Bowdun Offshore Wind Farm, Onshore EIA Report

Volume 1, Chapter 13: Noise and Vibration

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Contents

List of Tables

List of Figures

13 Noise and Vibration

13.1 Introduction

13.1.0 This chapter of the Onshore Environmental Impact Assessment (EIA) Report identifies the noise and vibration receptors of relevance to the onshore infrastructure of the Bowdun Offshore Wind Farm ('the Project'). The onshore infrastructure of the Project, is the works landward of Mean Low Water Springs (MLWS), including the intertidal area, and is referred to as 'the Proposed Development'.

13.1.1 This Onshore EIA Report accompanies the application to Aberdeenshire Council for Planning Permission in Principle (PPP) for the Proposed Development. This chapter considers the potential noise and vibration impacts arising from the construction, operation and maintenance, and decommissioning of the Proposed Development and sets out the methodology for the assessment, the mitigation that will be deployed, the potential cumulative effects from proposed and approved nearby developments and the residual effects following the implementation of mitigation.

13.1.2 This assessment considers the impacts to a level suitable for an application for Planning Permission in Principle (PPP); it is accepted that further detail will be required should the development gain consent and as the project design progresses which would be addressed at the Matters Specified in Conditions (MSC) stage with the local authority, Aberdeenshire Council.

13.1.3 The noise and vibration assessment presented is informed by the following technical chapters and appendices of this Onshore EIA Report:

- Volume 1, Chapter 2: The Proposed Development;
- Volume 1, Chapter 14: Traffic and Transport;
- Volume 2, Appendix 13.1: Baseline Noise Survey;
- Volume 2, Appendix 13.2: Construction Noise; and
- Volume 2, Appendix 13.3: Operational Noise.

13.2 Noise and Vibration Study Areas

13.2.0 The Noise and Vibration Study Area includes areas where there is the potential for impacts on sensitive receptors arising from the construction, operation and maintenance, and decommissioning of the Proposed Development. These Study Areas have initially been set with reference to the guidance within the Design Manual for Roads and Bridges LA111 – Noise and Vibration (DMRB LA111 (2020)) (hereafter referred to as DMRB LA 111). Although DMRB LA 111 is primarily for assessing impacts from large road projects, the Study Areas are considered to be applicable to linear projects and therefore relevant to this assessment.

13.2.1 Note 1 of paragraph 3.5 of DMRB LA 111 states the following regarding noise sensitive receptors, which has largely been adopted in this assessment:

"*A study area of 300 m from the closest construction activity is normally sufficient to encompass noise sensitive receptors.*"

13.2.2 Similarly, Note 1 of paragraph 3.29 of DMRB LA 111 states the following regarding vibration sensitive receptors:

"A study area of 100 m from the closest construction activity with the potential to generate vibration is normally sufficient to encompass vibration sensitive receptors."

13.2.3 For operation and maintenance noise impacts, a Study Area of 650 m from the Substation Search Area has been established, as this is the only likely operational noise source from the Proposed Development and encompasses nearby sensitive receptors. The assessment of operational and maintenance noise impacts has been undertaken at the nearest noise-sensitive receptors within the Study Area.

13.2.4 These Study Areas are extended if it is considered from the calculation exercises undertaken that there may be impacts beyond the defined distances. An example of this relates to the construction noise impacts from the Substation construction, where the closest residential receptors are between 500 and 650 m away.

13.2.5 There is the potential for some construction activities to generate vibration impacts at sensitive receptors; as a consequence impacts from vibration are considered. As a result of the separation distance and given the nature of operational sources, which are unlikely to generate significant noise emissions, the impact on human receptors arising from vibration during operation and maintenance has been scoped out of the assessment and are not considered further in this chapter. The construction noise impacts assessed will mirror the noise impacts from decommissioning and as a consequence no further consideration of decommissioning has been made.

13.2.6 In summary, the Noise and Vibration Study Areas and receptors used in the assessment are defined as:

- The area of land temporarily or permanently occupied during the construction, operation and maintenance, and decommissioning of the Proposed Development.
- Noise sensitive receptors located within 300 m of construction activities.
- Vibration sensitive receptors located within 100m of construction activities with the potential to generate vibration.
- Noise sensitive receptors located within 500 m of the operational noise sources (the substation).

13.2.7 The Noise and Vibration Study Areas are shown in Figure 13.1 and Figure 13.2 (Annex - Figures) respectively.

13.3 Legislative and Policy Context

13.3.0 The overarching policy and legislation applicable to the Proposed Development is presented in Volume 1, Chapter 1: Introduction. Policy specific to Noise and Vibration is contained in the National Planning Policy Framework 4 (NPF4) (Scottish Government, 2023) and the Aberdeenshire Local Development Plan (ALDP) 2023 (Aberdeenshire Council, 2023). Table 13.1 presents a summary of

the main legislation and policy that is relevant to the assessment of noise and vibration.

Table 13.1: Summary of Policy and Legislation relevant to Noise and Vibration

Policy/ Legislation	Summary and where considered in this Chapter
National Planning Policy Framework 4	Policy 11 highlights the need for renewable energy projects to address impacts on communities and individual dwellings due to noise. Policy 23 states development proposals likely to raise unacceptable noise issues will not be supported. A noise impact assessment may be required where significant effects are likely or the agent of change principle applies to noise-sensitive development. A noise impact assessment has been undertaken and presented within this Chapter. An assessment of effects has been undertaken within Section 13.10 and mitigation measures to be adopted as part of the Proposed Development are presented in Sections 13.9 and 13.10.
Aberdeenshire Local Development Plan (ALDP)	Policy P4 of the ALDP states that where a noise impact assessment identifies significant detrimental impacts, appropriate mitigation measures must be provided. Mitigation measures to minimise significant and non-significant effects to be adopted as part of the Proposed Development are presented in Sections 13.9 and 13.10.
Control of Pollution Act 1974 (CoPA)	The CoPA grants powers to manage noise nuisances. Sections 60 and 61 remain in force: • Section 60 allows local authorities to issue notices controlling site noise including limits on working hours, machinery, and other methods. • Section 61 (S61) enables developers to apply for prior consent, agreeing noise and vibration limits in advance. This consent can serve as a defence enforcement is later pursued under S60. • Section 70 empowers Scottish Ministers to issue guidance on minimising noise emissions from specific operations or premises. These may include recommendations on equipment, procedures and working practices. • Section 71 enables Scottish Ministers to prepare, approve, and publish codes of practice for noise control. These codes are intended to guide operators and authorities on acceptable standards and mitigation measures. While not legally binding, they may be referenced in enforcement or consent decisions. • Section 72 of the Control of Pollution Act 1974 (CoPA) provides the statutory definition of "best practicable means" (BPM) for controlling and minimising noise and vibration from construction sites and other non-domestic premises. Consideration of CoPA is given in this assessment in identifying appropriate mitigation in Section 13.9. The provisions of the Act will be utilised to control noise during construction.
Environmental Protection Act (EPA) 1990	Part III, Section 79, of the EPA 1990 defines statutory nuisances, including noise from premises or vehicles. Certain sources –

Policy/ Legislation	Summary and where considered in this Chapter
	such as military activity or specific transport operations are exempt. Under section 80, local authorities must investigate noise complaints and where a nuisance is identified, serve abatement notices. Operators may be required to adopt the best practicable means to reduce noise. Local authorities are also required to monitor environmental noise and response to complaints are part of their statutory duties. The provisions of the Act is relevant Aberdeenshire Council to control noise during construction. Appropriate mitigation measures to avoid nuisance are presented in Section 13.9

13.3.1 Table 13.2 presents a summary of the main technical standards and guidance used for the assessment of noise and vibration.

Table 13.2: Summary of Technical Standards and Guidelines relevant to Noise and Vibration Assessment

Technical Standards and Guidelines	Summary
Planning Advice Note (PAN) 1/2011 Planning and Noise (Scottish Government 2011)	Paragraph 2 of PAN1/2011 states that it: "*promotes the principles of good acoustic design and a sensitive approach to the location of new development. It promotes the appropriate location of new potentially noisy development, and a pragmatic approach to the location of new development within the vicinity of existing noise generating uses, to ensure that quality of life is not unreasonably affected, and that new development continues to support sustainable economic growth*".
Technical Advice Note (TAN): Assessment of Noise (Scottish Government 2011)	TAN: Assessment of Noise is supplementary guidance to PAN1/2011 on the technical evaluation of noise assessment. It is of relevance in this assessment as it explains the methods to be employed to assess the potential noise impacts that could arise during construction of the Proposed Development.
BS 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound ((British Standards Institution (BSI), 2019)	BS 4142:2014+A1:2019 provides methods for rating and assessing sound from industrial and commercial sources to determine its impact on people in nearby residential and commercial areas. It details procedures for measuring sound levels, including the use of appropriate instrumentation and technique and outlines methods for comparing the rating level of the industrial sound with the background sound level to determine the likelihood of adverse impact.
BS 5228:2009+A1:2014 – Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise and Part 2: Vibration (BSI, 2014)	Both parts emphasize the importance of effective project supervision and emergency procedures to mitigate noise and vibration impacts. • Part 1: Provides guidelines for controlling noise on construction and open sites. It includes methods for predicting and measuring noise levels, impact assessment for those exposed to noise, community relations and managing neighbourhood nuisance, noise control strategies at the source and spread of noise. • Part 2: Focuses on controlling vibration on construction and open sites. It includes methods for predicting and

Technical Standards and Guidelines	Summary
	measuring vibration levels, impact assessment for those exposed to vibration, community relations and managing nuisance, vibration control strategies at the source and spread of vibration.
BS 7445-1:2003 – Description and measurement of environmental noise. Guides to quantities and procedures (BSI, 2003)	BS 7445-1:2003 provides guidelines for describing and measuring environmental noise, focusing on the quantities and procedures involved.
Calculation of Road Traffic Noise (CRTN) (Department for Transport and Welsh Office, 1988)	Calculation of Road Traffic Noise (CRTN) provides a standardized method for predicting noise levels from road traffic, primarily used for environmental assessments and highway design.
DMRB LA111 Rev 2 – Noise and Vibration (DMRB LA1 11) (Highways England et al., 2020)	DMRB LA 111 provides guidelines for assessing and managing noise and vibration impacts associated with the construction, improvement, use, and maintenance of motorways and trunk roads. The key components are: • Assessment Methodology: Details the procedures for evaluating noise and vibration impacts, including baseline scenario assessments and determining the significance of impacts. • Construction Noise and Vibration: Outlines methods for assessing noise and vibration during construction activities, including Study Areas and baseline assessment.
World Health Organisation (WHO) Guidelines for Community Noise (WHO, 1999)	These guidelines provide comprehensive recommendations for managing community noise to protect public health and well-being. The key components are: • Noise Sources and Measurements: Discusses various noise sources, measurements techniques and the complexity of noise. • Adverse Health Effects: Covers the impact of noise on hearing, speech communication, sleep, cardiovascular health, and overall physiological effects. • Noise Management: Offers strategies for noise control, including setting noise limits and implementing noise reduction measures. • Community Engagement: Emphasises the importance of involving communities in noise management and addressing their concern.

13.4 Consultation

13.4.0 The approach to consultation for the Proposed Development is set out in Volume 1, Chapter 4: Stakeholder Engagement and Consultation. A summary of the issues raised during consultation specific to noise and vibration is presented in Table 13.3, together with how these issues have been considered in the production of this assessment.

Table 13.3: Summary of Key Consultation Issues Raised During Consultation Activities Undertaken for the Proposed Development Relevant to Noise and Vibration Assessment

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or where Considered in this Chapter
24 October 2024 as part of Council's full response	2024 Bowdun Scoping Opinion (Aberdeenshire Council Environmental Health Department, 2024)	Approach proposed for the Construction Noise and Vibration Assessment.	Approach accepted and incorporated in Construction Noise Section. A construction noise and vibration assessment is to be undertaken to predict the impact on sensitive receptors and specify necessary control measures. Addressed in Section 13.11.
		Approach proposed for the Operational Noise and Vibration Assessment.	Approach accepted in incorporated in Operational Noise Section. An operational noise impact assessment to predict the impact on sensitive receptors. Addressed in Section 13.9 and 13.11.
2 April 2025 via email	Aberdeenshire Council Environmental Health Department	Assessment of baseline in vicinity. Suggested that much of the baseline could be derived from Scotland's Noise Map, with measurement only in vicinity of Substation	Proposed approach to utilise noise mapping outputs where these exist and only utilise baseline noise measurement where operational noise sources have the potential to occur accepted by Aberdeenshire Council Environmental Health Department. See Section 13.4.
15 May 2025 on site	Aberdeenshire Council Environmental Health Department	Agreement of baseline measurement location.	Measurement location, duration and parameters agreed during site meeting. Reflected in survey undertaken. See Section 13.4.
10 June 2025 by Teams Call	Aberdeenshire Council Environmental Health Department	Discussion of baseline measurement results given low levels reported. Requested clarification given the low baseline noise levels measured during the survey.	Clarification provided given that the baseline noise levels are low for the BS4142:2014 Methodology. Considered in Operational Noise element of Section 13.11.
18 June 2025 via email	Aberdeenshire Council Environmental Health Department	Request for confirmation of discussion held by Teams call on 10th June 2025.	Written confirmation provided of guidance given in Teams Call of 10th June 2025. Considered in Operational Noise element of Section 13.11.

13.5 Data Sources

13.5.0 Information in relation to the plant and equipment to be used for construction operations, and the proposed operational noise sources for the Substation, have been reviewed and analysed to inform the noise and vibration baseline. In addition, consultation with Aberdeenshire Council Environmental Health Department has been undertaken to aid the collection of baseline information.

Desktop Study

13.5.1 Information on baseline noise levels and noise and vibration receptors within the Noise and Vibration Study Areas was collected through a detailed desktop review of existing studies and datasets which are summarised in Table 13.4. These were used to characterise the baseline, together with a site-specific noise survey.

Table 13.4: Summary of Key Data Sources

Title	Source	Extent	Year	Author
OS Raster Data	Ordnance Survey Data Portal (https://www.ordnancesurvey.co.uk or https://digimap.edina.ac.uk)	UK	2025	Ordinance Survey (GB)
OS AddressBasePlus	Ordnance Survey Address Data (https://www.ordnancesurvey.co.uk/products/addressbase-plus)	UK	2025	Ordinance Survey (GB)
Baseline Noise Levels	Scotland's Noise Map (https://noise.environment.gov.scot/noise-map.html)	UK	2021	Scottish Government
Google Earth Imagery	Google Earth (https://noise.environment.gov.scot/noise-map.html)	UK	2025	Google LLC

Identification of Sensitive Receptors

13.5.2 Sensitive receptors within the Noise and Vibration Study Areas were identified using the data sources referred to in Table 13.4 and during the site-specific survey.

Site-Specific Survey

13.5.3 A site-specific survey was undertaken, as agreed with Aberdeenshire Council Environmental Health Department, to inform the assessment by establishing background noise levels; a summary of the survey is presented in

13.5.4 Table 13.5, with further details within Volume 2, Appendix 13.1: Baseline Noise Survey.

Table 13.5: Summary of Site-Specific Survey

Title	Extent of Survey	Overview of Survey	Survey Contractor	Date
Noise Survey	At a location representative of the two closest sensitive receptors to the proposed Substation.	7-day unattended baseline noise survey.	Jacobs	May 2025

13.7 Methodology for Assessment of Effects

Overview

13.7.0 The noise and vibration assessment of likely significant effects has followed the methodology set out in Volume 1, Chapter 3: EIA Methodology. Specific to the Noise and Vibration assessment, the following guidance documents have also been considered:

- For the calculation of the construction noise levels the assessment has followed the methodology contained in BS 5228-1. The calculated construction noise levels have been corrected for the closest separation distances to the respective noise sensitive receptors following the method for calculating the noise propagation outdoors contained in ISO 9613-2:2024: 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation' (Internation Standard Organisation, 2024).
- In relation to the calculation of vibration impacts, given the proposed types and methods of work anticipated to be employed, the relevant construction activities relate to vibratory compaction. Prediction of vibration levels has been undertaken following the methods and formulae contained in Annex E of BS 5228-2, which allow for the prediction of vibration in terms of Peak Particle Velocity (PPV).
- For the assessment of operational noise, the methodology outlined in BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' has been followed. This method compares the predicted noise from the Proposed Development, including any corrections for tonal components, against the background noise level in the area. If the predicted noise from the Proposed Development is above the background noise level, then this is an indication of an adverse impact.

Criteria for Assessment

13.7.1 This section outlines the sensitivity of receptors and defines the magnitude of impact. The two-stage process for determining the overall significance of effect is then described. This relates to construction noise, construction vibration (affecting human response and on buildings), road traffic noise during construction, operational noise and noise and vibration (human response and on buildings) during decommissioning. As the impacts during decommissioning are expected to be similar to those during construction, they are assessed further.

Determining the Sensitivity of Receptors

13.7.2 The determination of the sensitivity of the receptors in proximity to the construction works is set out in Table 13.6 which is based on the guidance within the Technical Advice Note (TAN) 'Assessment of Noise' which accompanies PAN1/2011. By using this classification, the receptor sensitivities of 'Very High' and 'Negligible', as described within Chapter 3: EIA Methodology, are not used.

Table 13.6: Criteria for Classifying Sensitivity of Receptors

Receptor Sensitivity	Receptor Type Definition
High	Residential, including private gardens where appropriate, quiet outdoor areas used for recreation, theatres/auditoria/studios, schools during the daytime, hospitals/residential care homes, places of worship.
Medium	Commercial, offices, bars/cafes/restaurants where external noise may be intrusive. Leisure facilities and hotels.
Low	Buildings not occupied during working hours, factories and working environments with existing high noise level, industrial land.

13.7.3 This classification is only relevant with regards to construction noise and vibration impacts in terms of human response/annoyance where a building is occupied. However, when assessing vibration impacts in terms of building/structure damage, all buildings are considered to be of high sensitivity, even if unoccupied.

Determining the Classification for Magnitude of Impact

13.7.4 This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts. The terms used to define magnitude are based on those which are described in further detail in Volume 1, Chapter 3: EIA Methodology.

13.7.5 Potential changes in construction noise and vibration are always categorised as adverse, as positive changes from construction noise or vibration are not possible. The general criteria adopted for determining the change from noise and vibration during construction are defined in Table 13.7. These have been derived from threshold values for annoyance, changes in attitude or building damage criteria provided within the standards and guidance documents described in Section 13.1. The magnitude of impact category of 'no change' is not applicable where the topic is an absolute level of noise or vibration.

Table 13.7: Criteria for Classifying Magnitude of Impact

Topic	Criteria	Magnitude of Impact				
		No change	**Negligible**	**Low**	**Medium**	**High**
Construction Noise	Predicted noise level in dB(A)	n/a	Less than or equal to 65 dB	Above 65 to 70 dB	Above 70 to 75 dB	Greater than 75 dB
Operational Noise	Predicted noise level in relation to background, dB(A)	Less than background	Equal to background	0 to 5 dB above background	Greater than 5 to 10 dB above background	Greater than 10 dB above background
Vibration annoyance (human response)	Predicted vibration level in mm/s	n/a	Less than 0.29 mm/s	0.30 to 0.99 mm/s	Between 1.00 and 9.99 mm/s	Greater than 10.00 mm/s
Vibration on buildings	Predicted vibration level in mm/s	n/a	No vibration	Between 0.1 and 7.4 mm/s	Between 7.5 and 14.9 mm/s	Greater than 15.0 mm/s
Construction road traffic noise on access routes / operational road traffic noise	Predicted change in road traffic noise in dB(A)	No change	Less than 1.0 dB	1.0 to 2.9 dB	3.0 to 4.9 dB	At least 5.0 dB

Assessing the Significance of Effect

13.7.6 To determine the initial significance of effect, the change in noise or vibration is compared with the sensitivity of the receptor. This is shown within matrix provided in Table 13.8.

Table 13.8: Matrix Used for Assigning the Initial Significance of Effect

Sensitivity of Receptor	Magnitude of Impact				
	No change	**Negligible**	**Low**	**Medium**	**High**
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major

13.7.7 Where the significance of effect is within a category having two options (e.g., Minor or Moderate), the category has been chosen based on where the predicted noise level or change is within the magnitude of impact band. For example, a low magnitude of impact with a receptor of high sensitivity would be Minor or Moderate significance of effect. In this instance the chosen significance of effect would be determined by examining where the calculated noise level or change is within the low magnitude of impact category, as shown in Table 13.8. If towards the lower end of the range then Minor would be assigned, but towards the upper end of the range Moderate would be assigned as the significance of effect.

13.7.8 When determining the final significance of effect, the duration of the impact is taken into consideration alongside the initial significance of effect.

13.7.9 DMRB LA 111 states that: "*a significant adverse effect is likely to occur from construction noise, vibration and construction traffic where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:*

- *10 or more days or nights in any 15 consecutive days or nights*
- *a total number of days exceeding 40 in any 6 consecutive months*".

13.7.10 Therefore, based on DMRB LA 111, for the noise and vibration impacts resulting in Moderate, Major/Moderate and Major, the above durations are considered to determine whether the effect would be significant. The assessment uses the indicative duration of the works (specified in Volume 1, Chapter 2: The Proposed Development), to determine the likelihood of the noise and vibration levels being exceeded for a period exceeding either of the two listed durations from DMRB LA 111.

13.7.11 Table 13.9 presents the definitions for the significance categories for noise and vibration.

Table 13.9: Criteria for Determining the Final Significance of Effect

Final determination	Criteria for determination
Not significant	Any initial significance of effect where neither of the DMRB LA111 duration criteria is met.
Significant	Moderate or Major initial significance of effect where either of the DMRB LA 111 duration criteria are met.

13.8 Key Parameters for Assessment

Design Scenarios

13.8.0 The Maximum Design Scenario (MDS) identified in Table 13.10 are those parameters expected to have the potential to result in the greatest effect on an identified receptor or receptor group. Any other development scenario within the Project Design Envelope (PDE), will result in the same, or less, level of environmental effect. The scenario has been selected from the details provided in Volume 1, Chapter 2: The Proposed Development.

13.8.1 The noise and vibration assessment for the cable route element of the Proposed Development has considered two scenarios, given a detailed design is not available at this stage. Scenario 1 has assessed noise sources aligned with an 'indicative cable route alignment' (see Figure 13.1 and Figure 13.2 within Annex - Figures), situated within the Onshore Export Cable Corridor based on Pre-FEED engineering and preliminary ground investigations. Scenario 2 which can be seen as the MDS, has assessed noise sources located to the closest noise receptor (50 m buffer from receptor). These scenario assessments have been discussed further in Section 13.6 of this chapter.

13.8.2 Irrespective of the Scenario, construction of the 220/275 kV Cable Route, which links the Landfall area to the Substation is over a distance of approximately 22 km. Construction works will take place along a maximum 50 m wide corridor, with a permanent easement over a maximum 35 m wide corridor where the cables will be situated. Where cable jointing is required, a joint bay or link box will be required; these are sub-surface concrete structures, often pre-cast and lifted into place. Where the cable route passes through elements of the alignment where open cut construction is not practicable, trenchless methods such as Horizontal Directional Drilling will be undertaken. These require the construction of launch and receipt pits.

13.8.3 There is also a 400 kV Cable Route, between the Substation and the Hurlie Substation, which will use similar construction methods over a distance of 1.2 km, save for the construction corridor being a maximum 35 m wide, and the permanent easement as a maximum 15 m with.

13.8.4 Cable construction works for the length of the entire 22 km cable corridor will be undertaken over a period of 33 months.

13.8.5 In order to create a level platform for the Substation, a 'cut and fill process will be utilised, excavating part of the site and placing material downslope, compacting it to create a level platform. Following on from this the substation itself will be constructed on the platform generated using typical construction

methods for structures construction. It is expected that the construction period for the substation will take place over 45 months.

13.8.6 The proposed plant and equipment complements included in the assessment are detailed in Volume 2, Appendix 13.2 Construction Noise and Vibration.

Table 13.10: Design Scenarios Considered for Each Potential Impact as Part of the Assessment of Likely Significant Environmental Effects on Noise and Vibration

Potential Impact	Phase*			Design Scenarios
	C	O&M	D	
Noise from the construction and day to day operation of the construction compounds.	✓	×	×	The construction and operational activities are at the closest point within the compound to the closest sensitive receptors.
Noise and vibration from the construction of the cable route and laying of the cable.	✓	×	×	Two scenarios have been considered for the route of the cable. Scenario 1 is a indicative cable route and Scenario 2 is that works are at a point where the 50 m buffer of the cable route is closest to sensitive receptors. This will consider an indicative cable route alignment and also a identifies all potential receptors that could be affected regardless of final cable route.
Noise and vibration from the construction of the Substation.	✓	×	×	The Substation has been assumed to be located within the Substation Search Area. This location is informed by the pre-FEED design and preliminary ground investigations and represents the most likely scenario.
Noise impacts from the operation of the Substation.	×	✓	×	The Substation has been assumed to be located within the Substation Search Area. The operation of the Substation is 24 hrs a day and there is therefore potential noise impacts at sensitive receptors.
Noise and vibration from the decommissioning of the Onshore Export Cable Corridor cable route and Substation.	×	×	✓	The same MDS as for the construction of the cable route and substation.
Noise from additional traffic during construction and decommissioning.	✓	×	✓	The 2031 annualised data has been used to align with national guidance of considering effects over a year.

* Project Phase refers to Construction (C), Operation and Maintenance (O&M) and Decommissioning (D)

Impacts Scoped Out of the Assessment

13.8.7 On the basis of the baseline environment set out in Section 13.8, and the Project Description outlined in Volume 1, Chapter 2: The Proposed Development, a number of impacts are scoped out of the assessment for noise and vibration. These were proposed and confirmed to be scoped out in the Scoping Report (TWP, 2024) with no concerns raised by key consultees in the subsequent Scoping Opinion (Volume 2, Appendix 1.1).

13.8.8 The impacts are outlined, together with a justification for scoping them out, in Table 13.11.

Table 13.11: Impact Scoped Out of the Assessment for Noise and Vibration (Tick Confirms the Impact is Scoped Out)

Potential Impact	Phase*			Justification
	C	O&M	D	
The impact on human receptors and heritage assets arising from vibration generated by additional vehicle movements on the local highway.	✓	✓	✓	Additional vehicle movements on the local highway network during all phases of the Proposed Development will not generate sufficiently high levels of vibration to result in significant adverse effects.
The impact on human receptors and heritage assets arising from noise generated by additional vehicle movements on the local highway.	×	✓	×	Additional vehicle movements on the local highway network during the operation and maintenance phases of the Proposed Development will not generate sufficiently high levels of noise to result in significant adverse effects.
The impact on human receptors and heritage assets arising from vibration during the operation of the substation.	×	✓	×	The equipment forming the plant strategy for the onshore substation will include vibration isolation measures at the source as part of the engineering design. As such, vibration during the operational phase of the Proposed Development will not result in significant adverse effects.
The impact of noise and vibration of the Onshore Export Cable and associated infrastructure.	×	✓	×	The Onshore Export Cables are to be installed underground and will not generate any level of noise and vibration during the operation and maintenance phases. As such, there will be no significant noise and vibration effects.

* Project Phase refers to Construction (C), Operation and Maintenance (O&M) and Decommissioning (D)

13.9 Baseline Environment

Overview of Baseline Environment

13.9.0 The Study Area in which the Proposed Development cable route sits is predominantly rural in nature, consisting mainly of farming communities, bisected by the A90 dual carriageway and the Dundee to Aberdeen railway line. As a consequence, the baseline noise environment is mainly of a quiet rural nature, with a relatively narrow corridor affected by the A90, and other narrow corridors affected by more local roads.

13.9.1 Nonetheless, many of the residential receptors with potential to be affected by noise resulting from construction of the Proposed Development currently experience low baseline daytime noise levels, being remote from any major sources of noise.

13.9.2 The proposed Substation Site is located within Fetteresso Forest, a relatively remote area of upland commercial forestry with very few residential receptors nearby. Those sensitive receptors which are located in the vicinity are remote

from any major sources of noise and are consequently subjected to low levels of noise. The closest residential receptors are the Cottages and Steadings at Burn of Day some 371 m to the East.

13.9.3 The noise maps produced by the Scottish Government (https://noise.environment.gov.scot/map) cover a limited area of the Noise and Vibration Study Areas due to there being no major noise sources in the area.

13.9.4 The measured noise levels from the site-specific noise survey at a position representative of the closest receptors to the proposed Substation are a daytime level of 45 dB(A) L_{Aeq} and a night-time level of 41 dB(A) L_{Aeq}. The survey results are reported in Volume 2, Appendix 13.1: Baseline Noise Survey.

Future Baseline Scenario

13.9.5 The Noise and Vibration Study Areas comprise a mixture of fields and farmland with residential settlement areas and open roads. It is therefore considered that any increase in the overall baseline noise levels would only result from increased traffic flows on roads or any major new developments. Both of these are considered unlikely in the area and as such it is not anticipated that the future baseline scenario will change noticeably in the absence of the Proposed Development.

13.9.6 It is worth noting that as the proportion of road traffic vehicles which are electrically powered increases, it is possible that traffic noise levels may reduce slightly due to the lower engine-noise levels, although on higher speed roads there will still be influence from noise due to tyre-road interaction and aerodynamic deflections over the vehicle surface.

Data Assumptions

13.9.7 For the purposes of this assessment, the key assumptions set out in Table 13.12 were applied, taking a precautionary approach.

Table 13.12: Key Assumptions of the Proposed Development for the Noise and Vibration Assessment

Item	Area	Assumptions
1.	Duration of each phase of construction	All phases of construction are assumed to last longer than the temporal thresholds given within DMRB LA 111, these being 10 days out of 15 or 40 days in a 6-month period. Although some of the phases are transient in nature, a single receptor is still assumed to be exposed to the noise from this activity for longer than the temporal scope. This assumption is used when determining the final significance of effect. This assumption is considered precautionary and therefore a worst-case assumption.
2.	Working hours	Precise working hours will be subject to agreement with Aberdeenshire Council. For this assessment it is assumed that construction will occur during normal or core working hours (i.e. Monday to Friday: 07:00 – 19:00 and Saturday: 08:00– 14:00). In the event of work being required out with standard hours (such as abnormal load deliveries), Aberdeenshire Council would be notified prior to these works taking place and their approval sought.

3.	Baseline noise levels	At receptors outside of the coverage of the Scottish Government Noise Maps the baseline noise level has been assumed to be the same as the measured daytime level of 45 dB(A) LAeq.
4.	Sensitive receptors	The sample of receptors used for the assessment of construction noise and vibration were selected as representative of receptors closest to the Proposed Development and are the closest and/or most exposed receptors which are therefore assumed to experience the worst-case noise levels.
5.	Construction activities and plant	The assumed construction activities and plant have been developed from the construction phases and plant reported in Volume 2, Appendix 13.1: Construction Noise and Vibration.
6.	Construction calculations	The calculations of construction noise have conservatively assumed no ground absorption in urban areas predominated by buildings and 50% ground absorption where there is predominantly grass between the work site and the sensitive receptors. The attenuation provided by existing screening obstacles such as topographical features or existing buildings has conservatively not been considered in the calculations.
7.	Construction calculations	Where construction activities are located less than 10 m from a receptor, noise calculations have conservatively applied a minimum separation distance of 10 m. This reflects the practical constraint that it is unrealistic for all plant to operate simultaneously at the closest point to a receptor.
8.	Decommissioning	The noise levels from decommissioning are assumed to be the same as those from construction. This is a conservative approach as decommissioning would generally involve less plant.
9.	Piling technique and vibration sources	It has been assumed that any piling taking place for the Proposed Development will be rotary in method, rather than vibratory or impact. Vibration sources assessed in this chapter relate to compaction activities as these are the only other source included in Volume 2, Appendix 13.2: Construction Noise and Vibration, likely to generate vibration.
10.	Traffic	For the calculations of noise from individual roads, the default speeds within CRTN for particular road classes have been used. The flow on some roads is below the validated flow of the calculation methodology within CRTN. Since the assessment is only examining the change in noise and not the absolute level, this is not considered to be a limitation of the assessment.

13.10 Mitigation

Embedded Mitigation

13.10.0 In terms of construction impacts the indicative cable route is considered to include Embedded Mitigation, as it seeks to avoid close proximity to residential receptors (mitigation reference GEN1) refer to Volume 2, Technical Appendix 2.1: Schedule of mitigation.

13.10.1 The following construction mitigation measures across the Proposed Development are discussed below. These are incorporated to manage the noise on-site during the construction phase and reduce the magnitude of predicted impacts.

13.10.2 Measures developed for construction sites will be implemented considering the use of Best Practicable Means (BPM) under Section 72 of CoPA 1974 and good

practice under BS 5228 Part 1: Noise and Part 2: Vibration (GEN2). These include, but are not limited to requirements, secured through consent conditions, to:

- Programme the works to restrict impacts to the minimum practicable time;
- Keep local residents and property owners fully informed about the nature and timing of the works, including traffic controls, via such means as newsletters or individual contact, where appropriate;
- Have a representative available on site during working hours to answer queries or address any concerns expressed;
- Use the quietest available plant or machinery where practicable. For example, any compressors brought to site will be super-silenced or sound reduced models fitted with acoustic enclosures, or any pneumatic tools fitted with silencers or mufflers, wherever practicable;
- Ensure that all plant and equipment is properly maintained and operated in accordance with manufacturers' recommendations and in such a manner as to avoid causing excessive noise;
- Ensure that plant and equipment are started sequentially rather than simultaneously, to minimise peak noise levels;
- Ensure that equipment is shut down when not in use for a period longer than 5 minutes;
- Use temporary construction noise screens/barriers around particularly noisy activities and stationary plant such as generators;
- Set vibration compaction plant to a low amplitude mode or use smaller plant items when operating within 50 m of sensitive receptors to minimise the vibration levels; and
- Have no vehicles wait or queue on public highways with engines running and for care to be taken when unloading deliveries.
- All piling methods where reasonably practicable will be undertaken by bored methods.

13.10.3 The Contractor on site will be required to carry out a risk assessment to determine the most appropriate mechanism of noise management for reversing alarms (GEN2). The use of reversing alarms will not be considered as a default position in lieu of a proper risk assessment. The noise control for reversing alarms will consider designing traffic routing and vehicle selection to avoid/minimise the requirement for vehicle reversing and switching off alarms and introducing a banksman where feasible. Where vehicle reversing alarms are required, they will be designed to cause the lowest practical impact; preferably these will be directional broadband noise emitters or automatically adjusted to ambient noise levels.

13.10.4 From guidance contained in BS 5228-1:2009+A1:2014, these measures, when combined, can mitigate noise levels by up to 10 dB. It has been assumed that by incorporation the requirements into a Construction Environmental Management Plan (CEMP) (see Volume 2, Appendix 2.2: Outline CEMP) (GEN2), compliance with these measures should be achieved, and noise levels will be reduced by 10 dB.

13.10.5 As part of the Proposed Development design process, a number of measures have been proposed to reduce the potential for noise and vibration impacts; see Table 13.13. They are considered at every stage of the Proposed Development through design and best practice and, as there is a commitment to implementing these measures, these have been considered in the assessment presented in Section 13.11 (i.e. the determination of magnitude and therefore significance assumes implementation of these measures). These embedded measures are considered standard industry practice for this type of development.

Table 13.13: Mitigation Measures Adopted as Part of the Proposed Development

Ref.	Mitigation Measures Adopted as Part of the Proposed Development	Justification
GEN2	Construction Environmental Management Plan (CEMP)	Construction of the Proposed Development would be undertaken in accordance with the relevant best practice measures as recommended in BS 5228. This would include agreement of working hours with Aberdeenshire Council, location of haul routes to minimise noise impacts on sensitive receptors, a detailed Noise and Vibration Management Plan, a Noise and Vibration Monitoring Procedure, and a complaints investigation and resolution process. Further detail is included in Volume 2, Appendix 2.2: Outline CEMP.
GEN3	Construction Traffic Management Plan (CTMP)	Measures will be adopted to ensure that the potential impacts of noise emission on sensitive receptors due to the movement of construction vehicles entering or exiting construction sites and utilising the local highway network would be controlled. Further detail is included in Volume 1, Chapter 14: Traffic and Transport.

Operational Phase

Embedded Mitigation

13.10.6 In terms of operational impacts, the Substation Site has been located such that the chosen site is isolated from residential receptors, but as a consequence of initial noise modelling undertaken of the potential operational noise impacts of the proposed Substation, the facility was designed to encapsulate the noise sources in a building (GEN1).

13.10.7 Whilst the design has not yet been finalised, the building will be a maximum of 15 m in height and will be capable of reducing the noise emissions from the substation by at least 20 dB (GEN1). In order to demonstrate the effectiveness of enclosure of the facility, an assessment has been undertaken of the impacts both with and without the enclosure, although the Proposed Development would be constructed as an enclosed Substation if consent is granted.

13.10.8 The final specification of the acoustic measures required would be determined through further studies when the final onshore Substation design and equipment specifications are known and will be designed to meet the thresholds as part of the detailed design process.

13.10.9 These specifications will be detailed within the Noise and Vibration Management Plan (NV1) which will be developed post-consent; Volume 2, Appendix 2.2: Outline CEMP provides further detail of these specifications. The majority of noise generating plant would be contained within buildings. The buildings would be constructed with insulated cladding to reduce noise breakout and where required would be ventilated using forced ventilation with a vertical exhaust. There may be some external plant which if required can be fitted with silencers to meet the required noise limits.

13.11 Assessment of Significance

13.11.0 Table 13.10 summarised the potential impacts arising from the construction phase of the Proposed Development, as well as the MDS against which each impact has been assessed. An assessment of the likely significance of the effects of the Proposed Development on the noise and vibration receptors caused by each identified impact is given below.

Construction Phases

13.11.1 The assumed phases of construction and the associated plant and equipment to be used for those phases of construction are set out in Volume 2, Appendix 13.2: Construction Noise and Vibration and are based on the experience of the lead author for the chapter of similar activities.

13.11.2 The phases of construction for the compounds and cable route works are listed below:

- A1: Compound Construction
- A2: Compound Operation
- A3: Cable Route Devegetation Works and Fencing
- A4: Cable Route Soil Strip
- A5: Cable Route Haul Route
- A6: Cable Route Ductwork
- A7: Horizontal Directional Drilling
- A8: Road Access Points, Bellmouths and Surfacing
- A9: Cable Route Reinstatement
- A10: Cable Pulling

13.11.3 The phases of construction for the Substation Site are at the present noted to be:

- B1: Substation Groundworks
- B2: Substation Building Foundations
- B3: Substation Access Road and Car Parking
- B4: Substation Building and High Voltage (HV) Plant Installation

13.11.4 Two different scenarios have been considered for the cable route activities (A3, A4, A6, A9 and A10):

- Scenario 1: noise sources aligned with an indicative cable route.
- Scenario 2: noise sources located to the closest noise receptor given the commitment by the Applicant, wherever practicable, to work no closer to a residential receptor than 50 m. The only exception to this will be at access points, where vehicles will enter site closer than 50 m.

13.11.5 All of these phases are likely to last longer than the temporal thresholds given within DMRB LA 111. Although some of the phases (e.g., A4: Cable Route Soil Strip) are transient in nature, a single receptor is still expected to be exposed to the noise from this phase for longer than the temporal threshold.

13.11.6 It is important to note that at Planning Permission in Principle (PPP) stage the assumed plant and equipment complements set out in Volume 2, Appendix 13.2: Construction Noise and Vibration are indicative and conservative. These will be confirmed later during detailed design and subject to approval by Aberdeenshire Council at the MSC stage. Aberdeenshire Council Environmental Health Department will be consulted throughout to ensure that they agree with the assumptions made, the calculated noise levels and the proposed methods of mitigation. An application under Section 61, Part III of The Control of Pollution Act 1974, as amended, may be made to ensure that noise and vibration levels are understood and kept under control throughout the construction works. A decision on whether an application under Section 61 will be made is a joint decision between Aberdeenshire Council Environmental Health and Bowdun Offshore Wind Farm Limited.

13.11.7 At this stage the calculations do not include the standard mitigation measure of a 10 dB reduction for Best Practicable Means (BPM). This has been undertaken to demonstrate the effect of not ensuring that BPM is followed.

Closest Sensitive Receptors

13.11.8 A series of residential receptors have been chosen along the route of indicative alignment; these are the closest receptors to the proposed construction works and hence most likely to result in construction noise impacts. Table 13.14 reports the receptors modelled, the daytime baseline noise level and the Construction Noise Threshold, taking into account the guidance contained in Annex E.3.2 of BS 5228-1:2009+A1:2014.

Table 13.14: Noise Receptor Locations, Sensitivity, Baseline Noise Levels and Construction Noise Thresholds

Noise Receptor Name (all considered High Sensitivity)	Inferred Baseline Noise Levels from Scotland's Noise Map or measured level from baseline survey (dB)	Construction Noise Threshold, Annex E.3.2, BS 5228-1:2009+A1:2014 (dB)	Closest Approach of PPP Boundary to Receptors (m)
Annamuick	45	65	70
Annamuick Cottages	45	65	75
Anniston Farm	45	65	600
Banff Croft	45	65	290
Blarerno	42	65	70
Bloomfield	44	65	490
Brenzieshill	43	65	320
Brenzieshill Cottage	42	65	320
Bridge of Mondynes	61	65	426
Broombank	52	65	95
Broombank Cottage	53	65	50
Burnside Cottage	43	65	86
Candy	63	65	10
Clachanshiels	45	65	600
Cottages and Steadings burn of day	45	65	371
Druimree	53	65	50
East Kinmonth	45	65	428
East Kinmonth Cottage	45	65	198
East Tillygrain	45	65	15
Elfstone Cottage	43	65	15
Gobbs	45	65	62
Gowans	45	65	50
Gowans Cottage	48	65	83
Gowans Steading	51	65	420
Gyratesmyre	47	65	10
Gyratesmyre Bungalow	47	65	227
Haughs of Benholm	54	65	460
Hillrise	49	65	57
Kirton House	45	65	10
Kirton of Arbuthnott	45	65	57
Knoxhill House	45	65	240
Laes	45	65	275
Little Bogburn	51	65	260

Noise Receptor Name (all considered High Sensitivity)	Inferred Baseline Noise Levels from Scotland's Noise Map or measured level from baseline survey (dB)	Construction Noise Threshold, Annex E.3.2, BS 5228-1:2009+A1:2014 (dB)	Closest Approach of PPP Boundary to Receptors (m)
Little Wairds	45	65	50
Mid Kinmonth	45	65	290
Middle Knox	45	65	234
Middle Knox	45	65	234
Nether Benholm	45	65	236
Nether Benholm Cottages	43	65	60
Nether Buckiesmill	40	65	166
Nether Craighill	45	65	480
Nether Knox Cottage	43	65	81
Nether Quithel Cottage	45	65	55
Peattie	45	65	10
Peattie Cottage	45	65	59
Pitcarles	45	65	90
Pitcarles Cottages	48	65	90
Quithel Cottage	40	65	25
Riverdale Croft	45	65	845
Seafield House	41	65	50
Smiddy Cottage	45	65	600
Springwood	40	65	90
Threewells Cottage	53	65	10
Toll of Mondynes*	63	70	482
Upper Baulk	47	65	700
Upper Craighill	45	65	380
Upper Knox Farm	45	65	69
Wairds of Alpity	45	65	480
Whitehill	45	65	673
West Newbiggin Cottage	51	65	97
Westfield House	47	65	50

* Noise level is higher at this location as a consequence of the receptor's location close to the major source of noise in the vicinity, the A90 dual carriageway. As a consequence, under Annex E.3.2 of BS5228-1:2009+A1:2014, the construction noise threshold is increased.

13.11.9 As reported in Section 13.6, for the purposes of the noise assessment, two potential construction scenarios have been generated. Scenario 1 uses a indicative construction route, which minimises the impacts on residential receptors wherever practicable. Under this scenario no receptors are within 100 m of vibration generating activities. As there are no sensitive receptors within

the Study Area, no vibration calculations have been undertaken for this scenario.

13.11.10 Scenario 2 uses the closest approach to the residential receptors of the construction noise search area. The receptors located within 100 m of the vibration generating activities, along with their distances from the nearest phase for Scenario 2, are listed in Table 13.15.

Table 13.15: Vibration Receptors – Scenario 2

Receptor Name (all considered High Sensitivity)	Closest Approach Distance from PPP Boundary to Residential Receptor (m)	Phase
Blarerno	70	A6 Cable Route Ductwork
Broombank	95	A6 Cable Route Ductwork
Broombank Cottage	50	A6 Cable Route Ductwork
Burnside Cottage	86	A6 Cable Route Ductwork
Candy	10	A6 Cable Route Ductwork
Druimree	50	A6 Cable Route Ductwork
East Tillygrain	15	A6 Cable Route Ductwork
Elfstone Cottage	15	A6 Cable Route Ductwork
Gobbs	62	A6 Cable Route Ductwork
Gowans	50	A6 Cable Route Ductwork
Gowans Cottage	83	A6 Cable Route Ductwork
Gyratesmyre	10	A6 Cable Route Ductwork
Hillrise	57	A6 Cable Route Ductwork
Kirton House	10	A6 Cable Route Ductwork
Kirton of Arbuthnott	57	A6 Cable Route Ductwork
Little Wairds	50	A6 Cable Route Ductwork
Nether Benholm Cottages	60	A6 Cable Route Ductwork
Nether Knox Cottage	81	A6 Cable Route Ductwork
Nether Quithel Cottage	55	A6 Cable Route Ductwork
Peattie	10	A6 Cable Route Ductwork
Peattie Cottages	59	A6 Cable Route Ductwork
Pitcarles	90	A6 Cable Route Ductwork
Pitcarles Cottages	90	A6 Cable Route Ductwork
Quithel Cottage	25	A6 Cable Route Ductwork
Seafield house	50	A6 Cable Route Ductwork
Threewells Cottage	10	A6 Cable Route Ductwork
Upper Knox Farm	69	A6 Cable Route Ductwork
Westfield House	50	A6 Cable Route Ductwork

Construction Noise Impact

13.11.11 Further details of the construction calculations are contained within Volume 2, Appendix 13.1 Construction Noise. The magnitudes of impact and their significance are discussed below.

Scenario 1 for Construction Noise

13.11.12 There are two phases that are predicted to reach or exceed the 65dB(A) threshold at one or more receptors. These are A6: Cable Duct works at five locations, and A9: Cable Route Reinstatement at one location. Table 13.16 and Table 13.17 report the magnitude and significance of calculated construction impacts.

Table 13.16: Scenario 1, Construction Noise - Magnitude and Significance of Impacts, Phase A6

Receptor	Magnitude of Impact	Significance of Impact
Westfield House	Negligible	Minor Adverse (Not Significant)
Nether Benholm Cottages	Low	Minor Adverse (Not Significant)
East Tillygrain	Low	Minor Adverse (Not Significant)
Kirkton House	Low	Minor Adverse (Not Significant)
Kirkton of Arbuthnott	Low	Minor Adverse (Not Significant)

Table 13.17: Scenario 1, Construction Noise - Magnitude and Significance of Impacts, Phase A9

Receptor	Magnitude of Impact	Significance of Impact
East Tillygrain	Negligible	Minor Adverse (Not Significant)

13.11.13 From Table 13.16 and Table 13.17, it can be seen that for Scenario 1 for construction noise impacts, **no** significant effects will occur.

Scenario 2 For Construction Noise

13.11.14 The phases that are predicted to exceed the 65 dB(A) threshold are:

- A3: Devegetation at nine locations
- A4: Cable Soil Strip at 10 locations
- A6: Cable Duct Work at 11 locations
- A9: Cable Reinstatement at 11 locations

13.11.15 Tables Table 13.18 to Table 13.21 report the magnitude and significance of calculated construction impacts.

Table 13.18: Scenario 2, Construction Noise - Magnitude and Significance of Impacts, Phase A3

Receptors	Magnitude of Impact	Significance of Impact
Nether Benholm Cottages	Negligible	Minor Adverse (Not Significant)
Peattie Cottages	Low	Minor Adverse (Not Significant)
East Tillygrain	Low	Minor Adverse (Not Significant)
Little Wairds	Low	Minor Adverse (Not Significant)
Peattie	Low	Minor Adverse (Not Significant)
Kirkton House	Low	**Moderate Adverse (Significant)**
Kirkton of Arbuthnott	Low	**Moderate Adverse (Significant)**
Threewells Cottage	Low	Minor Adverse (Not Significant)
Westfield House	Low	**Moderate Adverse (Significant)**

13.11.16 For Construction Phase A3, at Kirkton of Arbuthnott, the predicted noise level is expected to exceed the 65 dB(A) threshold be 3 dB(A), representing a low magnitude of impact but which is of **Moderate Adverse Significance** and a likely significant effect. At Kirkton House and Westfield House, the predicted noise levels are expected to exceed the 65 dB(A) threshold by 4 dB(A), representing a low magnitude of impact, which is of **Moderate Adverse Significance** and a likely significant effect.

Table 13.19: Scenario 2, Construction Noise - Magnitude and Significance of Impacts, Phase A4

Receptors	Magnitude of Impact	Significance of Impact
Blarerno	Negligible	Minor Adverse (Not Significant)
Little Wairds	Low	Minor Adverse (Not Significant)
Nether Benholm Cottages	Low	Minor Adverse (Not Significant)
Peattie Cottages	Low	Minor Adverse (Not Significant)
East Tillygrain	Low	Minor Adverse (Not Significant)
Kirkton of Arbuthnott	Low	**Moderate Adverse (Significant)**
Peattie	Low	Minor Adverse (Not Significant)
Threewells Cottage	Low	**Moderate Adverse (Significant)**
Westfield House	Low	**Moderate Adverse (Significant)**
Kirkton House	Medium	**Moderate Adverse (Significant)**

13.11.17 For Construction Phase A4, at Threewells Cottages, the predicted noise levels are expected to exceed the 65 dB(A) threshold by 3 dB(A), representing a low magnitude of impact, which is of **Moderate Adverse Significance** and a likely significant effect. At Kirkton of Arbuthnott and Westfield House, the predicted noise levels are expected to exceed the 65 dB(A) threshold by 4 dB(A), representing a low magnitude of impact, which is of **Moderate Adverse Significance** and a likely significant effect. At Kirkton House, the predicted noise levels are expected to exceed the 65 dB(A) threshold by 5 dB(A), representing a medium magnitude of impact, which is of **Moderate Adverse Significance** and a likely significant effect.

Table 13.20: Scenario 2, Construction Noise - Magnitude and Significance of Impacts, Phase A6

Receptors	Magnitude of Impact	Significance of Impact
Blarerno	Low	**Moderate Adverse (Significant)**
Little Wairds	Low	**Moderate Adverse (Significant)**
Nether Benholm Cottages	Low	**Moderate Adverse (Significant)**
Peattie Cottages	Low	**Moderate Adverse (Significant)**
Upper Knox Farm	Low	**Moderate Adverse (Significant)**
East Tillygrain	Medium	**Moderate Adverse (Significant)**
Peattie	Medium	**Moderate Adverse (Significant)**
Threewells Cottage	Medium	**Moderate Adverse (Significant)**
Westfield House	Medium	**Moderate Adverse (Significant)**
Kirkton House	Medium	**Moderate Adverse (Significant)**
Kirkton of Arbuthnott	Medium	**Moderate Adverse (Significant)**

13.11.18 For Construction Phase A6, at Blarerno and Peattie Cottages, the predicted noise levels are expected to exceed the 65 dB(A) threshold by 3 dB(A), indicating a low magnitude of impact, which is of **Moderate Adverse Significance** and a likely significant effect.

13.11.19 At Little Wairds and Nether Benholm Cottages, the predicted noise levels are expected to exceed the 65 dB(A) threshold by 4 dB(A), indicating a medium low of impact, which is of **Moderate Adverse Significance** and a likely significant effect.

13.11.20 At East Tillygrain, Peattie, and Threewells Cottage, the predicted noise levels are expected to exceed the 65 dB(A) threshold by 5 dB(A), indicating a medium magnitude of impact, which is of **Moderate Adverse Significance** and a likely significant effect.

13.11.21 At Kirkton House, Kirkton of Arbuthnott, and Westfield House, the predicted noise levels are expected to exceed the 65 dB(A) threshold by more than 5 dB(A). This constitutes a medium magnitude of impact, which is of **Moderate Adverse Significance** and a likely significant effect.

Table 13.21: Scenario 2, Construction Noise - Magnitude and Significance of Impacts, Phase A9

Receptors	Magnitude of Impact	Significance of Impact
Upper Knox Farm	Negligible	Minor Adverse (Not Significant)
Blarerno	Low	Minor Adverse (Not Significant)
Peattie Cottages	Low	**Moderate Adverse (Significant)**
East Tillygrain	Low	**Moderate Adverse (Significant)**
Little Wairds	Low	Minor Adverse (Not Significant)
Nether Benholm Cottages	Low	Minor Adverse (Not Significant)
Peattie	Low	**Moderate Adverse (Significant)**
Threewells Cottage	Low	**Moderate Adverse (Significant)**
Kirkton House	Medium	**Moderate Adverse (Significant)**

Receptors	Magnitude of Impact	Significance of Impact
Kirkton of Arbuthnott	Medium	**Moderate Adverse (Significant)**
Westfield House	Medium	**Moderate Adverse (Significant)**

13.11.22 For Construction Phase A9, at East Tillygrain, Peattie, Peattie Cottages and Threewells Cottage, the predicted noise levels are expected to exceed the 65 dB(A) threshold by 3 dB(A), representing a low magnitude of impact, which is of **Moderate Adverse Significance** and a likely significant effect.

13.11.23 At Kirkton House, Kirkton of Arbuthnott, and Westfield House, the predicted noise levels are expected to exceed the 65 dB(A) threshold by 5 dB(A), representing a medium magnitude of impact, which is of **Moderate Adverse Significance** and a likely significant effect.

Construction Vibration Impact

13.11.24 As previously noted, a vibration impact assessment has only been undertaken for construction works under Scenario 2, as this is the only scenario where vibration generating activities take place within 100 m of sensitive receptors. In this instance the main source of vibration generation will be vibro-compaction, where a vibratory roller is likely to be used in all the phases of works where compaction or surfacing is required. These phases are:

- A1: Compound Construction
- A5: Cable Route Haul Route
- A6: Cable Route Ductwork
- A7: Horizontal Directional Drilling
- A8: Road Access Points, Bellmouths & Surfacing
- B1: Substation Groundworks
- B3: Substation Access Road and Car Parking

13.11.25 Volume 2, Appendix 13.2: Construction Noise and Vibration contains the calculated level of vibration at each identified sensitive receptor. For these calculations and the assessment, the only phase that has been considered is A6: Cable Route Ductwork as these works are likely to generate the highest levels of vibration.

13.11.26 The predicted construction vibration levels during construction phase A6 do not reach the 15 mm/s threshold level for potential cosmetic damage for un-reinforced structures. As a consequence, no further assessment of construction vibration on potential structural impacts has been undertaken.

13.11.27 The predicted construction vibration levels are above the 1 mm/s level at which vibration may be felt but below the 10 mm/s threshold level for human response at Candy, Gyratesmyre, Kirkton House, Peattie and Threewells Cottage. This is a Medium impact at a high sensitivity receptor and therefore presents a **Moderate Adverse** significance. Impacts of this scale are likely to be significant. As a consequence, there exists the potential for significant adverse effect during vibratory compaction works to arise.

13.11.28 Typical methods to control vibration impacts during compaction are outlined in Section 13.9 and would be adopted by the construction contractor and secured

by consent condition. With the adoption of these measures, such as running start up and run down modes away from sensitive properties and adopting low vibration amplitude or non-vibratory techniques when working in close proximity to sensitive properties, it is anticipated that vibration impacts can be controlled, and significant adverse effects can be avoided.

Construction Traffic Noise Impact

13.11.29 The traffic assessment for the Proposed Development is described within Volume 1, Chapter 14: Traffic and Transport. Data from that assessment has been used to examine the change in noise from the use of roads by construction traffic. This has been examined using the annualised data for 2031 and has compared the baseline scenario against the scenario of the baseline plus the potential traffic generated during construction by the Proposed Development.

13.11.30 The calculations have identified three roads where increases may be above 3 dB(A), which would be a Medium or High magnitude of impact. Residential receptors alongside these roads would be of high sensitivity. The three road links where these changes have been identified, the calculated noise change and magnitude of impact are shown in Table 13.22.

Table 13.22: Traffic Noise Impacts

Road Name	Change in Noise (dB(A))	Magnitude of Impact
C1K, south of Proposed Development	3.2	Medium
C20K, south of A90	6.7	High
C14K, west of Three Wells	3.0	Medium

13.11.31 A magnitude of Medium or High is a **likely significant adverse effect**. The CTMP, which is an embedded mitigation measure, would contain measures to reduce or remove these predicted adverse effects. It should be noted that the traffic flow on these three roads is below the validated range of the algorithms within CRTN that are used to calculate the noise. When the traffic flow is below 1,000 vehicles in the 18-hour period, as it is on these three roads, the passing traffic is likely to take the form of discrete events rather than a constant noise.

Operation Phase Noise Impact

13.11.32 Once constructed, the cable route will present no operational noise impacts, as there is no active equipment between the cable route at Landfall and the Substation location. The Substation does however have potential for the generation of noise.

13.11.33 Predictions have been made of the noise levels at the closest sensitive receptors to the Substation, based on source noise levels provided by project engineers from Manufacturers' data. These receptors are the Cottage and Steadings at Burn of Day, Smiddy Cottage and Upper Baulk. The predicted noise levels at the receptors are reported in Volume 2, Appendix 13.2: Operational Noise, together with their impact, based on the guidance contained in BS4142:2014. The potential for complaint is also considered under the guidance within BS4142:2014. The assessment considers the worst-case impacts which will take place at night. To demonstrate the effectiveness of the embedded

mitigation of noise source encapsulation within the Substation, these predictions have been undertaken with and without this mitigation.

13.11.34 For the noise modelling scenario without mitigation, the impact at all modelled receptors would be of Medium or High magnitude. With the sensitivity of the receptor as **High,** as a worst case the effect will therefore be of **Major Adverse** significance, which is a **likely significant adverse effect**.

13.11.35 Mitigation in the form of barriers and enclosures is proposed for the Substation. This reflects the expectation, based on previous consultation and standard practice, that Aberdeenshire Council Environmental Health Department will seek measures to reduce the difference between the Rating Level of operational noise and the low Background, in the interest of preserving amenity.

13.11.36 Whilst no final design is available at PPP stage, professional experience has demonstrated that full enclosure of Substation installations is practicable and has the benefit of significantly reducing noise levels. Given this, it was agreed that the proposed Substation would also be modelled with an enclosure providing 20 dB noise attenuation.

13.11.37 This level of mitigation aligns with best practice approaches observed in similar substation installations and supports the conclusion that, with the enclosure in place, the operational noise emissions will be effectively controlled to avoid adverse effects on residential amenity.

13.11.38 With the mitigation, the predicted noise level from the Substation was either at or below the level of background noise. This magnitude of impact is either No change or Negligible. As a worst case the effect is therefore **Minor Adverse**, which is not significant in EIA terms.

13.11.39 Details of the assumed plant and equipment, including noise levels, is within Volume 2, Appendix 13.2: Operational Noise. The Appendix also contains the prediction noise levels at each nearby sensitive receptor and the full BS 4142 calculations to assess the potential impact.

Residual Effects

13.11.40 If the embedded mitigation measure contained in Section 13.9 is employed, utilising the indicative cable route (Scenario 1), there will be no significant impacts from the construction works associated with the cable route.

13.11.41 In this instance therefore the magnitude of impact for these works would be negligible. Given the sensitivity of the receptors being High, the effect will therefore be of **Minor** significance, which is not significant in EIA terms.

13.11.42 If, however, it is established that the indicative cable route cannot be utilised or design refinement results in changes to the cable route, the tertiary mitigation measures become important. From advice contained in BS5228-1:2009+A1:2014, the measures reported in Section 13.9 can reduce the noise levels at the receptor by up to 10 dB.

13.11.43 This being the case, all activities noted above as being of significance could reduce by 10 dB. As none of the activities are calculated to generate noise levels in excess of 72 dB, by the employment of the noted mitigation, noise levels from

the cable route construction works will reduce to less than the 65 dB construction noise trigger. As a consequence, there will be no significant impacts following the implementation of embedded mitigation.

13.11.44 In this instance therefore the magnitude of impact for these works would be negligible. Given the sensitivity of the receptors being High, the effect will therefore be of **Minor** significance, which is not significant in EIA terms.

13.11.45 There are no significant construction noise impacts from the construction of the Substation. As a consequence, if the embedded mitigation measures were employed as matters of good site practice, the effects would be less than those reported in this chapter. There would however be no change in the level of significance.

13.11.46 It is anticipated that the identified likely significant adverse effects from traffic noise during construction can be mitigated through the control of traffic. Measures such as ensuring a steady flow of vehicles and ensuring vehicles do not meet each other on the narrow roads will be contained within a Construction Traffic Management Plan (CTMP). In addition, the roads will be examined to ensure there are no defects or undulations that may cause additional vehicle noise. No decibel value can be assigned to these measures, but it is considered that these would be sufficient to remove the likely significant adverse effect.

13.11.47 The operation of the Substation, once the mitigation of the enclosure in a building is employed, will not result in any significant impacts. In this instance therefore the magnitude of impact for these works would be negligible. Given the sensitivity of the receptors being High, the effect will therefore be of Minor significance, which is not significant in EIA terms.

Proposed Monitoring

13.11.48 This section outlines the proposed monitoring applicable to the identified potential significant adverse impacts related to noise and vibration.

13.11.49 Table 13.23 also outlines proposed monitoring measures for cumulative impacts. These will be secured either via planning conditions or via compliance with the CEMP or CTMP (NV2, Volume 1, Appendix 2.1: Schedule of Mitigation). With the exception of construction traffic no significant impacts are calculated, and as a consequence monitoring will only be required in response to complaints from affected sensitive receptors.

Table 13.23: Proposed Monitoring and the Method of Implementation for Noise and Vibration

Potential Environmental Effect	Monitoring Commitment	Means of Implementation
Construction Noise Impacts	Compliance noise measurements are to be undertaken in the event of complaints being received.	Construction Environmental Management Plan or Construction Traffic Management Plan Environmental Management Plan (see
Construction Vibration Impacts	In the event of a complaint in relation to vibration being received, vibration monitoring equipment will be installed at the complainant's property and left to run for several days or for the rest of the	

Potential Environmental Effect	Monitoring Commitment	Means of Implementation
	duration of the activities which have caused the complaint.	Volume 2, Appendix 2.2: Outline CEMP)

13.11.50 All results from noise and vibration measurements undertaken in response to complaints will be shared with the complainant and Aberdeenshire Council Environmental Health Department if requested but will remain on file for the duration of the construction of the Proposed Development.

13.12 Inter-Related Effects

13.12.0 For noise and vibration, the following potential impacts have been considered within the inter-related assessment:

- Landscape and Visual, specifically in relation to the enclosure of the Substation.

13.12.1 Table 13.24 lists the inter-related effects (project lifetime effects) that are predicted to arise during the construction, O&M phase, and decommissioning of the Proposed Development and also the inter-related effects (receptor-led effects) that are predicted to arise for noise and vibration receptors.

13.12.2 As noted above, effects from noise and vibration also have the potential to have secondary effects on other receptors and these effects are fully considered in the topic-specific chapters. These receptors and effects are:

- Landscape impact of enclosed substation on affected receptors.

Table 13.24: Summary of Likely Significant Inter-Related Effects for Noise and Vibration

Description of Impact	Phase*			Likely Significant Inter-Related Effects
	C	O&M	D	
Project Lifetime Effects				
Landscape and Visual	×	✓	×	Potential landscape and visual impacts of the enclosure of the substation on affected receptors at Smiddy Cottage, Clachanshiels and Whitehill. This is not an inter-related significant effect.
Receptor-Led Effects				
Impacts at Smiddy Cottage, Clachanshiels and Whitehill	×	✓	×	Landscape and Visual impacts in relation to appearance of enclosed substation from nearby noise sensitive receptors. This is not an inter-related significant effect.

* Project Phase refers to Construction (C), Operation and Maintenance (O&M) and Decommissioning (D).

13.13 Cumulative Effects Assessment

Methodology

13.13.0 The Cumulative Effects Assessment (CEA) assesses the impact associated with the Proposed Development together with other relevant projects and activities. Cumulative effects are defined as the effect of the Proposed Development in

combination with the effects from a number of different projects, on the same receptor or resource.

13.13.1 The projects selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise of the long list of Cumulative Projects included in Table 3.9 within Volume 1, Chapter 3: EIA Methodology. Full details on CEA methodology are provided in Volume 1, Chapter 3: EIA Methodology where further information is provided in relation to the other projects and how this information is obtained and applied to the assessment. Each project has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

13.13.2 The justification for screening other projects in or out of the CEA are included in Table 13.25.

Table 13.25: Screening of Other Projects for Consideration within the CEA for Noise and Vibration

Project	Overlap with the Proposed Development	Screened into CEA (Yes/No)
Tier 2		
Hurlie 400 kV Substation APP/2024/1951, ENQ/2024/1176, ENQ/2024/0146	Although the estimated construction period precedes the Proposed Development construction period, should programmes change, construction traffic could use the road network at the same time for this project. Additionally, operation of the Proposed Development and this project could impact on the same receptors.	Yes
The Waters BESS ENQ/2024/1615, ENQ/2024/1830	No expected overlap due to the potential scale and nature of the construction works.	No
Fetteresso 132 kV Substation Upgrade ENQ/2025/1103, ENQ/2025/1000	No expected overlap due to the distance from the Proposed Development being greater than a 300 m screening distance for the Noise and Vibration Cumulative Effects Assessment. Additionally, the estimated construction period precedes the Proposed Development construction period.	No
Grains Of Fetteresso Indoor Play Area APP/2025/0058	No expected overlap due to the distance from the Proposed Development being greater than a 300 m screening distance for the Noise and Vibration Cumulative Effects Assessment.	No
S36 Windfarm, Fetteresso Forest ECU00001851, APP/2019/1341		No
Glenskinnan Renewable Energy Park ENQ/2025/0960		No
Craigneil Wind Farm ENQ/2024/0640		No
Meetlaw Farm Battery Energy Storage System		No

Project	Overlap with the Proposed Development	Screened into CEA (Yes/No)
APP/2022/2676		
East Coast Viners Solar Storage Project APP/2022/1701		No
Tier 3		
Tealing to Kintore 400 kV OHL ENQ/2024/1397, ECU00005225	No expected overlap due to the estimated construction period preceding the Proposed Development construction period. Additionally, construction of OHLs are typically of short duration in any single tower location and as such, should construction overlap with the Proposed Development, it is not considered likely that significant cumulative effects would occur.	No
Droop Hill Solar Park ENQ/2025/0368, APP/2025/0560	No expected overlap due to the distance from the Proposed Development being greater than a 300 m screening distance for the Noise and Vibration Cumulative Effects Assessment.	No
Glendye Wind Farm 132 kV OHL ENQ/2024/1818, ECU0005197		No
Bridgend Farm BESS ENQ/2024/0747, APP/2025/0089		No
Quithel 50 MW BESS ENQ/2023/1713		No
Northeast Of Drumlithie BESS ENQ/2023/0093		No

Maximum Design Scenario

13.13.3 The MDS identified in Table 13.10 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative effects presented and assessed in this section have been selected from the details provided in Volume 1, Chapter 2: The Proposed Development as well as the information available on other projects to inform a 'maximum design scenario'. Any other development scenario within the Project Design Envelope (PDE), will result in in the same, or less, level of environmental effect.

Table 13.26: Maximum Design Scenario Considered for Each Impact as part of the Assessment of Likely Significant Cumulative Effects on Noise and Vibration

Potential Cumulative Effect	Phase*			Tier	Maximum Design Scenario
	C	O&M	D		
Noise Impacts	✓	✓	×	2 – Developments within Fetteresso Forest	**Construction Phase** There exists the potential, depending on programme, for there to be construction taking place at both substations at the same time. **Operation and Maintenance Phase** There is the potential for operational noise impacts to impact nearby residential receptors at the same time. **Decommissioning Phase** None known at present

* Project Phase refers to Construction (C), Operation and Maintenance (O) and Decommissioning (D).

Cumulative Effects Assessment

13.13.4 An examination of other nearby developments (shown in Table 13.25) has identified one possible development where there could be cumulative effects with the Proposed Development. This is the Hurlie Substation, and possible impacts are considered below.

13.13.5 SSEN-T have submitted an EIA for the construction and operation of a new electricity substation within the Fetteresso forest, known as the Hurlie Substation, in relatively close proximity to the Substation proposed in this Application, being approximately 750 m to the south-west. Whilst their cumulative impact assessment considers it unlikely that construction at the two projects will take place at the same time, it has been considered appropriate to take a precautionary approach and assume that there is a potential for both sites to be constructed at the same time.

Construction Phase

Sensitivity of Receptor

13.13.6 There are three receptors which are relatively close to both Substation sites, being within 1500 m from Hurlie and within 650 m from the proposed Substation. These are Clachanshiels, Smiddy Cottage and Whitehill. As residential receptors these are of high sensitivity.

Magnitude of Impact

13.13.7 Assessing the combined maximum construction noise impacts against a 65 dB construction noise trigger, the maximum construction noise levels from Hurlie Substation and the Substation combined are 64 dB at each receptor. The magnitude is therefore Negligible.

13.13.8 There is not considered to be any potential for cumulative impacts from vibration due to the separation distances between the receptors and the development areas.

Significance of Effect

13.13.9 Overall, the magnitude of the cumulative effect is deemed to be Negligible and the sensitivity of the receptor is considered to be High. The cumulative effect will, therefore, be of Minor Adverse significance, which is not a significant effect.

Additional Mitigation and Residual Effect

13.13.10 No additional mitigation, other than that discussed in Section 13.11 is proposed.

13.13.11 No noise mitigation is considered necessary because the likely effect in the absence of additional mitigation (beyond the embedded measures outlined in Section 13.9) is not significant.

Maintenance Phase

13.13.12 It is not expected that maintenance activities associated with the two substations would generate noticeable levels of noise or vibration and therefore no assessment of cumulative impacts is required.

Operation Phase

Magnitude of Impact

13.13.13 Should both projects gain consent, following construction, both substations will be operating at the same time. As both will operate potentially 24 hours a day, and will generate some noise emissions, there exists the potential for cumulative noise impacts to occur at nearby receptors.

13.13.14 The two baseline surveys report different Background L_{A90} noise levels for the measurement location in the vicinity of the two receptors noted below. SSEN-T report an L_{A90} of 29 dB, and the Proposed Development has reported an L_{A90} of 27 dB. Considering the lower of these measured noise levels (i.e., the worst case) of 27 dB, the combined noise emissions at Clachanshiels and Smiddy Cottage from both substations, including the mitigation proposed, would be 20.5 dB. Allowing for tonality of the source, the combined assessed level would be 29.5 dB.

13.13.15 This is above measured background L_{A90}, but lower than the +5 dB level considered to be where there is the potential for an adverse impact. This is considered to be a Low magnitude impact, which given a High sensitivity receptor would be a Minor or Moderate impact. This is not considered to be a significant effect.

Decommissioning Phase

13.13.16 Given the time before a substation needs to be decommissioned, it is unlikely that decommissioning of the two substations would take place at the same time, and as a consequence, decommissioning is not included in the cumulative assessment.

13.14 Summary of Impacts, Mitigation, Likely Significant Environmental Effects and Monitoring

13.14.0 Table 13.27 reports the summary of Impacts, required mitigation, likely significant environmental effects.

Table 13.27: Summary of Effects

Activity	Magnitude of impact	Mitigation	Significance following any mitigation
Construction (Scenario 1)	Magnitude of impact Negligible or Minor	BPM	No likely significant effects
Construction (Scenario 2)	Magnitude of impact Negligible or Medium	BPM	No likely significant effects
Construction traffic	Magnitude of impact Medium or High	Mitigation to be within the CTMP	No likely significant effects
Maintenance	Magnitude of impact No Change		No likely significant effects
Operation	Magnitude of impact No Change or Negligible	Mitigation in the form of an enclosure	No likely significant effects
Decommissioning	Magnitude of impact Negligible or Minor	BPM	No likely significant effects

13.14.1 From the assessment undertaken, with the implementation of embedded or standard mitigation, there are predicted to be **no** significant effects from construction. With the implementation of the same mitigation measures, decommissioning works are likely to have the same scale of impacts as construction works. The embedded mitigation measures are in the form of BPM being adopted throughout the works.

13.14.2 Potential significant effects were predicted for the construction traffic when using minor local roads. It is expected that these can be managed through implementing measures within the CTMP.

13.14.3 There are assessed to be no significant effects from maintenance.

13.14.4 During the operation of the Substation, mitigation measures in the form of enclosures and barriers are proposed to remove a potential significant effect. With these mitigation measures in place there would be no significant effects from the operation of the Substation.

13.14.5 There are no assessed cumulative impacts from noise and vibration.

13.14.6 It is recommended that compliance noise and vibration measurements be undertaken at the commencement of each phase of construction in order to verify the calculated impacts. Further monitoring will also be undertaken as a consequence of complaints being received, rather than programmed to be undertaken throughout the works. It is proposed that such an approach will be a consent condition.

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Annex - Figures

KIRKTON OF ARBUTHNOTT
KIRKTON HOUSE
BANFF CROFT
PEATTIE
PEATTIE COTTAGES
THREEWELLS COTTAGE
UPPER KNOX FARM
BURNSIDE COTTAGE
KNOXHILL HOUSE
MIDDLE KNOX
MIDDLE KNOX
NETHER BENHOLM COTTAGES
EAST TILLYGRAIN
NETHER KNOX COTTAGE
NETHER BENHOLM
HAUGHS OF BENHOLM

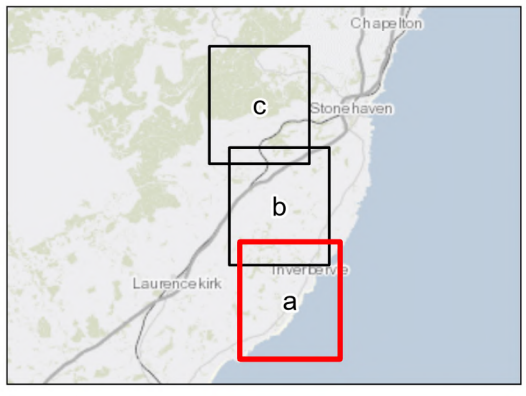
Allardice
Inverbervie
Gourdon
Johnshaven
Cotter House
Chapelwaird Wood
Birniehill Wood
Hareden Wood
Will's Wood
Bervie Water
Pitcarry Burn
Seppie Wood
Darn Bay
Bervie Brow
Bervie Bay
Horse Crook Bay
Hallgreen Wood
Peattie Burn
Banff Wood
Banff Burn
Banff Hill
Den of Davo or Woodburn Den
Carling Den
Kenshot Hill or King's Seat Hill
Dendoldrum Hill
Shakil Hill
Lady's Plantation
Brae Rd
Brawleymuir Plantation
Damside Plantation
Craighead Plantation
Den of Stone of Benholm Plantation
Burn of Benholm
Boghead Wood
East Walk Plantation
Cloch Hill
Bridgeton Hill
Garvock Burn
A92

N

0 2 km

Legend

- PPP Application Boundary
- Noise Study Area
- Substation Search Area
- Noise Receptors within 300m buffer
- Indicative 220/275kV Cable Centreline
- Indicative 400 kV Cable Centreline



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Jacobs

Client: THISTLE WIND PARTNERS

Project: Bowdun Offshore Wind Farm
Onshore EIA Report

Drawing Title: Noise Study Area

Aconnex Number	Drawing Status
TWP-BOW-JCB-ONE-DWG-00003	FINAL

Figure 13.1a

LITTLE BOGBURN
MID KINMONTH
EAST KINMONTH COTTAGE
HILLRISE
WETFIELD HOUSE
DRUIMREE
CANDY
BROOMBANK
BROOMBANK COTTAGE
BRENZIESHILL
GYRATESMYRE BUNGALOW
BRENZIESHILL COTTAGE
GYRATESMYRE
LITTLE WAIRDS
UPPER CRAIGHILL
GOBBS
LAES
PITCARLES
PITCARLES COTTAGES
KIRKTON OF ARBUTHNOTT
KIRKTON HOUSE
BANFF CROFT
PEATTIE
PEATTIE COTTAGES

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Drawing Title: Noise Study Area

Aconnex Number: TWP-BOW-JCB-ONE-DWG-00003	Drawing Status: FINAL

Figure 13.1b

R02 COTTAGES AND STEADINGS BURN OF DAY
SPRINGWOOD
ANNAMUICK COTTAGES
ANNAMUICK
R04 ELFSTONE COTTAGE
NETHER QUITHEL COTTAGE
QUITHEL COTTAGE
GOWANS COTTAGE
GOWANS
SEAFIELD HOUSE
GOWANS STEADING
BLARERNO
NETHER BUCKIESMILL
LITTLE BOGBURN
MID KINMONTH
EAST KINMONTH COTTAGE

0 2 km

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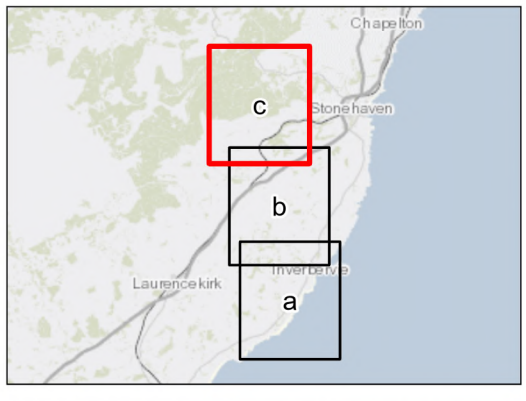

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Figure 13.1c

KIRKTON OF ARBUTHNOTT

KIRKTON HOUSE

PEATTIE

PEATTIE COTTAGES

THREEWELLS COTTAGE

UPPER KNOX FARM

BURNSIDE COTTAGE

NETHER KNOX COTTAGE

EAST TILLYGRAIN

NETHER BENHOLM COTTAGES

N

0 2 km

Legend

- PPP Application Boundary
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- Substation Search Area
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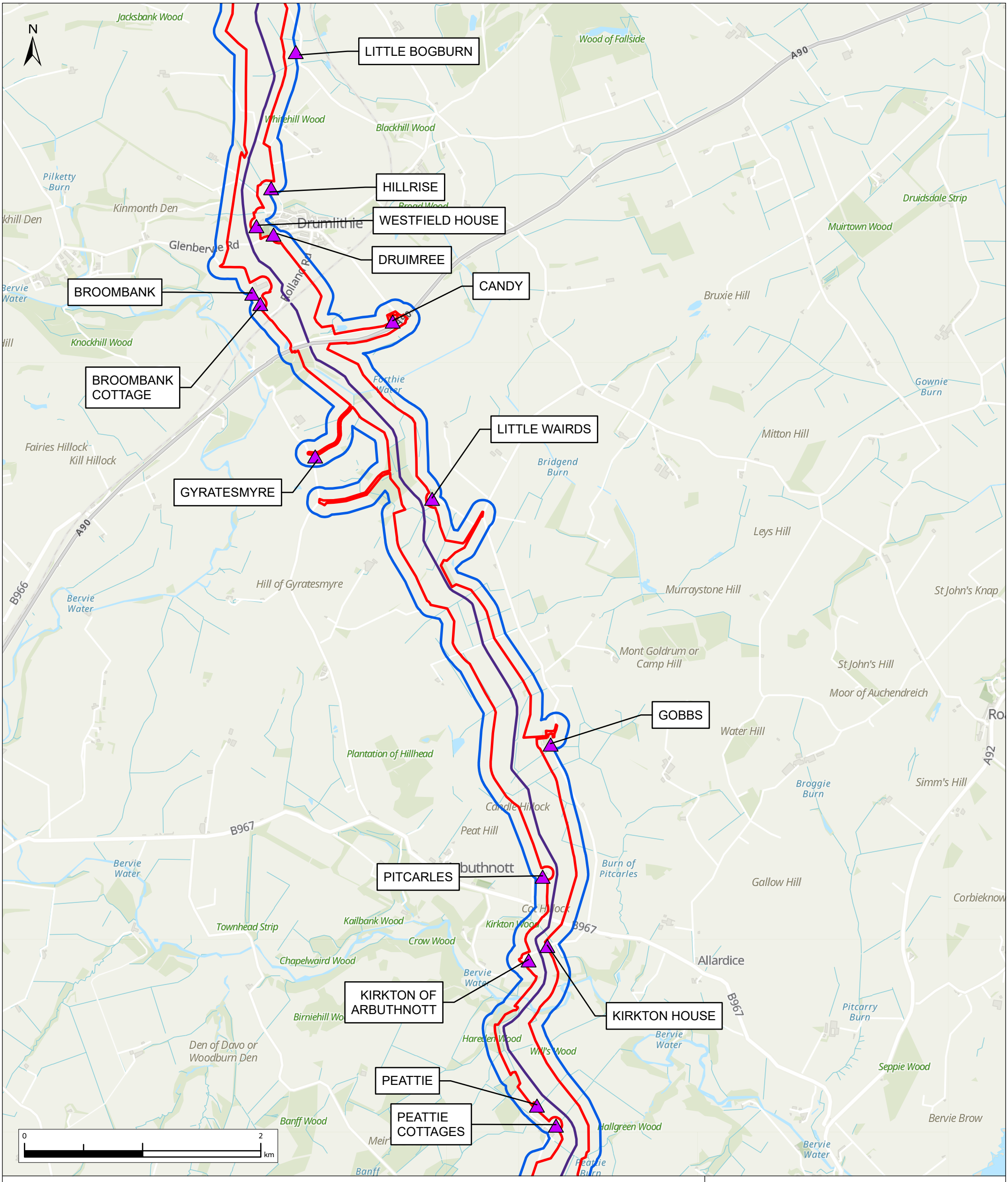
Onshore EIA Report

Drawing Title: Vibration Study Area

Aconnex Number: TWP-BOW-JCB-ONE-DWG-00004

Drawing Status: FINAL

Figure 13.2a



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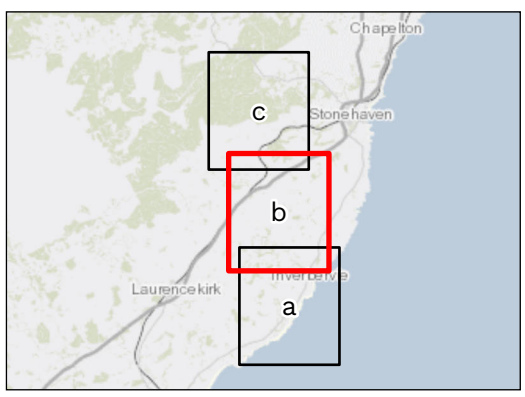

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Onshore EIA Report

Drawing Title: Vibration Study Area

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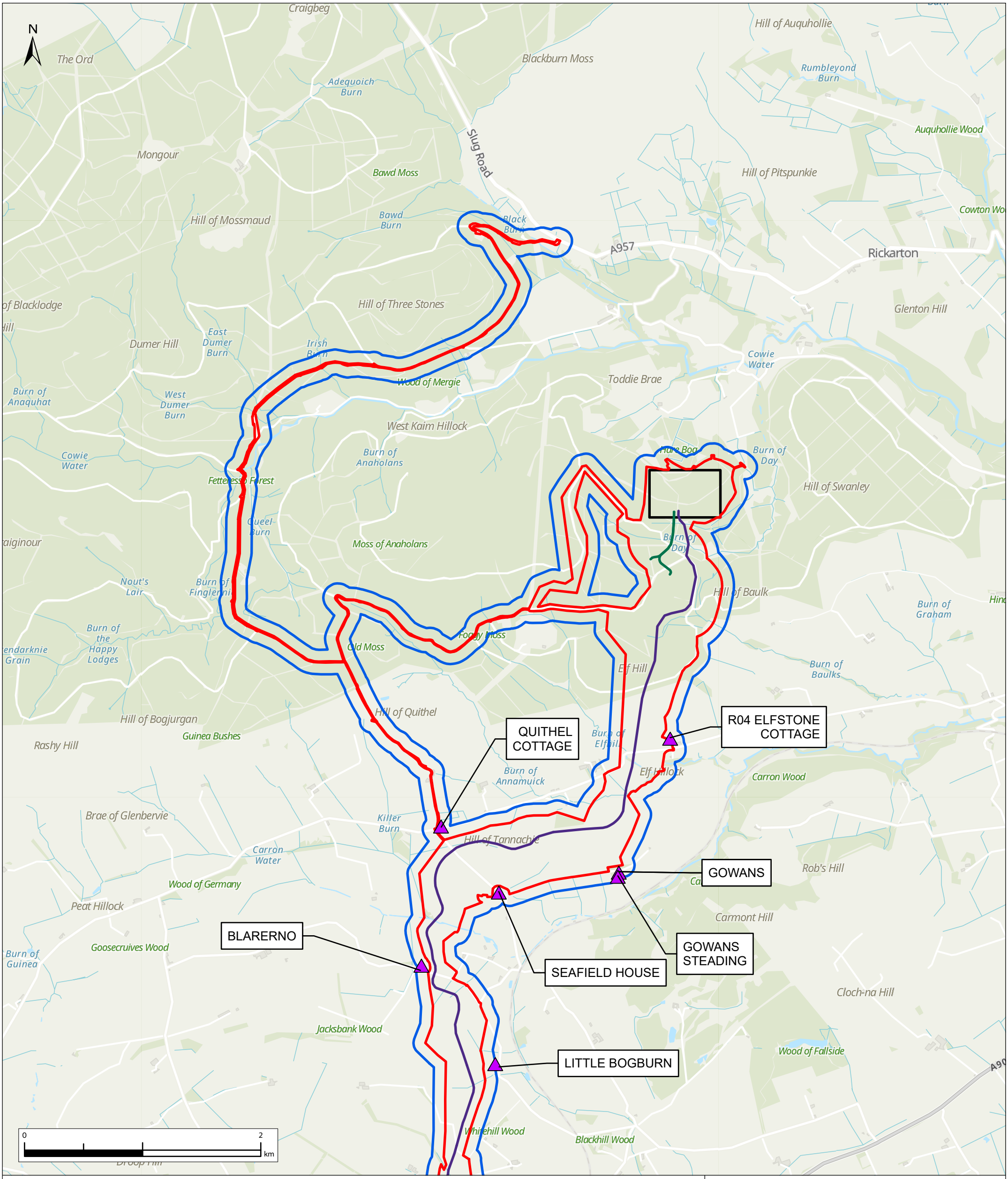
Figure 13.2b



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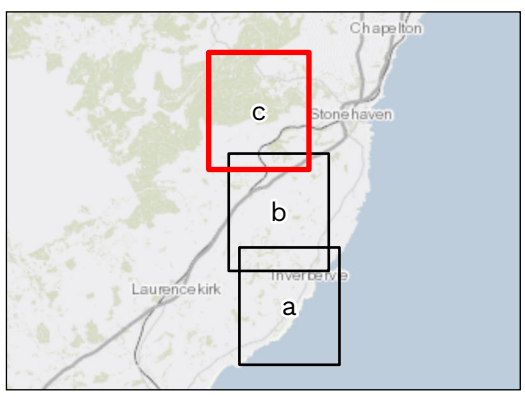

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Figure 13.2c