in west wall, aligned with similar pair at east leading to walled garden (See separate entry for walled garden).
Statement of Special Interest

Mansion of Strath Halladale estate. Home of Mackays of Strath Halldale and Bighouse, a cadet branch of the Lords of Reay. 17th century memorials to Mackays of Bighouse in Old Reay Burial Ground (Reay Parish, Caithness,) in which parish Strath Halladale was formerly included). "A modern house" (1774) according to The Rev. Alexander Pope, Minister of Reay Parish.
References
Bibliography

Site Gazetteer

Thomas Pennant, A TOUR IN SCOTLAND, 1769. 3rd edition of 1774 with appendix by Alexander Pope, p.329;

Nicholas Carlisle, A TOPOGRAPHICAL DICTIONARY OF SCOTLAND (1813) vol. ii (no page numbers);

IMPERIAL GAZETTEER OF SCOTLAND, ii, (circa 1858) p.646.

Site Number	70
Site Name	Garden House, Bighouse
Type of Site	Listed Building
NMRS Number	LB7160
HER Number	
Status	Listed Building- Category A
Easting	289201
Northing	964831
Parish	Farr
Council	Highland
Description	Garden pavilion; mid-18th century, small square 2-storey, 3-bay garden pavilion. Harl pointed rubble, polished ashlar dressings and margins.

West facing front facade with centre door and small margined flanking windows; similarly detailed taller windows in 1st floor outer bays; 9- and 12-pane glazing. Ashlar quoins; eaves band; tall centre margined and corniced wallhead stack; fluted end dies with ball finials; pyramidal slate roof with salmon weather-vane (carved wood salmon) 1st floor door in south gable reached by forestair (masked from front view by garden wall); both door and centre 1st floor window blocked; small lean-to at rear (east), corniced wallhead rear stack.

Interior; bolection moulded chimneypiece in ground floor chamber; interior gutted.

Walled garden; high coped rubble garden walls flank pavilion; pair mid 18th century square chanelled ashlar gate piers, with cornice and square cap, in centre of west wall, opposite pavilion. Pair plain cast-iron gates.
Statement of Special Interest

Gate piers aligned with pair in east wall close to mansion.

Site Number	71
Site Name	Barracks, Bighouse
Type of Site	Listed Building
NMRS Number	LB7161
HER Number	
Status	Listed Building- Category B
Easting	289099
Northing	964766

Parish	Farr
Council	Highland
Description	Dated 1738. Small 2-storey, 3-bay house with well advanced outer bays forming U-plan. Harl pointed rubble, ashlar margins. Centre door masked by corrugated iron porch filling re-entrant bay; further door in centre west (left) bay; rear entrance with flanking windows. Narrow windows, all with chamfered margins, smaller in 1st floor; square off-centre 1st floor window with mould surrounds and dated lintel. 4- and 12- pane glazing. Off centre rear entrance flanked by small windows. Paired ridge stacks; piended slate roof; stone ridge. Interior: divided as two dwellings; later 19th century pine plank lined walls and small chimneypieces. Statement of Special Interest Dated lintel appears re-used. Inscribed: "I L MACKAY BIGHOUSE 1738". House probably of slightly later date. Probably acquired the present title of "The Barracks" if used to house servants at some time.

Site Number	72
Site Name	Ice House, Bighouse
Type of Site	Listed Building
NMRS Number	LB7162
HER Number	
Status	Listed Building- Category B
Easting	289201
Northing	964922
Parish	Farr
Council	Highland
Description	Early 19th century, large tall cylindrical rubble ice house built into hillside. Rubble; bowed projecting lower outer chamber with centre door at north (facing onto River Halladale). Conical turf roof. Ramp to rear leads to wallhead ice chute. Interior; stone flagged floor to semi-circular outer chamber; conical interior. Statement of Special Interest Unusual form for commercial ice house. Still in use as such.

Site Number	73
Site Name	Smigel Bridge
Type of Site	Listed Building
NMRS Number	LB12915
HER Number	
Status	Listed Building- Category B

Site Gazetteer

Easting	289503
Northing	957695
Parish	Farr
Council	Highland
Description	Circa 1850, single span rubble bridge, carrying road over Smigel Burn. Parapet on W wide recently repaired and cope re-set. Statement of Special Interest of historic interest in its context, sited to the W of Smigel Mill, listed separately and a scheduled ancient monument, which was built circa 1850 as a co-operative venture (see J Hume The Industrial Archaeology of Scotland Vol 2, The Highlands and Islands (1977) p136). The near contemporary mission church to the N is also listed separately.

Site Number	74
Site Name	Church Of Scotland Mission House, Leathad Carnaich
Type of Site	Listed Building
NMRS Number	LB12922
HER Number	
Status	Listed Building- Category B
Easting	289255
Northing	955791
Parish	Farr
Council	Highland
Description	1910 corrugated iron church built as a mission for UF Congregation, missionary's house also contained within the same building at north end; probably a kit design from Spears of Glasgow. Virtually inaltered, and on rubble base, small-paned windows in segmental-arched openings, some windows tripartite, timber detailing including margins and gable head framing; roof also corrigated iron, plain axial ventilator. Basically a rectangular plain structure, church has porch at one corner, 2-bay flanks, original interior timberwork and hanging paraffin lamps; house originally with 3-bay gabled west front; extended by one bay retaining profile, rear outshot added,all in corrugated iron shortly after church was first built. Statement of Special Interest Ecclesiastical building in use as such. References Bibliography Historical details provided by Dr Frank Bardgett, minister.

Site Number	75
Site Name	Old Bridge, Borgie Bridge
Type of Site	Listed Building
NMRS Number	LB18451
HER Number	
Status	Listed Building- Category B

Easting	266846
Northing	958748
Parish	Tongue
Council	Highland
Description	Earlier 19th century twin arched rubble bridge; dressed rubble arch rings; triangular cutwaters; dressed rubble cope to parapet; splayed approaches. Statement of Special Interest Now bypassed. References

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Site Number	76
Site Name	1 Borgie AND STEADING
Type of Site	Listed Building
NMRS Number	LB18463
HER Number	
Status	Listed Building- Category C
Easting	267671
Northing	959891
Parish	Tongue
Council	Highland
Description	Circa 1922. Single storey and attic, S facing 3-bay house. Rubble, tooled rubble dressings. Off-centre door; 2 gabled weatherboarded dormers; rear centre gable with single 1st floor window and flanking coped wallhead stack; 4-pane glazing; coped end stacks; slate roof. Lean-to rear porch. Steading; simple, low rectangular steading to rear of house; harl pointed rubble; corrugated iron roof. Statement of Special Interest Borgie estate divided into 7 crofts circa 1922 for ex-servicemen returning from 1st World War. Nos 1-6 flank the Borgie Skerray road; no 7 (not included in listing) fronts the A836. Well built dwellings and steadings which reflect local traditional building styles. Borgie House now an Hotel.

Site Number	77
Site Name	2 Borgie and steading
Type of Site	Listed Building
NMRS Number	LB18464
HER Number	
Status	Listed Building- Category C
Easting	267641
Northing	959742
Parish	Tongue

Site Gazetteer

Council	Highland
Description	Circa 1922. Single storey and attic, S facing 3-bay house. Rubble, tooled rubble dressings. Off-centre door; 2 gabled weatherboarded dormers; rear centre gable with single 1st floor window and flanking coped wallhead stack; 4-pane glazing; coped end stacks; slate roof. Rear lean-to porch raised to 2 storeys as bathroom extension; harled. Steading; simple, low rectangular steading to rear of house; harl pointed rubble; corrugated asbestos roof.

Site Number	78
Site Name	3 Borgie
Type of Site	Listed Building
NMRS Number	LB18465
HER Number	
Status	Listed Building- Category C
Easting	267590
Northing	959536
Parish	Tongue
Council	Highland
Description	Circa 1922. Single storey and attic, S facing 3-bay house. Rubble, tooled rubble dressings. Off-centre door; 2 gabled weatherboarded dormers; rear centre gable with single 1st floor window and flanking coped wallhead stack; 4-pane glazing; coped end stacks slate roof. Rear lean-to porch. Statement of Special Interest Steading ruinous.

Site Number	79
Site Name	4 Borgie
Type of Site	Listed Building
NMRS Number	LB18466
HER Number	
Status	Listed Building- Category C
Easting	267485
Northing	959382
Parish	Tongue
Council	Highland
Description	Circa 1922. Single storey and attic, S facing 3-bay house. Rubble, tooled rubble dressings. Off-centre door; 2 gabled weatherboarded dormers; rear centre gable with 1st floor window; modern glazing; coped end stacks; slate-roof. Rear lean-to porch. Statement of Special Interest

Steading sited to E of dwelling and not included in listing.

Site Number	80
Site Name	6, Borgie and steading
Type of Site	Listed Building
NMRS Number	LB18467
HER Number	
Status	Listed Building- Category C
Easting	267245
Northing	959033
Parish	Tongue
Council	Highland
Description	Circa 1922. Single storey and attic, S facing 3-bay house. Rubble, tooled rubble dressings. Off-centre door; 2 gabled weatherboarded dormers; rear centre gable with 1st floor window and flanking coped wallhead stack; modern glazing; coped end stacks; slate roof. Rear lean-to porch with modern tiled roof. Steading; simple, low rectangular steading to rear of house; harl pointed rubble; felt roof.

Site Number	81
Site Name	5 Borgie
Type of Site	Listed Building
NMRS Number	LB19882
HER Number	
Status	Listed Building- Category C
Easting	267336
Northing	959148
Parish	Tongue
Council	Highland
Description	Circa 1922. Single storey and attic, S facing 3-bay house. Rubble, tooled rubble dressings. Off-centre door with modern glazed porch; 2 gabled weatherboarded dormers; rear centre gable with 1st floor window and flanking coped wallhead stack; 8-pane glazing; coped end stacks; slate roof. Rear lean-to porch with modern extension. Rectangular steading to rear with some recent additions.

Site Number	82
Site Name	BETTYHILL FORMER FISHING STATION INCLUDING ICE HOUSE, RUINED DWELLING HOUSE AND
Type of Site	Listed Building

Site Gazetteer

NMRS Number	LB49634
HER Number	
Status	Listed Building- Category B
Easting	269979
Northing	962100
Parish	Farr
Council	Highland
Description	Multi-phase early to mid 19th century former fishing station complex comprising: ice house built into steep bank to S, gabled range to N including substantially ruinous 2-storey 3-bay dwelling house with long single storey boilhouse range extending from N gable. Harled and harl-pointed random rubble walls with ladder pinnings and brick repairs. Turf overlay to ice house roof, graded grey slab roof to boilhouse. ICE HOUSE: asymmetrical W gable with entrance door centred on gablehead and retaining wing-wall at right. Interior; flagstone floors, barrel-vaulted entrance chamber leading to barrel-vaulted main space with 2 ice-loading doors to vault; modern refrigeration plant to rear of main space (2003). RUINED DWELLING HOUSE: surviving left bay of W (principal) elevation, N gable with rubble apex stack, corresponding S end wall missing gablehead with modern roofless single storey lean-to. BOILHOUSE: asymmetrical W (principal) elevation with vertically-boarded door at centre flanked by windows (infilled at right). Widened door opening to left with window to outer right. Blank harled red brick N gable; brick infill to former openings in E (rear) elevation. Interior: exposed timber beams; one inscribed "5th September 1840 Duke and Duchess of Sutherland hear visited". Statement of Special Interest Simple and partly ruinous, this grouping of buildings are valuable survivors of a once thriving local industry which operated on the River Naver during the 19th and 20th centuries. Salmon was caught by means of a sweep net and transported the small distance from the shore to the fishing station. Each day's catch was washed, gutted, and cooked in the boilhouse before being salted and packed into wooden barrels, or sealed in large tins. The packed fish was taken along a track to a natural port at the nearby headland and dispatched by sea. A plan of 1810 shows the boilhouse in existence, it is thought that the present boilhouse follows this footprint and contains original fabric (the brick gable ends demonstrate later 19th re-build). In 1846 it is recorded that the ice house was built marking an increase in productivity, it is possible that the 2-storey dwelling house was constructed in response to this. The ice house enabled salmon to be stored before transportation and probably allowed fresh salmon to be packed on ice and dispatched on fast ships to London and other ports. Between the icehouse and the village is a shallow depression in the ground (formerly a pond) which was used to stock the icehouse with fresh ice in cold weather, otherwise the ice would have been collected and transported from further inland. The Ordnance Survey maps show that there was an outshot to the rear of the boilhouse, this is no longer, however former access to it is indicated by bricked up openings in the rear wall. Due to conservation measures the fishery completely ceased operation in 1992. The ice house and boilhouse are at present (2003) without their doors and windows, it is noted that the roof of the boilhouse is beginning to fail, with slabs slipping. The nearby concrete pier does not appear on the 1st or 2nd edition Ordnance survey maps, most likely being built as a more direct means of dispatching the fish, replacing the short journey up to the headland. It is interesting to note that one can discern a considerable amount of blasting to have taken place at the rocky foreshore, some time in the 19th century. This enabled the fish to be landed and carried up to the station with greater ease. References Bibliography

Rev J Dingwall, The Statistical Account of Scotland (1792) Vol 3 p. 539; Sutherland Estate Plan (1810); 1st edition (Sutherland) Ordnance Survey Map (1878); Elizabeth Beaton, Sutherland - An Illustrated Architectural Guide (1995) p.41

Site Number	83
Site Name	Lochstrathy
Type of Site	Bothy (20th Century), Farmstead (19th Century)
NMRS Number	NC74NE 1
HER Number	
Status	Non designated
Easting	279348
Northing	948960
Parish	Farr
Council	Highland
Description	Field Visit (2012)

A desktop survey was conducted as part of a management plan for a c8000ha area of existing forestry in North Sutherland and West Caithness. The following unrecorded archaeological sites were noted: NC 8055 5168 Sheepfold; NC 9885 4616 Sheepfold; NC 8197 5897 Cairn

; NC 9987 4515 Sheepfold; NC 8253 5924 Field system (possible); NC 9936 4436 Farmstead; NC 7935 4896 Farmstead; NC 9339 4292 Standing stone/cairn; NC 7983 5004 Sheepfold; ND 0092 4572 Farmstead; NC 8261 6027 Farmstead; ND 0086 4593 Sheepfold; NC 93865 47557 Sheepfold; ND 0863 4829 Farmstead;

Report: RCAHMS

Funder: Fountains Forestry Ltd

Stuart Farrell,

2012

Site Number	84
Site Name	Yellow Bog
Type of Site	Sheepfold (Period Unassigned)
NMRS Number	NC75SE 3
HER Number	
Status	Non designated
Easting	279830
Northing	950045
Parish	Farr
Council	Highland
Description	Field Visit (2012)

Site Gazetteer

A desktop survey was conducted as part of a management plan for a c8000ha area of existing forestry in North Sutherland and West Caithness. The following unrecorded archaeological sites were noted: NC 8055 5168 Sheepfold; NC 9885 4616 Sheepfold; NC 8197 5897 Cairn

; NC 9987 4515 Sheepfold; NC 8253 5924 Field system (possible); NC 9936 4436 Farmstead; NC 7935 4896 Farmstead; NC 9339 4292 Standing stone/cairn; NC 7983 5004 Sheepfold; ND 0092 4572 Farmstead; NC 8261 6027 Farmstead; ND 0086 4593 Sheepfold; NC 93865 47557 Sheepfold; ND 0863 4829 Farmstead;

Report: RCAHMS

Funder: Fountains Forestry Ltd

Stuart Farrell,

2012

Site Number	85
Site Name	Cathair Dubh Bo Graideach
Type of Site	Enclosure (Period Unassigned)
NMRS Number	NC85SW 1
HER Number	MHG11612
Status	Non designated
Easting	281590
Northing	951903
Parish	Farr
Council	Highland
Description	

NC85SW 1 816 519.

An enclosure 4m by 5m by 0.3m high comprising a sub-rectangular area of grass.

R J Mercer 1980.

Mercer, R J. (1980a) Archaeological field survey in northern Scotland, 1976-1979, University of Edinburgh, Department of Archaeology, Occasional Paper No. 4. [Edinburgh]. Page(s): 105, no. Dyk 24 RCAHMS Shelf Number: E.2.MER

Site Number	86
Site Name	A' Chailleach
Type of Site	Cairn (Period Unassigned)
NMRS Number	NC85NW 6
HER Number	
Status	Non designated
Easting	281963

Northing	958971
Parish	Farr
Council	Highland
Description	Desk Based Assessment (January 2005 - April 2007)

CFA Archaeology Ltd undertook an assessment of the likely effects on cultural heritage interests of the construction and operation of a proposed wind farm at Strathy North Forest, near Strathy, Sutherland (NGR: NC 81 58 centred).

Thirty-seven sites of cultural heritage significance have been identified by the assessment within the application area boundary, using a range of desk-based sources, consultations and reconnaissance field survey. Additional buried and unrecorded remains of archaeological significance may survive across the application area, and are considered more likely to occur in land bordering the River Strathy where known sites are concentrated.

Through an iterative design process it has been possible to avoid almost all known archaeological sites within the proposed wind farm area. Fourteen sites are predicted to receive direct impacts from the construction of the proposed access route but only one would receive a significant direct impact. Mitigation measures to reduce and offset predicted effects have been proposed, to be carried out either prior to development or during the construction phase.

Funder: Scottish and Southern Energy

CFA Archaeology Ltd

Field Visit (2012)

A desktop survey was conducted as part of a management plan for a c8000ha area of existing forestry in North Sutherland and West Caithness. The following unrecorded archaeological sites were noted: NC 8055 5168 Sheepfold; NC 9885 4616 Sheepfold; NC 8197 5897 Cairn

; NC 9987 4515 Sheepfold; NC 8253 5924 Field system (possible); NC 9936 4436 Farmstead; NC 7935 4896 Farmstead; NC 9339 4292 Standing stone/cairn; NC 7983 5004 Sheepfold; ND 0092 4572 Farmstead; NC 8261 6027 Farmstead; ND 0086 4593 Sheepfold; NC 93865 47557 Sheepfold; ND 0863 4829 Farmstead;

Report: RCAHMS

Funder: Fountains Forestry Ltd

Stuart Farrell,

2012

Site Number	87
Site Name	A33-Dallangwell Farm
Type of Site	FARMSTEAD (Undated)
NMRS Number	NC85NW 5
HER Number	
Status	Non designated
Easting	282503
Northing	959876

Site Gazetteer

Parish	Farr
Council	Highland
Description	Desk Based Assessment (January 2005 - April 2007)

CFA Archaeology Ltd undertook an assessment of the likely effects on cultural heritage interests of the construction and operation of a proposed wind farm at Strathy North Forest, near Strathy, Sutherland (NGR: NC 81 58 centred).

Thirty-seven sites of cultural heritage significance have been identified by the assessment within the application area boundary, using a range of desk-based sources, consultations and reconnaissance field survey. Additional buried and unrecorded remains of archaeological significance may survive across the application area, and are considered more likely to occur in land bordering the River Strathy where known sites are concentrated.

Through an iterative design process it has been possible to avoid almost all known archaeological sites within the proposed wind farm area. Fourteen sites are predicted to receive direct impacts from the construction of the proposed access route but only one would receive a significant direct impact. Mitigation measures to reduce and offset predicted effects have been proposed, to be carried out either prior to development or during the construction phase.

Funder: Scottish and Southern Energy

CFA Archaeology Ltd

TA 7.4: Cultural Heritage Plates

Plate 7.1:South facing view of the Scheduled earthwork remains of The Tulloch (Site 11)

Plate 7.2: North east view towards Proposed Varied Development from the Scheduled The Tulloch (Site 11)

Plate 7.3: South facing view of the Scheduled Cnoc Carnachadh broch (Site 17)

Plate 7.4: Easting facing view across Strath Naver towards the Proposed Varied Development

Plate 7.5: West facing view of the Category C Listed Strathy Free Chruch (Site 23)

Plate 7.6: North facing view of the Category C Listed Strathy Former Manse (Site 24)

Plate 7.7: West facing view of the Catgeory C Listed Strathy Former Church School (Site 25), with the Strathy Former Free Church (Site 23) in the rear ground.

Plate 7.8: View south from the the front of Strathy Former Manse (Site 24) towards the Proposed Vraied Development. The operational turbines of Strathy North are visible to the south.

Plate 7.9: North east facing view of Scheduled Skelpick Lodge Chambered Cairn (Site 14)

Plate 7.10: South eastern view fom Skelpick Lodge Chmabered Cairn (Site 14) toward the Proposed Varied Development

Plate 7.11: View south east from the Scheduled Dalmor homestead (Site 10) towards the Proposed Development

Plate 7.12: North east facing view of the Scheduled, The Borg broch (Site 16), showing modern forestry plantation and an OHL to the east

Plate 7.13: West facing view from the Scheduled, The Borg broch (Site 16) towards the Proposed Varied Development.

Plate 7.14: North, east and south panorama from the western edge of the Scheduled Loch Druim broch (Site 18)

Plate 7.15: View from the Schduled Loch Druim broch (Site 18) towards the Proposed Varied Development

Plate 7.16: East facing view towards the Scheduled Fiscary Cairns (Site 13)

Plate 7.17: View from the Scheduled Fiscary Cairns towards the Proposed Varied Development. Note the existing two turbines in the middle distance.

Plate 7.18: East facing view of the Scheduled Achargary Chambered and Ring cairns (Site 12)

Plate 7.19: View from the Scheduled Achargary (Site 12) towards the Proposed Varied Development

Plate 7.20:South east facing view of the Scheduled Skelpick Long Cairn (Site 50) towards the Proposed Varied Development

Plate 7.21: View north west across the the north western area of the Scheduled Halladale Bridge (Site 32)

Plate 7.22: View south east towards the south eastern area of the Scheduled Halladale Bridge (Site 32)

Plate 7.23: View north and east across the Scheduled Rosdal township (Site 56)