

## 3 Human Environment

### 3.3 Onshore Noise

#### 3.3.1 Baseline Information

##### Introduction

3.3.1.1 This section considers the baseline against which construction, operation and decommissioning effects have been compared to assess the significance of the noise in EIA terms. A noise technical report is presented in Appendix 3.3 A which presents further details in relation to the baseline environment within the modified onshore export cable corridor and indicative substation locations whilst the baseline noise survey data is presented in Appendix 3.3 A: Noise Technical Report. Appendix 3.3 A (App 2) presents noise levels tables for each assessed construction scenario at varying distances from the works area within the modified onshore export cable corridor and indicative substation locations.

3.3.1.2 Potentially sensitive receptors to noise include residential properties, which are generally located within a predominantly rural location (with the exception of properties located within the urban area of Banff) where existing baseline noise levels are generally relatively low at locations away from main roads. Schools located within the wider study area have also been considered.

3.3.1.3 Potentially sensitive receptors to noise include residential properties, which are generally located within a predominantly rural location (with the exception of properties located within the urban area of Banff) where existing baseline noise levels are generally relatively low at locations away from main roads. Schools located within the wider study area have also been considered.

##### Consultations

3.3.1.4 Details of consultation undertaken with the Aberdeenshire Council is presented in Table 3.3-1.

**Table 3.3-1 Consultation**

Organisation	Consultation Response	MORL Approach
Environmental Health Department, Aberdeenshire Council	<p>Consultation has been undertaken between Sam Moran (WYG) and Linda Will, Environmental Health Officer, Aberdeenshire Council by telephone conversation on 27th May 2014. It was specified by Linda Will that the assessment methodology to be undertaken within the ES is in line with the proposed methodology presented within the MORL TI Scoping Report (MORL, 2014).</p> <p>Regarding the operational noise assessment, Linda Will requested that consideration was given to Noise Rating (NR) levels with respect to establishing the internal noise level criteria at receptors within proximity to the substations.</p>	<p>The assessment has been undertaken in accordance with the agreed methodology (as shown in Appendix 3.3 A) with the exception that the noise survey was completed over a marginally shorter timeframe, although data has still been collected during a variety of weather conditions. Details of the noise survey can be found in Section 4 of the Noise Technical Report and in Appendix 3.3 A (App 2).</p> <p>Consideration has been given to NR levels, details of this assessment can be found in section 5 of Technical Appendix 3.3 A: Noise Technical Report.</p>

## Baseline Characteristics

- 3.3.1.5 The route of the modified OnTI runs through mainly rural areas and passes a number of towns /villages such as Cuminestown and Banff. The route is shown in Figure 3.3-1 In Volume 3.

## Desktop Studies

- 3.3.1.6 In addition to on site observations made during the noise survey, a desk based review of Ordnance Survey (OS) landline information, electoral registers and Google satellite images has been undertaken to identify the location of sensitive receptors which are detailed in the noise technical report.

## Baseline Noise Environment

- 3.3.1.7 In order to define the baseline noise environment along the modified OnTI route, an extensive noise survey has been undertaken at locations representing sensitive receptors around the modified onshore export cable route corridor and indicative substation locations (See Figure 3.3-1 in Volume 3) The measurements include attended and unattended measurements which have been collected during both daytime and night-time periods over weekdays and weekends at 52 survey locations. The noise survey data is tabulated in Appendix 3.3 A(App 2) with further details regarding the survey presented within the noise technical report in Appendix 3.3 A. Noise levels are primarily influenced by traffic noise, livestock, birdsong and wind induced vegetation noise. Noise levels generally fall to very low levels at night in locations away from roads.

## Site Specific Surveys

- 3.3.1.8 A baseline monitoring survey was undertaken at 52 locations (as specified in the following table and shown in Figure 3.3-1 in Volume 3) from 17th May 2014 to 29th May 2014. Attended short term measurements were undertaken at 11 locations during daytime periods on both weekdays and weekends, with 41 additional locations being measured unattended; the results of the baseline survey are summarised in Appendix 3.3 A (App 2), the raw data collected from the long term monitoring is available upon request.
- 3.3.1.9 The short term locations were chosen to represent properties that were not covered by the unattended measurements and as a safeguard in the event of complaints.

## Legislative and Planning Framework

- 3.3.1.10 Noise from wind farm developments is considered within Sections 187 - 192 of Scottish Planning Policy (2010) which states that 'the criteria will vary depending on the scale of development and its relationship to the characteristics of the surrounding area'. With regard to off-shore developments, plans should identify appropriate locations for infrastructure facilities.
- 3.3.1.11 There are local policies regarding noise or vibration within the Aberdeenshire Local Development Plan 2012 which states "Renewable energy development could potentially have an impact on occupiers of neighbouring properties, such as noise, visual intrusion or traffic movements. The developer should demonstrate that satisfactory steps have been taken to mitigate negative development impacts" (Aberdeenshire Council Local Development Plan 2012: Supplementary Guidance Rural Development 3: Other renewable energy developments).

3.3.1.12 The Control of Pollution Act 1974 provides a framework for applying (under section 61) for a 'prior consent for work on construction sites' allowing noise levels and construction methods to be agreed with Aberdeenshire Council.

**Planning Advice Note 1/2011: Planning and Noise**

3.3.1.13 This Planning Advice Note (PAN) provides advice on the role of the planning system in helping to prevent and limit the adverse effects of noise. It provides high level guidance on issues such as development planning, development management, noise impact assessment and mitigation. The PAN refers to Technical Advice Note (TAN): Assessment of Noise for more detailed guidance with respect to noise assessments.

**Technical Advice Note (TAN): Assessment of Noise (March 3, 2011)**

3.3.1.14 The TAN presents guidance on using a five stage assessment approach from identifying sensitive receptors to determining the level of significance of a proposed in order to inform the decision process. This guidance has been used in establishing the assessment methodology within this Chapter.

**3.3.2 Impact Assessment**

**Summary of Effects and Mitigation**

3.3.1.15 A summary of effects and mitigation is presented in Table 3.3-2 below.

**Table 3.3-2 Impact Assessment Summary**

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
<i>Construction &amp; Decommissioning – Modified OnTI</i>				
<b>Noise</b>	141 Sensitive Receptor Locations	Negligible during daytime, up to significant if during evening or night-time	Detailed in Section 1.1.2.9 No night time working.	Negligible.
<b>Vibration</b>	141 Sensitive Receptor Locations	None	None Required	None
<i>Operational Noise (Substation)</i>				
<b>Noise</b>	13 Sensitive Receptor Locations	Will be designed to be neutral effect	No additional required	Will be designed to be neutral effect

**Summary of Effects – Operational Noise (Substations)**

3.3.1.16 During the operational phase, noise will be generated by plant associated with the substations. At this stage of the proposals, specific details of the exact location of these noise sources are not available. However, an indicative worst case scenario assessment has been undertaken to identify potential noise levels at the closest receptors to five worst case indicative substation locations (shown in Figure 3.3-3 in Volume 3). The assessment has identified that at the nearest potential location, the maximum reduction in noise levels required by the substation building/enclosures would need to be 23.3 dB. Typical substation building/enclosure constructions have been considered and show that a 25 – 30 dB reduction will be readily achievable. The buildings and enclosures will be designed to meet the relevant BS8233:2014 (Guidance on sound insulation and noise reduction for buildings) target external and internal noise levels at all nearby sensitive receptor locations and as such there will be no residual effects.

3.3.1.17 The assessment has determined that there will be no operational vibration effects associated with the proposed scheme.

#### **Summary of Effects – Modified OnTI Construction**

3.3.1.18 In accordance with the 'significance based upon noise change' ABC method of assessment outlined in BS 5228-1:2009 (Code of practice for noise and vibration control on construction and open sites), a significant effect is deemed to occur if the total noise level exceeds the threshold level for the category appropriate to the ambient noise level. It can be seen from the results detailed in section 3 of the Noise Technical Report (Appendix 3.3 A) that no properties are expected to receive a significant effect during the daytime.

3.3.1.19 The OnTI works will be temporary, of a short term duration and mostly undertaken during standard daytime working hours, Monday to Saturday. However, there is the possibility that due to operational requirements a small amount of construction work will be required outside of these hours and potentially during the night-time period.

3.3.1.20 The assessment detailed in the Noise Technical Report (see Appendix 3.3 A) confirms that there could be significant noise effects at some properties in the event of evening or night-time working. Night time construction activities will therefore be avoided at all sensitive locations.

3.3.1.21 Noise from Heavy Goods Vehicle (HGV) movements on the public highway has been assessed. There are no significant effects at sensitive receptors (some of which are adjacent to the public highway) during the daytime. There are no proposed HGV movements during the evening or night-time.

#### **Proposed Mitigation Measures and Residual Effects**

##### *Operational Phase*

3.3.1.22 The buildings and enclosures will be designed to meet the relevant BS8233:2014 target external and internal noise levels at all nearby sensitive receptor locations and as such there will be no residual effects. The requirement to achieve this criteria can be enforced through the use of suitably worded planning conditions.

##### *Modified OnTI Construction*

3.3.1.23 During the construction phase, through the use of 'Best practice' noise control measures outlined in Section 8.5 of BS 5228:2009 (Code of practice for noise and vibration control on construction and open sites), and the restriction of working hours such as at evenings and weekends, noise effects can be reduced and the assessment shows that significant effects are not likely to occur.

#### **Introduction to Impact Assessment**

3.3.1.24 The methodology used to assess the likely effects during the construction, operational and decommissioning phases has been defined within the context of planning policy and guidance. Effects which are significant have been established and, where required, mitigation measures have been specified. The residual effects have then been stated.

#### **Details of Impact Assessment**

3.3.1.25 With respect to noise assessments in Scotland, the principal planning advice and guidance is contained within Planning Advice Note 1/2011: Planning and Noise and Technical Advice Note (TAN): Assessment of Noise. In addition, with regard to noise sources of an industrial nature, BS 4142 'Rating Industrial Noise Affecting Mixed Residential and Industrial Areas' (1997) is typically regarded as the most appropriate assessment method.

- 3.3.1.26 BS 4142 states that the standard is unsuitable when background noise levels and noise rating levels  $L_{Aeq}$  are very low. The documents clarifies that a background noise level of around 30 dB and a noise rating level of around 35  $dBL_{Aeq}$  are very low; measured background noise levels at residential locations surrounding the proposed substation locations are considered to be very low (around or below 30 dB  $L_{A90}$ ). Accordingly, rather than adopting the 5 stage approach outlined within the TAN, the assessment is based on achieving an external noise rating level of 35  $dBL_{Aeq,1hour}$  at the nearest sensitive receptors.
- 3.3.1.27 Noise from potential construction activity has been assessed in accordance with BS 5228-1: 2009 'Code of Practice for Noise and vibration control on construction and open sites' which provides guidance on the prediction, measurement and assessment of noise generated from construction sites as follows. In order to determine whether construction noise levels are significant or not, reference has been made to the fixed limit and ABC methods provided in Annex E.2 of BS 5228-1:2009.
- 3.3.1.28 In accordance with the principles outlined in BS 4142:1997, BS 8233:2014 and BS 5228:2009 methodologies, the criteria which the noise impact during the construction and operational have been assessed against have been established following the review of the baseline noise data collected during the noise survey. During construction, the assessment has considered receptors along and adjacent to the modified OnTI whilst the operational assessment considers only the area around the indicative substation locations (See Figures 3.3-2 and 3.3-3 in Volume 3).

**Rochdale Envelope Parameters Considered in the Assessment**

3.3.1.29 The Rochdale Envelope considers all the potential modified OnTI parameters and scenarios, the details of which are presented in Chapter 2.2: Project Description. The potential for noise and vibration effects during the construction, operation and decommissioning phases of the modified OnTI are based upon the 'realistic worst case scenario' indicated in the design envelope and are specific to the potential effects assessed in this Chapter. The design envelope parameters considered within the assessment are presented in the Table below (Table 3.3-3).

**Table 3.3-3 Rochdale Envelope Parameters relevant to the Noise and Vibration Impact Assessment**

Potential Effect	Rochdale Envelope Scenario Assessed
<i>Construction &amp; Decommissioning</i>	
<b>Site Preparation and Construction Noise</b>	Given the cable corridor, receptors within 1 km of the corridor have been assessed using realistic worst case 1 hour construction noise levels. Receptors within 1km are those that have the potential to be around or above background noise levels.  The modified export cable Landfall / modified onshore export cable route corridor / indicative location of onshore substations has been assessed.
<b>Noise from HGV movements</b>	In the absence of exact locations of HGV movements, the HGV movements based on data provided in table 5.6-5 of Chapter 5.6 (transport) have been assessed.
<b>Vibration</b>	Although the precise locations of piling (if any) are not known, only daytime sheet piling at a small number of locations will be undertaken during the construction phase. However it is known that there is no cable percussive piling proposed and no piling at night.
<i>Operation</i>	
<b>Noise</b>	The noise assessment has considered potential plant locations within five indicative locations on the site of the onshore substations shown in Figure 3.3.3 in Volume 3.  Closest sensitive properties (up to 1km) to the five worst case indicative locations of the substations have been considered. Beyond this distance worst case predicted operational noise levels would be below background noise levels.

## EIA Methodology

3.3.1.30 A 'significance matrix assessment approach' which is based on the characteristics of the effect (magnitude and nature) and the sensitivity of the receptor has been set out below. This allows the relative significance of effects to be assessed on a scale and ultimately the significant effects determined, as explained in the following subsections. The derivation of the significance of effects follows stages 1 – 4 as presented in the TAN (Technical Advice Note (TAN): Assessment of Noise (March 3, 2011) to derive the descriptors and assessment criteria. It should be noted, however, that the overarching method which has been adopted as part of this assessment, using the most appropriate guidance, is based on establishing whether the effects of the modified OnTI are significant or not in EIA terms within the context of absolute noise level criteria. This approach incorporates the matrix based approach with the TAN stages as identified below.

### Stage 1 – Initial Process

3.3.1.31 Key receptors to noise include individual or groups of residential properties, hospitals and schools. Table 3.3-4 provides examples of the different sensitivities which can be assigned to different receptors.

**Table 3.3-4 Method for Assessing the Sensitivity Associated with Various Examples of Noise Sensitive Receptors**

Sensitivity	Description	Receptor
<b>High</b>	Receptors where people or operations are particularly susceptible to noise	Residential, including private gardens where appropriate Quiet outdoor areas used for recreation Conference facilities Theatres/Auditoria/Studios Schools during the daytime Hospitals/residential care homes Places of worship
<b>Medium</b>	Receptors moderately sensitive to noise, where it may cause some distraction or disturbance	Offices Bars/Cafes/Restaurants where external noise may be intrusive Sports grounds when spectator noise is not a normal part of the event and where quiet conditions are necessary (e.g. tennis, golf, bowls)
<b>Low</b>	Receptors where distraction or disturbance from noise is minimal	Buildings not occupied during working hours Factories and working environments with existing high noise levels Sports grounds when spectator noise is a normal part of the event Night Clubs

### Stage 2 – Quantitative Assessment

3.3.1.32 Table 3.3-5 presents the descriptors and corresponding general criteria which provide a classification of the magnitude of noise effects. The table also identifies a method of assessing the magnitude of effect in terms of the change in noise level as a result of the proposed development.

**Table 3.3-5 Classification of Magnitude on Noise Effects**

Descriptors for Magnitude of Effect	Criteria of Descriptor and Change in Noise Level Effect / Change in Noise Level, dB
<b>Major</b>	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements. Greater than +5 dB
<b>Moderate</b>	Loss of resource, but not adversely affecting the integrity; partial loss of / damage to key characteristics, features or elements. From +3 dB to + 5 dB
<b>Minor</b>	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. From +1 dB to + 3 dB
<b>Negligible</b>	Very minor loss or detrimental alteration to one or more characteristics, features or elements. From 0 dB to + 1 dB
<b>No Change</b>	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

3.3.1.33 Further to the general classification presented in Table 3.3-5, for the purpose of this assessment there is the requirement to consider establishing descriptors which are specific to a particular source of noise.

3.3.1.34 BS 5228: 2009+A1 2014 - "Code of practice for noise and vibration control on construction and open sites" sets out a methodology for predicting, assessing and controlling noise and vibration during construction works. An example method to define the significance of the potential construction noise effects is the 'significance based upon noise change method' presented within Annex E of BS 5228-1:2009. This is explained in Stage 4 below and establishes the significance of noise effects.

3.3.1.35 With respect to a source which is industrial in nature, such as mechanised plant associated with the substations, the most relevant guidance is BS 4142:1997 'Rating Industrial Noise Affecting Mixed Residential and Industrial Areas' (1997).

3.3.1.36 In addition to noise levels the likelihood of complaints depends on the individuals affected and to the acoustic features present. Section 8 of BS 4142:1997 recommends that a correction factor of +5dB be applied to the specific noise level if the noise contains certain acoustic features that can increase the likelihood of complaints. Such features of new or modified noise sources include:

- a distinguishable, discrete, continuous note (whine, hiss, screech, hum etc.)
- distinct impulses (bangs, clicks, clatters or thumps)
- irregular enough to attract attention.

3.3.1.37 As specified within the MORL TI Scoping Report (MORL, 2014), due to the rural nature of the area where the indicative substations are located, existing background noise levels will be low. BS 4142:1997 specifies that the method is not suitable for assessing noise measured inside buildings or when the background noise level and rating level are very low. For the purpose of the standard, background noise levels below around 30 dB and rating levels below around 35 dB are considered to be very low. The baseline noise survey shows that during both daytime and night-time periods very low noise levels exist within the modified OnTI area. As such, measured background noise levels determine that the assessment area falls outside of the scope of BS 4142:1997.

### Stage 3 – Qualitative Assessment

3.3.1.38 Where the quantitative assessment does not provide sufficient information on noise effects or where attributing a descriptor is over simplistic, a qualitative assessment can be used to assist in the determination of the significance of effect.

3.3.1.39 This stage is based on perception and how noticeable the noise effect is in affecting the amenity value of the noise-sensitive receptor. In order for a qualitative assessment to assist in supporting or modifying the outcome reached from the quantitative assessment, descriptors for the qualitative effects that correspond with those used for assessing the magnitude of effects need to be assigned. This is presented in Table 3.3-6 below.

**Table 3.3-6 Example of Assigning Descriptors for Qualitative Effects from Noise on Sensitive Properties**

Perception	Criteria of Descriptor for Residential Dwellings	Descriptor for Qualitative Impact
<b>Noticeable (Very disruptive)</b>	Significant changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm.	Major significance
<b>Noticeable (Disruptive)</b>	Causes an important change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area.	Moderate significance
<b>Noticeable (Mildly Intrusive)</b>	Noise can be heard and may cause small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows more often. Potential for non-awakening sleep disturbance. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Minor significance
<b>Just Noticeable (Non intrusive)</b>	Noise can be heard, but does not cause any change in behaviour or attitude, e.g. increasing volume of television; speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Negligible
<b>Not Noticeable</b>	None	No Effect

### Stage 4 – Level of Significance

3.3.1.40 Table 3.3-7 presents an example of how the interaction of magnitude and sensitivity results in the significance of an environmental effect. If the scale of the effect magnitude is negative then the resulting effect is adverse. If the scale of the effect magnitude is positive then the resulting effect is beneficial.



**Table 3.3-7 Example of Assigning Descriptors for Qualitative Effects from Noise on Sensitive Properties**

Magnitude of Effect	Sensitivity of Receptor		
	High	Medium	Low
<b>Major</b>	Large / Very Large	Moderate / Large	Slight / Moderate
<b>Moderate</b>	Moderate / Large	Moderate	Slight
<b>Minor</b>	Slight / Moderate	Slight	Neutral / Slight
<b>Negligible</b>	Slight	Neutral / Slight	Neutral / Slight
<b>No change</b>	Neutral	Neutral	Neutral

3.3.1.41 As stated within the TAN, the level of significance and its relevance to the decision making process is explained as follows:

- Very Large: These effects represent key factors in the decision-making process. They are generally, but not exclusively, associated with effects where mitigation is not practical or would be ineffective.
- Large: These effects are likely to be important considerations but where mitigation may be effectively employed such that resultant adverse effects are likely to have a Moderate or Slight significance.
- Moderate: These effects, if adverse, while important, are not likely to be key decision making issues.
- Slight: These effects may be raised but are unlikely to be of importance in the decision making process.
- Neutral: No effect, not significant, noise need not be considered as a determining factor in the decision making process.

3.3.1.42 This assessment considers the above levels of significance to be synonymous with EIA significance criteria.

*Construction Noise*

3.3.1.43 With regard to construction effects, the specific assessment methodology used follows the BS 5228-1:2009 ABC Method (E.3.2. Example Method 1). This method is adopted to identify whether the level of construction noise incident at neighbouring residents could be significant. Primarily, the ABC Method requires the ambient noise level for the appropriate period (night, evening/weekends or day) to be determined and rounded to the nearest 5dB. This is then compared with the site noise level and if the site noise level exceeds the appropriate category value, then a significant effect is deemed to potentially occur.

3.3.1.44 However, as these thresholds are primarily relevant with regard to long term large scale road or rail projects, the Stage 3 qualitative assessment will also be used to establish whether the effect is significant in line with the TAN guidance and in EIA terms.

3.3.1.45 Table 3.3-8 below shows the threshold of significant noise effects at dwellings (as defined in BS 5228-1:2009 ABC Method (E.3.2. Example Method 1). In the absence of other specific guidance, it is considered reasonable to consider the effect will be comparable at other receptors of high sensitivity. In EIA terms, for the purpose of this assessment, if the predicted noise level falls on or below the relevant threshold presented in Table 3.3-8, the effect will not be significant whilst an effect will be significant if it exceeds the threshold. The Stage 3 Qualitative assessment will be referred to in determining the residual effect.

**Table 3.3-8 Matrix for Determining Threshold of Potentially Significant Construction Noise Effects (from BS 5228-1:2009)**

Assessment category and threshold value period (LAeq) [Average A-Weighted Noise Levels]	Threshold value in decibels (dB)		
	Category A <sup>A)</sup>	Category B <sup>B)</sup>	Category C <sup>C)</sup>
Night (23:00 – 07:00)	45	50	55
Evenings and Weekends <sup>D)</sup>	55	60	65
Day (07:00 – 19:00) and Saturdays (07:00 / 13:00)	65	70	75
<p>Note 1: A significant effect has been deemed to occur if the L<sub>Aeq</sub> noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.</p> <p>Note 2: If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise is higher than the above values), then a significant effect is deemed to occur if the total L<sub>Aeq</sub> noise level for the period increases by more than 3 dB due to construction activity.</p> <p>Note 3: Applied to residential receptors only.</p> <p>A) Category A: threshold values to use when the ambient noise levels (when rounded to the nearest 5dB) are less than these values.</p> <p>B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.</p> <p>C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.</p> <p>D) 19.00-2300 weekdays, 13.00-2300 Saturdays and 07.00-2300 Sundays</p>			

### Industrial Noise

3.3.1.46 Due to the very low existing background noise levels, the noise criteria presented within BS 8233:2014 'Sound insulation and noise reduction for buildings – code of practice' and World Health Organisation (WHO) recommendations presented within their 'Guidelines for Community Noise' (1999) publication have been used. In addition to the guidance provided within BS 8233:2014 and the WHO Guidelines, further consideration has been given to NR curves which are considered to be another way of demonstrating acceptable levels in noise sensitive premises whilst taking into account the anticipated tonal content of the noise generation.

3.3.1.47 For the purpose of this assessment the target noise criteria (based on BS 8233:2014) will be applied:

- Internal noise levels in bedrooms: 25 dBL<sub>Aeq,5 mins</sub> / NR 20
- Internal noise levels in living rooms: 30 dBL<sub>Aeq,1 hour</sub> / NR 25
- Noise levels in external amenity areas: 35 dBL<sub>Aeq,1 hour</sub> / NR 25

3.3.1.48 In EIA terms, for the purpose of this assessment, if the predicted noise level falls on or below the NR criteria specified in the bullet points above, the effect will not be significant whilst an effect will be significant if it exceeds the criteria.

### Limitations of the Assessment

3.3.1.49 With regard to construction works, the detailed design work has not yet been commissioned. Where such details are unknown, the assessment undertaken has been based on a worst case scenario informed by previous experience and professional judgement of the assessor with regard to similar types of development or source noise data for similar applications which is available within the public domain.

3.3.1.50 The assessment undertaken provides sufficient information to enable the Local Planning Authority to adequately assess the likely effects of the modified OnTI for all identified sources of noise during the construction, operational and decommissioning phases.

## Impact Assessment

### Operational Noise (Substation)

- 3.3.1.51 During the operational phase, noise will be generated by plant associated with the substations. At this stage of the proposals, specific details of the exact location of these noise sources are not available. However, an indicative worst case scenario assessment has been undertaken to identify potential noise levels at the closest receptors to indicative substation location (shown in Figure 3.3-3 in Volume 3). The assessment has identified that at the nearest potential location, the maximum reduction in noise levels required by the building/enclosures would need to be 23.3 dB. Typical building/enclosure constructions have been considered and show that a 25 – 30 dB reduction will be readily achievable. The buildings and enclosures will be designed to meet the relevant BS 8233:2014 target external and internal noise levels at all nearby sensitive receptor locations and as such the impact significance will be **'permanent'** but there will be a **'no change'** magnitude of effect on **high sensitivity** receptors, giving an overall **'neutral effect'**. As such, with regard to residual effects, there will be none.
- 3.3.1.52 The assessment has determined that there will be no operational vibration effects associated with the proposed scheme.

### Construction (Modified OnTI)

#### Noise

- 3.3.1.53 The most notable effects due to increases in noise during construction would be during periods of earthworks, construction of site infrastructure and the construction of substructures. In addition to onsite sources, increased noise may be caused by HGV movements travelling to and from the site during construction.
- 3.3.1.54 Whilst construction / demolition noise effects are generally sufficiently controlled by adherence to 'Best Practice' techniques and restricted operating hours, an indicative realistic worst case noise assessment has been undertaken to assess whether any effects that could be significant may arise.
- 3.3.1.55 The assessment has been undertaken based on the use of assumed construction plant and considering the range of typical activities likely to be employed during the construction phase of the modified OnTI. The following scenarios have been assessed with regard to works occurring at landfall, over the cable route and within the onshore substation area:
- Site preparation: top soil removal
  - Site construction of access roads and site compound
  - Trench excavation (open trench or cable plough)
  - Laying the cable and jointing
  - Backfilling the trench
  - Re-instatement
  - Cable pulling
  - Sheet piling.
- 3.3.1.56 Indicatively, works at the modified offshore export cable landfall point are expected to be undertaken over a 3 month period with specific activities lasting typically up to 1 month. In terms of the modified export cable route, it is expected that a distance of 1.5 km will be progressed per week. The longest period of works will comprise the civil engineering works which are expected to be undertaken over a 24 month period.

- 3.3.1.57 Information regarding noise emissions from equipment that may be used during the works has been obtained from Annex C of BS 5228-1:2009. This annex presents a range of current sound level data on typical site equipment and common site activities.
- 3.3.1.58 This data was obtained by field measurements for items of plant in actual use on construction and open sites in the UK. Levels quoted in the database are based on an average (logarithmic) of measured sound levels, and where appropriate have been derived from more than one model of similarly sized plant. The results are presented as un-weighted octave band activity Leq levels, and overall A-weighted activity Leq levels in dB. All sound pressure levels are standardized to 10 m from the plant.
- 3.3.1.59 With respect to HGV movements, it is anticipated that these will only occur during daytime periods. Therefore, an assessment has been undertaken in accordance with the BS5228 method of mobile plant using a well defined route. Appendix 3.3 A presents predicted noise levels based on data detailed in table 5.6-5 of Chapter 5.6 (Traffic and Transport).
- 3.3.1.60 In accordance with the ABC method of assessment outlined in BS 5228-1:2009, a significant effect is deemed to occur if the total noise level exceeds the threshold level for the category appropriate to the ambient noise level. It can be seen from the results detailed in the Technical Report (section 3) that no properties are expected to experience a significant effect during the daytime.
- 3.3.1.61 The OnTI works will be **temporary**, of a **short term** duration and mostly undertaken during standard daytime working hours, Monday to Saturday. However, there is the possibility that due to operational requirements a small amount of construction work will be required outside of these hours and potentially during the night-time period.
- 3.3.1.62 The assessment detailed in the noise technical report (Appendix 3.3 A) confirms that there could be significant effects of noise at some properties in the event of evening or night-time working.
- 3.3.1.63 With regard to HGV movements on the public highway, the effects will be transient at locations adjacent to the road network during daytime periods and it has been established that there will be no significant effects from noise or vibration.

#### *Vibration*

- 3.3.1.64 As specified within the MORL TI Scoping Report (MORL, 2014) the vast majority of activities will not generate levels of vibration which would result in significant effects. It is confirmed that there is no cable percussive piling proposed and that only sheet piling will be undertaken during the construction phase.

### **Decommissioning**

#### *Noise*

- 3.3.1.65 The OnTI construction noise assessment is considered to also be representative of any decommissioning works both for removal of the infrastructure and of the substations. As such the conclusions remain the same in that no properties are expected to have a significant effect if the works are undertaken during the daytime, however there could be significant effects of noise at some properties in the event of evening or night-time working.
- 3.3.1.66 The decommissioning works will be **temporary**, of a **short term** duration and mostly undertaken during standard daytime working hours, Monday to Saturday. However, there is the possibility that due to operational requirements a small amount of

decommissioning work will be required outside of these hours and potentially during the night-time period.

- 3.3.1.67 The assessment detailed in the noise technical report (Appendix 3.3A) confirms that there could be significant effects of noise at some properties in the event of evening or night-time working.

## Proposed Monitoring and Mitigation

### Operational Noise

- 3.3.1.68 The design benefits from Gas Insulated Switchgear (GIS) and as such, plant will be housed within buildings fitted with silencers / attenuators. The assessment has identified that at the nearest potential location, the maximum reduction in noise levels required by the building/enclosures would need to be 23.3 dB. Typical building/enclosure constructions have been considered and show that a 25 – 30 dB reduction will be readily achievable. The buildings and enclosures will be designed to meet the relevant BS8233:2014 target external and internal noise levels at all nearby sensitive receptor locations and as such there will be **'no change'** magnitude of effects on **high sensitivity** receptors giving an overall **'neutral effect'**. There will be no residual effects and no requirement for additional mitigation beyond this design.

### Construction

- 3.3.1.69 Construction works may be subject to control by suitably worded planning conditions. It is recommended that 'Best Practicable Means' should be employed to minimise adverse effects.
- 3.3.1.70 MORL will prepare and adhere to a Construction and Environmental Management Plan (CEMP) within which procedures and methods can be specified to protect noise and vibration sensitive receptors. This will include a series of specific method statements identifying methods of working and controls to address the OnTI development's construction noise and vibration effects. The CEMP will be implemented during the construction phase. Mitigation measures specified below have been included as an example of suitable mitigation measures and should not be regarded as an exhaustive list. Therefore, the following additional mitigation should be considered the minimum additional mitigation required to control and minimise noise impacts from such associated activities:
- Restricting hours of site operation in agreement with Aberdeenshire Council. If there is the requirement to undertake work outside of the agreed hours, further consultation should be undertaken with Aberdeenshire Council.
  - For Horizontal Directional Drilling (where required) works the location of noise sensitive receptors should be identified and an assessment of predicted noise levels undertaken to establish the likely effects. Consultation will be undertaken with both the Local Authority and residents where significant effects are predicted.
  - Residents located within 100 m of a construction works area during each of the modified OnTI phases should be notified of the works being undertaken. Consultation will also be undertaken at schools and holiday premises within this zone. The times, duration and type of work should be explained. This should be extended as applicable should evening and night-time working be undertaken.
  - Careful selection of working methods and programme.
  - Selection of quietest working equipment available (e.g. electric/battery powered equipment which is generally quieter than petrol/diesel powered equipment).

- Positioning equipment behind physical barriers, i.e. existing features, hoarding, etc., or provision of lined and sealed acoustic covers for equipment that could potentially contribute to a noise nuisance.
- Positioning of noise generating equipment, such as any blending plant in areas which minimise noise as far is practicable.
- Directing noise emissions away from plant including exhausts or engines away from sensitive locations.
- Ensuring that regularly maintained and appropriately silenced equipment is used.
- Shutting down equipment when not in use, i.e. maintain a 'no idling policy'.
- Handling all materials in a manner which minimises noise.
- Switching all audible warning systems to the minimum setting required by the Health and Safety Executive.
- Where processes could give rise to significant levels of noise, noise levels should be monitored regularly by a suitably qualified person. The methodology of any surveys should be agreed with the Local Authority.
- Employing best practices and follow guidance of British Standard 5228 – Parts 1 and 2.

3.3.1.71 Following the implementation of the above mentioned mitigation works, it is considered that all effects which are significant in EIA terms can be avoided. For daytime works the effect magnitude will be **minor** at receptors of **high sensitivity**. Therefore, the residual effect is **slight / moderate adverse** which, although an important consideration, can be effectively mitigated (as detailed above) to reduce noise levels such that resultant adverse effects are likely to have only a **slight significance**.

### 3.3.3 Cumulative Impact Assessment

#### Operational Effects - Substations

3.3.1.72 No committed developments are located within the vicinity (up to 2 km) of the substation area and thus there are no cumulative effects anticipated.

#### Construction (Modified OnTI)

3.3.1.73 This section presents the results of assessment of the potential cumulative effects upon noise and vibration arising from the modified OnTI in conjunction with other existing or reasonably foreseeable onshore developments and activities. MORL's approach to the assessment of cumulative effects is described in Chapter 1.3 of this ES: Environmental Impact Assessment.

3.3.1.74 It is considered highly unlikely that any construction works associated with other developments, including those undertaken with respect to the three consented wind farms or MORL Western Development Area, will be undertaken at the same location and at the same time as the as the temporary modified OnTI construction works. As such, it is considered highly unlikely that any cumulative noise generation would result in changes to the effects at identified receptors. Similarly, the proposed substations will not generate any cumulative significant noise effects during operation as they would need to be located adjacent to or within the indicative substation locations.

## References

- Aberdeenshire Council (2012) Aberdeenshire Local Development Plan, adopted 1 June 2012.
- Aberdeen City and Shire Strategic Development Planning Authority (SDPA) (2014) Aberdeen City and Shire Strategic Development Plan 2014.
- BOWL and Arcus Renewable Energy Consulting Ltd, (2012) Beatrice Offshore Windfarm EIA, October 2012
- BS 5228 (2009+A1 2014) – Noise and Vibration Control on Construction and Open Sites, Part 1: Noise
- BS 5228 (2009) – Noise and Vibration Control on Construction and Open Sites, Part 2: Vibration
- BS 7385 – 2 (1993) – Evaluation and Measurement for Vibration in Buildings, Part 2: Guide to Damage Levels from Groundborne Vibration
- British Standard 4142 (1997) - Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas
- BS 8233 (2014) – Guidance on sound insulation and noise reduction for buildings
- BS 4142:1997 – Method for rating industrial noise affecting mixed residential and industrial areas
- Department of Environment, Transport and the Welsh Office (1998) Calculation of Road Traffic Noise.
- Department of Transport (November 2011) Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7 – HD 213/11.
- EON (2012) Rampion Offshore Wind Farm, ES Section 27 – Noise, December 2012
- MORL (2014) MORL TI Scoping Report.
- WHO (1999) Guidelines for Community Noise.