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Volume 7: Other Documents

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Outline Noise and Vibration Management Plan - Clean Version

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1. Introduction

1.1 Summary

- 1.1.1 National Grid Electricity Transmission plc ('National Grid') owns and maintains the national high voltage electricity transmission network throughout England and Wales. National Grid has developed plans for Norwich to Tilbury (the 'Project'). The Project would support the UK's net zero target through the connection of new low carbon energy generation in East Anglia and by reinforcing the transmission network.
- 1.1.2 The Project comprises reinforcement of the transmission network between the existing Norwich Main Substation in Norfolk and Tilbury Substation in Essex, via Bramford Substation, the new East Anglia Connection Node (EACN) Substation and the new Tilbury North Substation.
- 1.1.3 The Project is a Nationally Significant Infrastructure Project (NSIP), and National Grid is seeking development consent under statutory procedures set by government. NSIPs are projects of certain types, over a certain size, which are considered by the government to be of national importance, hence permission to build them needs to be given at a national level, by the relevant Secretary of State. Instead of applying to the local authority for planning permission, the developer must apply to the Planning Inspectorate for a Development Consent Order (DCO) that would grant development consent.
- 1.1.4 This document is an outline management plan prepared as an appendix to the Outline Code of Construction Practice (CoCP) (document reference 7.2) (Revision F). It forms part of a suite of outline management plans that provide the preliminary framework for the principles, standards and procedures that the Main Works Contractor(s) must implement to minimise and manage the potential environmental impacts of construction activities associated with the Project. This outline management plan will be fully developed based on detailed design and construction methodology information to be provided by the Main Works Contractor(s). The final version will be submitted for approval in accordance with Requirement 4 (construction management plans) of the draft DCO (document reference 3.1) (Revision E) prior to commencement of development. This process ensures that detailed design is developed with a clear alignment between the Outline CoCP (document reference 7.2) (Revision F), and this outline management plan.
- 1.1.5 The purpose of the Outline Noise and Vibration Management Plan (NVMP) is to set out the outline framework for the management of noise and vibration, and where feasible at this stage, the site-specific measures and construction methodologies that are required to help avoid or reduce potential effects of the Project on the environment during construction. The Outline NVMP is based on the Project detail as submitted with the application for development consent. This Outline NVMP would be updated to a detailed NVMP prior to commencement of development to include any further site-specific measures identified by the Main Works Contractor(s).
- 1.1.6 All pre-commencement operations (as defined in Article 2(1) of the draft DCO (document reference 3.1) (Revision F)) must be carried out in accordance with the Outline CoCP. In doing so, where any measures referenced in the Outline CoCP are

to be agreed with the relevant LPA, National Grid and / or its Main Works Contractor(s) must seek the agreement of the relevant LPA before carrying out any pre-commencement operations to which those measures are relevant.

1.2 Project Description

1.2.1 The Project is a proposal by National Grid to upgrade the electricity transmission system in East Anglia between Norwich and Tilbury, comprising:

- A new 400 kilovolt (kV) electricity transmission connection of approximately 180 km overall length from Norwich Main Substation to Tilbury Substation via Bramford Substation, a new East Anglia Connection Node (EACN) Substation and a new Tilbury North Substation, including:
 - Approximately 159 km of new overhead line supported on approximately 509 pylons, either standard steel lattice pylons (approximately 50 m in height) or low height steel lattice pylons (approximately 40 m in height) and some of which would be gantries (typically up to 15 m in height) within proposed Cable Sealing End (CSE) compounds or existing or proposed substations
 - Approximately 21 km of 400 kV underground cabling, some of which would be located through the Dedham Vale National Landscape (an Area of Outstanding Natural Beauty (AONB¹).
- Up to seven new CSE compounds (with permanent access) to connect the overhead lines to the underground cables
- Modification works to connect into the existing Norwich Main Substation and a substation extension at the existing Bramford Substation
- A new 400 kV substation on the Tendring Peninsula, referred to as the EACN Substation (with a new permanent access). This is proposed to be an Air Insulated Switchgear (AIS) substation
- A new 400 kV substation to the south of Orsett Golf Course in Essex, referred to as the Tilbury North Substation (with a new permanent access). This is proposed to be a Gas Insulated Switchgear (GIS) substation
- Modifications to the existing National Grid Electricity Transmission overhead lines to facilitate the connection of the existing network into the new Tilbury North Substation to provide connection to the Tilbury Substation
- Ancillary and/or temporary works associated with the construction of the Project.

1.2.2 In addition, third party utilities diversions and/or modifications would be required to facilitate the construction of the Project. There would also be land required for environmental mitigation and Biodiversity Net Gain (BNG).

1.2.3 As well as the permanent infrastructure, land would also be required temporarily for construction activities including, for example, working areas for construction equipment and machinery, site offices, welfare, storage and temporary construction access.

¹ National Landscape is the rebranded name of an Area of Outstanding Natural Beauty (AONB) from 22 November 2023

- 1.2.4 The Project would be designed, constructed and operated in accordance with applicable health and safety legislation. The Project will need to comply with design safety standards including the Security and Quality of Supply Standard (SQSS), which sets out the criteria and methodology for planning and operating the National Electricity Transmission System (NETS). This informs a suite of National Grid policies and processes, which contain details on design standards required to be met when designing, constructing and operating assets such as those proposed for the Project.
- 1.2.5 Further details of the Project are included within Chapter 4: Project Description of the Environmental Statement (ES) (document reference 6.4).
- The Project has also been sub-divided into eight geographical sections for reader accessibility, based largely on Local Planning Authority boundaries. These comprise:
 - Section A – South Norfolk Council
 - Section B – Mid Suffolk District Council
 - Section C – Babergh District Council, Colchester City Council and Tendring District Council
 - Section D – Colchester City Council
 - Section E – Braintree District Council
 - Section F – Chelmsford City Council and Brentwood Borough Council
 - Section G – Basildon Borough Council and Brentwood Borough Council (and part of Chelmsford City Council)
 - Section H – Thurrock Council.

1.3 Purpose of the Outline NVMP

- 1.3.1 The purpose of this Outline NVMP is to provide the overarching general principles, controls, and arrangements that will be applied to the Project with regard to noise and vibration during construction.
- 1.3.2 This Outline NVMP seeks to protect noise and vibration sensitive receptors (NSRs) including residential NSRs (both domestic and recreational such as hotels, guest houses, holiday parks, campsites, and other tourism related uses), schools, healthcare facilities, offices, heritage, and ecological NSRs.
- 1.3.3 This Outline NVMP considers the impact of noise and vibration and the control measures that will be employed to mitigate the risks by reducing and minimising adverse effects. These will be supported through monitoring procedures to identify both elevated noise and vibration levels and to review complaints, should they arise. The complaints management procedure, including management responsibilities, is also addressed.
- 1.3.4 This Outline NVMP aims to assist in complying with the following legislation:
- Environmental Protection Act 1990 (EPA)
 - Control of Pollution Act 1974 (CoPA).

- 1.3.5 This Outline NVMP aims to assist compliance with the above legislation through the following appropriate guidance:
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise (BS 5228-1) (British Standards Institution (BSI), 2014a)
 - BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration (BS 5228-2) (BSI, 2014b)
 - BS 7385-2:1993 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration (BS 7385-2) (BSI, 1993).
- 1.3.6 BS 5228-1 and BS 5228-2 gained Approved Code of Practice status (in England) in 2015 under the powers conferred by Sections 71(1)(b), (2) and (3) of CoPA 1974, as enacted under The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015.
- 1.3.7 The Main Works Contractor(s) will be responsible for the further development of this Outline NVMP into a NVMP, its implementation, and delivery of the measures outlined herein as applicable to each work area. This will be secured in accordance with control and management measure NV05 detailed in the Outline CoCP (document reference 7.2) (Revision F). The Outline NVMP will be reviewed as necessary by the Main Works Contractor(s), during the construction programme. Any such review should consider any new consented change of land use around the Project and any future consented developments (not already considered) that could be affected by construction noise and vibration emissions to the environment.
- 1.3.8 If rapid action is required to solve a noise or vibration problem and that action may contravene something written in the NVMP, typically it is preferable to undertake the mitigating action at the earliest opportunity. The NVMP can then be revised in reasonable time after the event.
- 1.3.9 The application for development consent includes environmental commitments under the following categories:
- Embedded Measures: measures that form part of the engineering design set out in the Outline Code of Construction Practice (CoCP) (document reference 7.2) (Revision F)
 - Control and Management Measures: standard approaches and actions to be implemented on construction sites, intended to protect the environment. These may be general or topic-specific but are typically applicable across the whole of the Project. The control and management measures are provided in full in the Outline CoCP (document reference 7.2) (Revision F)
 - Additional Mitigation Measures: any additional project-specific measures needed to avoid, reduce, or offset potential impacts that could otherwise result in negative effects considered significant in the context of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Mitigation measures have been identified by environmental topic specialists, considering the embedded design and control and management measures. These can be found in the Outline CoCP (document reference 7.2) (Revision F).
- 1.3.10 Construction phase measures relevant to noise and vibration are secured within this Outline NVMP.

1.4 Structure of the Outline NVMP

1.4.1 The Outline NVMP structure is set out in Table 1.1.

Table 1.1 Structure of the Outline NVMP

Chapter	Content
1.	Introduction
2.	Project Details
3.	Project Team Roles and Responsibilities
4.	Construction Noise and Vibration Management
5.	Implementation

2. Project Details

2.1 Introduction

- 2.1.1 Details of the Project are provided in ES Chapter 4: Project Description (document reference 6.4) and within the Outline CoCP (document reference 7.2) (Revision F).

2.2 Identification of NSRs

- 2.2.1 In order to assess potential construction noise impacts, the closest NSRs need to be identified. NSRs identified as part of the ES are shown on Figure 14.1: Baseline Noise Data (document reference 6.14.F1).
- 2.2.2 All NSRs where the initial assessment indicated potential significant adverse effects from construction noise and vibration are detailed in ES Chapter 14: Noise and Vibration (document reference 6.14).
- 2.2.3 Further assessment of construction noise and vibration impacts, including identification of any additional NSR (in case, for example, new dwellings are constructed between the ES and construction phase) and specification of mitigation in the form of best practicable means (BPM) is to be completed by the Main Works Contractor(s).

2.3 Construction Workforce

Estimated Workforce

- 2.3.1 National Grid has estimated the number of construction workers that it would require on the Project and how these would be spread across the construction programme. Over the four-year construction period, there would be an anticipated maximum peak day where approximately 1,720 Full Time Equivalent (FTE)² gross direct employees would be working on the Project. Employees would be spread across various work sites along the 180 km Project.

Estimated Construction Vehicles

- 2.3.2 National Grid has estimated the flows / volumes of construction vehicles that are anticipated to be required to construct the Project. These estimates are provided in Section 6.2 of the Transport Assessment (document reference 7.11). The numbers are based on worst-case assumptions.

² FTE measures the total number of hours worked by employees in relation to a full-time work schedule.

2.4 Enabling Works, Access, and Site Preparation

- 2.4.1 In order for elements of the Projects to be constructed, enabling works are required such as the establishment of temporary construction compounds, temporary bellmouths, and access tracks and drainage works. Details are provided in ES Chapter 4: Project Description (document reference 6.4) and shown on Figure 4.1: Proposed Project Design (document reference 6.4.F1).

3. Project Team Roles and Responsibilities

3.1 Project Responsibilities

- 3.1.1 Project team roles and responsibilities are outlined within the Outline CoCP (document reference 7.2) (Revision F).

3.2 Information Training and Awareness

- 3.2.1 In accordance with control and management measure NV20 of the Outline CoCP (document reference 7.2) (Revision F), all staff and operatives working on the Project will undergo a site-specific induction, which will include topics relevant to the NVMP.
- 3.2.2 Regular environmental toolbox talks will be provided by the Main Works Contractor(s). These will give targeted information about site-specific issues or activities taking place at that time.

4. Construction Noise and Vibration Management

4.1 Construction Noise and Vibration Assessment

ES Construction Noise and Vibration Assessment

- 4.1.1 The assessment of construction noise and vibration impacts is presented in ES Chapter 14: Noise and Vibration (document reference 6.14). The assessment was undertaken based on the methodologies described in as BS 5228-1 (BSI, 2014a) and BS 5228-2 (BSI, 2014b) for noise and vibration, respectively. However, the assessments are indicative, based on available construction information, including those used on similar projects. Additionally, the assessment excluded mitigation measures such as localised screening. The assessment therefore provided an indication of likely impacts and highlighted potential construction noise and/or vibration 'hot-spots' requiring further consideration of mitigation and BPM during the planning and construction phases. Indicative mitigation measures were identified at the hot-spots. The identified hot-spots and indicative mitigation measures are provided below in Section 4.3 of this Outline NVMP.

Further Construction Noise and Vibration Assessment

- 4.1.2 The Main Works Contractor(s) will conduct detailed construction noise and vibration assessments based on their specific construction methodologies. The Main Works Contractor(s) will then identify the required site-specific mitigation measures and update the Outline NVMP into a NVMP accordingly to ensure the measures are implemented. The NVMP will be updated as required if further assessments are conducted and additional mitigation measures are identified during the works.
- 4.1.3 Noise and vibration impacts will be assessed by the Main Works Contractor(s) in accordance with applicable guidance, such as BS 5228-1 (BSI, 2014a) and BS 5228-2 (BSI, 2014b).

4.2 General Measures

- 4.2.1 General noise and vibration control measures are listed in BS 5228-1 and BS 5228-2, which are the primary guidance documents for the assessment and control of noise and vibration from construction works.

Best Practicable Means (BPM)

- 4.2.2 BPM is defined in Section 72 (CoPA) and Section 79 of the EPA (as amended by the Noise and Statutory Nuisance Act 1993) as those measures which are:

'reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to financial implications.'

- 4.2.3 National Grid will require its Main Works Contractor(s) to consider construction noise and vibration mitigation in the following order:
- Design of the works in terms of techniques and plant: Methods/approaches with lower noise and vibration consequences should be selected over those with higher consequences unless there are significant penalties in terms of cost, health, safety, or environmental impact, or delays to the programme which also have cost implications (though it should also be understood that the elongation of the duration of exposure of NSRs to noise by amending methods to reduce noise levels may also be undesirable, depending on the context)
 - BPM as identified above, including but not limited to:
 - noise and vibration control at source: for example, the selection of quiet and low vibration equipment
 - use of equipment with proprietary acoustic treatments (such as enclosure of generator equipment)
 - review of construction methodology to consider quieter methods
 - location of equipment on site
 - control of working hours
 - the provision of acoustic screening at locations (and for specific activities)
 - the use of less intrusive audible warnings such as broadband vehicle reversing alarms to be used in sensitive areas.

4.3 Mitigation Measures

Indicative Mitigation Measures Identified in ES

Construction Noise

- 4.3.1 The assessment presented in ES Chapter 14: Noise and Vibration (document reference 6.14) identified potential significant adverse effects, without mitigation, at:
- 144 NSRs during daytime and weekend/ bank holiday works
 - 25 NSRs during potential night-time works.
- 4.3.2 Of the 144 identified potential significant adverse effects, without mitigation, during daytime periods:
- 33 relate to highway remediation works
 - 21 relate to the construction of new pylons
 - Nine relate to underground cable construction
 - 18 relate to temporary construction compound construction
 - 10 relate to haul road construction
 - One relates to pylon removal
 - Four relate to conductor stringing

- One relates to earthworks
 - 47 relate to potential cumulative effects of multiple nearby activities, with no one activity exceeding the threshold in isolation.
- 4.3.3 Of the 25 identified potential significant adverse effects during night-time periods:
- 10 relate to trenchless crossing of the A12 in Section C
 - 15 relate to trenchless crossings of the River Stour and Higham Road in Section C.
- 4.3.4 The NSRs where there are significant effects from construction noise are also shown on Figure 14.2: Construction Noise Assessment Outputs (document reference 6.14.F2).
- 4.3.5 National Grid has committed to undertake additional mitigation to reduce the significant effects to a non-significant level. Additional temporary noise mitigation measures will be put in place to reduce noise levels from construction plant and machinery at the identified locations, unless a detailed assessment is undertaken at a later stage that demonstrates that no significant noise impacts would occur to nearby NSRs.
- 4.3.6 Examples of construction noise mitigation measures, based on guidance from BS 5228-1 (BSI, 2014a), are provided in Table 4.1 with the attenuation values that these typically achieve.

Table 4.1 Examples of construction noise mitigation measures

Example Mitigation	Likely Attenuation
Screening	5 dB where activities are partially obscured and 10 dB where activities are totally obscured
Specified use of quieter plant	5 to 10 dB
Suitable material handling methods. Do not drop materials from excessive heights	Up to 15 dB
Alternative construction methods	Up to 20 dB
Use of an acoustic shed with adequate ventilation around trenchless crossing machinery	Up to 15 dB
Use of temporal restrictions	Avoiding temporal significance criteria being exceeded

- 4.3.7 The Main Works Contractor(s) will conduct detailed construction noise assessments to determine whether there are likely to be any new or different significant adverse effects at NSRs and therefore whether additional measures, including site-specific BPM, may be required.
- 4.3.8 For the construction of pylon foundations, non-percussive piling methods will be used, except where the results of ground investigations reveal that percussive piling is unavoidably required. A schedule of locations where percussive piling is

unavoidably required will be prepared following the completion of ground investigations and shared with the relevant Local Planning Authorities prior to piling operations commencing.

Construction Traffic Noise

- 4.3.9 During construction, there would be additional vehicle traffic (including Heavy Goods Vehicles) on the local road network, travelling to and from the work sites. An assessment of potential noise impacts from construction traffic is presented in Appendix 14.2: Construction Traffic Noise Assessment (document reference 6.14.A2). Where applicable, the assessment considers the cumulative effect of construction traffic from other projects.
- 4.3.10 The assessment indicates that construction traffic noise impacts are negligible or small on most routes. The impact of noise from construction traffic is therefore not significant on most routes.
- 4.3.11 There is, however, one route where there is the potential for a large adverse magnitude impact; namely:
- Link PAR 30 - Bentley Road (Section C).
- 4.3.12 With regard to Link PAR 30, there are 16 NSRs within 50 m of the route. Effects at these NSRs have the potential to be significant without mitigation. Of these, one NSR has the potential for effects to be more significant due its proximity (approximately 1 m) to Bentley Road; namely:
- Jasmine Cottage, Bentley Road, Little Bentley, CO7 8SS (National Grid Reference (NGR) 611137, 226669).
- 4.3.13 Jasmine Cottage is located immediately adjacent to Bentley Road at a distance of approximately 1 m from the carriageway edge. The predicted noise increase at this specific property is 11.4 dB due to the increase in construction traffic, which is a large magnitude adverse impact. Additionally, the absolute noise level would be above the construction noise SOAEL, principally due to the small distance between the property and the carriageway.
- 4.3.14 A bespoke noise mitigation strategy will be prepared for Jasmine Cottage, Bentley Road, Little Bentley prior to the start of works to mitigate construction noise levels to non-significant levels as far as practicable, both inside the dwelling and in the garden areas. In principle this may include the offer of acoustically rated glazing and ventilation to achieve suitable internal sound levels (as suggested in BS 8233:2014), and the offer of acoustic fencing (which may be subject to planning permission) to achieve suitable external amenity levels (as BS 8233:2014).
- 4.3.15 Further review of construction traffic noise on other noise sensitive receptors along Bentley Road will be undertaken prior to the start of works, and appropriate mitigation may be implemented to reduce construction traffic noise levels as far as practicable. This may include the offer of sound insulation and alternate ventilation via bespoke noise mitigation strategies if other mitigation options (such as screening) are not viable for avoiding significant adverse effects.

Construction Vibration

Construction Vibration Effects on People Within Buildings

- 4.3.16 The assessment presented ES Chapter 14: Noise and Vibration (document reference 6.14) did not identify any potential significant adverse effects from construction vibration on people within buildings. There are, however, 72 identified locations where there are potential short duration exceedances of the construction vibration SOAEL. Of these, 72 relate to potential compaction activities associated with highway works, haul road construction, and compound construction. These activities would be expected to be relatively short duration (typically less than a day) and construction vibration from compaction activities would therefore cause a minor effect at these NSRs and be not significant.
- 4.3.17 The remaining two affected NSRs relate to potential piling activities associated with pylon construction without BPM mitigation measures, namely:
- Pylon RB8 affecting 1, The Vale, Swainsthorpe, NR14 8PL (grid reference 621235, 301105) (Section A)
 - Pylon TB141 affecting Windmill House, Chelmsford Road, Great Waltham, Chelmsford, Essex, CM3 1AB (grid reference 570159, 212882) (Section F).
- 4.3.18 As noted above for construction noise, for the construction of pylon foundations, non-percussive piling methods will be used, except where the results of ground investigations reveal that percussive piling is unavoidably required. A schedule of locations where percussive piling is unavoidably required will be prepared following the completion of ground investigations and shared with the relevant Local Planning Authorities prior to piling operations commencing.

Construction Vibration Effects on Buildings and Structures

- 4.3.19 With regard to potential damage to buildings and structures due to construction vibration, the assessment indicates that there are five structures or buildings where there is the potential for damage due to construction vibration caused by potential compaction activities, namely:
- War Memorial, Church Road, Little Bromley, CO11 2PP (grid reference 609889, 228147) (Section C)
 - Haywain, The Haywain, Bentley Road, Little Bromley, CO11 2PL (grid reference 610156, 227908) (Section C)
 - Jasmine Cottage, Bentley Road, Little Bentley, CO7 8SS (grid reference 611137, 226669) (Section C)
 - Pellens Cottage, Bentley Road, Little Bentley, CO7 8SS (grid reference 611272, 226569) (Section C)
 - St. Margarets Cottage, Botney Hill Road, Billericay, CM12 9SJ (grid reference 565553, 191847) (Section G).
- 4.3.20 No structures or buildings have been identified where there is the potential for damage from vibration from potential piling activities.

Indicative Construction Vibration Mitigation

- 4.3.21 With the use of mitigation in the form of BPM, the magnitude of impact of construction vibration is expected to be **not significant** at all NSRs. Examples of construction vibration mitigation measures, based on guidance from BS 5228-2 (BSI, 2014b), are provided in Table 4.2.

Table 4.2 Example construction vibration mitigation measures

Example Mitigation	Likely Attenuation
Alternative construction methods (e.g. non-percussive/vibratory methods)	Would not generate material levels of vibration, therefore removing impact.
Reducing energy per blow	Depends on the energy reduction but could be set relative to the impact thresholds. However, this may increase the duration of activities.
Pre-boring for piled foundations	Dependent on ground conditions.

Specific Mitigation Measures Identified by the Main Works Contractor(s)

- 4.3.22 The NVMP will include any site-specific noise and vibration mitigation measures identified by the Main Works Contractor(s) following their detailed construction noise and vibration assessment.

4.4 Applications for Prior Consent Under Section 61 of the Control of Pollution Act 1974

Introduction

- 4.4.1 With the implementation of noise and vibration control measures such as those identified in Table 4.1 and Table 4.2, no significant residual effects are predicted based on the outcome of the construction noise assessment conducted as part of the ES. However, as noted above, the Main Works Contractor(s) will be required to prepare a construction noise and vibration assessment based on their proposed construction methodologies.
- 4.4.2 Where the results of the Main Works Contractor(s) assessment indicate the potential for significant effects at NSRs, or for working outside of core hours, a Section 61 application may be required. If this is the case, the Main Works Contractor(s) will liaise with the relevant LPAs to discuss the works and determine whether the works would benefit from a Section 61 consent. Where applicable, the Main Works Contractor(s) will then prepare and apply for Section 61 consent under CoPA for the applicable construction activities through consultation with the LPAs.
- 4.4.3 The number, extent (geographically and in terms of construction activities) and duration of Section 61 applications will be the subject of consultation between the Main Works Contractor(s) and the relevant LPA.
- 4.4.4 Lead-in times will be agreed with the relevant LPA in advance of the applications being submitted and a format for the applications will be agreed prior to the first

applications being made. This is to ensure appropriate information is provided in a timely manner. The relevant LPA is required to inform the applicant of their decision within 28 days of the final application being received. If this does not occur, there is an appeals process.

4.4.5 The Main Works Contractor(s) will be required to demonstrate that BPM, as defined under Section 72 of CoPA, are employed at all times for all activities, to minimise noise and vibration effects.

4.4.6 Agreement of proposed measures will be sought from the relevant LPA through Section 61 consent, dispensation, or variation applications.

Application Procedure

4.4.7 The Section 61 application will include the following information:

- An outline of the proposed construction methods, types, and numbers of plant to be used
- Definition of the working hours required and, where these differ from the core working hours, a justification of the hours sought
- A programme of works which identifies the location and duration of each significant noise and/or vibration-generating activity
- The sound power levels, or sound pressure level at 10 m, for each item of plant, for each relevant activity
- Appropriate justification that the method and plant proposed demonstrates that BPM has been employed to control noise and vibration impacts
- Predicted noise and/or vibration levels at specified NSRs supported by calculations following the methodology in BS 5228-1 (BSI, 2014a) for noise and BS 5228-2 (BSI, 2014b) for vibration and the likely effects of these levels on affected NSRs, and the likely durations of these effects
- All steps to be employed to minimise noise and vibration during the works
- Proposals for noise and vibration monitoring including frequency, locations relative to each work site, reporting proposals, etc (See Section 4.6)
- Proposals for the notification of occupants/stakeholders affected by works.

Unscheduled Overruns

4.4.8 In the event that planned works, covered by consent (either a full Section 61 application or dispensation/variation) extend beyond the approved working hours or generally agreed construction period, and/or continue due to unforeseen circumstances that would affect safety or engineering practicability, the relevant LPA will be kept informed of the nature, time, location, and reasons for the overrun as soon as possible, and records kept by the site management.

4.4.9 The relevant LPA will be requested to provide a telephone number and nominate an office to receive such notifications. Overruns, and the reasons for these, will be reviewed by National Grid, its Main Works Contractor(s), and the relevant LPA, with the aim of reducing the potential for further unplanned overruns if these are likely to result in significant noise or vibration effects.

- 4.4.10 In the case of work required in response to an emergency (or which, if not completed, would be damaging or unsafe) the relevant LPA will be advised as soon as is reasonably practicable of the reasons for, and likely duration of, such works.

Suitably Qualified Persons

- 4.4.11 The person(s) responsible for the development of Section 61 applications and variations, and for the associated noise and vibration calculations and/or monitoring, will need be able to demonstrate the following to be deemed competent:
- Appropriate training and education relevant to the management of construction noise and vibration
 - Experience of the Section 61 process and the prediction, assessment and of monitoring of construction noise and vibration
 - Confirmation that they are, at minimum, an Associate Member of the IoA (AMIOA).
- 4.4.12 Any team leader associated with the above must be able to demonstrate all of the above and also be a full member of the IoA (MIOA) as a minimum.

4.5 Public Notification and Communications

- 4.5.1 The Main Works Contractor(s) will implement a system for the provision of information to local residents and occupiers about the works. A community relations team will be appointed to provide dedicated community relations and external communication support during construction. The information to be provided to local residents will be specific to the works to be carried out, describing the nature of the works, the location and extent of the works, the duration of works, and the hours to be worked.
- 4.5.2 Local residents will be informed of the commencement and likely duration of the construction work activities through community liaison in accordance with control and management measure GG30 detailed in the Outline CoCP (document reference 7.2) (Revision F). The letter(s) will be tailored to a specific area and will reflect the works to be carried out and the duration of works. The letter will include a contact telephone number for public information. In addition, an emergency number will be displayed at the entrance to the compounds.
- 4.5.3 The name and contact details for the Project will be displayed at the entrance to the main site compound. This will include an emergency telephone number. In addition, details of the works, including contact details, will be provided to the relevant community groups, such as the local parish councils and landowners before work commences.
- 4.5.4 A free telephone Project helpline and Project website will be maintained and managed by the National Grid community relations team. The Project helpline and website information will be visible on boards placed in appropriate locations where they will be visible to the public, including the main site compound. The telephone number and Project website details will be provided to the relevant LPA and other relevant parties.
- 4.5.5 The community relations team will record the details of any complaints and how these are to be investigated and appropriately managed. Further details about the

complaints procedure can be found in the Outline CoCP (document reference 7.2) (Revision F).

4.6 Noise and Vibration Monitoring

Introduction

- 4.6.1 The need for construction noise and/or vibration monitoring, and any potential monitoring locations, will be identified by the Main Works Contractor(s) following their detailed assessments, as secured by commitment NV05 detailed in the Outline CoCP (document reference 7.2) (Revision F). The monitoring proposals will be submitted to the relevant LPA as part of the detailed NVMP in accordance commitment NV05 of Outline CoCP (document reference 7.2 prior to commencement of development. The agreed monitoring proposals will also include any associated reporting requirements, thresholds, triggers, and associated actions.
- 4.6.2 Construction noise and/or vibration monitoring may also be secured through Section 61 applications for specific activities, where required, pursuant to commitment NV03. These would be subject of discussion between the Main Works Contractor(s), National Grid, and the relevant LPA prior to agreement of any Section 61 application, secured by commitment NV03 detailed in the Outline CoCP (document reference 7.2) (Revision F).
- 4.6.3 If complaints regarding noise and/or vibration are received, noise and/or vibration measurements may be undertaken, either at the complainant's property or at a suitable known reference distance, if appropriate. Complaints will be managed in accordance with the agreed complaints procedure secured by commitment GG37 of Outline CoCP (document reference 7.2) (Revision F). In the interests of providing a timely response, noise and/vibration monitoring in response to a complaint may be undertaken without prior agreement with the relevant planning authority. However, details and results of any monitoring and actions following a complaint will be provided to the relevant local planning authority in accordance with any agreed protocols.
- 4.6.4 Where applicable, monitoring will be carried out in accordance with the requirements set out in this section. Meetings will be sought to be held with the relevant LPA, to review and agree on the general requirements for monitoring if these have not already been agreed through the DCO process.
- 4.6.5 Where noise or vibration monitoring is to be implemented, as a minimum it will be in accordance with the procedures described in this section.

Noise Monitoring

- 4.6.6 Noise monitoring, carried out either through pre-agreed schemes of monitoring or in response to complaints will be undertaken using the following procedures.
- 4.6.7 Noise monitoring, where required, will be conducted in accordance with the methodology described in Annex G of BS 5228-1 (BSI, 2014a).
- 4.6.8 During the activity working hours, noise levels will be measured following a methodology and at locations agreed with the relevant LPA. The measured levels will be compared against the relevant thresholds for potential significant adverse effects described in Annex E.3.2 of BS 5228-1 (the 'ABC' method), as reproduced in Table 4.3.

Table 4.3 Thresholds for potential significant effects from construction noise

Time Periods	Threshold value, dB $L_{Aeq,T}$		
	Category A ^A	Category B ^B	Category C ^C
Weekdays 0700 to 19:00, and Saturdays 07:00 to 13:00	45	50	55
Weekdays 19:00 to 23:00, Saturdays 13:00 to 23:00, and Sundays 07:00 to 23:00	55	60	65
Night-time 23:00 to 07:00	65	70	75

Note 1: A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.

Note 2: If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise.

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values

- 4.6.9 BS 5228-1 states that This is then compared with the site noise level. If the site noise level exceeds the appropriate category value, then a potential significant effect is indicated. The assessor then needs to consider other project-specific factors, including the duration of the impact, to determine if there is a significant effect.
- 4.6.10 Significant adverse effects are deemed to occur where the applicable thresholds are exceeded for a period of ten or more days in any 15 consecutive days or a total number of days exceeding 40 in any consecutive six-month period.
- 4.6.11 Reporting of the monitoring results will be provided to the relevant LPA in accordance with the procedures outlined in the detailed NVMP or/and Section 61 agreement.
- 4.6.12 In the event of any noise level threshold exceedance, or exceedances beyond any agreed temporal criteria, if appropriate, the Main Works Contractor(s) will follow the procedures outlined in paragraphs 4.6.17 to 4.6.18, or procedures otherwise agreed with the relevant LPA in the detailed NVMP or Section 61 agreement.

Vibration Monitoring

- 4.6.13 The Main Works Contractor(s) will normally limit vibration arising from site activities at any residential building to a level of 1.0 mm/s PPV.
- 4.6.14 Where works may induce high levels of vibration, monitoring will be undertaken at the external foundations of the nearest representative NSR. The monitoring will be undertaken in accordance with Section 9 of BS 5228-2 (BSI, 2014b).

- 4.6.15 In relation to standard buildings and structures, monitoring is required to ensure that PPV levels of 12.5 mm/s PPV are not exceeded for any vibration-generating works, such as percussive or vibratory piling, or vibratory compaction. A lower trigger (typically 5 mm/s PPV) will be set such that warning is provided before exceeding 12.5 mm/s PPV.
- 4.6.16 Lower threshold values may be applicable to some structures if they are more sensitive to vibration. This would be determined by the Main Works Contractor(s) prior to starting works.

Exceedance Actions

- 4.6.17 Unless otherwise agreed with the relevant LPA in the detailed NVMP or Section 61 agreement, in the event of a construction noise or vibration threshold level exceedance, the responsible Main Works Contractor(s) will implement the following measures:
- Notify National Grid of the exceedance
 - Immediately undertake an investigation of construction/removal activities on site to ascertain if any work activities are being implemented contrary to specified noise or vibration control measures. If the exceedance is directly attributable to the Project, then the specific work activity suspected of causing the exceedances will be stopped as soon as it is safe to do so, and the Main Works Contractor(s) will determine why the appropriate measures of the NVMP were not being implemented
 - Remedial measures will be determined and implemented where appropriate to ensure no repeat of the construction noise or vibration threshold level exceedance, or to ensure the exceedance does not occur for a duration sufficient to cause a significant adverse effect.
 - Work activities identified to have caused the exceedance will not be allowed to continue/resume until the remedial measures have been implemented
 - Identify and rectify causes of the exceedance
 - Record actions taken to identify and rectify the exceedance
 - If the cause of the construction noise or vibration threshold level being breached is not related to site operations, record the outcome of the investigation once the investigation is completed
 - Report the above to the relevant LPA according to any agreed protocol.

Repeated Exceedances

- 4.6.18 Unless otherwise agreed with the relevant LPA in the detailed NVMP or Section 61 agreement, in the event of a series of repeated exceedances of the construction noise or vibration threshold levels within a short period of time (for example, should exceedances occur over three consecutive days) the following course of action will be taken by the Main Works Contractor(s):
- Identification of exceedances
 - Following identification of an exceedance, determine whether the exceedances are directly attributable to the Project

- Inspection of all works currently being undertaken at the relevant construction site or area to determine if the noise and vibration control measures, as outlined within the NVMP and/or Section 61 consents, are being implemented appropriately
- Confirmation of the root cause of the exceedance. If the exceedance is identified to have been caused by a third party, details and location of third-party activities will be recorded and communicated to the third party, if appropriate. If the exceedance is directly attributable to the Project, then the specific work activity suspected of causing the exceedance will be stopped as soon as is safe to do so and the Main Works Contractor(s) will determine if the appropriate measures of the NVMP and/or Section 61 consent were being implemented. Remedial measures will be identified and implemented to ensure there are no exceedances of the appropriate construction noise or/and vibration level and temporal thresholds due to the Project. Work activities determined to have caused the exceedance will not be allowed to continue/resume until the remedial measures have been implemented
- Within 48 hours of the exceedance of three or more sequential exceedances, the Main Works Contractor(s) will investigate to determine which activities and/or decisions resulted in the exceedances occurring. A report detailing the findings of the investigation will be compiled by the Main Works Contractor(s) and provided to National Grid.
- Report the above to the relevant LPA according to any agreed protocol.

5. Implementation

5.1 Implementation of the NVMP

- 5.1.1 National Grid will put in place robust procedures to inform and supervise all those working on the Project including its Main Works Contractor(s), to make sure the control measures set out in the NVMP are adopted when undertaking the construction of works authorised by the DCO. The main responsibility for implementing these control measures will fall to the Main Works Contractor(s).
- 5.1.2 The Main Works Contractor(s) will brief all operatives on the specific details within the NVMP prior to the commencement of works. The briefings will be delivered by a suitably trained member of the team such as the site supervisor, Construction Manager or Environmental Manager.

5.2 Site Checks and Reporting

- 5.2.1 Regular site checks will be carried out across the Project to monitor compliance with the NVMP. The programme of site inspections will be controlled by the Environmental Manager who will draw on appropriate suitably experienced specialists for specific tasks. The overarching inspections are summarised below in Table 5.1. Immediate actions including, if necessary ‘stopping a job’, will be taken should any incidents or non-conformance with the NVMP be found during inspection.
- 5.2.2 Site checks and inspections will include checks against compliance with control and management measures and other commitments made by the Project.

Table 5.1 Anticipated site checks relevant to the Outline NVMP

Inspection Type	Purpose	Who	Frequency
Environmental inspections	To monitor compliance with Project commitments and the environmental standards. To record adherence to control and management commitments and raise actions where concerns are identified. To check mitigation measures for sensitive features are in place.	Environmental Manager EnvCoW	Weekly
Audits (external/ internal)	Formal audit process for internal Management System.	External Auditor Environmental Manager	Annual
Site checks	To ensure that working practices are carried out in accordance with approved methods, standards and control and management commitments. These will	Works Supervisor	Daily visual check in working area

Inspection Type	Purpose	Who	Frequency
	also check compliance with requirements agreed in any applicable permit.		
Environmental observations	Allows all staff to raise concerns or control and management ideas to safeguard continual improvement and innovation.	All staff	As required

- 5.2.3 The results of inspections will be recorded in an Environmental Log. Findings will be disseminated to the wider construction team and additional procedures put in place if required.

5.3 Non-Compliance Procedure

- 5.3.1 The EnvCoW will generally be responsible for undertaking site audits to check compliance with the NVMP. All incidents associated with the construction of the Project, including environmental incidents and non-conformance with the NVMP, will be reported and investigated. Where the Main Works Contractor(s), suppliers or sub-contractors are not delivering the requirements, National Grid will review performance and will conduct further training and issue formal warnings as appropriate.

5.4 Community Liaison

- 5.4.1 In accordance with control and management measure GG30 detailed in the Outline CoCP (document reference 7.2), members of the community and local businesses will be kept informed regularly of the works through active community liaison. This will include notification of noisy works and/or activities anticipated to be conducted outside of core working hours. A contact number will be provided which members of the public can use to raise any concerns or complaints about the Project. All construction-related complaints will be logged by the Main Works Contractor(s) in a complaints register, together with a record of the responses given and actions taken. Further details can be found in the Outline CoCP (document reference 7.2) (Revision F).
- 5.4.2 The complaints procedure for the Project is outlined within Appendix E: Community Engagement and Public Information (document reference 7.2) (Revision C).

5.5 Change Process

- 5.5.1 The CoCP is one of the plans listed in Requirement 4 of the draft DCO (document reference 3.1) (Revision E).
- 5.5.2 Requirement 4(1) of the draft DCO (document reference 3.1) (Revision E) states: '*No stage of the authorised development may commence until, for that stage, the following plans as relevant to that stage have been submitted to and approved by the relevant planning authority (in consultation with Natural England in the case of the landscape and ecological management plan) or other discharging authority as may be appropriate to the relevant plan concerned.*'

- 5.5.3 Where there is a need to update the CoCP beyond derogations addressed pursuant to the above, the below text addresses the process for changing the CoCP itself. This does not cover changes to the DCO (material or non-material) which would be managed through the process set out in Schedule 6 of the Planning Act 2008.
- 5.5.4 Therefore, the below process is limited to changes to the CoCP.

CoCP Changes

- 5.5.5 It may be necessary to amend the details contained in the CoCP as a result of the iterative discussion and engagement that will continue after the CoCP has been approved. The resulting changes would not alter any of the underlying commitments, mitigations and methodologies set out in the CoCP. An example may be where a preconstruction survey identifies that a measure already committed to is no longer required in the CoCP. In every case, consideration will be given to any changes to the outcome of the assessment of environmental effects.
- 5.5.6 Where there is a proposed change to the CoCP, National Grid will provide details to the relevant planning authority together with evidence of relevant stakeholder engagement, where upon, the relevant planning authority will, acting reasonably, endeavour to respond within 28 days to either confirm its consent to the change to the CoCP or provide its reasons why the change is not accepted.

Abbreviations

Abbreviation	Full Reference
BPM	Best Practicable Means
BS	British Standard
BSI	British Standards Institution
CoCP	Code of Construction Practice
dB	Decibels
DCO	Development Consent Order
EACN	East Anglia Connection Node
EIA	Environmental Impact Assessment
ES	Environmental Statement
Leq	Equivalent Continuous Sound Level
LPA	Local Planning Authority
NSR	Noise Sensitive Receptor
NVMP	Noise and Vibration Management Plan
PPV	Peak Particle Velocity (a metric of vibration from construction activities)
SOAEL	Significant Observed Adverse Effect Levels

Glossary

Term	Definition
A-Weighted	The A Weighting corrects the variation in the ear's ability to hear different frequencies and provides a good representation of how sound is perceived by the human ear.
Best Practicable Means	A term used under the Control of Pollution Act 1974 and Environmental Protection Act 1990 to refer to measures which are reasonably practicable, having regard to local conditions and circumstances, to the current state of technical knowledge and to financial implications, concerning the mitigation of noise and other potential nuisance.
Cable	An insulated conductor designed for underground installation.
Cable Sealing End	Structures used to transfer transmission circuits between underground cables and overhead lines.
Cable Sealing End compound	Electrical infrastructure used as the transition point between overhead lines and underground cables. A compound on the ground acts as the principal transition point.
Code of Construction Practice	The Code of Construction Practice (CoCP) sets out the standards and procedures to which a developer (and its contractors) must adhere in order to manage the potential impacts of construction works.
Conductor	The overhead wire that carries electricity from one place to another. For example, the line between two pylons.
Construction compounds	Temporary compounds installed during the construction phase of the Project. Each compound may contain storage areas including laydown areas, soils storage and areas for equipment and fuel, drainage, generators, car parking and offices and welfare areas (portacabins).
Decibel (dB)	Unit for measuring sound levels.
Development Consent Order	A statutory instrument which grants consents and other rights to build a Nationally Significant Infrastructure Project, as defined by the Planning Act 2008.
Environmental Statement (ES)	The main output from the EIA process, an ES is the report required to accompany an application for development consent (under The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 to inform public and stakeholder consultation and the decision on whether a project should be allowed to proceed. The EIA Regulations set out specific requirements for the contents of an ES for Nationally Significant Infrastructure Projects.
Equivalent Continuous Sound Level (Leq)	Equivalent continuous sound level is a notional steady sound level that causes the same A-weighted sound energy to be received as that due to the actual and possibly fluctuating sound over a period of time T. It can also be used to relate periods of exposure and noise level. For

Term	Definition
	example, halving or doubling the period of exposure is equivalent in sound energy to a decrease or increase of 3dB(A) in the sound level for the original period.
Frequency Weighting Networks	Frequency weighting networks, which are generally built into sound level meters, attenuate the signal at some frequencies and amplify it at others. The A-weighting network approximately corresponds to human frequency response to sound. Sound levels measured with the A-weighting network are expressed in dB(A). Other weighting networks also exist, such as C-weighting which is nearly linear (i.e. unweighted) and other more specialised weighting networks. Variables such as L_p and L_{eq} that can be measured using such weightings are expressed as L_{pA} / L_{pC} , L_{Aeq} / L_{Ceq} etc.
Haul road	Another term used for the temporary access route, which is a temporary route built to carry construction vehicles within the Order Limits.
Heavy Goods Vehicle	Goods vehicles weighing more than 3,500 kg.
Horizontal directional drilling	Trenchless method for the installation of pipes, in a shallow arc using a surface-launched drilling rig. In particular, it applies to large-scale crossings in which a fluid filled pilot bore is drilled without rotating the drill string, and this is then enlarged by a washover pipe and back reamer to the size required for the product pipe.
Impact magnitude	This is the scale of change which a given impact may cause. This is compared to the baseline state and consideration is given to how the change relates to accepted thresholds and standards.
Impact significance	The level of significance is defined by the magnitude of impact in relation to the sensitivity/value of the environmental receptor.
Insulator	Used to attach the conductors to the pylons preventing electrical discharge to the steelwork.
$L_{Aeq,T}$	The A-weighted L_{eq} sound level measured over a specified period of time, T.
Local Planning Authority	The public authority whose duty it is to carry out specific planning functions for a particular area.
Mitigation	The action of reducing the severity and magnitude of change (impact) to the environment. Measures to avoid, reduce, remedy or compensate for significant adverse effects.
Noise	Unwanted sound.
Noise and vibration sensitive receptor (NSR)	A location that is sensitive to noise and/or vibration. The sensitivity of a receptor to noise and vibration varies depending on the receptor type.
Order Limits	The maximum extent of land within which the authorised development may take place.

Term	Definition
Overhead line	Conductor (wire) carrying electric current, strung from pylon to pylon.
Peak Particle Velocity	A measurement of vibration level, being the maximum rate of displacement of the vibration propagation medium (such as the ground) for a given event, such as the impact of a piling hammer, at specific locations.
Piling	Engineering process of installing elongated structural elements, known as piles, into the subsoil. This technique is employed to transfer structural loads to deeper, more competent strata, thereby providing stable foundations for construction projects. Essentially, it addresses situations where surface soils lack sufficient bearing capacity to support intended structures.
Pylons	Structures that support the overhead line (conductors).
Receptor	The physical resource or user group that would respond to an effect, e.g. somebody or something adversely affected by a pollutant.
Residual effects	The consequence of an 'impact' of construction, operation and decommissioning of the proposed development after mitigation measures have been applied.
Sensitivity	A term applied to specific receptors, combining judgements of the susceptibility of the receptors to the specific type of change or development proposed and the value related to that receptor.
Significance	A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.
Significant observed adverse effect level (SOAEL)	This is the level of noise above which significant adverse effects on health and quality of life occur.
Sound	Sound is vibrations travelling through a medium (usually air) that can be perceived by the hearing organs.
Substation	Substations are used to control the flow of power through the electricity system. They are also used to change (or transform) the voltage from a higher to lower voltage to allow it to be transmitted to local homes and businesses.
Trenchless crossing	A crossing installation method that has limited above ground disturbance, which is used to avoid a sensitive feature such as an environmental feature.
Underground cabling	An insulated conductor carrying electric current designed for underground installation. Underground cables link together two cable sealing end compounds.

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