AQUIND Limited

AQUIND INTERCONNECTOR

Environmental Statement – Volume 1 – Chapter 24 – Noise and Vibration

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(a)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

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24. NOISE AND VIBRATION

24.1. SCOPE OF THE ASSESSMENT

24.1.1. INTRODUCTION

24.1.1.1. This chapter reports the outcome of the assessment of likely significant effects on the environment arising from the Proposed Development in respect of noise and vibration. The Proposed Development that forms the basis of this assessment is described in Chapter 3 (Description of the Proposed Development) of this Environmental Statement ('ES') Volume 1 (document reference 6.1.3).

24.1.1.2. The noise and vibration assessment considers the potential impacts associated with the following activities:

- Operational noise from the Converter Station and Fibre Optic Cable ('FOC') infrastructure (the Telecommunications Buildings in Section 1 and Optical Regeneration Station ('ORS') in Section 10);
- Construction and decommissioning noise and vibration from the Converter Station, the Telecommunications Buildings and ORS; and
- Construction and decommissioning noise and vibration from works to be carried out within the Onshore Cable Corridor.
- Noise effects on receptors in proximity to the surrounding road network resulting from construction vehicles and redistribution of traffic from road/lane closures during construction.

24.1.1.3. This chapter assesses the impacts arising from the Proposed Development within the Onshore Components of the Order Limits and the Site only (above Mean Low Water Springs ('MLWS')). Refences to the Order Limits and the Site in this chapter, any appendices to it and plans enclosed to it, is only in relation to the Order Limits and the Site as applicable to the Onshore Components as illustrated in Figure 3.9 of the ES Volume 2 (document reference 6.2.3.9).

24.1.1.4. This chapter is supported by Appendices 24.1 to 24.9 of this ES Volume 3 (document references 6.3.24.1 to 6.3.24.9) and Figures 24.1 to 24.5 of this ES Volume 2 (document references 6.2.24.1 to 6.2.24.5).

24.1.2. STUDY AREA

24.1.2.1. The study area for the noise and vibration assessment depends on the specific noise and vibration activities under assessment.

Converter Station Area

24.1.2.2. The Converter Station Area is located within a sparsely populated area, with a small number of residential receptors located sporadically in all directions. The locations of the proposed Converter Station compound and the surrounding sensitive receptors determine the study area.

Construction and Decommissioning Stages

24.1.2.3. The residential receptors included in the Converter Station Area construction and decommissioning assessment are those located within a 300m radius of the construction or decommissioning activity. The rationale for this study area is described in the methodology section. A list of addresses for all receptors included in the Converter Station Area construction and decommissioning assessment are provided in Appendix 24.3 (Noise Survey Measurement Locations and Sensitive Receptors Surrounding Telecommunications Infrastructure at Landfall).

Operational Stage

24.1.2.4. The residential receptors included in the operational assessment are located approximately within a one kilometre radius from the Converter Station. This radius is approximate because there are two potential Converter Station microsite options (Options B(i) and B(ii)), illustrated within the Converter Station and Telecommunication Parameter Plan (document reference 2.6)). A list of addresses for all receptors included in the operational assessment of the Converter Station and the Telecommunications Buildings are provided in Appendix 24.3 (Noise Survey Measurement Locations and Sensitive Receptors Surrounding Telecommunications Infrastructure at Landfall).

Onshore Cable Corridor

24.1.2.5. The study area for the Onshore Cable Corridor is defined by the distance from the illustrative Onshore Cable Route within which a greater than negligible magnitude of level is predicted to occur. This distance is variable depending on the specific construction activity being assessed and the time when the activity is expected to occur (i.e. daytime, weekend/evening or night-time). The approach to assessing construction noise and vibration from the Onshore Cable Corridor is explained further in section 24.4.1.9

24.1.2.6. The Operational Stage of the Onshore Cable Route has been scoped out of this assessment and hence no study area is presented.

Construction noise

24.1.2.7. The approximate study areas for the Onshore Cable Corridor construction noise assessment are presented in Table 24.1 for each time period and construction activity. They represent the maximum distances from the illustrative Onshore Cable Route (see section/paragraph 24.4.1.9 for further information regarding the illustrative Onshore Cable Corridor) where a greater than negligible magnitude level

of effect is predicted. For certain sub-activities (i.e. different elements of cable trenching, Joint Bay or HDD activities) the distances will be smaller as lower noise levels are predicted for these works.

Table 24.1 – Approximate study area for Onshore Cable Corridor construction noise assessment

Time period	Approximate maximum distance (i.e. indicative study area) from illustrative Onshore Cable Route, Joint Bays or HDD site.		
	Cable route trenching	Joint Bays	HDD sites
Daytime	50m	50m	80m
Evenings and weekends	90m	50m[1]	170m
Night-time	260m	n/a[2]	280m[3]

1 – Weekend working at Joint Bays is limited to 08:00-13:00 hours on Saturday.

2 – No night time working is anticipated at Joint Bays.

3 – Night-time working may occur at HDD-4.

Construction vibration

24.1.2.8. The approximate study area for the construction vibration assessment is determined by the maximum distances from the illustrative Onshore Cable Route where a greater than negligible magnitude of level is predicted. This is approximately 70m from the cable route trenching and Joint Bay works, and 80m from the Horizontal Directional Drilling ('HDD') sites.

Decommissioning Stage

24.1.2.9. The approximate study area for the Decommissioning Stage of the Onshore Cable Route is the same as that presented for construction noise and vibration.

ORS at Landfall

24.1.2.10. The study area for the ORS at the Landfall in Eastney is determined by the proposed location of the ORS buildings, as defined by the Optical Regeneration Station(s) Parameter Plan (document reference 2.11) and the proximity of the nearest noise sensitive receptors. The approximate study area is a 50m radius from the boundary of the ORS compound.

Construction traffic noise

24.1.2.11. The study area for the construction stage road traffic noise assessment is defined by the road links within a 3km radius of the Order Limits. The justification for this study area is included in section 24.4.4.

24.2. LEGISLATION, POLICY AND GUIDANCE

24.2.1.1. This assessment has taken into account the current legislation, policy and guidance relevant to noise and vibration. These are listed below with full details provided in Appendix 24.4 (Legislation, Policy and Guidance) of the ES Volume 3 (document reference 6.3.24.4).

24.2.2. LEGISLATION

Control of Pollution Act 1974

24.2.2.1. Legislation relevant to the control of noise emanating from construction sites is provided in the Control of Pollution Act 1974.

24.2.2.2. Section 61 allows developers and the local authority to enter into a prior agreement such that noise and vibration during demolition and construction works are discussed and working methods (and often noise and vibration criteria) are agreed prior to the works being undertaken. The Section 61 application usually details proposed working methods, plant lists and expected noise and vibration levels that may be generated during the works. Assuming the local authority is in agreement with the contents of the Section 61 application, consent is granted for the works which can be subject to conditions.

24.2.3. PLANNING POLICY

National Policy

National Policy Statement

24.2.3.1. The Overarching National Policy Statement for Energy ('NPS EN-1') is of relevance to the Proposed Development and sets out national policy for energy infrastructure for which environmental impacts, such as those relating to noise and vibration, can arise.

24.2.3.2. NPS EN-1 outlines the aims for new development with respect to noise, guidance on the appropriate methodology, content and an approach to establishing mitigation measures. NPS EN-1 also makes reference to the Noise Policy Statement for England.

Noise Policy Statement for England

24.2.3.3. The Noise Policy Statement for England ('NPSE') was published in 2010 and seeks to clarify the main principles and aims of existing policy documents, legislation and guidance that relate to noise. The NPSE states its vision as being to "Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development".

National Planning Policy Framework

24.2.3.4. The National Planning Policy Framework ('NPPF) is published by central government and replaces all previous policy documents, including Planning Policy Guidance Note 24 - Planning and Noise ('PPG 24'). The NPPF references the NPSE.

Local Policy

Portsmouth City Council

24.2.3.5. The Portsmouth Plan (adopted 2012) is the principal planning policy document in the city's Local Plan. Aspects of the Plan relevant to this assessment are provided in Appendix 24.4 (Legislation, Policy and Guidance).

Havant Borough Council

24.2.3.6. Havant Borough Council's ('HBC') Core Strategy (adopted 2011) makes reference to noise in Policy DM10 Pollution, details of which are provided in Appendix 24.4 (Legislation, Policy and Guidance).

Winchester City Council

24.2.3.7. The Winchester City Council ('WCC') Local Plan 2036 is currently in consultation. Current policy is determined by the Joint Core Strategy (adopted 2013), and details relevant to this assessment are provided in Appendix 24.4 (Legislation, Policy and Guidance).

East Hampshire District Council

24.2.3.8. The East Hampshire District Council ('EHDC') Local Plan comprises the Joint Core Strategy (adopted 2014) and the Housing and Employment allocations document. Policy CP27 Pollution of the Joint Core Strategy makes reference to noise, the details of which are provided in Appendix 24.4 (Legislation, Policy and Guidance).

Hampshire County Council

24.2.3.9. There are no relevant policies to consider.

24.2.4. GUIDANCE

24.2.4.1. A summary of relevant guidance is provided below. Note that other guidance documents have also been used in this assessment; please see Appendix 24.4 (Legislation, Policy and Guidance) for full details.

- Operational noise from the Converter Station and FOC infrastructure (including the Telecommunications Buildings and ORS) – BS 4142: 2014+A1:2019 Method for rating and assessing industrial and commercial sound;
- Construction noise – BS 5228:2009+A1 2014 Code of practice for noise and vibration control on construction and open sites: Part 1 Noise; and

- Construction vibration - BS 5228:2009+A1 2014 Code of practice for noise and vibration control on construction and open sites: Part 2 Vibration.

Planning Practice Guidance ('PPG')

24.2.4.2. The PPG is a web-based resource first issued by central Government in 2014, with the Noise section updated in July 2019. Whilst much like the NPPF, the PPG is not directly applicable to major energy infrastructure, it may still be a relevant consideration for the purpose of determining an application for major energy infrastructure.

24.2.4.3. In paragraph 005[1], the PPG introduces a 'noise exposure hierarchy table' which provides example outcomes relevant to the No Observed Effect Level ('NOEL'), Lowest Observed Adverse Effect Level ('LOAEL') and Significant Observed Adverse Effect Level ('SOAEL') effect levels described in the NPSE. The term Unacceptable Adverse Effect ('UAE') level is introduced which equates to noise perceived as "noticeable and very disruptive". It is stated that UAEs should be prevented.

24.2.4.4. The outcomes are in descriptive form and there is no numerical definition of the NOEL, LOAEL and SOAEL (or UAE), or detailed advice regarding methodologies for their determination. There is also no reference to the further research that is identified as necessary in the NPSE.

24.2.4.5. The assessment of impacts and effects described in this ES chapter cover Construction (and Decommissioning) and Operational Stages.

24.2.4.6. The standards and guidelines underpinning both temporary and permanent aspects are well-developed and long-standing – BS 5228 for construction and BS 4142 for operation. In each case the adopted assessment (based around the aforementioned Standards) is multi-faceted in that more than a simple threshold level has been considered.

24.2.4.7. For the Construction Stage noise and vibration effects, the adopted assessment methodology considers not only the level of noise or vibration but also the duration of exposure to determine the magnitude of impact. For example, the longer the exposure, the higher the magnitude of impact which also considers the period (day, evening or night and weekday or weekend) over which the construction activity occurs.

[1] Reference ID: 30-005-20190722 of the Planning Practice Guidance (2014)

24.2.4.8. The Operational Stage noise assessment adopts robust criteria based on BS 4142 and developed in collaboration with WCC. The assessment considers the likelihood of an adverse impact occurring, taking into account the specific level of noise from permanent plant relative to the current background noise level as well as the frequency spectrum of the noise to ensure that any particularly characteristic components are adequately assessed.

24.2.4.9. It is clear that the NPSE (and by association the PPG) are focussed on 'health and quality of life'. However, there is a lack of health based research available to confidently assign effect levels for short-term construction noise and vibration and operational converter station noise. If an attempt were made to determine effect levels such as the LOAEL or SOAEL, it is certain that this would rely heavily, if not exclusively, on those existing standards and guidelines referred to in this ES chapter, thereby adding no value to the assessment that has been undertaken.

24.2.4.10. In summary, therefore, it is considered that the assessment of impacts and effects described in this ES chapter are deemed sufficient and robust to determine the significance of effects without the need to incorporate an additional assessment in line with the effect levels described above (i.e. the NOEL, LOAEL and SOAEL).

24.3. SCOPING OPINION AND CONSULTATION

24.3.1. SCOPING OPINION

24.3.1.1. As detailed within Chapter 4 (EIA Methodology) of this ES Volume 1 (6.1.4), a Scoping Opinion was received from PINS (on behalf of the Secretary of State ('SoS')) on 7 December 2018. A summary of the Scoping Opinion responses is below.

- The noise and vibration assessment should include any impacts on ecologically sensitive areas and should clearly explain assumptions made with regard to the assessment of noise and vibration effects on sensitive ecological receptors. Please refer to Chapter 16 (Onshore Ecology) of this ES Volume 1 (document reference 6.1.16) which assesses noise and vibration impacts at ecologically sensitive areas.
- The study area is to be agreed with the Environmental Health Officers at PCC, HBC, EHDC and WCC, and the Application should ensure that the selected study area is sufficient to encompass all sensitive receptors which may experience significant effects from the Proposed Development, including sensitive ecological receptors. The study area, as agreed with the relevant EHO's is discussed at Section 24.1.2. Ecological receptors in relation to noise and vibration effects are discussed Chapter 16 (Onshore Ecology).

- The results of the completed surveys regarding the existing noise climate should be fully reported in the ES or an appropriate technical appendix) and effort should be made to agree the monitoring locations with relevant consultation bodies. The monitoring locations have been agreed with WCC, EHDC and PCC with results summarised in Section 24.5 which relates to the Baseline Environment and shown in full in Appendix 24.6 (Noise Survey Equipment, Meteorological Conditions and Noise Survey Results) of this ES Volume 3 (document reference 6.3.24.6).
- The assessment methodologies and the significance of effects should be clearly presented in the ES. Please refer to Section 24.4 Assessment Methodology below.
- Any proposed mitigation measures should be detailed in the ES, including the mechanism for their delivery (e.g. via the Construction Environmental Management Plan ('CEMP')). Embedded mitigation is detailed at Section 24.6.1 including how those measures are secured, and opportunities for additional mitigation are discussed at Section 24.8.

24.3.1.2. Appendix 24.1 (Consultation Responses) of this ES Volume 3 (document reference 6.3.24.1) includes the responses to the PINS EIA Scoping Opinion.

24.3.2. INFORMAL CONSULTATION PRIOR TO PEIR

24.3.2.1. The following informal consultation was undertaken prior to the Preliminary Environment Information Report ('PEIR'):

- WCC and EHDC: telephone consultation with the Environmental Health Officers (EHO) to discuss the approach to the assessment.

24.3.2.2. Note that the EHO for EHDC also represents HBC.

24.3.2.3. Appendix 24.1 (Consultation Responses) includes a summary of consultation undertaken and outcome of discussions for noise and vibration.

24.3.3. PEIR CONSULTATION

24.3.3.1. Consultation on the PEIR was undertaken with WCC and EHDC between June 2018 and the submission of the PEIR. A summary is provided below.

- WCC and EHDC: consultation meeting with the EHOs. Initial modelling results showing the predicted noise levels from the Converter Station were presented and the broadband assessment methodology for the Converter Station was agreed.

24.3.3.2. Appendix 24.1 (Consultation Responses) includes the responses to the PEIR consultation in relation to noise and vibration and how these have been addressed.

24.3.4. POST PEIR CONSULTATION

24.3.4.1. Below is a summary of the consultation undertaken following submission of the PEIR.

- June 2019: Meeting with WCC and EHDC EHOs to provide an update on the noise assessment with particular focus on the Converter Station.
- August 2019: Meeting with EHDC and PCC EHOs to discuss construction noise and vibration associated with the Onshore Cable Corridor.
- October 2019: Call with WCC EHO to discuss and agree the octave band assessment methodology for the Converter Station and FOC infrastructure.

24.3.4.2. Appendix 24.1 (Consultation Responses) includes a summary of consultation undertaken and the outcomes of those discussions.

24.3.5. ELEMENTS SCOPED OUT OF THE ASSESSMENT

24.3.5.1. The elements shown in Table 24.2 were not considered to give rise to significant effects at Scoping and have, therefore, not been considered within the ES:

Table 24.2 – Topics and elements scoped out of the assessment at Scoping

Element Scoped Out	Justification
Operational noise from the Onshore Cable Corridor	As the cables are buried, noise effects during operation are expected to be negligible.

24.3.6. IMPACTS SCOPED INTO THE ASSESSMENT

Construction Stage

24.3.6.1. The following impacts are considered to have the potential to give rise to significant effects during construction of the Proposed Development and have, therefore, been considered within the ES:

- Construction noise and vibration associated with the Converter Station Area (including construction of the Converter Station, Telecommunications Buildings, Access Road, temporary car parking. Work Compound and Laydown Areas);
- Construction noise and vibration from works within the Onshore Cable Corridor;
- Construction noise and vibration associated with the Landfall (including the construction of the ORS and its infrastructure); and
- Change in noise levels on receptors in proximity to the surrounding road network resulting from construction vehicles and redistribution of traffic from road/lane closures.

Operational Stage

24.3.6.2. The following impacts are considered to have the potential to give rise to significant effects during operation of the Proposed Development and have, therefore, been considered within the ES:

- Noise from the operation of the Converter Station and the Telecommunications Buildings; and
- Noise from the operation of the ORS at the Landfall.

Decommissioning Stage

24.3.6.3. The following impacts are considered to have the potential to give rise to significant effects during decommissioning of the Proposed Development and have, therefore, been considered within the ES:

- Noise associated with the decommissioning of the Converter Station, the Telecommunications Buildings and the ORS infrastructure; and
- Noise associated with the decommissioning of the Onshore Cable Route.

24.4. ASSESSMENT METHODOLOGY

24.4.1. BASELINE NOISE SURVEY

24.4.1.1. Unattended noise measurements were undertaken at five locations which are representative of sensitive receptors close to the Converter Station (see Figure 24.1). Measurements were undertaken between the afternoon of Wednesday 28th June 2017 and the morning of Thursday 6th July 2017. The data obtained during these measurements are considered representative of the current noise climate and are, therefore, suitable for use in this assessment. Details of the measurement locations are given, below.

- **Measurement Position 1** – representative of Kimberley House (R4) and Little Denmead Farm (R5)

24.4.1.2. Located on the fence line between the Little Denmead Farm outbuildings and open fields. The nearest roads are Old Mill Lane approximately 500 m to the west and an unnamed single-track road approximately 150 m to the south-west. Noise from Lovedean substation (located approximately 500 m to the north-east) was noted as being barely perceptible during the daytime attended measurements.

- **Measurement Position 2** – representative of The Haven and Old Mill Cottage (R1), Hillcrest (R2) and Millfield Farm (R3), Old Mill House and the Shieling (R14) and The Ranch (R15)

24.4.1.3. Located on the fence line to the south of The Ranch approximately 25 m south of Old Mill Lane. Noise sources included sporadic road traffic on Old Mill Lane and a low

level audible 'hum' of electrically generated noise from Lovedean substation (located approximately 400m to the south-east).

- **Measurement Position 3** – representative of Holme and Highfield Cottages (R6), Lower Chapters (R7) and The Arrows (R8)

24.4.1.4. Located to the south-east of Holme Cottage approximately 7 m from the unnamed single-track road. Noise levels in this area were deemed to be particularly low, with the dominant noise source noted to be sporadic car movements along the unnamed road. Noise from Lovedean substation (located approximately 750m to the north) was subjectively barely perceptible during the daytime attended measurements.

- **Measurement Position 4** – representative of Broadways (R9), Broadway Farm House (R10) and Broadway Farm Cottages (R11).

24.4.1.5. Located approximately 60 m west of Broadway Farm House, adjacent to open farm land. The measurement location was approximately 75 m west of Broadway Lane. Dominant noise sources included road traffic on Broadway Lane and Lovedean substation, which is located approximately 250 m to the north-west.

- **Measurement Position 6** – representative of Hinton Daubnay (R12) and Ludmore Cottages (R13).

24.4.1.6. Located approximately 120 m west of Broadway Lane and 500 m north-east of the Lovedean substation. Noise from the substation was barely audible at the measurement position.

24.4.1.7. Attended noise measurements were also undertaken at a single location (Measurement Position 5) which is considered representative of the sensitive receptors nearest to the ORS infrastructure (see Figure 24.3). The data obtained during these measurements are considered representative of the current noise climate and are, therefore, suitable for use in this assessment. Measurements were undertaken during the following periods:

- Monday 5th August 2019 between 13:22 hours and 14:22 hours (daytime);
- Monday 5th August 2019 between 22:02 hours and 23:02 hours (evening); and
- Tuesday 6th August 2019 between 02:00 hours and 03:00 hours (night-time).

24.4.1.8. Whilst measurements were undertaken during the school summer holiday period which would usually be avoided, the purpose of the measurements is to obtain the underlying background noise level which would usually be unaffected by small changes to the ambient noise levels. As such, the data are considered suitable and robust for use in this assessment and no further measurements are deemed necessary.

24.4.1.9. The measurement position was in the north-eastern area of the landfall car park, approximately 20m to the south-east of Fort Cumberland Road. During the daytime

measurement, noise sources included road traffic (distant and local), waves breaking and vehicle and pedestrian movements in the car park. During the evening and night-time measurements, noise sources included distant road traffic, breaking waves and occasional vehicles using the car park.

24.4.1.10. At each location the measurements were undertaken in the free-field (i.e. at least 3.5 m from vertical, reflective surfaces), at a height of approximately 1.5 m above local ground, which is also considered representative of noise levels which may be experienced at the first floor of the two storey receptors. The microphones were protected with a windshield throughout the survey.

24.4.1.11. The sound level meters were calibrated before and after measurements, with no significant drift recorded. An accredited laboratory calibrated the equipment not more than two years prior to the measurements, with the exception of the calibrator itself which had been calibrated not more than one year prior to the survey.

24.4.2. CONSTRUCTION STAGE - NOISE

24.4.2.1. The following methodologies have been used to establish significant effects during the construction stages of the Proposed Development.

Converter Station Area

24.4.2.2. The Converter Station and the Telecommunications Buildings construction works are expected to last for approximately two years, comprising six months for the enabling/preparation works and 18 months for substructure and superstructure construction works. Following construction works, there will be landscaping and re-instatement works lasting approximately one year.

24.4.2.3. A full list of assessment assumptions, including the work stages and equipment details (sound power levels, quantity, percentage on-times etc.) is included in Appendix 24.5 (Noise and Vibration Assessment Assumptions).

24.4.2.4. The proposed core working hours for the construction activities which may be audible outside the order limits are as follows:

- Monday to Friday: 0800 – 1800 hours
- Saturday: 0800 – 1300 hours.

24.4.2.5. Start-up and shut down activities and the receipt of oversize deliveries to the site, the arrival and departure of personnel to and from the site, on-site meetings or briefings, and the use of welfare facilities and non-intrusive activities may occur for up to one hour either side of these core working hours, as such activities should not create any discernible noise or vibration outside of the Order Limits.

24.4.2.6. The land surrounding the Converter Station Area is sparsely populated, and therefore it is practicable to predict the noise level from each stage of the construction works at specific surrounding sensitive receptors. BS 5228-1 states that construction noise predictions at distances over 300 m should be treated with caution due to the

increasing importance of meteorological effects and uncertainty regarding noise attenuation over soft ground. Furthermore, given the large distances involved, no significant construction effects would occur at distances beyond 300 m.

24.4.2.7. Noise predictions have been limited to receptors located within 300 m of a given construction activity, which are as follows (see Figure 24.1):

- R1 - The Haven and Old Mill Cottage
- R2 - Hillcrest
- R3 - Millfield Farm
- R5 - Little Denmead Farm
- R10 - Broadway Farm House
- R11 - Broadway Farm Cottages

24.4.2.8. The initial noise prediction has followed a 'worst-case' assumption, by calculating the construction noise level based on the distance between a receptor and the closest point of construction works. Where this has resulted in a greater than negligible impact being identified, a 'typical-case' has also been calculated, which is based on the distance between a receptor and the central point of the construction works. In each instance, the calculations follow the methodology set out BS 5228-1.

Onshore Cable Corridor

24.4.2.9. The Onshore Cable Corridor is approximately 20km in length and, therefore, there are a large number of receptors within the study area for the construction works. As such, it would not be practicable to predict the noise and vibration levels from construction works at every receptor along the Onshore Cable Corridor.

24.4.2.10. The construction noise and vibration assessment is based on an illustrative cable route alignment which represents a route within the Onshore Cable Corridor where the Onshore Cable Route could be installed (see Figure 24.2). The precise location of the Onshore Cable Route is yet to be determined and would be confirmed following the grant of the Order and the appointment of a contractor, taking into account precise constraints within the corridor.

24.4.2.11. The assessment method establishes at what distance from the construction works adverse impacts of each magnitude (small, medium and large) occur. This has enabled property counts of sensitive receptors impacted by each magnitude of level using GIS software.

24.4.2.12. Overall this method provides a robust and consistent indication of impacts whilst remaining proportionate given the linear geographical extent of the Onshore Cable Corridor and the area within which works may be carried out. The adverse impacts identified are considered realistic for the receptors located closest to the illustrative Onshore Cable Route. Receptors located further away from the illustrative Onshore

Cable Route may not experience the predicted magnitude of impact due to the screening afforded by buildings positioned between the cable route and these receptors. As such, the assessment is considered to be worst case in this regard, and consequently is robust.

24.4.2.13. Where this initial assessment identifies receptors potentially exposed to significant effects (i.e. major adverse) and further mitigation measures are considered practicable, a more detailed construction assessment has been completed.

24.4.2.14. The construction activities for the Onshore Cable Corridor have been divided into the following activities, which are explained further below:

1. Trenching and cable duct installation;
2. Cable Pulling and Jointing; and
3. HDD sites including sites of other Trenchless installation woks.

24.4.2.15. An assessment of the indicative High Voltage Alternating Current ('HVAC') Cable Route between the Converter Station and Lovedean substation has also been completed.

Trenching and cable duct installation

24.4.2.16. Trenching refers to the installation of the cable ducts, which will occur partly over open ground, and partly along roads. A full list of assessment assumptions, including the work stages and equipment details (sound power levels, quantity, percentage on-times etc.) is included in Appendix 24.5 (Noise and Vibration Assessment Assumptions); and the key information is detailed as follows:

- The trenching works are linear and transient in nature, whereby trench excavation, duct installation and backfilling could occur simultaneously along a 100m section at a time.
- Working hours for the majority of the trenching activities will be weekdays from 07:00 hours to 17:00 hours. Some works may also be completed from 08:00 hours to 13:00 hours on Saturdays. Start-up and shut down activities may occur for up to one hour either side of these core working hours, but such activities should not create any discernible noise or vibration outside of the order limits.
- The rate of trenching works is assumed to be approximately 100 m per week along roads and approximately 50 m per day over open ground.
- Along roads, breaking of the road surface is required to dig the trenches, whereas over open ground, no breaking is required.

24.4.2.17. There are some locations where trenching activities may need to occur outside of the above adopted working hours to mitigate adverse traffic impacts. Based on the information available at the time of the assessment, out-of-hours working has been assumed at the following locations:

1. Section 4 – a c.90m section of the A3 London Road in Purbrook near Stakes Road.
    - Aim to complete duct laying for each circuit over two weekends (4 weekends in total). It is most likely that each circuit would be completed in two c.45m sections, one per weekend. At this stage, it has not been confirmed if these would be consecutive weekends and on that basis working on consecutive and non-consecutive weekends has been assessed.
    - Work would be completed between 07:00 hours and 22:00 hours on Saturday and Sunday.
    - Whilst there would be two further weekends required for the installation of the second circuit, there will be a sufficient temporal gap between these two periods of work.
2. Section 5 – Havant Road near Drayton between Farlington Avenue and Eastern Road.
    - Based on the illustrative Onshore Cable Route, where both circuits are installed along Farlington Avenue, weekend working on Havant Road would be required between Farlington Avenue and Eastern Road. It is possible that the specific area for weekend working may not extend to the entire length of Havant Road between Farlington Avenue and Eastern Road; this is dependent on the specific location the cable circuit crosses the carriageway. However as this has not yet been confirmed, and to ensure a robust assessment, weekend working has been assumed for the entire length of Havant Road (between Farlington Avenue and Eastern Road).
    - There are three potential options for these works:
        - Option 1 – Works for each circuit could be completed in a single weekend. Works would commence at sunrise on Saturday morning and continue until sunset on the Sunday evening. Whilst this would include night-time working on Saturday, the noisiest activities (road cutting/breaking and re-surfacing) will be avoided at night to minimise sleep disturbance in the immediate area.
        - Option 2 – Works for each circuit could be completed in two consecutive weekends during the daytime and evening (from 07:00 to 22:00 hours).
        - Option 3 – Works for each circuit could be completed in two non-consecutive weekends during the daytime and evening (from 07:00 to 22:00 hours).

- Two further weekends (or a single weekend with night-time working) would be required for the installation of the second cable circuit, but there will be a sufficient temporal gap between these two periods of work.

3. Section 6 – Fitzherbert Road and Sainsbury's Car Park

   - The installation of the cable ducts along Fitzherbert Road, Sainsbury's car park and associated access road may need to take place at night to minimise disruption to the supermarket. The noisiest activities (road cutting/breaking and re-surfacing) will be avoided during hours of darkness to minimise sleep disturbance in the immediate area. Based on 24 hour working, it is assumed that cable duct installation across Fitzherbert Road and along the Sainsbury's access road to the mini-roundabout would take six days. Cable duct installation through the Sainsbury's Car Park from the mini-roundabout to the reception pit of HDD-4 would take one week. This work would need to be repeated for the installation of the second cable circuit, but there will be a sufficient temporal gap between these two periods of work.

4. Section 8 – Eastern Road between Airport Service Road and north of Milton Common (c. 350m south of Tangier Road).

   - This section of the cable trench is located on or adjacent to a 1.5km stretch of Eastern Road and temporary lane closures would be required for installation.
   - In order to minimise traffic disruption, 24-hour working seven days per week may be undertaken, so that the installation could be completed in approximately 33 days. This is based on a construction speed of 45 m per 24 hours. Works outside the Harbourside Caravan Park (the key sensitive receptor in this area) would take approximately seven days, and the noisiest activities (road cutting/breaking and re-surfacing) will be avoided near the Caravan Park during the hours of darkness to minimise sleep disturbance.

Cable Pulling and Joint Bays

24.4.2.18. Joint Bays refer to a series of excavations along the Onshore Cable Corridor, which are created to pull the cables through the ducts and subsequently join lengths of the cables together. The Joint Bays which connect the surface and marine cables is known as the Transition Joint Bay, and will be located in the vicinity of the HDD-1 compound at the Landfall.

24.4.2.19. A number of illustrative Joint Bay locations (referred to as JB1/2, for example) have been chosen to provide an indication of the likely noise and vibration impacts of the Joint Bay works (see Figure 24.2). It should be noted that, although final locations of Joint Bays will not be available until a contractor has been appointed, the quantity

and spatial distribution of the Joint Bays assessed are considered sufficient to identify likely magnitude of noise and vibration impacts on sensitive receptors and has facilitated a proportionate and robust assessment possible of the likely significant effects. As Joint Bay locations are confirmed and refined at detailed design by the contractor specific mitigation requirements will be confirmed also, though will fall within the scope of the range of mitigation measures considered as part of this assessment.

24.4.2.20. A full list of assessment assumptions, including the work stages and equipment details (sound power levels, quantity, percentage on-times etc.) is included in Appendix 24.5 (Noise and Vibration Assessment Assumptions); and the key information is detailed as follows:

- Working hours for Joint Bays activities will be weekdays from 07:00 hours to 17:00 hours. Some works may also be completed from 08:00 hours to 13:00 hours on Saturdays. Start-up and shut down activities may occur for up to one hour either side of these core working hours, but such activities should not create any discernible noise or vibration outside of the order limits.
- Works at each Joint Bay would last for approximately 4 weeks, scheduled as follows:
  - Week 1 – Joint Bay construction
  - Week 2 – Cable installation/pulling
  - Week 3 – Cable jointing
  - Week 4 – Joint Bay infilling and re-surfacing

HDD sites

24.4.2.21. HDD sites refer to the compounds where the drilling and ancillary equipment (used for the HDD sections of the Onshore Cable Corridor) are located. The indicative locations of the HDD sites along the illustrative Onshore Cable Route are shown on Figure 24.2. A full list of assessment assumptions, including the work stages and equipment details (sound power levels, quantity, percentage on-times etc) is included in Appendix 24.5 (Noise and Vibration Assessment Assumptions); and the key information is detailed as follows:

- There are six HDD areas (HDD-1 to HDD-6). At HDD-1, HDD-2, HDD-3, HDD-5 and HDD-6 there is a single compound containing the drilling and ancillary equipment, whereas at HDD-4, there is a launch pit and reception pit. HDD-4 utilises a Trenchless technique rather than HDD.
- The working hours will be 07:00-19:00 hours seven days per week, because drilling bores are generally not left for longer than 12 hours to mitigate the risk of the bores collapsing. Start-up and shut down activities may occur for up to one

hour either side of these core working hours, but such activities should not create any discernible noise or vibration outside of the order limits.

- Tunnelling at HDD-3 and the trenchless technique at HDD-4 may be undertaken 24-hours per day, seven days per week.
- The expected duration of works at each of the HDD sites is as follows:
  - HDD-1 – Landfall – 43 weeks
  - HDD-2 – Milton and Eastney Allotments – 12 weeks
  - HDD-3 – Langstone Harbour – 31 weeks (or two 17-week periods)
  - HDD-4 – Farlington Railway Crossing – 26 weeks
  - HDD-5 – Kings Pond – 13 weeks
  - HDD-6 – Milton Common – 2 weeks

24.4.2.22. The above durations are all based on 12 hour working, seven days per week. The durations for HDD-3 and HDD-4 could be different if night working is completed.

24.4.2.23. The illustrative Onshore Cable Route alignment utilised for the reasonable worst-case noise and vibration assessment does not follow the proposed HDD-6 route over Milton Common, as it is not considered this would represent a worst-case assessment of the optionality for the cable route within this location. However, for completeness, an assessment of HDD-6 has been included.

Landfall

24.4.2.24. Construction activities taking place at the Landfall comprise HDD-1, the Transition Joint Bay and the ORS. The assessment methodologies for HDD-1 and the Transition Joint Bay are described in the sections above.

24.4.2.25. The ORS and associated telecommunication infrastructure at the Landfall comprise two small single storey buildings and a small compound with associated car parking. As the construction activities associated with this infrastructure are assumed to be relatively small scale, a qualitative assessment of construction noise effects is considered appropriate.

24.4.2.26. It is assumed that the ORS infrastructure would be constructed after the HDD-1 works are completed, because they are located in the same area. Standard construction hours (Monday to Friday 0800-1800 hours and Saturday 0800-1300 hours) will apply.

Construction Assessment Criteria – Noise

24.4.2.27. The prediction and assessment of noise during the construction of the Converter Station (including the Telecommunications Buildings), the Onshore Cable Corridor (including trenching, Joint Bays and HDD sites) and the Landfall (including the ORS) has followed the guidance in the relevant sections of Annexes E and F of BS 5228-1:2009+A1:2014 (see Appendix 24.4 Legislation, Policy and Guidance).

24.4.2.28. Given the length of the Onshore Cable Corridor, it would not be practicable to quantify the baseline noise environment along the entire corridor. Therefore, the assessment of impacts and potential significance has been based on fixed noise criteria, rather than noise change relative to the existing ambient noise level. The criteria for the construction noise assessment refer to the expected 'magnitude of level', rather than 'magnitude of change'. Whilst baseline data are available for the land around the Converter Station Area and at the Landfall, to maintain a consistent approach for the entire construction assessment, fixed noise limits have also been adopted for the Converter Station and FOC infrastructure (the Telecommunications Buildings and ORS).

24.4.2.29. The guidance for fixed noise criteria in Annex E.2 of BS 5228-1 indicate that the 12-hour daytime construction noise level (07:00 to 19:00 hours), outside the window of the nearest sensitive receptor, should not exceed 70dBA in rural, suburban and urban areas away from main road traffic, and 75dBA in urban areas near main roads. If these daytime criteria are compared with the ABC method for assessing potential significance based on noise change (see Annex E.3 of BS 5228-1), these correspond to Category B and Category C respectively.

24.4.2.30. As such, 70dBA is considered an appropriate level to select as the daytime construction noise threshold between a small adverse and medium adverse magnitude of level. This corresponds with the stricter fixed noise limit, Category B (the middle category) of the ABC method and also reflects the expected baseline noise climate at the majority of receptors (i.e. rural, sub-urban and urban areas away from main road traffic and industrial noise).

24.4.2.31. The thresholds between negligible, small, medium and large magnitudes of level have been separated by 5dB steps, which is the same as that adopted for the ABC method.

24.4.2.32. As indicated above, there is the potential for some evening, weekend and night-time works in certain locations along the Onshore Cable Corridor. Section 6.3 of BS 5228-1 suggests that works out of normal weekday and Saturday morning working hours require special consideration, and noise criteria for activities outside of these periods will need to be stricter. BS 5228-1 also states that the evening limit may need to be as much as 10 dBA below the daytime limit and 'very strict' criteria may be required for night works. In Table E.1 of BS 5228-1, the evening and weekend criteria are 10dB below the weekday daytime criteria, and the night-time criteria are 20dB below the weekday daytime criteria.

24.4.2.33. Based on the above, the criteria adopted for the construction noise assessment are detailed in Table 24.3.

Table 24.3 – Assessment criteria for construction noise

Time Period	Construction noise level[4], dB, $L_{Aeq,T}$	Magnitude of level
Daytime[1]	≤65 dB	Negligible
	66 dB to 70 dB	Small adverse
	71 dB and 75 dB	Medium adverse
	≥76 dB	Large adverse
Evening and weekends[2]	≤55 dB	Negligible
	56 dB to 60 dB	Small adverse
	61 dB and 65 dB	Medium adverse
	≥66 dB	Large adverse
Night-time[3]	≤45 dB	Negligible
	46 dB to 50 dB	Small adverse
	51 dB and 55 dB	Medium adverse
	≥56 dB	Large adverse

1 – Monday to Friday 07:00 – 1900 hours, Saturday 07:00 – 14:00 hours
2 – Monday to Friday 19:00 – 22:00 hours, Saturday 14:00 – 22:00 hours, Sunday 07:00 – 2100 hours
3 – Monday to Saturday 22:00 – 07:00 hours, Sunday 21:00 – 07:00 hours.
4 – All noise criteria are free-field levels predicted at the façade of a sensitive receptor.

24.4.2.34. The time periods shown in the footnote of Table 24.3 broadly align with the time periods detailed in Table E.2 of BS 5228-1.

24.4.2.35. When determining the magnitude of impact from the magnitude of level, it is necessary to consider the duration, timing and frequency of the construction activities, which will vary for different elements.

24.4.2.36. The magnitudes of impact are shown in Table 24.4. It can be seen that the magnitudes of impact are greater for those activities which occur for longest, and those which occur at more sensitive time periods. It also allows the magnitude of impact to be lower for the very short-term activities which occur during less sensitive periods (i.e. typical daytime construction hours).

Table 24.4 – Matrix for determining the magnitude of impact from magnitude of level for construction noise

Time Period	Magnitude of level	Magnitude of impact		
		Up 2 consecutive periods	3-5 consecutive periods	>5 consecutive periods
Daytime[1]	Negligible	Negligible	Negligible	Negligible
	Small adverse	Negligible	Negligible	Low
	Medium adverse	Low	Low	Medium
	Large adverse	Medium	Medium	High
Evening and weekends[2]	Negligible	Negligible	Negligible	Negligible
	Small adverse	Negligible	Low	Low
	Medium adverse	Low	Medium	Medium
	Large adverse	Medium	High	High
Night-time[3]	Negligible	Negligible	Negligible	Negligible
	Small adverse	Low	Low	Medium
	Medium adverse	Medium	Medium	High
	Large adverse	High	High	High

1 – Monday to Friday 07:00 – 1900 hours, Saturday 07:00 – 14:00 hours
2 – Monday to Friday 19:00 – 22:00 hours, Saturday 14:00 – 22:00 hours, Sunday

07:00 – 2100 hours
3 – Monday to Saturday 22:00 – 07:00 hours, Sunday 21:00 – 07:00 hours.

24.4.2.37. The magnitudes of impact determined from Table 24.4 are applied to the matrix in Table 24.14, alongside the receptor sensitivity to determine the significance of effect.

24.4.3. CONSTRUCTION STAGE – VIBRATION

24.4.3.1. The assessment methodology for vibration has focused on the key items of vibration inducing equipment used during the construction of the Converter Station, Onshore Cable Corridor and the Landfall, which are as follows:

Trenching and Joint Bays

- A breaker to remove existing road surfacing during trenching and Joint Bay construction works. It is assumed that an excavator-mounted hydraulic hammer would be used.
- A vibratory roller for re-surfacing following trenching and Joint Bay works. It is assumed that a small ride-on roller would be used.
- A vibratory plate compactor for compaction during Joint Bay construction works.

HDD

- A vibratory hammer to install temporary sheet piles associated with site set-up at the launch and reception pits at HDD-4. It is assumed that an excavator mounted hydraulic vibratory hammer would be used.
- The rigs used for the HDD drilling.

Converter Station

- An impact hammer to install stone piles/columns associated with the Converter Station buildings.

24.4.3.2. All vibration inducing activities will be undertaken during daytime periods only, with the exception of Trenchless installation at HDD-4.

24.4.3.3. As far as possible, the vibration predictions have been determined using the relevant historical measurement data and calculation algorithms set out in BS 5228-2. However, not all sources of vibration or calculation methods are covered in the standard, and where required, substitute methods considered to be the most appropriate have been utilised. Full details of the assumptions and substitute methods utilised are included in Appendix 24.5 (Noise and Vibration Assessment Assumptions).

24.4.3.4. Similarly, to the noise assessment, the vibration assessment has utilised the illustrative Onshore Cable Route alignment (see Figure 24.2).

Construction Assessment Criteria – Vibration

24.4.3.5. British Standard BS 5228-2:2009+A1 2014 (see Appendix 24.4 Legislation, Policy and Guidance) describes ranges of vibration in terms of peak particle velocities ('PPV') and the corresponding effects on people. Using this guidance, the magnitude of level assessment criteria have been determined, as shown in Table 24.5.

24.4.3.6. These vibration criteria are derived for human comfort. Vibration criteria relevant to building damage are considerably higher (i.e. less strict) than those set out in Table 24.5. Therefore, potentially significant effects have been identified based on the human comfort criteria. An assessment of building damage from vibration has been scoped out of the assessment and criteria are not provided.

Table 24.5 – Assessment criteria for construction vibration

PPV vibration level from construction activities	Magnitude of level
≤0.3 mm·s^{-1}	Negligible
0.4 - 1.0 mm·s^{-1}	Small adverse
1.1 - 5 mm·s^{-1}	Medium adverse
≥5.1 mm·s^{-1}	Large adverse

24.4.3.7. Using a similar approach to the construction noise assessment for the Onshore Cable Corridor, the objective of the method utilised has been to identify at what distance from the construction works adverse vibration impacts of each magnitude (small, medium and large) occur. Areas where relatively large numbers of sensitive receptors are located near to the illustrative Onshore Cable Route has enabled counting of the number of sensitive receptors impacted by each magnitude of level using GIS software.

24.4.3.8. The distances from the vibration generating activities at which small, medium and large effects are predicted to occur have been calculated.

24.4.3.9. The relationship between magnitude of level and magnitude of impact for construction vibration effects is presented in Table 24.6, which shows that the magnitude of impact depends on the number of consecutive periods (i.e. days) that the vibration impact occurs.

Table 24.6 – Matrix showing relationship between magnitude of level and magnitude of impact for construction vibration effects

Magnitude of level	Magnitude of impact	
	Up to 5 consecutive days	>5 consecutive days
Negligible	Negligible	Negligible
Small adverse	Negligible	Low
Medium adverse	Low	Medium
Large adverse	Medium	High

24.4.4. CONSTRUCTION STAGE – ROAD TRAFFIC

24.4.4.1. An assessment of the noise impacts resulting from development related construction vehicles on the surrounding road network has been undertaken.

24.4.4.2. The study area for the transport assessment as set out in Chapter 22 Traffic and Transport, incorporates an approximate 5km area around the Order Limits, incorporating Denmead, Southwick and Cosham to the west and the A3(M) corridor to the east between Junction 1 (Horndean) and where it meets the A27 (Bedhampton). To provide a robust assessment the transport study area also includes all of Portsea Island and motorway between M27 Junction 12 to the west and A27 junction with A3(M) to the east.

24.4.4.3. To ensure a proportionate assessment, the study area for the noise assessment comprises all available road links within an approximate 3km distance from the Order Limits. No significant noise effects are expected beyond 3km from the Order Limits because the transport thresholds for potential significance were not exceeded on any links beyond the 3km boundary. The transport thresholds for potential significance are more sensitive than for noise.

24.4.4.4. The traffic data supplied includes:

- the impacts of temporary road/lane closures required for the Onshore Cable Corridor construction on traffic distribution across the wider network; and
- additional employee and construction related traffic for the Converter Station Area, the Onshore Cable Corridor and the Landfall.

24.4.4.5. Traffic data for three scenarios have been supplied:

1. 2026 DM (Do Minimum)
2. 2026 DS1 (Do-Something)
3. 2026 DS2 (Do-Something)

2026 DM

24.4.4.6. The 2026 DM refers to the future baseline scenario in the absence of the Proposed Development. The is the scenario that the DS1 and DS2 scenarios are compared against to determine the magnitude of noise level change as a result of development related traffic.

2026 DS1 and 2026 DS2

24.4.4.7. The 2026 DS1 and 2026 DS2 scenarios refer to the construction works, which include the following elements:

- Heavy Goods Vehicles (HGV) and construction worker movements associated with Converter Station construction. All vehicles have been assumed to utilise a defined route between the A3(M) and the Converter Station Area construction site;
- HGV, Light Good Vehicles (LGVs) and construction worker movements associated with construction within the Onshore Cable Corridor. As a reasonable worst case, it has been assumed that six groups of construction workers (referred to as cable gangs) would simultaneously be working at different points of the Onshore Cable Corridor. The construction workers and HGV movements are assumed to follow defined routes between the main site compound at the Converter Station Area and the relevant cable gang along the corridor; and
- Shuttle working traffic signals, temporary traffic signals or single lane closures at six locations. A seventh cable gang would be working at landfall.

24.4.4.8. As a reasonable worst-case scenario, it has been assumed that the construction works specified above are completed simultaneously and hence are included in the DS1 and DS2 scenarios.

24.4.4.9. The DS1 and DS2 scenarios are identical with the exception of the following assumption:

- DS1 refers to the construction scenario where southbound lane closures are in place on the A2030 between Airport Service Road and Burrfields Road.
- DS2 refers to the construction scenario where northbound lane closures are in place on the A2030 between Airport Service Road and Burrfields Road.

Basic Noise Level Calculations

24.4.4.10. The methodology contained in the Calculation of Road Traffic Noise 1988 ('CRTN') (see Appendix 24.4 Legislation Policy and Guidance) has been used to calculate a $L_{A10,18h}$ (0600-2400 hours) Basic Noise Level ('BNL') for each road link based on the following elements of the traffic data:

- The 18-hour (0600-2400 hours) Annual Average Weekday Traffic ('AAWT') flow;
- The average speed (km/h) across the 18-hour period; and
- The percentage of HGVs across the 18-hour period.

24.4.4.11. For two-ways roads, it has been necessary to combine the directional one-way flows into a single two-way flow, calculate a flow weighted average speed from the one-way speeds, and calculate the two-way percentage HGV.

24.4.4.12. The CRTN methodology is not reliable at speeds of less than 20 km/h. Where road links are subject to an average speed of less, the speed has been increased to 20 km/h. A low flow correction has been applied to all links with a AAWT flow of 1,000-4,000 vehicles in the 18-hour period, as per CRTN.

24.4.4.13. The calculated BNLs for the DS1 and DS2 scenarios have been compared with the BNLs for the DM scenario to determine the magnitude of noise change as a result of the Proposed Development.

Calculations for low flow links

24.4.4.14. The methodology in CRTN is not reliable where AAWT flows are below 1,000 vehicles in the 18 hour period. However, it is not considered appropriate to discount these links because this could lead to the omission of potential impacts on quieter roads. Therefore, where links have been identified as having a flow of below 1,000 vehicles in any scenario, these links have been assessed based on the increase or decrease in flow alone. For example, a doubling or halving of flow would equate to a 3dB increase or decrease in noise level.

24.4.4.15. Road links with an 18-hour flow of below 100 in both DM and DS scenarios have been excluded from the assessment because a noise level from a road with fewer than 100 vehicles would be very low.

Assessment Criteria – Road Traffic Noise

24.4.4.16. The magnitude of change categories for the construction road traffic noise assessment are presented in Table 24.7.

Table 24.7 – Magnitude of change categories for the construction road traffic noise assessment

Increase in basic noise level, dB $L_{A10,18h}$	Magnitude of Change
< 1 dB	Negligible
1.0 to 2.9 dB	Small adverse
3.0 to 4.9 dB	Medium adverse
≥5.0 dB	Large adverse

24.4.4.17. A magnitude of change for the road traffic noise assessment is considered to be temporary as it relates to the construction stage. Impacts would be short-term as road closures along the Onshore Cable Corridor are expected to be temporary and transient. Therefore, the magnitude of change categories in Table 24.7 are considered to correspond with the magnitude of impact categories in Table 24.13, as shown in Table 24.8.

Table 24.8 – Relationship between magnitude of change and magnitude of impact for construction road traffic noise assessment

Magnitude of Change	Magnitude of Impact
Negligible	Negligible
Small adverse	Negligible
Medium adverse	Low
Large adverse	Medium

24.4.5. OPERATION STAGE

24.4.5.1. Operation stage impacts include noise associated with the Converter Station and the Telecommunications Buildings in Section 1, and ORS infrastructure in Section 10. Operational impacts associated with Sections 2-9, the Onshore Cable Route in Section 1 and the remaining elements of the Landfall (HDD-1 and the Transition Joint Bay) have been scoped out of this assessment (see section 24.3).

Converter Station Area (including Telecommunications Buildings)

24.4.5.2. A computerised 3D acoustic model of the Converter Station (both options B(i) and B (ii), the Telecommunications Buildings and surrounding landscape has been produced to predict the likely noise levels at the sensitive receptors within the study area. Options B(i) and B(ii) refer to the two potential Converter Station locations within the Order Limits as shown in Converter Station and Telecommunication Parameter Plan document reference 2.6. The model has been produced using CadnaA noise mapping software. A full list of model settings, configurations, assumptions and data sources is included in Appendix 24.5 (Noise and Vibration Assessment Assumptions). The primary component parts of the noise model are as follows:

- Technical drawings and specifications of an indicative Converter Station Area layout including each building's location, size, layout and elevations.
- Technical drawings and specifications showing indicative layouts, heights and quantities of external and internal noise producing plant items.
- Proposed ground levels at the Converter Station, based on cut and fill calculations. Note this excludes any reprofiling of the land in this area which has been recommended to reduce landscape impacts. Increasing the height of the land around the Converter Station (not the platform level of the Converter Station itself) may reduce noise levels at sensitive receptors and will not increase noise levels.
- Topographical data for the area between the site and the surrounding sensitive receptors.
- Sound power levels for each proposed item of plant, including octave band data, where available.
- The embedded mitigation measures applied to the plant (e.g. enclosures and attenuators) that have been included within the Converter Station assessment (see Embedded Mitigation in section 24.6).
- The location of surrounding noise sensitive receptors (see figure 24.1). Receptors have been arranged into groups based on geographical location, and the noise level at the receptor located closest to the proposed Converter Station has been used as a representative value for all receptors within that geographical area. A list of addresses for all receptors included in the operational Converter Station Area noise model are provided in Appendix 24.3 (Lists of Sensitive Receptors for Noise and Vibration Assessment of Converter Station and Telecommunications Infrastructure).

24.4.5.3. To present a worst-case assessment it has been assumed that all plant will be operating continuously (24 hours per day, 365 days per year). In practice there are

likely to be variations in the operation of equipment in response to factors including demand profile changes and climatic conditions which may result in lower noise levels.

24.4.5.4. The predicted noise levels at sensitive receptors for Options B (i) and B (ii) have been compared to determine which is considered the 'worst-case'. This enables the results for a single option to be presented in the predicted impacts section.

24.4.5.5. The assessment considers the broadband noise level and also the noise levels across the octave band frequency spectrum. The broadband noise level assessment is in accordance with the methodology in BS4142:2014. The assessment methodology and criteria for the daytime and night-time octave band noise level assessments is described in more detail below.

24.4.5.6. The broadband noise criteria (see Table 24.9) for each group of sensitive receptors has been determined by establishing the typical daytime and night-time background sound level, as measured during the baseline noise survey. The method for deriving the noise criteria has been agreed with the relevant LPAs.

Table 24.9 – Broadband free-field noise criteria at receptors for operational Converter Station and the Telecommunications Buildings

Receptor Group Name	Receptor Group Number	Noise assessment criterion ($L_{Ar,T}$)	
		Daytime	Night-time
The Haven and Old Mill Cottage	R1	33	25
Hillcrest	R2	33	25
Millfield Farm	R3	33	25
Kimberley House	R4	33	27
Little Denmead Farm	R5	33	27
Holme and Highfield Cottages	R6	30	23
Lower Chapters	R7	30	23
The Arrows	R8	30	23
Broadways	R9	32	27
Broadway Farm House	R10	32	27
Broadway Farm Cottages	R11	32	27
Hinton Daubnay	R12	33	27
Ludmore Cottages	R13	33	27
Old Mill House and The Shieling	R14	33	25
The Ranch	R15	33	25

24.4.5.7. The predicted broadband noise levels from the Converter Station and the Telecommunications Buildings have been compared to the noise assessment criteria above to determine the magnitude of level, as defined in Table 24.11 below.

24.4.5.8. Given the large distances between the Converter Station and closest sensitive receptors (over 200m), it is unlikely that character corrections in accordance with BS4142:2014 would need to be applied. This approach is considered to be robust.

24.4.5.9. The daytime and night-time octave band assessment methodologies differ as daytime noise criteria are relevant to noise outside a receptor and night-time criteria are relevant to internal noise levels.

24.4.5.10. The daytime criteria have been derived from the octave band spectrum for the 16-hour (07:00 – 23:00 hour) background (L_{A90}) noise level at each measurement location. For consistency, these spectra have then been adjusted to equal the daytime background noise level used in the broadband assessment (see Table 24.9). The octave band assessment has been undertaken over the 31.5Hz to 8kHz range. The criteria for each receptor are shown in Appendix 24.6 (Noise Survey Equipment, Meteorological Conditions and Noise Survey Results) and have been set equal to the background noise levels across all octave bands.

24.4.5.11. The night-time octave band noise assessment uses the noise rating (NR) curves as BS4142:2014 is not appropriate for the assessment of internal noise. Furthermore, the NR curves consider the octave band spectrum. As for the daytime, the octave band assessment has been undertaken over the 31.5Hz to 8kHz range. Internal noise levels have been determined from the external predicted noise levels by subtracting the octave band performance of an open window (see Appendix 24.7 Noise Modelling Results - Operational Converter Station and Landfall Telecommunications Infrastructure). The night-time internal criterion for each receptor has been set at NR20.

ORS infrastructure at Landfall

24.4.5.12. Similarly to the Converter Station Area, a CadnaA 3D acoustic model of the ORS infrastructure and surrounding landscape at Landfall has been produced to predict the likely noise levels at the nearest sensitive receptors. A full list of model settings, configurations, assumptions and data sources is included in Appendix 24.5 (Noise and Vibration Assessment Assumptions). The primary component parts of the noise model are as follows:

- Technical drawings showing the location, size, layout and elevations of the ORS buildings, and the location of the external plant items (which accord with the location and maximum envelope identified on the Indicative Optical Regeneration Station(s) Parameter Plans (document reference 2.11));
- Topographical data for the area between the site and the surrounding receptors;
- The sound power levels for the plant items, including octave band data; and
- The location of the nearest noise sensitive receptors, which have been arranged into groups based on geographical location (see Figure 24.3). The noise level at the receptor located closest to the ORS infrastructure are used as a representative value for all receptors within that geographical area.

24.4.5.13. To present a worst-case assessment it has been assumed that the equipment included in the assessment will operate continuously (24 hours per day, 365 days per year).

24.4.5.14. The broadband noise criteria (Table 24.10) for the two groups of sensitive receptors has been determined from the background sound level measurements undertaken during the baseline noise survey.

Table 24.10 – Broadband free-field noise criteria at receptors for operational ORS infrastructure at Landfall

Receptor Group Name	Receptor Group Number	Noise assessment criterion ($L_{Ar,T}$)	
		Daytime	Night-time
Southsea Leisure Park (Caravans)	R16	43	35
41-51 Fort Cumberland Road	R17	43	35

24.4.5.15. The predicted broadband noise levels from the ORS infrastructure at the nearest noise sensitive receptors have been compared to the noise assessment criteria above to determine the magnitude of level, as defined in Table 24.11 below. Consideration has also been given to appropriate character corrections in accordance with BS4142:2014.

24.4.5.16. The assessment methodologies for the daytime and night-time octave band analysis are the same as those utilised for the operational assessment of the Converter Station Area. Please see Appendix 24.6 (Noise Survey Equipment, Meteorological Conditions and Noise Survey Results) for the typical octave band breakdown of daytime background noise levels (i.e. the daytime assessment criteria).

Operational Assessment Criteria - Noise

24.4.5.17. The magnitude of level categories for the operational assessment of the Converter Station (including the Telecommunications Buildings) and the ORS infrastructure are presented in Table 24.11. The predicted noise levels from the Proposed Development during operation have been compared with the assessment criteria to determine the magnitude of level.

Table 24.11 – Magnitude of level categories for the operation of the Converter Station (including the Telecommunications Buildings) and ORS infrastructure at Landfall.

Operational Noise Level, dB L_{Aeq}	Magnitude of Level*
Daytime and night-time broadband assessment and daytime octave band assessment[1]	
≤ assessment criterion	Negligible

Operational Noise Level, dB L_{Aeq}	Magnitude of Level*
0.1 to 3.0 dB above assessment criterion	Small adverse
3.1 to 5.0 dB above assessment criterion	Medium adverse
≥5.1 dB above assessment criterion	Large adverse
Night-time octave band assessment[2]	
≤ NR20 (assessment criterion)	Negligible
NR21 – NR23	Small adverse
NR24 – NR25	Medium adverse
≥NR26	Large adverse

1 - External free-field noise levels at the façade of the sensitive receptor

2 – Internal noise levels

N.B. May be amended depending on context, including the absolute baseline and predicted noise levels across the octave band spectrum

24.4.5.18. The noise levels resulting from the operational assessment are considered to be permanent, and the duration, timing and frequency of the impact is considered to be relatively unchanging. Therefore, the operational magnitude of level categories in Table 24.11 are considered to correspond with the magnitude of impact categories in Table 24.13, as shown in Table 24.12.

Table 24.12 – Relationship between magnitude of level and magnitude of impact for operational noise effects

Magnitude of Level	Magnitude of Impact
Negligible	Negligible
Small adverse	Low
Medium adverse	Medium
Large adverse	High

24.4.6. DECOMMISSIONING

24.4.6.1. The methodologies utilised for the noise assessment of the decommissioning stage are similar to those detailed for the construction stage.

24.4.6.2. A specific assessment of vibration for the decommissioning stage has not been included as impacts are considered the same or less than those defined for the construction stage.

Converter Station Area

24.4.6.3. The methodology used to establish the likely significant effects during decommissioning of the Converter Station Area is similar to that used for its construction, in terms of the sensitive receptors assessed, assessment approach and guidance document utilised (BS 5228-1).

24.4.6.4. However, the methodologies differ in terms of the equipment details and work stages assumed. Whilst exact details of the Converter Station Area decommissioning are unknown at this stage, the assessment has been divided into the following general categories:

- Superstructure demolition of the Converter Station and the Telecommunications Buildings;
- Substructure demolition of the Converter Station and associated landscaping; and
- Removal of access road and associated landscaping.

24.4.6.5. It is assumed that working hours for the decommissioning of the Converter Station would be the same as assumed for construction (Monday to Friday 0800-1800 hours and Saturday 0800-1300 hours).

24.4.6.6. A full list of assessment assumptions for the decommissioning of the Converter Station, including the work stages and equipment details (sound power levels, quantity, percentage on-times etc) is included in Appendix 24.5 (Noise and Vibration Assessment Assumptions).

24.4.6.7. Similarly to the construction assessment, the initial noise predictions for the decommissioning works have followed a 'worst-case' assumption, by calculating the construction noise level based on the distance between a receptor and the closest point of works. Where a greater than negligible impact has been identified using the worst-case method, a 'typical-case' has also been calculated, which is based on the distance between a receptor and the central point of the works.

24.4.6.8. The noise assessment criteria utilised for the Decommissioning Stage are the same as those utilised for the Construction Stage (see Table 24.3).

Onshore Cable Corridor

24.4.6.9. It is understood that the cable ducts are likely to be left in situ. Even if cables are required to be removed from the ducts, noise producing activities associated with the decommissioning of the Onshore Cable Corridor are likely to be minimal. This will be confirmed at the time of decommissioning. As such, a qualitative approach has been utilised to quantify potential impacts.

ORS infrastructure

24.4.6.10. As the decommissioning activities associated with this infrastructure are assumed to be relatively small scale, a qualitative assessment of decommissioning noise effects is considered appropriate.

24.4.7. SIGNIFICANCE CRITERIA

24.4.7.1. The magnitude of impact is correlated with the sensitivity of the receptor to determine the significance of a potential effect.

Magnitude of impact

24.4.7.2. The magnitude of impact relates to the level at which the receptor will be impacted, considering the magnitude of change (or magnitude of level), together with the duration, timing and frequency of the impact. Table 24.13 includes generic definitions of magnitude of impact; definitions are more specific for some assessment elements.

Table 24.13 – Definitions of 'magnitude' of impact

Magnitude of Impact	Definition
High	Total loss or major alteration to key elements/features of the baseline (i.e. pre-development) conditions.
Medium	Partial loss or alteration to one or more key elements/features of the baseline (i.e. pre-development) conditions.
Low	Minor shift away from baseline (i.e. pre-development) conditions.
Negligible	Very slight change from baseline (i.e. pre-development) conditions.

Value/Sensitivity

24.4.7.3. As described within Chapter 4 EIA Methodology, sensitivity is a means of measuring how affected receptors/processes and/or the receiving environment is to change. The sensitivity is assigned at the receptor/process level. This may be defined in terms of

quality, value, rarity or importance, and be classed as negligible, low, medium, or high.

24.4.7.4. For the purpose of determining the significance of noise and vibration effects, the sensitivity of residential receptors, hotels, educational and healthcare facilities are considered to be high. Other receptors potentially sensitive to noise and vibration, such as sports pitches, are generally considered to be of low sensitivity; but this will vary depending on the time at which the impacts occur. Additionally, some of these receptors may not be considered sensitive to vibration, depending on the context.

Significance

24.4.7.5. The overall significance has been assessed using the matrix shown in Table 24.14. Effects deemed to be significant for the purpose of this assessment are those which are described as 'major' and 'moderate to major'. In addition, 'moderate' effects can also be deemed as significant, depending on the context. Whether they do so has been determined by a qualitative analysis of the specific impact to the environment and has been based on professional judgement. If/where this is the case, the basis for any judgement has been outlined.

Table 24.14 – Matrix for classifying the significance of effects

		Sensitivity of receptor/receiving environment to change			
		High	Medium	Low	Negligible
Magnitude of Impact	High	Major	Major to Moderate	Minor to Moderate	Negligible
	Medium	Moderate	Moderate	Minor	Negligible
	Low	Minor	Minor to Negligible	Negligible	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

24.4.8. ASSUMPTIONS AND LIMITATIONS

Construction

Illustrative Onshore Cable Route within the Onshore Cable Corridor

24.4.8.1. The construction noise and vibration assessment is based on an illustrative Onshore Cable Route alignment which represents a scenario of where the Onshore Cable could be laid within the Onshore Cable Corridor (see figure 24.2). The illustrative

Onshore Cable Route takes into account the reasonably limited width of the Onshore Cable Corridor in most locations, and therefore the relatively limited flexibility for deviation. The precise location of the cable route is yet to be determined and will be confirmed following the Order being made once a contractor(s) for the Proposed Development has been appointed, taking into account precise constraints within the corridor (principally existing utilities). The assessment of the Onshore Cable Route construction noise and vibration effects is considered robust and sufficient to identify the likely significant noise and vibration impacts on sensitive receptors.

Joint Bays

24.4.8.2. A number of illustrative Joint Bay locations were identified to provide an indication of the likely noise and vibration impacts of the Joint Bay works. It should be noted that although final locations of Joint Bays will not be available until a contractor has been appointed, the quantity and spatial distribution of the Joint Bays assessed are considered robust and sufficient to identify the likely magnitude of noise and vibration impacts on sensitive receptors.

HDD

24.4.8.3. Noise levels relating to some of the construction equipment utilised in the assessment of the HDD sites have been provided by an external contractor. These data have been assumed to be accurate.

Vibration assessment

24.4.8.4. As far as possible, the vibration predictions have been determined using the relevant historical measurement data and calculation algorithms set out in BS 5228-2. However, not all sources of vibration or calculation methods are covered in the standard. Where required, substitute methods considered to be the most appropriate have been utilised.

Operational

24.4.8.5. A full list of assumptions which apply to the 3D noise model created to assess the operational impacts of the Converter Station and FOC infrastructure is included in Appendix 24.5 (Noise and Vibration Assessment Assumptions).

24.4.8.6. The following assumptions apply to the equipment source data and mitigation included in the operational Converter Station Area assessment:

- The source data and mitigation assumptions have been gathered from a number of different data sources as detailed in Appendix 24.5 (Noise and Vibration Assessment Assumptions), which are assumed to be accurate.
- Details of the exact equipment which will be installed at the Converter Station are unknown until a contractor is appointed. The plant data used in this assessment

are based on the most robust and referenceable information available at this stage.

- The source data and mitigation have been selected with the aim of demonstrating that a solution exists which avoids significant effects during the operation of the Converter Station. It is appreciated that the detailed design of the Converter Station Area may present equipment lists with different source levels and mitigation measures. However, this approach is considered robust, with appropriate measures to be put in place to ensure the Converter Station Area criteria are not exceeded.
- The noise model of the Converter Station Area buildings does not include facade openings (e.g. doors or ventilation openings) and the effect these could have on the sound insulation performance of the building.

24.4.8.7. The following assumptions apply to the operational assessment of the ORS at landfall:

- Information provided by the design team indicates that the noise producing equipment at the ORS buildings comprise four external heating, ventilation and air-conditioning units (providing thermostatic control to the inside of the buildings) and two external diesel generators (providing back-up power supply).
- To present a worst-case it is assumed that the heating, ventilation and air-conditioning units will operate continuously (24 hours per day, 365 days per year), and therefore these equipment items have been included in the noise model.
- It is understood that as a worst case, the generators would operate approximately five to six times per year for a period of up to 24 hours until the network operator restores the power supply fault. Therefore, given the limited period of time that this equipment would be expected to operate, it has been excluded from the assessment.

24.5. BASELINE ENVIRONMENT

24.5.1. DC CABLE CORRIDOR SECTIONS

24.5.1.1. The baseline noise climate has been quantified at receptors close to the Converter Station Area and the Landfall. This is primarily due to these areas containing the proposed permanent noise sources.

24.5.1.2. Given the changeable noise climate expected along the Onshore Cable Corridor and the transient nature of the associated construction works, it is considered unnecessary to obtain baseline noise levels along the Onshore Cable Corridor (Sections 2-9). However, the expected noise climate within the Onshore Cable Corridor Sections 2 to 9 is described below.

24.5.1.3. Details of the survey equipment and meteorological conditions throughout the measurement periods are provided in Appendix 24.6 (Noise Survey Equipment, Meteorological Conditions and Noise Survey Results).

24.5.1.4. The baseline noise climate for each of the Onshore Cable Corridor sections is described below based on aerial mapping.

Section 1 – Lovedean (Converter Station Area)

24.5.1.5. A summary of the time-averaged ambient broadband noise levels and typical background noise levels for each day and night period are presented in Tables 24.15 to 24.19 below.

Full results of the noise survey, including typical daytime octave band spectra, are presented in tabular form in Appendix 24.6 (Noise Survey Equipment, Meteorological Conditions and Noise Survey Results).

Table 24.15 – Summary of measured noise levels, Measurement Position 1

Day/Date	Daytime (07:00 – 23:00)		Night time (23:00 – 07:00)	
	Average Ambient Noise Level $L_{Aeq,16h}$ (dB)	Typical Background Noise Level $L_{A90,15min}$ (dB)	Average Ambient Noise Level $L_{Aeq,8h}$ (dB)	Typical Background Noise Level $L_{A90,15min}$ (dB)
28 June 2017	46	36*	44	32
29 June 2017	45	31	43	35
30 June 2017	45	35	43	27
01 July 2017	46	34	45	20
02 July 2017	45	33	43	22
03 July 2017	46	33	43	23
04 July 2017	46	31	41	28
05 July 2017	42	32	41	31
06 July 2017	46	38*	-	-
Average	45	33	43	27

*Part period – not used in determination of operational noise criteria.

Table 24.16 – Summary of measured noise levels, Measurement Position 2

Day/Date	Daytime (07:00 – 23:00)		Night time (23:00 – 07:00)	
	Average Ambient Noise Level $L_{Aeq,16h}$ (dB)	Typical Background Noise Level $L_{A90,15min}$ (dB)	Average Ambient Noise Level $L_{Aeq,8h}$ (dB)	Typical Background Noise Level $L_{A90,15min}$ (dB)
28 June 2017	39	31*	38	25
29 June 2017	41	31	39	22
30 June 2017	42	31	40	25
01 July 2017	42	34	46	27
02 July 2017	43	33	35	23
03 July 2017	41	34	36	23
04 July 2017	40	32	38	22
05 July 2017	40	35	38	29
06 July 2017	44	40*	-	-
Average	42	33	40	25

*Part period – not used in determination of operational noise criteria.

Table 24.17 – Summary of measured noise levels, Measurement Position 3

Day/Date	Daytime (07:00 – 23:00)		Night time (23:00 – 07:00)	
	Average Ambient Noise Level $L_{Aeq,16h}$ (dB)	Typical Background Noise Level $L_{A90,15min}$ (dB)	Average Ambient Noise Level $L_{Aeq,8h}$ (dB)	Typical Background Noise Level $L_{A90,15min}$ (dB)
28 June 2017	41	32*	43	26
29 June 2017	43	28	41	19
30 June 2017	44	28	40	24
01 July 2017	42	33	38	25
02 July 2017	44	29	37	20
03 July 2017	44	34	42	21
04 July 2017	42	29	37	23
05 July 2017	42	29	38	28
06 July 2017	42	37*	-	-
Average	43	30	40	23

*Part period – not used in determination of operational noise criteria.

Table 24.18 - Summary of measured noise levels, Measurement Position 4

Day/Date**	Daytime (07:00 – 23:00)		Night time (23:00 – 07:00)	
	Average Ambient Noise Level $L_{Aeq,16h}$ (dB)	Typical Background Noise Level $L_{A90,15min}$ (dB)	Average Ambient Noise Level $L_{Aeq,8h}$ (dB)	Typical Background Noise Level $L_{A90,15min}$ (dB)
28 June 2017	42	31*	34	29
29 June 2017	39	31	34	25
30 June 2017	44	32	36	28
01 July 2017	42	32	35	28
02 July 2017	42	34	35	27
03 July 2017	41	33*	-	-
Average	42	32	35	27

*Part period – not used in determination of operational noise criteria.

**The battery of the sound level meter used at MP4 ran out on 03 July 2017. The data gathered are considered robust and suitable for use in this assessment.

Table 24.19 - Summary of measured noise levels, Measurement Position 6

Day/Date**	Daytime (07:00 – 23:00)		Night time (23:00 – 07:00)	
	Average Ambient Noise Level $L_{Aeq,16h}$ (dB)	Typical Background Noise Level $L_{A90,15min}$ (dB)	Average Ambient Noise Level $L_{Aeq,8h}$ (dB)	Typical Background Noise Level $L_{A90,15min}$ (dB)
28 June 2017	41	32*	41	30
29 June 2017	41	31	43	23
30 June 2017	45	31	41	27
01 July 2017	44	32	37	29
02 July 2017	44	32	41	27
03 July 2017	41	36	44	25
04 July 2017	52	34	39	24
05 July 2017	42	35	38	29
06 July 2017	44	37*	-	-
Average	46	33	41	27

*Part period – not used in determination of operational noise criteria.

24.5.1.6. The typical L_{A90} values are taken as the most frequently occurring (modal) integer value of the measured background noise levels logged every 15 minutes over each daytime or night time periods. These values have been derived in accordance with the methodology in BS 4142:2014 and it is these which have been used to set the noise criteria for the Converter Station Area, as agreed with the relevant LPAs.

24.5.1.7. The daytime octave band spectrum derived for each of the measurement positions is shown in Appendix 24.6 (Noise Survey Equipment, Meteorological Conditions and Noise Survey Results). The spectra have been derived from the 16-hour daytime background (L_{A90}) noise level and adjusted to equal the broadband noise criteria at each location.

Section 2 – Anmore

24.5.1.8. Section 2 passes through a predominantly rural area where baseline noise levels are expected to be relatively low. In the south of Section 2, is the north-eastern boundary of Denmead and the northern area of Anmore where noise levels may be influenced by traffic on the surrounding roads.

24.5.1.9. Section 2 passes through a sparsely populated area with a small number of receptors situated along Edney's Lane and White Horse Lane to the west. The southern boundary of Section 2 coincides with the onset of a more densely populated residential area to the south of Anmore Road.

Section 3 – Denmead/Kings Pond Meadow

24.5.1.10. Section 3 passes between the villages of Denmead and Anmore with the eastern fringe of Denmead also being included within the section. The baseline noise climate within this area is expected to be relatively low with no obvious major noise sources.

24.5.1.11. Section 3 includes receptors in Anmore with the Order Limits being adjacent to the western fringe of the village. There are also receptors at the southern end of Soake Road to the south of Anmore.

Section 4 – Hambledon Road to Farlington Avenue

24.5.1.12. Section 4 covers a large area from the north-western fringe of Waterlooville continuing along the alignment of Hambledon Road which turns into the A3 London Road as it continues to the west of Purbrook and Widley. At its junction with the B2177 it continues eastbound and on to Farlington Avenue. As this section predominantly follows the road network, it is expected that the baseline noise climate is heavily influenced by road traffic. There are also industrial and commercial premises within Section 4 and these have the potential to influence the noise climate.

24.5.1.13. There are various receptors on either side of Hambledon Road and the A3. In the south of Section 4 the receptors include dwellings on Portsdown Road and Farlington Avenue.

Section 5 – Farlington

24.5.1.14. Section 5 runs southbound along Farlington Avenue with a parallel area to the east which passes east of the Solent Infant School. These two options meet in the south at Havant Road and continue south on Eastern Road. In most areas within Section 5 the Onshore Cable Corridor is close to, or aligned with, the road network which is likely to influence the noise levels in these areas. Solent Infant School may also influence the noise climate when it is in use.

24.5.1.15. There are sensitive receptors along the majority of this section including those on Farlington Avenue, Blake Road, Havant Road and Eastern Avenue.

Section 6 – Zetland Field and Sainsbury's Car Park

24.5.1.16. Section 6 starts immediately to the north of Zetland Field which it encompasses and continues south to include the Sainsbury's Car Park which fronts the A2030. It stops at the Southampton to Brighton railway line. The baseline noise climate in Section 6 is likely to include a range of noise sources, such car park movements and railway noise. The use of Zetland Field may also contribute to the noise climate.

24.5.1.17. There are sensitive receptors backing on to Eastern Avenue to its west and also dwellings to the east of the Order Limits on Nutborne Road and Zetland Road

Section 7 – Farlington Junction to Airport Service Road

24.5.1.18. Section 7 is wide in the north and includes Farlington Playing Fields. It narrows as it continues south crossing the A27 and Langstsone Harbour, stopping to the south at the junction of the A2030 Eastern Road and Airport Service Road.

24.5.1.19. This section covers a large area and the noise sources are likely to vary along its length. In the north it is expected that railway and road traffic dominate the noise climate. Further south within Section 7, the noise climate is likely to be dominated by road traffic from the A27 and Eastern Road. The south of the section is close to industrial areas which also have the potential to influence the noise climate.

24.5.1.20. There are relatively few sensitive receptors in Section 7, most being confined to the eastern area of Hillsea adjacent to Eastern Road.

Section 8 – Eastern Road (adjacent to Great Salterns Golf Course) to Moorings Way

24.5.1.21. Section 8 runs southbound along the alignment of Eastern Road to Milton Common. At this point, there are two options for the installation of the Onshore Cable Route; one running in the east of Milton Common and the other to the west in the area of Shore Avenue. Road traffic is likely to dominate the northern area of this Section as it runs along Eastern Road. Road traffic is also likely to be dominant in the area to the west of Milton Common. The area within Milton Common itself is likely to be exposed to lower noise levels given it is further from local roads.

24.5.1.22. Receptors in the north of Section 8 include Harbourside Caravan Park and Great Salterns Mansion public house. The option running to the west of Milton Common includes receptors on Eastern Avenue, Salterns Avenue, Shore Avenue and those either side of Moorings Way.

Section 9 –Moorings Way to Bransbury Road

24.5.1.23. Section 9 of the Onshore Cable Corridor has many options for the installation of the Onshore Cable Route. In general, the noise climate across this area is likely to be influenced by road traffic on the local roads and by other more localised noise sources such as the University of Portsmouth Langstone Campus and Milton Park Primary School.

24.5.1.24. Receptors in Section 9 include those fronting Milton Road, Bransbury Road Ironbridge Lane, Tideway Gardens, Kingsey Road and Longshore Way. Portsmouth University's Langstone student accommodation is also located in Section 9.

Section 10 – Eastney (Landfall)

24.5.1.25. A summary of the time-averaged ambient noise levels and typical background noise levels for each measurement period are presented in Table 24.20 below. Daytime octave band results for measurement position 5 are included in Appendix 24.6 (Noise Survey Equipment, Meteorological Conditions and Noise Survey Results).

Table 24.20 – Summary of measurement noise levels, Measurement Position 5 (Landfall)

Period	Average Ambient Noise Level $L_{Aeq,1h}$ (dB)	Typical Background Noise Level $L_{A90,15min}$ (dB)
Daytime (13:22-14:22)	50	43
Evening (22:02-23:02)	43	38
Night-time (02:00-03:00)	39	35

24.5.1.26. The daytime and night-time background noise levels have been used to set the criteria for the ORS infrastructure proposed at the Landfall.

24.5.2. FUTURE BASELINE

24.5.2.1. There are expected to be no changes to the future baseline vibration climate in the absence of the Proposed Development.

24.5.2.2. The future noise climate in the absence of the Proposed Development may be influenced by future local developments. For example, those which alter traffic on the surrounding road network may decrease or increase noise levels. More notably, the future noise climate in Section 1 could be influenced by any changes to the Lovedean substation, including development which has been consented. However, with the exception of the consented substation extension, given the information available, there are no known developments which could alter the noise climate in the absence of the Proposed Development.

24.6. PREDICTED IMPACTS

Embedded Mitigation

Construction Stage

24.6.1.1. Embedded mitigation for the construction stage has been secured through the Onshore Outline CEMP (document reference 6.9).

24.6.1.2. At all stages of the construction assessment, it will be important to ensure that Best Practicable Means ('BPM'), as defined in the Control of Pollution Action 1974 is followed. This will comprise employing reasonably practicable noise and vibration mitigations measures, with simultaneous regard to local conditions and circumstances (e.g. proximity of sensitive receptors) and current technical knowledge (e.g. utilising quietest equipment available) and to financial implications. A list of specific BPM to be employed during the construction work is included in Appendix 24.2 (Best Practicable Means Measures to be Employed during Construction) and the Onshore Outline CEMP.

Trenching

24.6.1.3. The majority of duct laying activities via trenching are to take place during weekdays between the hours of 07:00 and 17:00 and Saturdays from 08:00 to 13:00 hours. Due to the transient nature of the duct laying works, and the substantial space constraints anticipated, noise mitigation in the form of screening is unlikely to be practicable.

24.6.1.4. However, there are some locations where trenching is expected to take place outside of conventional working hours (i.e. during evenings, weekends and at night-time) to mitigate adverse traffic effects. The out of hours working locations are as follows:

1. Section 4 – a c.90m section of the A3 London Road in Purbrook near Stakes Road;
2. Section 5 – Havant Road between Farlington Avenue and Eastern Road;
3. Section 6 – Fitzherbert Road and Sainsbury's Car Park;
4. Section 8 – Eastern Road between Airport Service Road and north of Milton Common (c. 350m south of Tangier Road).

24.6.1.5. Through discussions and workshops with the project team, out-of-hours works during the night have been limited as much as possible whilst balancing other environmental impacts (i.e. adverse traffic effects of road closures).

24.6.1.6. Embedded mitigation for out-of-hours trenching works includes:

- Avoiding the noisiest activities (road cutting/breaking and re-surfacing) at night to minimise sleep disturbance in the immediate area.
- The incorporation of screening expected to achieve a total of 5 dB attenuation. The exact form that this screening would take is unknown at this stage. It could

comprise solid (e.g. timber) 2 m high site hoarding around the construction works. Alternatively, if this is not possible due to time or space constraints, Heras fencing around the compounds will be fitted with acoustic quilts, and combined with further localised screening around the noisy equipment items. Acoustic quilts must be fitted to fencing with no gaps underneath or between the panels. Screening is considered an important mitigation measure at these locations because of the night-time period being when receptors are considered more sensitive to noise and stricter criteria are applied.

Joint Bays

24.6.1.7. Screening expected to achieve a total of 5 dB attenuation is required where Joint Bay works are predicted to have more than a negligible impact at surrounding receptors. This is the case at nine of the illustrative Joint Bays (JB3/4, JB6/7, JB7/8, JB8/9, JB10/11, JB17/18, JB18/19, JB19/20 and JB20/21). Similarly to the screening for the out-of-hours trenching works, the exact form that this screening would take is unknown at this stage. At the remaining 11 illustrative Joint Bays (JB1/2, JB2/3, JB4/5, JB5/6, JB9/10, JB11/12, JB12/13, JB13/14, JB14/15, JB15/16 and JB16/17), mitigation has not been incorporated into the assessment.

24.6.1.8. The Joint Bay locations are illustrative and there is the potential for Joint Bays to be located in other areas within the Order Limits, as described in Chapter 3. Embedded mitigation in the form of screening would be required at all Joint Bay locations if construction works would be expected to have any more than a negligible impact at surrounding receptors. Generally, Joint Bays located in rural areas distant from sensitive receptors would not require screening, whereas those in more urban areas in close proximity to sensitive receptors would require screening.

HDD sites

24.6.1.9. Screening expected to achieve a total of 5 dB attenuation has been assumed and is required where HDD works are predicted to have more than a negligible impact at surrounding receptors. As work associated with HDD compounds will be scheduled for longer relative to trenching and Joint Bays activities, it is assumed that this screening would take the form of solid (e.g. timber) at least 2 m high site hoarding around the construction compound. This is the case at HDD-1, HDD-2 and HDD-5. There are no high sensitivity receptors within 100m of the HDD-3, HDD-4 and HDD-6 compounds, and therefore embedded mitigation from screening is not considered necessary at these sites. At HDD-3, there are three receptors of low sensitivity (a football club, sailing club and sports ground), and embedded mitigation is considered unnecessary for these receptors. Similarly, Farlington Playing Fields and pavilion are located in the vicinity of HDD-4, and as these are of low sensitivity, embedded mitigation is considered unnecessary. Milton Common is located in the vicinity of

HDD-6, and as this is of low sensitivity, embedded mitigation is considered unnecessary.

Operational Stage

24.6.1.10. The embedded mitigation measures listed below have been incorporated into the operational assessment to demonstrate that a solution exists which avoids significant effects. The detailed design of the Converter Station may present equipment lists with different source levels, which could require different mitigation measures. Therefore, the DAS design principles (document reference 5.5), which secures the mitigation required to avoid significant effects, cross references the noise criteria utilised in this assessment rather than the embedded mitigation measures listed below. The noise criteria must be achieved regardless of the specific equipment and mitigation ultimately used in the design.

Converter Station Area

24.6.1.11. Focus has been placed on identifying mitigation measures which can be applied to minimise the noise impacts from the Converter Station at surrounding sensitive receptors. Two types of embedded mitigation have been employed. Firstly, the layout and orientation of the Converter Station itself, and secondly, mitigation applied to the dominant plant items to reduce noise at the point of generation and contain noise.

24.6.1.12. With respect to layout and orientation, both Converter Station options are orientated such that the dominant plant items are screened from the nearest sensitive receptors by the Converter Station buildings. The control buildings have been positioned along the western edge of the Converter Station compound, providing an uninterrupted screen between the valve converter cooling fan banks and Millfield Farm to the west (a receptor at which large adverse impacts were predicted in the PEIR).

24.6.1.13. With respect to mitigating noise from plant items at source, the following embedded mitigation measures have been included (see Appendix 24.5 for full details including the octave band breakdown and reference information for each mitigation measure):

- Acoustic enclosures around the converter transformers and aux transformers, providing 33 dBA attenuation to each transformer;
- Reducing the operating fan speed of the valve converter cooling fan banks to attenuate noise levels by 3 dBA for each fan bank.
- Silencers added to the converter transformer fans providing 16 dBA attenuation to each fan.
- Acoustic enclosures with top hats around the AC filter reactors providing 10 dBA attenuation to each reactor.
- Acoustic enclosures around the AC filter capacitors providing 7 dBA attenuation to each capacitor.

- The building envelope provides a minimum sound insulation performance of 32 dB R_w.

Impacts

24.6.1.14. The following elements are considered to have the potential to give rise to likely significant effects and have therefore been considered within this ES.

24.6.2. SECTION 1 – LOVEDEAN (CONVERTER STATION AREA)

Construction Stage - noise

Converter Station Area

24.6.2.1. The predicted impacts during the construction of the Converter Station Area are presented in Tables 24.21 – 24.24.

Table 24.21 – Predicted noise impacts of Converter Station Area construction – enabling works

Construction stage	Construction activity and location	Receptor group number	Worst case		Typical case	
			Noise level, dB ($L_{Aeq,10h}$)	Magnitude of level	Noise level, dB ($L_{Aeq,10h}$)	Magnitude of level
Enabling works	Cut/fill and drainage works at Converter Station Area	R1	51	Negligible	n/a	n/a
		R2	53	Negligible		
		R3	49	Negligible		
	Construction of main site access road	R5	55	Negligible		
		R10	55	Negligible		
		R11	61	Negligible		
	Establishment of car parking and site welfare area	R5	53	Negligible		
		R10	66	Small adverse	55	Negligible

Construction stage	Construction activity and location	Receptor group number	Worst case		Typical case	
			Noise level, dB ($L_{Aeq,10h}$)	Magnitude of level	Noise level, dB ($L_{Aeq,10h}$)	Magnitude of level
	Establishment of laydown area	R11	74	Medium adverse	57	Negligible

R1 - The Haven and Old Mill Cottage
R2 – Hillcrest
R3 - Millfield Farm
R5 - Little Denmead Farm
R10 - Broadway Farm House
R11 - Broadway Farm Cottages

24.6.2.2. A **medium adverse** magnitude of level is predicted at Broadway Farm Cottages during the establishment of the laydown areas, assuming the worst-case scenario where activities occur 30m from the receptor. However, the enabling works are expected to occur in this area for a short period of time (up to 5 days) and, therefore, this is considered to be a **low** impact. There will be a direct, temporary, short-term, **minor adverse** (not significant) effect at this receptor. Under the more typical case, where works occur 150m from the receptor, there will be a direct, temporary, medium-term, **negligible** effect (not significant).

24.6.2.3. A **small adverse** magnitude of level is predicted at Broadway Farm House during the establishment of the laydown areas, assuming the worst-case scenarios where activities occur 60m from the receptor. However, the enabling works are expected to occur in this area for a short period of time (up to 5 days) and, therefore, this is considered to be a **negligible** impact, and a direct, temporary, short-term, **negligible** (not significant) effect. Under the more typical case, where works occur 180m from the receptor, a direct, temporary, medium-term, **negligible** (not significant) effect is also expected.

24.6.2.4. Direct, temporary, medium-term, **negligible** (not significant) effects are expected at all other receptors for the remainder of the enabling works.

Table 24.22 – Predicted noise impacts of Converter Station construction – substructure

Construction stage	Construction activity and location	Receptor group number	Worst case	
			Noise level, dB ($L_{Aeq,10h}$)	Magnitude of level
Substructure	Converter Station	R1	51	Negligible
		R2	53	Negligible
		R3	49	Negligible
	Telecommunications Buildings	R5	53	Negligible

R1 - The Haven and Old Mill Cottage
R2 – Hillcrest
R3 - Millfield Farm
R5 - Little Denmead Farm

24.6.2.5. Direct, temporary, medium-term **negligible** (not significant) effects are predicted at all receptors during the substructure works at the Converter Station and the Telecommunications Buildings. This is primarily due to the relatively large distances between the works and sensitive receptors.

Table 24.23 – Predicted noise impacts of Converter Station construction – superstructure

Construction stage	Construction activity and location	Receptor group number	Worst case	
			Noise level, dB ($L_{Aeq,10h}$)	Magnitude of level
Superstructure	Converter Station	R1	50	Negligible
		R2	52	Negligible
		R3	48	Negligible

Construction stage	Construction activity and location	Receptor group number	Worst case	
			Noise level, dB ($L_{Aeq,10h}$)	Magnitude of level
	Telecommunications Buildings	R5	52	Negligible

R1 - The Haven and Old Mill Cottage
R2 – Hillcrest
R3 - Millfield Farm
R5 - Little Denmead Farm

24.6.2.6. Direct, temporary, medium-term, **negligible** (not significant) effects are predicted at all receptors during the superstructure works at the Converter Station and the Telecommunications Buildings. This is primarily due to the relatively large distances between the works and sensitive receptors.

Table 24.24 – Predicted noise impacts of Converter Station Area construction – post construction landscaping

Construction stage	Construction activity and location	Receptor group number	Worst case		Typical case	
			Noise level, dB ($L_{Aeq,10h}$)	Magnitude of level	Noise level, dB ($L_{Aeq,10h}$)	Magnitude of level
Landscaping	Car parking and site welfare area	R5	52	Negligible		
	Laydown area	R10	65	Negligible		
		R11	73	Medium adverse	55	Negligible

R5 - Little Denmead Farm
R10 - Broadway Farm House
R11 - Broadway Farm Cottages

24.6.2.7. Assuming the worst-case scenario where activities occur 30m of the receptor, a **medium adverse** magnitude of level is predicted at Broadway Farm Cottages during post-construction landscaping of the laydown areas. However, these works are expected to occur in this area for a short period of time (up to 5 days) and, therefore, this is considered to be a **low** magnitude of impact. There will be a direct, temporary, short-term, **minor adverse** (not significant) effect. Under the more typical case, where works occur 150m from the receptor, there will be a direct, temporary, medium-term **negligible** (not significant) effect.

24.6.2.8. Direct, temporary, medium-term **negligible** (not significant) effects are predicted at all other receptors for the remainder of the enabling works.

Illustrative Onshore Cable Route

24.6.2.9. The cable route construction activity in Section 1 comprises trenching of the High Voltage Direct Current ('HVDC') and HVAC Cables.

Trenching

24.6.2.10. During the trenching of the HVDC Cables over open ground between the Converter Station and Broadway Lane, direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors.

24.6.2.11. During the trenching of the HVAC cable circuits between the Converter Station and Lovedean substation, direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors.

Construction Stage - Vibration

24.6.2.12. The vibration assessment in Section 1 considers the piling works for the Converter Station buildings. The Telecommunications Buildings are relatively small scale, single storey and no piled foundations are anticipated. Therefore, no vibration effects from construction of these buildings are anticipated.

24.6.2.13. The trenching works occur across soft ground and, therefore, no vibration effects are anticipated due to the absence of breaking or vibratory rolling.

Converter Station

24.6.2.14. Direct, temporary, medium-term **negligible** (not significant) effects associated with piling works at the Converter Station are predicted at all receptors. This is because there are no sensitive receptors within 130m of the Converter Station, which is the threshold at which greater than a negligible magnitude of level is predicted.

Operational Stage

Converter Station Area – broadband noise

24.6.2.15. Converter Station Options B (i) and B (ii) have been assessed to determine which is considered the 'worst case' with respect to operational broadband noise impacts. The

Converter Station is surrounded by isolated receptors in all directions and, therefore, the worst-case option for one receptor may not be the worst-case for others. As such, professional judgement has been applied to determine the worst case.

24.6.2.16. Operational noise levels from Option B (i) are higher at seven receptors, whereas noise levels from Option B (ii) are higher at six receptors. However, overall, Option B (ii) is considered to be the worst case. The primary justification is that all receptors are predicted to experience negligible impacts based on Option B (i), whereas a single receptor is predicted to experience a small adverse impact based on Option B (ii). Whilst a worst-case has been determined, it should be noted that the variation in noise level between each option is relatively small (±0.6 dB at any receptor).

24.6.2.17. The broadband operational Converter Station results for Option B (ii) are presented in Table 24.25, and a noise modelling contour plot is presented in Figure 24.4. The results also include noise associated with the Telecommunications Buildings located in Section 1. Full results, including the octave band breakdown for Options B (i) and B (ii), are presented in Appendix 24.7.

Table 24.25 – Broadband operational Converter Station Area free-field noise levels – Option B (ii)

Receptor number and group	Predicted noise level from Converter Station Area, dB $L_{Aeq,T}$	Noise criterion ($L_{Ar,T}$) and assessment outcome			
		Daytime		Night-time	
		Criterion	Difference	Criterion	Difference
R1 - The Haven and Old Mill Cottage	24.8	33	-8.2	25	-0.2
R2 - Hillcrest	24.8	33	-8.2	25	-0.2
R3 - Millfield Farm	20.9	33	-12.1	25	-4.1
R4 - Kimberley House	15.7	33	-17.3	27	-11.3
R5 - Little Denmead Farm	17.4	33	-15.6	27	-9.6
R6 - Holme and Highfield Cottages	16.7	30	-13.3	23	-6.3
R7 - Lower Chapters	16.0	30	-14.0	23	-7.0
R8 - The Arrows	15.0	30	-15.0	23	-8.0

Receptor number and group	Predicted noise level from Converter Station Area, dB $L_{Aeq,T}$	Noise criterion ($L_{Ar,T}$) and assessment outcome			
		Daytime		Night-time	
		Criterion	Difference	Criterion	Difference
R9 - Broadways	19.6	32	-12.4	27	-7.4
R10 - Broadway Farm House	23.1	32	-8.9	27	-3.9
R11 - Broadway Farm Cottages	23.5	32	-8.5	27	-3.5
R12 - Hinton Daubnay	27.4	33	-5.6	27	+0.4
R13 - Ludmore Cottages	19.6	33	-13.4	27	-7.4
R14 - Old Mill House and The Shieling	23.2	33	-9.8	25	-1.8
R15 - The Ranch	23.4	33	-9.6	25	-1.6

24.6.2.18. Table 24.21 shows that, with the exception of Hinton Daubnay at night, the predicted broadband operational noise levels from the Converter Station Area are below the daytime and night-time noise criteria. Therefore, this is considered to represent a **negligible** magnitude of level and impact, and therefore a direct, permanent, long-term, **negligible** (not significant) effect.

24.6.2.19. At Hinton Daubnay the predicted broadband noise level marginally exceeds the criterion (by +0.4 dB) at night. Based on the assessment criteria, this is considered to be a **small adverse** magnitude of level. It should be noted that this exceedance only occurs when predictions are undertaken at first floor level (representative of a typical bedroom window). When noise levels are predicted at ground floor level, the criterion is achieved. However, as this impact would occur during the night-time, and the receptor sensitivity is considered to be **high**, there would be a direct, permanent, long-term, **minor adverse** effect. Whilst a minor adverse effect would normally be considered not significant, given the permanent and long-term nature of the operational Converter Station noise, mitigation measures are considered which could be employed to reduce the effect to negligible (see section 24.8).

Converter Station Area – octave band noise

24.6.2.20. The octave band noise modelling results are presented in Appendix 24.7 for Option B (i) and Option B (ii). The results also include noise associated with the Telecommunications Buildings located in Section 1.

Daytime

24.6.2.21. The daytime assessment for Option B(i) shows that with the exception of 63 Hz at one receptor (R6), the predicted noise levels meet the criteria (i.e. the background noise levels in any octave band (31.5Hz-8000Hz) are not exceeded). At Holme and Highfield Cottages (R6), the noise level exceeds the 63 Hz criterion by +0.3 dB. However, as the background noise level at the representative measurement position (MP3) is very low at this frequency (4.4dB), this small exceedance is not considered to be of concern.

24.6.2.22. The results for Option B(ii) show that the predicted daytime noise levels meet the agreed criteria (i.e. the background noise levels in any octave band (31.5Hz-8000Hz) are not exceeded).

24.6.2.23. Therefore, based on the octave band assessment, there will be a direct, permanent, long-term **negligible** (not significant) effect for both options of the Converter Station.

Night-time

24.6.2.24. The night-time assessments for Option B(i) and Option B (ii). show that the predicted internal noise levels meet the criteria (NR 20) at all receptors. Therefore, based on the octave band assessment, there will be a direct, permanent, long-term **negligible** (not significant) effect for both options of the Converter Station.

Decommissioning Stage

Converter Station Area

24.6.2.25. The predicted impacts associated with the decommissioning of the Converter Station Area are presented in Table 24.26.

Table 24.26 – Predicted impacts of decommissioning at Converter Station Area

Decommissioning activity and location	Receptor group number	Worst case	
		Noise level (dB $L_{Aeq,10h}$)	Magnitude of level
	R1	61	Negligible
	R2	63	Negligible

Superstructure demolition of Converter Station	R3	59	Negligible
	R5	63	Negligible
Substructure demolition and landscaping at Converter Station	R1	54	Negligible
	R2	56	Negligible
	R3	52	Negligible
	R5	56	Negligible
Removal of access road and landscaping	R5	55	Negligible
	R10	55	Negligible
	R11	62	Negligible

R1 - The Haven and Old Mill Cottage
R2 – Hillcrest
R3 - Millfield Farm
R5 - Little Denmead Farm
R10 - Broadway Farm House
R11 - Broadway Farm Cottages

24.6.2.26. Table 24.26 shows that the predicted impacts of decommissioning the Converter Station Area (including the Telecommunications Buildings) would result in a direct, temporary, short-term **negligible** (not significant) effect at all sensitive receptors.

24.6.3. SECTION 2 – ANMORE

Construction Stage - noise

Illustrative Onshore Cable Route

24.6.3.1. The Onshore Cable Route construction activities in Section 2 comprise trenching and include Joint Bay ('JB') 1/2.

Trenching

24.6.3.2. During trenching activities between Broadway Lane and Anmore Road, a **medium adverse** magnitude of level is predicted at Hillcrest Children's Services. Whilst this receptor is of **high** sensitivity, these transient works are expected to be completed at a rate of approximately 50 m per day and, therefore, adverse impacts are only expected for one day. On this basis, it is considered a low impact, which is a direct, temporary, short-term, **minor adverse** (not significant) effect.

Joint Bays

24.6.3.3. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors for the duration of the construction activities at JB1/2.

Construction Stage - vibration

24.6.3.4. The vibration assessment elements in Section 2 comprise ground compaction at JB1/2. The trenching works and JB1/2 are located on soft ground and therefore no vibration effects are anticipated due to the absence of breaking or vibratory rolling.

Joint Bays

24.6.3.5. There will be direct, temporary, short-term **negligible** (not significant) effects associated with ground compaction at JB1/2 at all receptors. This is because there are no sensitive receptors within 30m of the Joint Bay, which is the threshold at which greater than **negligible** impacts are predicted.

24.6.4. SECTION 3 – DENMEAD/KINGS POND MEADOW

Construction Stage - noise

Illustrative Onshore Cable Route

24.6.4.1. The Onshore Cable Route construction activities in Section 3 comprise trenching and include JB2/3 and HDD-5 beneath Kings Pond Meadow.

Trenching

24.6.4.2. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors during the trenching of the cable route over open ground between Anmore Road and HDD-5 at King's Pond.

24.6.4.3. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors during the trenching of the cable route along Hambledon Road between HDD-5 and Soake Road.

Joint Bays

24.6.4.4. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors for the duration of the construction activities at JB2/3.

HDD-5 – King's Pond

24.6.4.5. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors for the duration of the activities at HDD-5.

Construction Stage - vibration

24.6.4.6. The vibration assessment elements in Section 3 comprise breaking and vibratory rolling during trenching along Hambledon Road, ground compaction at JB2/3, sheet piling associated with HDD-5, and HDD-5 drilling itself.

24.6.4.7. The trenching works north of HDD-5 and JB2/3 are located on soft ground and, therefore, no breaking or vibratory rolling are anticipated.

Trenching

24.6.4.8. There will be direct, temporary, short-term **negligible** (not significant) vibration effects associated with breaking and vibratory rolling during trenching along Hambledon Road at all receptors. This is because there are no sensitive receptors within 67m of the works, which is the threshold at which greater than **negligible** impacts are predicted.

Joint Bays

24.6.4.9. There will be direct, temporary, short-term **negligible** (not significant) vibration effects associated with ground compaction at JB2/3. This is because there are no sensitive receptors within 30m of the Joint Bay, which is the threshold at which greater than **negligible** impacts are predicted.

HDD-5 – King's Pond

24.6.4.10. Direct, temporary, short-term **negligible** (not significant) vibration effects associated with sheet piling at HDD-5 are predicted at all receptors. This is because there are no vibration sensitive receptors within 75m of the sheet piling activities, which is the threshold at which greater than negligible impacts are predicted.

24.6.4.11. Direct, temporary, short-term **negligible** (not significant) vibration effects associated with the horizontal directional drilling at HDD-5 are predicted at all receptors. This is because there are no sensitive receptors within 14m of the HDD drilling alignment, which is the threshold at which greater than negligible impacts are predicted.

24.6.5. SECTION 4 – HAMBLEDON ROAD TO FARLINGTON AVENUE

Construction Stage - noise

Illustrative Onshore Cable Route

24.6.5.1. The Onshore Cable Route construction activities in Section 4 comprise trenching, including a section of out-of-hours working in Purbrook and seven Joint Bays (JB3/4, JB4/5, JB5/6, JB6/7, JB7/8, JB8/9 and JB9/10).

Trenching

24.6.5.2. The predicted impacts during daytime weekday trenching activities along Hambledon Road, London Road, Portsdown Hill Road and Farlington Avenue are presented in Table 24.27.

Table 24.27 – Section 4 – predicted noise impacts of weekday daytime trenching

	Number of properties experiencing specified magnitude of level		
	Weekday daytime (07:00-17:00 hours)		
Activity	Large adverse	Medium adverse	Small adverse
Trenching and duct installation – along roads	17	284	324

24.6.5.3. A **large adverse** magnitude of level is predicted at 17 residential receptors during the daytime trenching works in Section 4, which is expected to be completed at a rate of 100 m per week. Given that construction activities will be transient along the 100 m section, it is considered unlikely that a large impact would be experienced for more than two days at any given receptor. **Medium** and **small adverse** magnitudes of level may be experienced at these receptors for an additional 2-3 days. Therefore, given the likely limited duration of exposure, this is considered a **medium** impact, which is a direct, temporary, short-term, **moderate adverse** effect (not significant) effect at these 17 receptors.

24.6.5.4. A **medium adverse** magnitude of level is predicted at 284 receptors during the daytime trenching works in Section 4. Given the expected construction rate, it is considered unlikely that this level would be experienced for more than three days at any given receptor. **Small adverse** magnitudes of level may be experienced at these receptors for an additional 1-2 days. On this basis, there will be a **low** impact, which is a direct, temporary, short-term, **minor adverse** (not significant) effect.

24.6.5.5. A **small adverse** magnitude of level is predicted at 324 receptors during the daytime trenching works in Section 4. Given the expected construction rate, it is considered unlikely that this level would be experienced for more than four days at any given receptor. On this basis, there will be a **negligible** magnitude of impact, which is a direct, temporary, short-term, **negligible** (not significant) effect.

Out-of-hours trenching –assessment

24.6.5.6. The predicted impacts during the out-of-hours trenching activities along the c.90m section of the A3 London Road in Purbrook near Stakes Road are presented in Table 24.28.

		Number of properties experiencing specified magnitude of level		
Activity		Large adverse	Medium adverse	Small adverse
Trenching and duct installation – along roads	Weekend Daytime (07:00-22:00 hours)	16	26	58

Table 24.28 – Section 4 –assessment – predicted impacts of out-of-hours trenching

24.6.5.7. Large, medium and small adverse magnitudes of level are predicted at 16, 26 and 58 receptors respectively during the daytime weekend trenching works. These works are expected to take place across two weekend periods.

24.6.5.8. Whilst these adverse impacts are likely to be realistic for the receptors located close to the illustrative cable route, those located further away may not experience the magnitude of impact predicted, due to the screening afforded by buildings positioned between the cable route and these receptors.

24.6.5.9. Given the sensitive time periods when this work is expected to occur, and the potentially wide spatial extent of receptors impacted, a more detailed assessment is considered necessary prior to determining the significance of the effect. This detailed assessment is outlined below.

Out-of-hours trenching – detailed assessment

24.6.5.10. The receptors considered to be most affected have been combined into eight groups as shown in Table 24.29.

Table 24.29 – Section 4 – receptors included in detailed out-of-hours trenching assessment

Group	Receptors
Group 1	24-34 (Evens) London Road, Purbrook, PO7 5LJ
Group 2	McCarthy and Stone Retirement Living, 38-44 London Road, Purbrook, PO7 5LJ
Group 3	48 & 50 London Road and 1 Stakes Road, Purbrook, PO7 5LN
Group 4	Flats 1-12 Rudolph Court, 52-54 London Road, Purbrook, PO7 5RA
Group 5	56-68 (Evens) London Road, Purbrook, PO7 5LN
Group 6	17-29 (Odds) London Road, Purbrook, PO7 5LG
Group 7	9-11 London Road, Purbrook, PO7 5LG
Group 8	St John the Baptist Church and Church Hall.

24.6.5.11. The detailed assessment has accounted for the following factors:

- The height of the sources (assumed to be 1.5m) and height of the receptor. The receptor is assumed to be a 1.5m high for the daytime assessment which is representative of a ground floor window.
- The closest distance between the receptors and illustrative cable route. Hence the predicted noise levels represent a worst case.
- The intervening ground between the sources and receptor (assumed to be 100% hard ground).
- The 5dB attenuation provided by screening (e.g. solid hoarding or Heras fencing with acoustic quilts) around the site compound and around noisy activities.

24.6.5.12. During the daytime weekend works, all activities and equipment used for trenching have been included in the assessment.

24.6.5.13. The results of the detail assessment are presented in Table 24.30.

Table 24.30 – Section 4 – predicted noise levels from detailed out-of-hours trenching assessment

Receptor group	Worst case noise level from construction activities, dB $L_{Aeq,T}$
	Weekend daytime
1	67
2	74
3	80
4	68
5	74
6	80
7	73
8	76

24.6.5.14. At all receptor groups a **large adverse** magnitude of level is expected during the weekend daytime out-of-hours trenching works in Section 4. If these works occur over non-consecutive weekend periods, this represents a **medium** magnitude of impact, and there will be a direct, temporary, short-term, **moderate adverse** effect (not significant). If these works occur over consecutive weekend periods, this represents a **high** magnitude of impact, and there will be a direct, temporary, short-term, **major adverse** effect (significant).

Joint Bays

24.6.5.15. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors for the duration of the construction activities at JB3/4, JB4/5, JB5/6, JB7/8 and JB9/10.

24.6.5.16. At JB6/7, a **small adverse** magnitude of level is predicted at four residential receptors for a period of up to five days whilst the Joint Bay is constructed. Therefore, this is considered a **negligible** impact, which is a direct, temporary, short-term, **negligible** effect (not significant). Direct, temporary, short-term **negligible** (not significant) effects are also predicted during the other activities at JB6/7 (cable installation, cable jointing, Joint Bay infilling and re-surfacing).

24.6.5.17. At JB8/9, a **small adverse** magnitude of level is predicted at one residential receptor for a period of up to five days whilst the Joint Bay is constructed. Therefore, this is considered a **negligible** impact, which is a direct, temporary, short-term, **negligible** effect (not significant). During the other activities at JB8/9 (cable installation, cable jointing, Joint Bay infilling and re-surfacing) direct, temporary, short-term **negligible** (not significant) effects are predicted.

Construction Stage – vibration

24.6.5.18. The vibration assessment elements in Section 4 comprise:

- Breaking and vibratory rolling during trenching along Hambledon Road, London Road, Portsdown Hill and Farlington Avenue.
- Breaking and vibratory rolling at five Joint Bays (JB3/4, JB4/5, JB6/7, JB7/8, JB8/9). Breaking and vibratory rolling is not expected at JB5/6 and JB9/10 as these are located on soft ground.
- Ground compaction at seven Joint Bays (JB3/4, JB4/5, JB5/6, JB6/7, JB7/8, JB8/9 and JB9/10).

Trenching

The predicted impacts during trenching activities in section 4 are presented in Table 24.31.

Table 24.31 – Section 4 – predicted vibration impacts of trenching

	Number of properties experiencing specified magnitude of level		
Activity	Large adverse	Medium adverse	Small adverse
Breaker (road surface removal)	0	110	827
Vibratory roller (re-surfacing)	0	5	366

24.6.5.19. A **medium adverse** magnitude of level is predicted at 110 receptors during road surface removal in Section 4. Breaking activities are expected to be intermittent and transient in nature. Therefore, it is considered unlikely that a **medium** impact would be experienced for more than one day at any given receptor.

24.6.5.20. A **medium adverse** magnitude of level is predicted at five receptors during re-surfacing in Section 4. Re-surfacing is expected to occur for a single day for each 100m section.

24.6.5.21. Therefore, these **medium adverse** levels are considered a **low** magnitude of impact, which is a direct, temporary, short-term, **minor** adverse effect (not significant).

24.6.5.22. A **small** adverse magnitude of level is predicted at 827 receptors during road surface removal in Section 4. Breaking activities are expected to be intermittent and transient in nature. Therefore, it is considered unlikely that a **small adverse** impact would be experienced for more than one day at any given receptor.

24.6.5.23. A **small adverse** magnitude of level is predicted at 366 receptors during re-surfacing in Section 4. Re-surfacing is expected to occur for a single day for each 100m section.

24.6.5.24. Therefore, these **small adverse** levels are considered a **negligible** magnitude of impact, which is a direct, temporary, short-term, **negligible** effect (not significant).

Joint Bays

24.6.5.25. Direct, temporary, short-term, **negligible** (not significant) vibration effects are predicted at all receptors for all construction activities at JB5/6 and JB9/10.

24.6.5.26. The results of road surface breaking at Joint Bays in Section 4 is presented in Table 24.32.

Table 24.32 – Section 4 – predicted vibration impacts of breaking at Joint Bays

	Number of properties experiencing specified magnitude of level		
Joint Bay	Large adverse	Medium adverse	Small adverse
JB3/4	0	0	3
JB4/5	0	0	5
JB6/7	0	0	11
JB7/8	0	0	14
JB8/9	0	0	21

24.6.5.27. As shown in Table 24.32, at JB3/4, JB4/5, JB6/7, JB7/8 and JB8/9, a **small adverse** magnitude of level from breaking of the road surface during Joint Bay construction is

predicted. As this activity is expected to last for no longer than one day at each Joint Bay, these are considered **negligible** impacts and direct, temporary, short-term, **negligible** effects (not significant).

24.6.5.28. **Negligible** effects are predicted for the other activities at JB3/4 and JB4/5. During re-surfacing and ground compaction at JB6/7, JB7/8 and JB8/9 a small adverse magnitude of level is predicted at six, one and one receptors respectively. These activities are expected to last for no longer than one day at each Joint Bay, and therefore are considered **negligible** impacts. There will be direct, temporary, short-term, **negligible** effects (not significant).

24.6.6. SECTION 5 – FARLINGTON

Construction Stage - noise

Illustrative Onshore Cable Route

24.6.6.1. The Onshore Cable Route construction activities in Section 5 comprise trenching, including a section of out-of-hours working on Havant Road near Drayton, and one Joint Bay (JB10/11).

Trenching

24.6.6.2. The predicted impacts during daytime weekday trenching activities along Farlington Avenue between the Section 5 boundary and Havant Road, and along Eastern Road between Havant Road and Zetland Field are presented in Table 24.33.

Table 24.33 – Section 5 – predicted impacts of weekday daytime trenching

	Number of properties experiencing specified magnitude of level		
	Weekday daytime (07:00-17:00 hours)		
Activity	Large adverse	Medium adverse	Small adverse
Trenching and duct installation – along roads	15	62	85

24.6.6.3. A **large adverse** magnitude of level is predicted at 15 receptors during the daytime trenching works in Section 5, which is expected to be completed at a rate of 100 m per week. Given that construction activities will be transient along each 100 m section, it is considered unlikely that these large magnitude of levels would be

experienced an any receptor for more than two days. Medium and small magnitudes of level may be experienced at these receptors for an additional 2-3 days. Given the limited duration of the adverse levels, this is considered a **medium** impact, which is a direct, temporary, short-term, **moderate** adverse (not significant) effect at these 15 receptors.

24.6.6.4. A **medium adverse** magnitude of level is predicted at 62 receptors during the daytime trenching works in Section 5. Given the expected construction rate, it is considered unlikely that a medium impact would be experienced for more than three days. Small impacts may be experienced at these receptors for an additional 1-2 days. Therefore, this is considered a **low** impact, which is a direct, temporary, short-term, **minor adverse** (not significant) effect.

24.6.6.5. **Small adverse** impacts are predicted at 85 receptors during the daytime trenching works in Section 5. Given the expected construction rate, it is considered unlikely that this impact would be experienced for more than four days. Therefore, this is considered a **negligible** impact, which is a direct, temporary, short-term, **negligible** (not significant) effect.

Out-of-hours trenching –assessment

24.6.6.6. The predicted impacts during the out-of-hours trenching activities along Havant Road between Farlington Avenue and Eastern Road are presented in Table 24.34.

Table 24.34 – Section 5 – predicted impacts of out-of-hours trenching

		Number of properties experiencing specified magnitude of level		
Activity		Large adverse	Medium adverse	Small adverse
Trenching and duct installation - along roads	Weekend Daytime and evening (07:00-22:00 hours)	26	12	43
	Weekend Night-time (22:00-07:00 hours)	81	89	313

24.6.6.7. A **large, medium** and **small adverse** magnitude of level is predicted at 26, 12 and 43 receptors respectively during the daytime weekend trenching works which are expected to take place across two consecutive weekend periods in the summer.

24.6.6.8. A **large, medium** and **small adverse** magnitude of level is predicted at 81, 89 and 313 receptors respectively during the night-time weekend trenching works which are expected to take place across two consecutive weekend periods in the summer.

24.6.6.9. Whilst these adverse magnitudes of level are likely to be realistic for the receptors located close to the illustrative cable route, those located further away may not experience the magnitude of impact predicted due to the screening afforded by buildings positioned between the cable route and these receptors.

24.6.6.10. Given the sensitive time periods when this work is expected to occur, and the potentially wide spatial extent of receptors impacted, a more detailed assessment is considered necessary prior to assignment of effect and significance. This detailed assessment is outlined below.

Out-of-hours trenching – detailed assessment

24.6.6.11. The receptors considered to be most affected have been combined into six groups as shown in Table 24.35.

Table 24.35 – Receptors included in detailed out-of-hours trenching assessment – Section 5

Group	Receptors
Group 1	1-9 Drayton Court, Waterworks Road, Portsmouth, PO6 1NQ
Group 2	1-6 Cavalier Court, Copsey Close, Portsmouth, PO6 1NX
Group 3	340 Havant Road, Portsmouth, PO6 1PQ
Group 4	2-14 (Evens) Copsey Close, Portsmouth, PO6 1NT
Group 5	243 & 245 Havant Road, Portsmouth, PO6 1DA
Group 6	247-259 (Odds) Havant Road, Portsmouth, PO6 1DB

24.6.6.12. The detailed assessment has accounted for the following factors:

- The height of the sources (assumed to be 1.5 m) and height of the receptor. The receptor is assumed to be a 1.5 m high for the daytime assessment which is representative of a ground floor window and a 4 m high first floor window for the night-time assessment.
- The closest distance between the receptors and illustrative Onshore Cable Route. Hence the predicted noise levels represent a worst case.
- The intervening ground between the sources and receptor (assumed to be 100% hard ground).
- The 5dB attenuation provided by screening (e.g. solid hoarding or Heras fencing with acoustic quilts) around the site compound and around noisy activities.

24.6.6.13. All activities and equipment used for trenching have been included in the assessment of daytime weekend works. However, during the night-time, equipment used for breaking and cutting of the road surface, and re-surfacing of the road have been excluded from the assessment. These are the loudest elements of trenching activities that would be considered unacceptable during the night-time in any circumstances given the close proximity of sensitive receptors.

24.6.6.14. The results of the detailed assessment are presented in Table 24.36.

Table 24.36 – Predicted noise levels from detailed out-of-hours trenching assessment – Section 5

Receptor group	Worst case noise level from construction activities, dB $L_{Aeq,T}$	
	Weekend daytime	Night-time
1	72	65
2	76	69
3	75	68
4	71	64
5	71	64
6	68	61

24.6.6.15. At all receptor groups in Section 5, **large adverse** magnitudes of level are expected during the weekend daytime and night-time out-of-hours trenching works. The associated magnitude of impact will be dependent on the chosen working pattern (descriptions of the options are provided in the methodology section):

- Option 1 – If these noise levels occur over a single weekend with night-time working, this represents a **high** magnitude of impact, which is a direct, temporary, short-term, **major adverse** effect (significant).
- Option 2 – If these noise levels occur over two consecutive weekends (daytime working only), this represents a **high** magnitude of impact, which is a direct, temporary, short-term, **major adverse** effect (significant).
- Option 3 – If these noise levels occur over two non-consecutive weekends (daytime working only) this represents a **medium** magnitude of impact, which is a direct, temporary, short-term, **moderate adverse** effect (not significant).

Joint Bays

24.6.6.16. At JB10/11, a **small adverse** magnitude of level is predicted at two residential receptors for a period of up to five days whilst the Joint Bay is constructed. This is considered a **negligible** impact, which is a direct, temporary, short-term, **negligible**

(not significant) effect. During the other activities at JB10/11 (cable installation, cable jointing, Joint Bay infilling and re-surfacing) direct, temporary, short-term **negligible** (not significant) effects are predicted.

Construction Stage - vibration

24.6.6.17. The vibration assessment elements in Section 5 comprise breaking and vibratory rolling during trenching, and breaking, vibratory rolling and compaction during works at JB10/11.

Trenching

24.6.6.18. The predicted vibration impacts during trenching activities in Section 5 are presented in Table 24.37.

Table 24.37 – Section 5 – predicted vibration impacts of trenching

	Number of properties experiencing specified magnitude of level		
Activity	Large adverse	Medium adverse	Small adverse
Breaker (road surface removal)	0	56	198
Vibratory roller (re-surfacing)	0	0	103

24.6.6.19. A **medium adverse** magnitude of level is predicted at 56 receptors during road surface removal in Section 5. Breaking activities are expected to be intermittent and transient in nature. Therefore, it is considered unlikely that a medium impact would be experienced for more than one day at any given receptor. This is considered a **low** magnitude of impact, which is a direct, temporary, short-term, **minor adverse** effect (not significant).

24.6.6.20. A **small adverse** magnitude of level is predicted at 198 receptors during road surface removal in Section 5. Breaking activities are expected to be intermittent and transient in nature and it is considered unlikely that a small adverse impact would be experienced for more than one day at any given receptor.

24.6.6.21. A **small adverse** magnitude of level is predicted at 103 receptors during re-surfacing in Section 5. Re-surfacing is expected to occur for a single day for each 100m section.

24.6.6.22. Therefore, these small adverse levels are considered a **negligible** magnitude of impact, which is a direct, temporary, short-term, **negligible** effect (not significant).

Joint Bays

24.6.6.23. At JB10/11, during the breaking, vibratory rolling and compaction works, a **small adverse** magnitude of level is predicted at 14, 4 and 4 receptors respectively. However, each activity is expected to occur for no longer than one day, and therefore

are considered **negligible** magnitudes of impact. There will be a direct, temporary, short-term, **negligible** effect (not significant).

24.6.7. SECTION 6 – ZETLAND FIELD AND SAINSBURY'S CAR PARK

Construction Stage - noise

Illustrative Onshore Cable Route

24.6.7.1. The Onshore Cable Route construction activities in Section 6 comprise trenching, JB11/12, JB12/13 and the reception pit of HDD-4 beneath the Brighton to Southampton railway line.

Trenching

24.6.7.2. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors during the trenching of the cable route across Zetland Field alongside Eastern Road.

24.6.7.3. If trenching of the cable route across Fitzherbert Road and the Sainsbury's car park and access road occurs during the standard working hours, direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors.

Out-of-hours trenching –assessment

24.6.7.4. The predicted impacts at night if trenching activities were completed 24 hours per day across Fitzherbert Road and the Sainsbury's car park and access road are presented in Table 24.38.

Table 24.38 - Section 6 - initial assessment - predicted impacts of night-time trenching

		Number of properties experiencing specified magnitude of level		
Activity		Large adverse	Medium adverse	Small adverse
Trenching and duct installation – along roads	Night-time (22:00-07:00 hours)	31	33	186

24.6.7.5. A **large, medium** and **small adverse** magnitude of level is predicted at 31, 33 and 186 receptors respectively during the night-time trenching works. This work is expected to last for approximately two weeks, although the duration of exposure at any one receptor would be less than this.

24.6.7.6. Whilst these adverse magnitudes of level may be realistic for the receptors located close to the illustrative cable route, those located further away may not experience the magnitude of impact predicted. This is due to the screening afforded by buildings positioned between the cable route and these receptors.

24.6.7.7. Given the sensitive time periods when this work is expected to occur, and the potentially wide spatial extent of receptors impacted, a more detailed assessment is considered necessary prior to assignment of effect and significance. This detailed assessment is outlined below.

Out-of-hours trenching – detailed assessment

24.6.7.8. The receptors considered to be most affected have been combined into two groups as shown in Table 24.39.

Table 24.39 – Receptors included in detailed night-time trenching assessment – Section 6

Group	Receptors
Group 1	Flats 1-24 Marshfield House, Grove Road, Portsmouth, PO6 1QA
Group 2	79-85 (Odds) Lealand Road, Portsmouth, PO6 1LZ

24.6.7.9. The detailed assessment has accounted for the following factors:

- The height of the sources (assumed to be 1.5 m) and height of the receptors (assumed to be a 4 m high first floor window).
- The closest distance between the receptors and illustrative Onshore Cable Route. Hence the predicted noise levels represent a worst case.
- The intervening ground between the sources and receptor (assumed to be 100% hard ground).
- The 5dB attenuation provided by screening (e.g. solid hoarding or Heras fencing with acoustic quilts) around the site compound and around noisy activities.

24.6.7.10. During the night-time, equipment used for breaking and cutting of the road surface, and re-surfacing of the road have been excluded from the assessment. These are the loudest elements of trenching activities that would be considered unacceptable during the night-time in any circumstances given the close proximity of sensitive receptors.

24.6.7.11. The results of the detailed assessment are presented in Table 24.40.

Table 24.40 – Predicted noise levels from detailed night-time trenching assessment – Section 6

Receptor group	Noise level from construction activities, dB $L_{Aeq,T}$
	Night-time
1	53
2	53

24.6.7.12. At all receptor groups, **medium adverse** magnitudes of level are expected during the night-time trenching works in Section 6. These medium adverse magnitudes of level are expected to occur when trenching activities are within 70 m of the sensitive receptors (i.e. at the western end of Fitzherbert Road and in the vicinity of the mini-roundabout for the Sainsbury's petrol filling station). Providing works within 70 m of the sensitive receptors do not last for more than five consecutive nights (which is reasonable given the anticipated speed of trenching), this is represents a **medium** magnitude of impact, and there will be a direct, temporary, short-term, **moderate adverse** effect (not significant).

24.6.7.13. Night-time trenching works at distances greater than 70 m from the sensitive receptors (e.g. in the southern part of the Sainsbury's Car Park) should not result in significant effects.

Joint Bays

24.6.7.14. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors for the duration of the construction activities at JB11/12 and JB12/13.

HDD-4 – Railway – Reception Pit

24.6.7.15. Direct, temporary, short-term **negligible** effects are predicted all receptors (bar one) for the duration of the construction activities at the reception pit of HDD-4. The sole exception is during site preparation, where a **small adverse** magnitude of level is predicted at a sports pavilion. This would be a **low** magnitude of impact given the expected duration, and because this receptor is of **low** sensitivity, there will be a direct, temporary, short-term **negligible** (not significant) effect.

Construction Stage - vibration

24.6.7.16. The vibration assessment elements in Section 6 comprise:

- Breaking and vibratory rolling during trenching works over the Sainsbury's car park. The trenching at Zetland Field is over soft ground and, therefore, no vibration effects are anticipated due to the absence of breaking or vibratory rolling.

- Compaction at JB11/12 and breaking, vibratory rolling and compaction at JB12/13. Breaking and vibratory rolling is not anticipated at JB11/12 as it is located on soft ground.
- Vibratory insertion of sheet piles at the reception pit of HDD-4 and HDD drilling itself at HDD-4.

Trenching

24.6.7.17. A **small adverse** magnitude of level is predicted at 16 receptors during surface removal of the Sainsbury's car park. Breaking activities are expected to be intermittent and transient in nature. Therefore, it is considered unlikely that a small adverse impact would be experienced for more than one day (or night) at any given receptor. This is a **negligible** magnitude of impact, which is a direct, temporary, short-term, **negligible** effect (not significant).

24.6.7.18. Direct, temporary, short-term **negligible** (not significant) vibration effects are predicted at all receptors during re-surfacing of the Sainsbury's car park following trenching.

Joint Bays

24.6.7.19. Direct, temporary, short-term **negligible** (not significant) vibration effects are predicted at all receptors for the duration of the construction activities at JB11/12 and JB12/13.

HDD-4 – Railway – Reception Pit

24.6.7.20. Direct, temporary, short-term **negligible** (not significant) vibration effects associated with the tunnelling at HDD-4 are predicted at all receptors. This is because there are no sensitive receptors within 14 m of the HDD drilling alignment, which is the threshold at which greater than negligible impacts are predicted.

24.6.7.21. The impact of vibration on Network Rail infrastructure has not been assessed in detail as part of this assessment. The contractor undertaking the works will be required to assess any vibration impacts appropriately as part of the process to obtain permission to tunnel beneath railway infrastructure. However, considering the limited vibration levels predicted during this assessment, significant impacts on this infrastructure are considered unlikely.

24.6.7.22. Direct, temporary, short-term **negligible** (not significant) vibration effects associated with sheet piling at the HDD-4 reception pit are predicted at all receptors. This is because there are no vibration sensitive receptors within 75m of the sheet piling activities, which is the threshold at which greater than negligible impacts are predicted. Whilst the Pavilion at Farlington Playing Fields is within 75 m of the reception pit, this receptor is not considered sensitive to vibration.

24.6.8. SECTION 7 – FARLINGTON JUNCTION TO AIRPORT SERVICE ROAD

Construction Stage - noise

Illustrative Onshore Cable Route

24.6.8.1. The Onshore Cable Route construction activities in Section 7 comprise trenching, JB13/14, JB14/15, the launch pit of HDD-4 beneath the Brighton to Southampton railway line and HDD-3 beneath Portsea Island.

Trenching

24.6.8.2. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors during the trenching of the cable route around the edge of Farlington Playing Field between the launch pit of HDD-4 and the northern end of HDD-3. It is understood that Farlington Playing Field is utilised as a venue and campsite for music festivals, however no works will be completed whilst the events are in progress.

24.6.8.3. A **small adverse** magnitude of level is predicted at Langstone Harbour sports ground and Baffins Milton Rovers Football Ground (Kendall Stadium) during the trenching of the cable route between the southern end of HDD-3 and Airport Service Road. However, given the limited duration of exposure, and the **low** sensitivity of these receptors, there will be a direct, temporary, short-term **negligible** (not significant) effect.

Joint Bays

24.6.8.4. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors for the duration of the construction activities at JB13/14 and JB14/15.

HDD-4 – Railway – Launch Pit

24.6.8.5. The predicted impacts from construction activities at the HDD-4 launch pit are detailed in Table 24.41.

Table 24.41 – Predicted impacts at HDD-4 Launch pit

Activity		Number of properties experiencing specified magnitude of level		
		Large adverse	Medium adverse	Small adverse
Site preparation	Weekday daytime (07:00-19:00 hours)	0	0	1
Tunnelling	Weekday daytime (07:00-19:00 hours)	0	0	0
	Weekday evenings (19:00-22:00 hours) and Weekend daytime and evenings (07:00-22:00 hours)	0	1	0
	Night-time (22:00-07:00 hours)	1	1	12
Site restoration	Weekday daytime (07:00-19:00 hours)	0	0	0

24.6.8.6. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors for the duration of the weekday daytime tunnelling works, and during the site restoration works. One receptor is predicted to experience a **small adverse** magnitude of level during site preparation works. However, this is a sports pavilion and is considered to be of **low** sensitivity and there will be a direct, temporary, short-term **negligible** (not significant) effect.

24.6.8.7. Whilst **large adverse** and **medium adverse** magnitudes of level are predicted at the Pavilion at Farlington Playing Fields and Farlington Playing Fields during the night-time (22:00-07:00 hours) tunnelling works, it is assumed that these receptors are not utilised during these periods and, therefore, no effects are anticipated.

24.6.8.8. Whilst a **medium adverse** magnitude of level is predicted at the sports pavilion during the weekday evening (19:00-22:00 hours) and weekend daytime and evening (07:00-22:00 hours) tunnelling works, as this receptor is considered to be of **low** sensitivity, this will be a direct, temporary, short-term **minor** (not significant) effect.

24.6.8.9. Whilst the assessment indicates **small adverse** magnitudes of level during night-time tunnelling works at 12 residential receptors north-west of the launch pit, these levels are not expected to occur due to the extensive screening provided by the industrial buildings and earth embankment of Eastern Road. With this screening

accounted for there will be a direct, temporary, short-term **negligible** (not significant) effect.

HDD-3 – Portsea Island

24.6.8.10. The predicted impacts from construction activities at HDD-3 are detailed in Table 24.42.

Table 24.42 - Predicted impacts at HDD-3

Activity		Number of properties experiencing specified magnitude of level		
		Large adverse	Medium adverse	Small adverse
Site preparation	Weekday daytime (07:00-19:00 hours)	0	0	1
Tunnelling	Weekday daytime (07:00-19:00 hours)	0	0	1
	Weekday evenings (19:00-22:00 hours) and Weekend daytime and evenings (07:00-22:00 hours)	0	1	0
	Night-time (22:00-07:00 hours)	1	0	2
Site restoration	Weekday daytime (07:00-19:00 hours)	0	0	1

24.6.8.11. A **small adverse** magnitude of level is predicted at Baffins Milton Rovers Football Ground (Kendall Stadium) during the site preparation, site restoration and weekday daytime tunnelling at HDD-3. This is a low magnitude of impact, and given the **low** sensitivity of this receptor, there will be a direct, temporary, short-term **negligible** (not significant) effect.

24.6.8.12. A **medium adverse** magnitude of level is predicted at Baffins Milton Rovers Football Ground (Kendall Stadium) during the weekday evening, weekend daytime and evening tunnelling at HDD-3. This is a medium magnitude of impact, and given the **low** sensitivity of this receptor, there will be a direct, temporary, short-term **minor** adverse (not significant) effect.

24.6.8.13. Whilst a **large adverse** magnitude of level is predicted at Baffins Milton Rovers Football Ground (Kendall Stadium) during the night-time tunnelling at HDD-3, this

receptor should not be utilised during this time and therefore no effects are anticipated.

24.6.8.14. Whilst a **small adverse** magnitude of level is predicted at Langstone Harbour sports ground and the Tudor Sailing Club during the night-time tunnelling at HDD-3, these facilities will not be utilised during this time and therefore no effects are anticipated.

Construction Stage - vibration

24.6.8.15. The vibration assessment elements in Section 7 comprise:

- Compaction works at JB13/14 and JB14/15. Breaking and vibratory rolling are not anticipated at these Joint Bays because they are located on soft ground.
- Vibratory insertion of sheet piles at the launch pit of HDD-4 and HDD-3, and HDD drilling itself at HDD-4 and HDD-3.

Joint Bays

24.6.8.16. Direct, temporary, short-term **negligible** (not significant) vibration effects are predicted at all receptors during the compaction works at JB13/14 and JB14/15.

HDD-4 – Railway – Launch Pit

24.6.8.17. Direct, temporary, short-term **negligible** (not significant) vibration effects associated with sheet piling at the HDD-4 launch pit are predicted at all receptors. This is because there are no vibration sensitive receptors within 75 m of the sheet piling activities, which is the threshold at which greater than negligible impacts are predicted. Whilst the Pavilion at Farlington Playing Fields is within 75 m of the launch pit, it is not considered sensitive to vibration.

HDD-3 – Portsea Island

24.6.8.18. Direct, temporary, short-term **negligible** (not significant) vibration effects associated with the drilling at HDD-3 are predicted at all receptors. This is because there are no sensitive receptors within 14m of the HDD drilling alignment, which is the threshold at which greater than negligible impacts are predicted.

24.6.8.19. Direct, temporary, short-term **negligible** (not significant) vibration effects associated with sheet piling at HDD-3 are predicted at all receptors. This is because there are no vibration sensitive receptors within 75m of the sheet piling activities, which is the threshold at which greater than negligible impacts are predicted Baffins Milton Rovers Football Ground (Kendall Stadium) is within 75m of HDD-3, but this receptor is not considered sensitive to vibration.

24.6.9. SECTION 8 – EASTERN ROAD (ADJACENT TO GREAT SALTERNS GOLF COURSE) TO MOORINGS WAY

Construction Stage - noise

Illustrative Onshore Cable Route

24.6.9.1. The Onshore Cable Route construction activities in Section 8 comprise trenching, JB15/16 and JB16/17. The illustrative cable route utilised for the noise and vibration assessment does not follow the proposed HDD-6 alignment. However, for completeness, an assessment has been included as a likely route to be used by the contractor.

Trenching

24.6.9.2. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors during the daytime off-road trenching of the cable route between the north of Milton Common (c. 350m south of Tangier Road) and Moorings Way.

24.6.9.3. The predicted impacts during the daytime on-road trenching of the cable route on Eastern Road (between East Shore Way and Eastern Avenue) and on Eastern Avenue are presented in Table 24.43.

Table 24.43 – Section 8 – predicted impacts of weekday daytime on-road trenching

	Number of properties experiencing specified magnitude of level		
	Weekday daytime (07:00-17:00 hours)		
Activity	Large adverse	Medium adverse	Small adverse
Trenching and duct installation – along roads	28	68	113

24.6.9.4. A **large adverse** magnitude of level is predicted at 28 receptors during the on-road weekday daytime trenching works in Section 8. These receptors are located within 15 m of the illustrative cable route, which is expected to be constructed at a rate of 100 m per week. Given that construction activities will be transient along each 100 m section, it is considered unlikely that these large magnitude of level would be experienced at any receptor for more than two days. A **medium** and **small adverse** magnitude of level may be experienced at these receptors for an additional 2-3 days. Therefore, given the limited duration of the adverse levels, this is considered a

medium impact. There will be a direct, temporary, short-term, **moderate** adverse (not significant) effect at these 28 receptors.

24.6.9.5. A **medium adverse** magnitude of level is predicted at 68 receptors during the on-road weekday daytime trenching works in Section 8. These receptors are located 16-26 m from the illustrative cable route and, therefore, given the expected construction rate, it is considered unlikely that a medium impact would be experienced for more than three days. Small impacts may be experienced at these receptors for an additional 1-2 days. This is considered a **low** impact, which is a direct, temporary, short-term, **minor** adverse (not significant) effect.

24.6.9.6. A **small adverse** magnitude of level is predicted at 113 receptors during the on-road weekday daytime trenching works in Section 8. These receptors are located 27-46 m from the illustrative cable route and, given the expected construction rate, it is considered unlikely that this impact would be experienced for more than four days. There will be a **negligible** impact, which is a direct, temporary, short-term, **negligible** (not significant) effect.

Out-of-hours trenching –assessment

24.6.9.7. The predicted impacts during the out-of-hours trenching activities along or adjacent to the c1.5km section of Eastern Road between Airport Service Road and north of Milton Common (c. 350m south of Tangier Road) are presented in Table 24.44. This work is expected take place for approximately 33 days, within which time 24-hour working could be undertaken.

Table 24.44 – Section 8 – predicted impacts of out-of-hours trenching

Activity		Number of properties experiencing specified magnitude of level		
		Large adverse	Medium adverse	Small adverse
Trenching and duct installation - along roads	Weekday Daytime (07:00-19:00 hours)	0	0	1
	Weekday evenings (19:00-22:00) and weekend daytime (07:00-22:00 hours)	1	3	1
	Night-time (22:00-07:00 hours)	4	0	37

Note: whilst Harbourside Caravan Park is identified as one property in the address point data, it is acknowledged that there are several caravans within the park.

24.6.9.8. When these works occur during daytime weekdays, a **small adverse** magnitude of level is predicted at the Harbourside Caravan Park. When these works occur during

weekday evenings, the weekend daytime and during the night-time, a **large adverse** magnitude of level is predicted. The trenching works on the section of the Eastern Road directly adjacent to the Caravan Park are expected to occur for up to seven days. They will be transient in nature, and are expected to be completed at a rate of 45 m per day.

24.6.9.9. Given the sensitive time periods when this work is expected to occur, a more detailed assessment is considered necessary prior to determining the significance of the effect. This detailed assessment is outlined below.

24.6.9.10. A self-contained flat within the Great Salterns Mansion Harvester is expected to experience a **medium adverse** magnitude of level the during the weekday evening and daytime weekend works, and a **large adverse** magnitude of level during night-time works. For the same reasons as described above for Harbourside Caravan Park, a more detailed assessment is considered necessary prior to determining the significance of the effect.

24.6.9.11. The Langstone Harbour Sports Ground Pavilion is predicted to experience a **small adverse** magnitude of level during the weekday evening and daytime weekend works, which would be a **low** magnitude of impact. However, as the receptor sensitivity is considered **low**, there will be a direct, temporary, short-term **negligible** (not significant) effect. A **large adverse** magnitude of level is predicted at the pavilion during the night-time works, but this receptor is unlikely to be in use during this time.

24.6.9.12. A **medium adverse** magnitude of level is expected at Great Salterns Golf Course during the weekday evening and daytime weekend works, which would be a **medium** impact. However, given the receptor sensitivity is **low**, this is considered a direct, temporary, short-term, **minor adverse** (not significant) effect. Adverse night-time impacts are also anticipated at this receptor, but it is unlikely to be in use during these times.

24.6.9.13. A **small adverse** magnitude of level is expected at 36 residential receptors during the night-time works. However, these properties are located at the extremity of the proposed area for night-works (on Eastern Road 160m to 260m south-west of the area of night works). Therefore, this small adverse magnitude of level would be expected to occur for no longer than four nights at the worst affected receptor. This is considered a **low** impact, and a direct, temporary, short-term, **minor adverse** (not significant) effect.

24.6.9.14. A **small adverse** magnitude of level is also expected at the Inn Lodge Hotel during the night-time works and, therefore, this is considered a **medium** impact. However, as the receptor sensitivity is **low**, this is a direct, temporary, short-term, **minor adverse** (not significant) effect.

24.6.9.15. A **medium adverse** magnitude of level is expected at the sports pitches of the Goals Soccer Centre during the weekday evening and daytime weekend works, which would be a **medium** impact. However, given the receptor sensitivity is **low**, this is

considered a direct, temporary, short-term, **minor adverse** (not significant) effect. Adverse night-time impacts are also anticipated at this receptor, but it is unlikely to be in use during this time.

Out-of-hours trenching – detailed assessment

24.6.9.16. The following residential receptors are subject to potentially significant effects:

1. Harbourside Caravan Park
2. Flat above the Great Salterns Mansion Harvester

24.6.9.17. The detailed assessment has accounted for the following factors:

- The height of the sources (assumed to be 1.5 m) and height of the receptors. At the Harbourside Caravan Park, the receptor height is assumed to be 1.5 m, and at the flat above the Harvester, the receptor height is assumed to be 4 m.
- The closest distance between the receptors and illustrative cable route. Hence the predicted noise levels represent a worst case.
- The intervening ground between the sources and receptor (assumed to be 100% hard ground).
- The 5dB attenuation provided by screening (e.g. solid hoarding or Heras fencing with acoustic quilts) around the site compound and around noisy activities.

24.6.9.18. During the daytime works, all activities and equipment used for trenching have been included in the assessment. However, during the night-time, equipment used for breaking and cutting of the road surface, and re-surfacing of the road have been excluded from the assessment. These are the loudest elements of trenching activities that would be considered unacceptable during the night-time in any circumstances given the close proximity of sensitive receptors.

24.6.9.19. At the Harbourside Caravan Park, the predicted noise level from trenching on the adjacent section of Eastern Road is 73 dB $L_{Aeq,T}$ during the daytime, and 66 dB $L_{Aeq,T}$ during the night-time. These noise levels represent a **medium adverse** magnitude of level during the weekday daytime works, and a **large adverse** magnitude of level during the weekday evening, weekend daytime and night-time.

24.6.9.20. Therefore, the weekday daytime works at Harbourside Caravan Park represent a medium magnitude of impact which is a direct, temporary, short-term, **moderate adverse** (not significant) effect.

24.6.9.21. The weekday evening, weekend daytime and night-time works represent a high magnitude of impact and, therefore, Harbourside Caravan Park will experience a direct, temporary, short-term, **major adverse** (significant) effect.

24.6.9.22. At the flat above the Harvester, the predicted noise level from trenching on the adjacent section of Eastern Road is 65 dB $L_{Aeq,T}$ during the daytime, and 58 dB $L_{Aeq,T}$ during the night-time. These noise levels represent a **negligible** magnitude of level

during the weekday daytime, a **medium adverse** magnitude of level during the weekday evening and weekend daytime, and a **large adverse** magnitude of level during the night-time.

24.6.9.23. Therefore, the weekday daytime works at the flat above the Harvester represent a negligible magnitude of impact which is a direct, temporary, short-term, **negligible** (not significant) effect.

24.6.9.24. The weekday evening and weekend daytime represent a medium magnitude of impact, and a direct, temporary, short-term, **moderate adverse** (not significant) effect.

24.6.9.25. The night-time works represent a high magnitude of impact, and, therefore, Harbourside Caravan Park will experience a direct, temporary, short-term, **major adverse** (significant) effect.

Joint Bays

24.6.9.26. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors for the duration of the construction activities at JB15/16 and JB16/17.

HDD-6

24.6.9.27. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all residential receptors for the duration of the activities at HDD-6. This is due to there being no residential receptors within 110m of the HDD-6 site compound, which is the distance within which more than a negligible impact would be expected.

24.6.9.28. **Large adverse** noise levels are expected on the public open space and footpaths in the vicinity of the HDD-6 compound. Given the expected duration and hours of working (0700-1900 hours for two weeks), this is considered a **high** magnitude of impact. However, as the sensitivity of this receptor is **low**, this is a direct, temporary, short-term, minor to **moderate adverse** (not significant) effect.

Construction Stage - vibration

24.6.9.29. The vibration assessment elements in section 8 comprise:

- Breaking and vibratory rolling during trenching along roads.
- Compaction works at JB15/16 and JB16/17. Breaking and vibratory rolling are not anticipated at these Joint Bays because they are located on soft ground.
- Vibratory insertion of sheet piles at HDD-6 and HDD drilling itself at HDD-6.

Trenching

24.6.9.30. The predicted impacts of trenching activities in Section 8 are presented in Table 24.45.

Table 24.45 – Section 8 – predicted vibration impacts of trenching

	Number of properties experiencing specified magnitude of level		
Activity	**Large adverse**	**Medium adverse**	**Small adverse**
Breaker (road surface removal)	0	35	272
Vibratory roller (re-surfacing)	0	18	96

24.6.9.31. A **medium adverse** magnitude of level is predicted at 35 receptors during road surface removal and at 18 receptors during re-surfacing in Section 8. Breaking activities are expected to be intermittent and transient in nature, and re-surfacing is expected to occur for a single day for each 100 m section. Therefore, it is considered unlikely that these medium impacts would be experienced for more than one day at any given receptor. This is a **low** magnitude of impact, which is a direct, temporary, short-term, **minor adverse** effect (not significant).

24.6.9.32. A **small adverse** magnitude of level is predicted at 272 receptors during road surface removal and at 96 receptors during re-surfacing in Section 8. Breaking activities are expected to be intermittent and transient in nature, and re-surfacing is expected to occur for a single day for each 100 m section. Therefore, these small adverse levels are considered a **negligible** magnitude of impact, which is a direct, temporary, short-term, **negligible effect** (not significant).

Joint Bays

24.6.9.33. Direct, temporary, short-term **negligible** (not significant) vibration effects are predicted at all receptors for the duration of the construction activities at JB15/16 and JB16/17.

HDD-6

24.6.9.34. Direct, temporary, short-term **negligible (**not significant) vibration effects associated with sheet piling at HDD-6 are predicted at all receptors. This is because there are no vibration sensitive receptors within 75m of the sheet piling activities, which is the threshold at which greater than negligible impacts are predicted.

24.6.9.35. Direct, temporary, short-term **negligible** (not significant) vibration effects associated with the horizontal directional drilling at HDD-6 are predicted at all vibration sensitive receptors. This is because there are no sensitive receptors within 14 m of the HDD drilling alignment, which is the threshold at which greater than negligible impacts are predicted.

24.6.10. SECTION 9 – MOORINGS WAY TO BRANSBURY ROAD

Construction Stage - noise

Illustrative Onshore Cable Route

24.6.10.1. The Onshore Cable Route construction activities in Section 9 comprise trenching, four Joint Bays (JB17/18, JB18/19, JB19/20, JB20/21) and HDD-2 beneath the allotments.

Trenching – north of HDD-2

24.6.10.2. The predicted impacts during the daytime trenching activities along Furze Lane and Locksway Road are presented in Table 24.46.

Table 24.46 – Section 9 (north of HDD-2) – predicted impacts of weekday daytime trenching

	Number of properties experiencing specified magnitude of level		
	Weekday daytime (07:00-17:00 hours)		
Activity	Large adverse	Medium adverse	Small adverse
Trenching and duct installation – along roads	65	45	118

24.6.10.3. Of the receptor impacts presented in Table 24.46, 44 of the large adverse, one of the medium adverse, and 90 of the small adverse are listed as halls of residence at the University of Portsmouth Langstone Campus. At this stage, the specific timing of these works is unknown – i.e. if they were completed outside of university term time, the halls of residence could be vacant or have lower occupation levels. However, the halls of residence have been included to ensure a robust assessment.

24.6.10.4. Including the receptors listed as halls of residences, a **large adverse** magnitude of level is predicted at 65 receptors during the daytime trenching works, which is expected to be completed at a rate of 100 m per week. Given that construction activities will be transient along each 100 m section, it is unlikely that a large magnitude of level would be experienced an any receptor for more than two days. Medium and small magnitudes of level may be experienced at these receptors for an additional 2-3 days. Given the limited duration, this is a **medium** impact, which is a direct, temporary, short-term, **moderate adverse** (not significant) effect.

24.6.10.5. Including the receptors listed as halls of residences, a **medium adverse** magnitude of level is predicted at 45 receptors during the daytime trenching works. Given the expected construction rate, it is considered unlikely that a medium magnitude of level would be experienced for more than three days. Small impacts may be experienced at these receptors for an additional 1-2 days. This is a **low** impact, which is a direct, temporary, short-term, **minor adverse** (not significant) effect.

24.6.10.6. Including the receptors listed as halls of residences, a **small adverse** magnitude of level is predicted at 118 receptors during the daytime trenching works. Given the expected construction rate, it is unlikely that these magnitudes of level would be experienced for more than four days. This is a **negligible** impact, which is a direct, temporary, short-term, **negligible** (not significant) effect.

Trenching – south of HDD-2

24.6.10.7. The predicted impacts during the daytime trenching over the open ground north-east of Kingsley Road and across Bransbury Park are presented in Table 24.47.

Table 24.47 – Section 9 (south of HDD-2) – predicted impacts of weekday daytime trenching

	Number of properties experiencing specified magnitude of level		
	Weekday daytime (07:00-17:00 hours)		
Activity	Large adverse	Medium adverse	Small adverse
Trenching and duct installation – over open ground	0	2	7

24.6.10.8. The majority of these transient works are expected to be completed at a rate of approximately 75 m per day (over open ground), whilst the construction rate along the short 50 m section of road (Yeo Court) may be slower (approximately two days). The **medium** and **small adverse** magnitudes of level predicted are expected to occur at receptors for no longer than four days. Therefore, the medium magnitude of level is considered a **low** impact and a direct, temporary, short-term, **minor adverse** (not significant) effect. The small magnitude of level is a **negligible** impact and a direct, temporary, short-term, **negligible** (not significant) effect.

Joint Bays

24.6.10.9. Direct, temporary, short-term negligible effects are predicted at all receptors for the duration of the construction activities at JB17/18, JB18/19, JB19/20 and JB20/21.

HDD-2 – Allotments – assessment

24.6.10.10. The predicted impacts from the initial assessment of activities at HDD-2 are detailed in Table 24.48.

Table 24.48 – Predicted impacts at HDD-2 – initial assessment

		Number of properties experiencing specified magnitude of level		
Activity	Time period	Large adverse	Medium adverse	Small adverse
Site preparation	Weekday daytime	0	0	1
Drilling	Weekday daytime	0	0	0
	Weekend daytime	0	1	0
Site restoration	Weekday daytime	0	0	1

*Working hours on both weekdays and weekends are expected to be 07:00-19:00 hours.

24.6.10.11. The single property predicted to be adversely impacted from activities at HDD-2 is the self-contained flat above the Thatched House public house. The **small adverse** magnitude of level predicted during site preparation and site restoration is expected to last for five and four days respectively and these works will be undertaken on a weekday. Therefore, they are considered **negligible** impacts and direct, temporary, short-term, **negligible** (not significant) effects. Direct, temporary, short-term **negligible** (not significant) effects are also predicted during weekday drilling works (Monday to Friday 07:00-19:00 hours for up to 12 weeks).

24.6.10.12. However, during the weekend daytime drilling works (Saturday and Sunday 07:00-19:00 hours for up to 12 weeks), the initial assessment indicates a **medium adverse** magnitude of level at the residential property above the Thatched House public house. Given the likely duration of exposure, this could be a **medium** magnitude of impact, and a direct, temporary, short-term, **moderate** effect. As the work may occur for up to 12 consecutive weekends, there is the potential for it to be deemed significant. Before significance is determined, a more detailed assessment is required to predict the noise level from HDD-2 works at this property, which is outlined below.

HDD-2 – Allotments – detailed assessment

24.6.10.13. The detailed assessment at HDD-2 has accounted for the following factors:

- The specific location of the equipment items as shown in indicative layout drawings, and their relative distances to the receptor.
- The height of the sources (assumed to be 1.5m) and height of the receptor (i.e. the 4 m high first floor window of the Thatched House public house).
- The intervening ground between the sources and receptor (assumed to be 100% hard ground).
- The attenuation provided by 3.5 m high timber screening around the site compound. The barrier attenuation for each piece of equipment varies between 5.8 dB and 15.5 dB, depending on the relative distance between the source, barrier and receptor. As spectral data for the equipment items are not available, the barrier attenuation calculations are based on a frequency of 500 Hz. This screening is included as embedded mitigation, and during the initial assessment and it was assumed to provide a conservative 5 dB attenuation. It will be important for the equipment to be positioned pragmatically, to ensure that the barrier provides the maximum possible attenuation.

24.6.10.14. Based on the detailed assessment, the predicted noise level during the weekend drilling works at the first-floor window of the Thatched House public house is 58 dB $L_{Aeq,12h}$ (free-field). This is a **small adverse** magnitude of level, a **low** magnitude of impact and a direct, temporary, short-term, **minor adverse** (not significant) effect.

Construction Stage - vibration

24.6.10.15. The vibration assessment elements in Section 9 comprise:

- Breaking and vibratory rolling during trenching along roads between Moorings Way and HDD-2. The trenching in section 9 south of HDD-2 is over soft ground and no vibration effects are anticipated due to the absence of breaking or vibratory rolling.
- Breaking and vibratory rolling at JB18/19, and compaction at JB17/18, JB18/19, JB19/20 and JB20/21. Breaking and vibratory rolling are not anticipated at JB17/18, JB19/20 and JB20/21 because they are located on soft ground.
- Vibratory insertion of sheet piles at HDD-2 and HDD drilling at HDD-2.

Trenching

24.6.10.16. The predicted impacts of trenching activities in Section 9 are presented in Table 24.49.

Table 24.49 – Section 9 – predicted vibration impacts of trenching

	Number of properties experiencing specified magnitude of level		
Activity	**Large adverse**	**Medium adverse**	**Small adverse**
Breaker (road surface removal)	0	100	206
Vibratory roller (re-surfacing)	0	0	117

24.6.10.17. A **medium adverse** magnitude of level is predicted at 100 receptors during road surface removal in Section 9. Breaking activities are expected to be intermittent and transient in nature. Therefore, it is unlikely that a medium impact would be experienced for more than one day at any given receptor. This is a **low** magnitude of impact, which is a direct, temporary, short-term, **minor adverse** effect (not significant).

24.6.10.18. A **small adverse** magnitude of level is predicted at 206 receptors during road surface removal in Section 9. Breaking activities are expected to be intermittent and transient in nature. Therefore, it is unlikely that a small adverse impact would be experienced for more than one day at any given receptor.

24.6.10.19. A **small adverse** magnitude of level is predicted at 117 receptors during re-surfacing in Section 9. Re-surfacing is expected to occur for a single day for each 100 m section.

24.6.10.20. These small adverse magnitudes of level are considered a **negligible** magnitude of impact, which is a direct, temporary, short-term, **negligible** effect (not significant).

Joint Bays

24.6.10.21. **Negligible** vibration effects are predicted at all receptors during the compaction works at JB17/18, JB18/19, JB19/20 and JB20/21.

24.6.10.22. At JB18/19, direct, temporary, short-term **negligible** (not significant) vibration effects are predicted at all receptors during the re-surfacing works using a vibratory roller. A **small adverse** magnitude of level is predicted at nine receptors during the breaking works, but as this is expected to last for no longer than one day, this is considered a **negligible** magnitude of impact and a direct, temporary, short-term, **negligible** (not significant) effect.

HDD-2 – Allotments

24.6.10.23. Direct, temporary, short-term **negligible** (not significant) vibration effects associated with the drilling at HDD-2 are predicted at all receptors. This is because there are no

sensitive receptors within 14m of the HDD drilling alignment, which is the threshold at which greater than negligible impacts are predicted.

24.6.10.24. A **medium adverse** magnitude of level associated with sheet piling at HDD-2 is predicted at a single receptor (the flat above the Thatched House public house). However, as sheet piling will be very infrequent (expected to occur for a couple of hours at the start of each HDD drill), this is considered a **low** magnitude of impact and a direct, temporary, short-term, **minor adverse** (not significant) effect.

24.6.10.25. A **small adverse** magnitude of level associated with sheet piling at HDD-2 is predicted at six receptors. However, as this activity will be very infrequent, this is a **low** magnitude of impact and a direct, temporary, short-term, **negligible** (not significant) effect.

24.6.11. SECTION 10 – EASTNEY (LANDFALL)

Construction Stage - noise

Illustrative Onshore Cable Route

24.6.11.1. The Onshore Cable Route construction activities in Section 10 comprise trenching, HDD-1 at the transition Joint Bay and construction of the ORS infrastructure at the Landfall.

Trenching

24.6.11.2. The predicted impacts during the daytime trenching activities along Henderson Road and Fort Cumberland Road are presented in Table 24.50.

Table 24.50 – Section 10 – predicted impacts of weekday daytime trenching

	Number of properties experiencing specified magnitude of level		
	Weekday daytime (07:00-17:00 hours)		
Activity	Large adverse	Medium adverse	Small adverse
Trenching and duct installation – along roads	29	80	97

24.6.11.3. A **large adverse** magnitude of level is predicted at 29 receptors during the daytime trenching works in Section 10, which are expected to be completed at a rate of 100 m per week. Given that construction activities will be transient along each 100 m section, it is unlikely that a large magnitude of level would be experienced an any receptor for more than two days. Medium and small magnitudes of level may be experienced at these receptors for an additional 2-3 days. Therefore, this is a

medium impact, and a direct, temporary, short-term, **moderate adverse** (not significant) effect.

24.6.11.4. A **medium adverse** magnitude of level is predicted at 80 receptors during the daytime trenching works in Section 10. Given the expected construction rate it is unlikely that a medium level would be experienced for more than three days. Small magnitudes of level may be experienced at these receptors for an additional 1-2 days. As such, this is a **low** impact, and a direct, temporary, short-term, **minor adverse** (not significant) effect.

24.6.11.5. A **small adverse** magnitude of level is predicted at 97 receptors during the daytime trenching works in Section 10. Given the expected construction rate, it is unlikely that these levels would be experienced for more than four days. Therefore, this is a **negligible** impact and a direct, temporary, short-term, **negligible** (not significant) effect.

HDD-1 – Landfall

24.6.11.6. The predicted impacts from activities at HDD-1 are detailed in Table 24.51.

Table 24.51 – Predicted impacts at HDD-1

		Number of properties experiencing specified magnitude of level		
Activity	Time period	Large adverse	Medium adverse	Small adverse
Site preparation	Weekday daytime	0	0	2
Drilling	Weekday daytime	0	0	0
	Weekend daytime	0	0	12
Site restoration	Weekday daytime	0	0	3
**Working hours on both weekdays and weekends are expected to be 07:00-19:00 hours.*				

24.6.11.7. The **small adverse** magnitude of level at two residential receptors during site preparation is expected to occur for five weekdays. Therefore, this is predicted to be a **negligible** impact and a direct, temporary, short-term, **negligible** (not significant) effect.

24.6.11.8. The **small adverse** magnitude of level at 12 residential receptors during weekend drilling works is expected to occur for up to 43 consecutive weekends. Despite the length of time that these activities are expected to occur, the magnitude of impact is considered **low** and, therefore, this is a direct, temporary, medium-term, **minor**

adverse (not significant) effect. Note that negligible effects are considered at these receptors during weekday daytime drilling.

24.6.11.9. The **small adverse** magnitude of level at three residential receptors during restoration works is expected to occur for four days. This is predicted to be a **negligible** impact and a direct, temporary, short-term, **negligible** (not significant) effect.

Transition Joint Bay

24.6.11.10. Direct, temporary, short-term **negligible** (not significant) effects are predicted at all receptors for the duration of the construction activities at the transition Joint Bay.

ORS infrastructure

24.6.11.11. As described in the methodology section, a qualitative assessment of construction noise effects has been undertaken due to the activities being relatively small scale. Subject to the adoption of standard construction working hours and employment of BPM (see Appendix 24.2), as described in the embedded mitigation section, no significant noise effects from construction of the ORS infrastructure are anticipated.

Construction Stage - vibration

24.6.11.12. The vibration assessment elements in section 10 comprise breaking and vibratory rolling during trenching along roads, vibratory insertion of sheet piles at HDD-1, HDD drilling at HDD-1 and construction of the ORS infrastructure.

Trenching

24.6.11.13. The predicted vibration impacts during trenching activities in Section 10 are presented in Table 24.52.

Table 24.52 – Section 10 – predicted vibration impacts of trenching

	Number of properties experiencing specified magnitude of level		
Activity	Large adverse	Medium adverse	Small adverse
Breaker (road surface removal)	0	52	250
Vibratory roller (re-surfacing)	0	8	146

24.6.11.14. A **medium adverse** magnitude of level is predicted at 52 receptors during road surface removal in Section 10, which is expected to be intermittent and transient in nature. Therefore, it is unlikely that a medium impact would be experienced for more than one day at any given receptor.

24.6.11.15. A **medium adverse** magnitude of level is predicted at eight receptors during re-surfacing in Section 10, which is expected to occur for a single day for each 100m section.

24.6.11.16. These medium adverse magnitudes of level are **low** magnitudes of impact, and direct, temporary, short-term, **minor adverse** effects (not significant).

24.6.11.17. A **small adverse** magnitude of level is predicted at 250 receptors during road surface removal in Section 10, which is expected to be intermittent and transient in nature. Therefore, it is unlikely that a small adverse impact would be experienced for more than one day at any given receptor.

24.6.11.18. A **small adverse** magnitude of level is predicted at 146 receptors during re-surfacing in Section 10, which is expected to occur for a single day for each 100m section.

24.6.11.19. Therefore, these small adverse magnitudes of level are a **negligible** magnitude of impact, which is a direct, temporary, short-term, **negligible** effect (not significant).

HDD-1 – Landfall

24.6.11.20. Engineering drawings indicate that the depth of the HDD drill under the Southsea Leisure Park will be at least 5m. Therefore, there is the potential for a **small adverse** magnitude of level during the drilling at HDD-1 beneath the mobile and static caravans at the leisure park. As the drilling could occur beneath the receptors for a period of greater than five consecutive days, this is a **low** magnitude of impact, and a direct, temporary, short-term, **minor adverse** effect (not significant).

24.6.11.21. A **medium adverse** magnitude of level associated with sheet piling at HDD-1 is predicted at four receptors. However, as this activity will be very infrequent (expected to occur for a couple of hours at the start of each HDD drill), this is a **low** magnitude of impact and a direct, temporary, short-term, **minor adverse** effect (not significant).

24.6.11.22. A **small adverse** magnitude of level associated with sheet piling at HDD-1 is predicted at 40 receptors. However, as this activity will be very infrequent, this is a **low** magnitude of impact and a direct, temporary, short-term, **negligible** (not significant) effect.

ORS infrastructure

24.6.11.23. The ORS infrastructure is relatively small scale, the buildings are single storey and therefore no piled foundations are anticipated. Therefore, a qualitative assessment of construction vibration effects has been undertaken. Given the distance between the edge of the ORS compound and nearest sensitive receptor is at least 20m, and subject to the employment of BPM, no significant vibration effects from construction are anticipated.

Operational Stage

ORS infrastructure

24.6.11.24. The predicted broadband operational noise levels for the telecommunications ORS infrastructure at landfall are presented in Table 24.53 and a noise contour plot is presented in figure 24.5. Full results, including the octave band breakdown, are presented in Appendix 24.7.

ORS– broadband noise

Table 24.53 – Broadband operational noise levels from telecommunications ORS infrastructure at landfall

Receptor Number and Group	Predicted noise level from ORS infrastructure, dB $L_{Aeq,T}$	Noise criterion ($L_{Ar,T}$) and assessment outcome			
		Daytime		Night-time	
		Criterion	Difference	Criterion	Difference
R16 – Southsea Leisure Park (Caravans)	28.9	43	-14.1	35	-6.1
R17 – 41-51 Fort Cumberland Road	17.7	43	-25.3	35	-17.3

24.6.11.25. Table 24.53 shows that at the nearest sensitive receptors, the predicted broadband operational noise levels from the ORS infrastructure are below the noise criteria during both the daytime and night-time.

24.6.11.26. It is worthwhile considering potential character corrections that could be applied to the predicted noise levels from the ORS infrastructure, in accordance with BS4142:2014. Whilst the specifications for the individual items of plant are not known at this stage of the assessment, an appropriate character correction for the heating, ventilation and air-conditioning units which will be located at the ORS could be +5dB (+2dB for tonality and +3dB for intermittency). The broadband assessment criteria are expected to be achieved, even with a +5dB character correction. Therefore, a **negligible** magnitude of level and impact are expected, and a direct, permanent, long-term, **negligible** (not significant) effect.

ORS - octave band noise

24.6.11.27. In addition to the consideration of potential character corrections in line with BS4142:2014, an octave band analysis of noise from the ORS infrastructure has been undertaken.

24.6.11.28. During the daytime, the noise level from the ORS infrastructure predicted at R16 and R17 does not exceed the background noise levels in any octave band (31.5Hz-8000Hz) and, therefore, meets the assessment criteria.

24.6.11.29. During the night-time, the internal predicted noise level from the ORS infrastructure achieves NR15 at R16, and NR2 at R17.

24.6.11.30. Operational noise from the ORS infrastructure during the day and night is considered a **negligible** magnitude of level and impact, which is a direct, permanent, long-term **negligible** effect (not significant).

24.6.12. SECTIONS 2-10 – DECOMMISSIONING

Onshore Cable Corridor

24.6.12.1. Assuming that the cables are left in-situ, no significant effects are predicted during the decommissioning of the Onshore Cable Route, including the trenched and HDD sections. However, in the event cables are removed as part of decommissioning, it is assumed that this would be completed at the Joint Bays, employing similar methods to the cable installation. As such, similar impacts to those described at the Joint Bays during the construction stage would be expected during decommissioning.

24.6.12.2. As it is assumed that the cable ducts would be left in situ as part of the decommissioning works, trenching works to remove the cable ducts would not be required.

ORS infrastructure

24.6.12.3. As described in the methodology section, a qualitative assessment of decommissioning noise effects has been undertaken due to the activities being relatively small scale. Subject to the adoption of standard working hours and employment of BPM (see Appendix 24.2), as described in the embedded mitigation section, no significant noise effects from decommissioning of the ORS infrastructure are anticipated.

24.6.13. SECTIONS 1-10 – CONSTRUCTION TRAFFIC NOISE

Basic Noise Level calculations

24.6.13.1. The predicted impacts for the construction stage road traffic noise assessment are summarised in Table 24.54. These results relate to the road links with 18-hour flows of greater than 1,000 vehicles.

Table 24.54 – Summary results of construction stage road traffic noise assessment

Increase in basic noise level, dB $L_{A10,18h}$	Magnitude of change	Number of road links	
		DM vs DS1	DM vs DS2
< 1 dB	Negligible	945	957

Increase in basic noise level, dB $L_{A10,18h}$	Magnitude of change	Number of road links	
		DM vs DS1	DM vs DS2
1.0 to 2.9 dB	Small adverse	49	37
3.0 to 4.9 dB	Medium adverse	4	4
≥5.0 dB	Large adverse	1	1

24.6.13.2. Some of the road links exposed to negligible magnitudes of change in Table 24.54 are predicted to experience a decrease in noise level during the construction period. The majority of these road links are located along the Onshore Cable Corridor and are expected to attract fewer vehicles due to the proposed road and lane closures. However, it is not considered appropriate to present these as beneficial decreases in noise level due to the expected noise generated by construction activities along the Onshore Cable Corridor which will influence noise levels on these road links.

24.6.13.3. The **negligible** and **small adverse** changes expected at 994 road links in both the DM vs DS1 and DM vs DS2 scenarios are considered to represent **negligible** magnitudes of impact and therefore direct, temporary, short-term **negligible** (not significant) effects.

24.6.13.4. The road links expected to experience medium and large adverse changes are listed in Table 24.55.

Table 24.55 – Medium and large adverse impacts for construction road traffic noise assessment

Link name	Increase in Basic Noise Level		Magnitude of change
	DM vs DS1	DM vs DS2	
Evelegh Road, Farlington	7.3	7.6	Large adverse
Mill Road, Waterlooville	4.7	4.7	Medium adverse
Station Road, Drayton	4.6	4.3	Medium adverse
Park Avenue, Purbrook	3.2	3.2	Medium adverse
Westbrook Grove, Purbrook	3.0	3.0	Medium adverse

24.6.13.5. The links in Table 24.55 are generally located parallel or adjacent to the Onshore Cable Corridor and would provide an alternative route to traffic when road and lane closures are in place. The **medium adverse** changes are considered a **low** magnitude of impact and an indirect, temporary, short-term, **minor adverse** effect (not significant). The one **large adverse** change is considered a **medium** magnitude of impact and an indirect, temporary, short-term, **moderate adverse** effect (not significant).

Low flow link calculations

24.6.13.6. The predicted impacts on the low flow links for the construction road traffic noise assessment are summarised in Table 24.56. These results relate to the road links with 18-hour flows of less than 1,000 vehicles in one or both of the Do Minimum ('DM') and Do Something ('DS') scenarios.

Table 24.56 – Summary results of construction road traffic noise assessment – low flow links (<1,000 vehicles/18-hour)

Indicative noise level increase, dB	Magnitude of change	Number of road links	
		DM vs DS1	DM vs DS2
< 1 dB	Negligible	53	50
1.0 to 2.9 dB	Small adverse	5	5
3.0 to 4.9 dB	Medium adverse	3	5
≥5.0 dB	Large adverse	4	2

24.6.13.7. The **negligible** and **small adverse** changes expected at 58 and 55 road links in the DM vs DS1 and DM vs DS2 scenarios respectively are considered to represent **negligible** magnitude of impacts and therefore direct, temporary, short-term **negligible** (not significant) effects.

24.6.13.8. The low flow road links expected to experience medium and large adverse changes are listed in Table 24.57.

Table 24.57 – Medium and large adverse impacts for construction stage road traffic noise assessment – low flow links (<1,000 vehicles/18-hour)

Link name	Indicative increase in noise level, dB		Magnitude of change
	DM vs DS1	DM vs DS2	
Park Avenue, Purbrook	12.8	12.8	Large adverse
Dundas Lane, Hillsea*	6.2	3.6	Large / Medium adverse
Closewood Road, Soake	5.3	5.2	Large adverse
Airport Service Road, Hillsea*	5.0	2.4	Large / Small adverse
Shaftesbury Avenue (East), Purbrook	4.8	4.1	Medium adverse
Shaftesbury Avenue (West), Purbrook	4.7	4.1	Medium adverse
Widley Walk, Purbrook Heath	3.5	3.4	Medium adverse

Link name	Indicative increase in noise level, dB		Magnitude of change
	DM vs DS1	DM vs DS2	
Haslemere Road, Eastney	0.2	3.0	Negligible \ Medium adverse

*There are no residential receptors located on these roads and therefore these predicted noise changes are not expected to impact any receptors and have not been considered further in this assessment.

24.6.13.9. The **medium adverse** changes in Table 24.57 are considered a **low** magnitude of impact and direct, temporary, short-term, **minor adverse** effects (not significant). The **large adverse** changes at Closewood Road are considered **medium** magnitudes of impact and direct, temporary, short-term, **moderate adverse** (not significant) effects.

24.6.13.10. The **large adverse** magnitude of change (+12.8 dB) at Park Avenue, Purbrook (in Section 4) is due to the vehicle flow increasing from 160 in the DM scenario to approximately 3,000 in the DS scenarios. Whilst he predicted noise increase represents a large adverse magnitude of change, the absolute noise level from a road with approximately 3,000 vehicles in the 18-hour period will still be relatively low. This is considered a **medium** magnitude of impact and a direct, temporary, short-term, **moderate adverse** (not significant) effect.

24.7. CUMULATIVE EFFECTS

24.7.1.1. The zone of influence for the 'other developments' has been identified as 1km from the Onshore Order Limits for both the construction and operational stage cumulative effects assessment.

24.7.1.2. The Stage 1 & 2 cumulative effects assessment is shown in Appendix 24.8 and the Stage 3 & 4 assessment is shown in Appendix 24.9.

24.7.1.3. The cumulative effects assessment has identified a short list of two other developments for consideration in Stage 4 (see Appendix 24.9). No inter-project operational effects are expected providing these other developments are subject to robust noise criteria and assessment across the octave band spectrum as well as consideration of broadband noise.

24.7.1.4. Given that vibration generally dissipates quickly with distance, no cumulative vibration effects are expected.

24.7.2. CONSTRUCTION STAGE

Cumulative Effects

24.7.2.1. Given that construction stage effects from the Proposed Development are generally short in duration, no other developments have been identified for consideration in the construction stage cumulative effects assessment.

24.7.3. OPERATIONAL STAGE

Cumulative Effects

24.7.3.1. The following two other developments have been considered in the operational cumulative effects assessment:

- Land South of Lovedean Electricity Substation, Broadway Lane, Lovedean, Waterlooville (ID 67). Two energy storage systems are proposed.
- Land to the south of Old Mill Lane and east/south-east of The Haven, Denmead (ID 68). Battery storage plant are proposed.

24.7.3.2. The Lovedean energy storage development is at screening stage and so a noise assessment is not publicly available. However, it is assumed that the development will include and be required to provide appropriate mitigation, where necessary, to ensure negligible cumulative noise effects at the nearby sensitive receptors.

24.7.3.3. The current noise assessment for the Pivot Power battery storage development assumes a 4 m high noise barrier on its western boundary. The Environmental Health Officer (EHO) has requested further assessment and detailed information to ensure that low frequency noise impacts are adequately assessed. It is recommended that mitigation measures are implemented by the applicant (Pivot Power) to ensure negligible effects and assumed appropriate mitigation measures will, where necessary, be secured.

24.8. PROPOSED MITIGATION AND ENHANCEMENT

OPERATIONAL STAGE

Converter Station Area

24.8.1.1. Mitigation measures that could be employed to mitigate the direct, permanent, long-term, minor adverse effect predicted during the night-time at Hinton Daubnay have been explored.

24.8.1.2. The embedded mitigation measures have focussed on the orientation and layout of Converter Station and mitigating the dominant plant items at source. Screening, in the form of a noise barrier, could be employed as a further mitigation measure, which would interrupt the pathway between the converter cooling fan banks of the southern converter building (the dominant plant item at the receptor) and Hinton Daubnay.

24.8.1.3. A 3 m high noise barrier located around the northern and eastern perimeter of the cooling fan banks would reduce the overall Converter Station noise level by 2.5-3 dB at Hinton Daubnay. The noise barrier would need to be absorptive to minimise the potential effect of reflections. Such mitigation would reduce the Converter Station noise level to below the assessment criterion, thereby reducing the effect from a minor adverse (potentially significant) to a direct, permanent, long-term, negligible noise effect (not significant).

24.8.1.4. The mitigation measure outlined above demonstrates that the Converter Station can be designed such that operational effects are negligible at surrounding sensitive receptors. It is possible that alternative mitigation solutions exist (e.g. further treatment at the source itself) that will result in the same outcome. These measures should be explored further during the detailed design process.

CONSTRUCTION STAGE

24.8.1.5. Additional measures have been explored which could be employed to mitigate the direct, temporary, short-term, major adverse significant effects during the weekend daytime trenching works in section 4, the weekend daytime and night-time trenching works in section 5, and the weekday evening, weekend daytime and night-time trenching works in section 8. The extent of out-of-hours working (and in particular night-working), has been minimised as much as possible whilst balancing other constraints. Furthermore, mitigation already incorporated into the detailed assessment of the out-of-hours works has included screening providing 5dB attenuation, and the night-time exclusion of the loudest equipment used for the trenching works (road surface breakers/cutters and road re-surfacing equipment).

24.8.1.6. Until a contractor is appointed, and detailed work plans are produced, it is not practicable to identify further specific physical mitigation measures that could be employed. However, the contractor appointed should engage with local residents affected by the works and the environmental health department at the local planning authorities to agree additional mitigation to reduce the significant effects as far as reasonably practicable. Examples of the range of measures that a contractor could consider are outlined below:

All out-of-hour locations

- Completing works in these areas as quickly as possible to minimise the duration of residents' exposure to high noise levels, whilst minimising the duration of works during the most sensitive periods (i.e. night-time).
- For night-time works, identifying if adversely affected dwellings have sleeping accommodation at the opposite façade to that affected by construction activity, as noise levels at these facades should be substantially lower than those predicted.

Section 4

- Completing the works across non-consecutive weekends to provide respite from significant noise impacts.

Section 5

- Avoiding night-time working if possible, and/or completing the works across non-consecutive weekends to provide respite from significant noise impacts.

Section 8

- The sensitive receptors most adversely affected by out-of-hours works are those at the Harbourside Caravan Park. If it were possible to complete the approximately 300m section of trenching on Eastern Road from the north of the Caravan Park to Burrfields Road during weekday daytimes (07:00 to 19:00 hours), major adverse (significant) effects could be avoided.

24.9. RESIDUAL EFFECTS

24.9.1.1. The following residual effects have been identified. The magnitude of effect and significance is dependent on the implementation and feasibility of the mitigation set out above. The residual effects presented are those which are considered significant, as well as the alternative working options which could reduce the significance of these effects.

24.9.2. SECTION 4 – HAMBLEDON ROAD TO FARLINGTON AVENUE

24.9.2.1. If works occur over consecutive weekends, there will be a direct, temporary, short-term, **major adverse** noise effect (significant), during weekend daytime construction works in section 4. However, if these works occur across two non-consecutive weekends, there will be a direct, temporary, short-term, **moderate adverse** noise effect (not significant).

24.9.3. SECTION 5 – FARLINGTON

24.9.3.1. For out-of-hours construction works in section 5, the residual effect is dependent on the method utilised to complete the work:

- Option 1 – If works occur over a single weekend with night-time working, there will be a direct, temporary, short-term, **major adverse** noise effect (significant).
- Option 2 – If works occur over two consecutive weekends (daytime working only), there will be a direct, temporary, short-term, **major adverse** noise effect (significant).
- Option 3 – If works occur over two non-consecutive weekends (daytime working only) there will be a direct, temporary, short-term, **moderate adverse** noise effect (not significant).

24.9.4. SECTION 8 – EASTERN ROAD (ADJACENT TO GREAT SALTERNS GOLF COURSE) TO MOORINGS WAY

24.9.4.1. If works outside the Harbourside Caravan Park are completed 24 hours per day, the weekday evening, weekend daytime and night-time works will result in a direct, temporary, short-term **major adverse** noise effect (significant) during weekday evening, weekend daytime and night-time construction works in section 8.

24.9.4.2. If construction works along the c.300m section of Eastern Road outside the Caravan Park are limited to weekday daytimes (07:00 to 19:00 hours), this would be a direct, temporary, short-term, **moderate adverse** (not significant) effect.

24.10. SUMMARY OF EFFECTS

Table 24.58 – Summary of effects table for noise and vibration

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Construction Stage				
Section 1 – Lovedean (Converter Station Area)				
Construction noise effects	All receptors in Section 1	Weekday daytime: Negligible T / D / MT to Minor - / T / D / ST	N/A	Weekday daytime: Negligible T / D / MT to Minor - / T / D / ST
Construction vibration effects		Daytime: Negligible T / D / MT	N/A	Daytime: Negligible T / D / MT
Section 2 – Anmore				

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Construction noise effects	All receptors in Section 2	Weekday daytime: Negligible T / D / ST to Minor - / T / D / ST	N/A	Weekday daytime: Negligible T / D / ST to Minor - / T / D / ST
Construction vibration effects		Daytime: Negligible T / D / ST	N/A	Daytime: Negligible T / D / ST
Section 3 – Denmead/Kings Pond Meadow				
Construction noise effects	All receptors in Section 3	Weekday daytime: Negligible T / D / ST	N/A	Weekday daytime: Negligible T / D / ST
Construction vibration effects				
Section 4 – Hambledon Road to Farlington Avenue				

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Construction noise effects	All receptors in Section 4	Weekday daytime: Negligible T / D / ST to Moderate - / T / D / ST	N/A	Weekday daytime: Negligible T / D / ST to Moderate - / T / D / ST
	All receptors in vicinity of out-of-hours works in section 4	Weekend daytime: Major - / T / D / ST	Works could be completed across non-consecutive weekends.	Weekend daytime: Moderate - / T / D / ST to Major - / T / D / ST
Construction vibration effects	All receptors in Section 4	Daytime: Negligible T / D / ST to Minor - / T / D / ST	N/A	Daytime: Negligible T / D / ST to Minor - / T / D / ST
Section 5 - Farlington				

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Construction noise effects	All receptors in Section 5	Weekday daytime: Negligible T / D / ST to Moderate - / T / D / ST	N/A	Weekday daytime: Negligible T / D / ST to Moderate - / T / D / ST
	All receptors in vicinity of out-of-hours works in section 5	Weekend daytime: Major - / T / D / ST	Works could be completed across non-consecutive weekends.	Weekend daytime: Moderate - / T / D / ST to Major - / T / D / ST
	All receptors in vicinity of out-of-hours works in section 5	Night-time: Major - / T / D / ST	Night-time works could be avoided and completed during the daytime across non-consecutive weekends	Night-time: Moderate - / T / D / ST to Major - / T / D / ST

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Construction vibration effects	All receptors in Section 5	Daytime: Negligible T / D / ST to Minor - / T / D / ST	N/A	Daytime: Negligible T / D / ST to Minor - / T / D / ST
Section 6 – Zetland Field and Sainsbury's Car Park				
Construction noise effects	All receptors in Section 6	Weekday daytime: Negligible T / D / ST	N/A	Weekday daytime: Negligible T / D / ST
	All receptors in vicinity of out-of-hours trenching in section 6	Night-time: Moderate - / T / D / ST	N/A	Night-time: Moderate - / T / D / ST
Construction vibration effects	All receptors in Section 6	Weekday daytime: Negligible T / D / ST	N/A	Weekday daytime: Negligible T / D / ST
Section 7 – Farlington Junction to Airport Service Road				

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Construction noise effects	All receptors in Section 7	Weekday daytime: Negligible T / D / ST	N/A	Weekday daytime: Negligible T / D / ST
	All receptors in vicinity of HDD-4	Weekday evenings, weekend daytime and evenings: Minor - / T / D / ST	N/A	Weekday evenings, weekend daytime and evenings: Minor - / T / D / ST
		Night-time: Negligible T / D / ST	N/A	Night-time: Negligible T / D / ST
	All receptors in vicinity of HDD-3	Weekday evenings, weekend daytime and evenings: Minor - / T / D / ST	N/A	Weekday evenings, weekend daytime and evenings: Minor - / T / D / ST

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Construction vibration effects	All receptors in Section 7	Daytime: Negligible T / D / ST	N/A	Daytime and night-time: Negligible T / D / ST
Section 8 – Eastern Road (adjacent to Great Salterns Golf Course) to Moorings Way				

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Construction noise effects	All receptors in Section 8	Weekday daytime: Negligible T / D / ST to Moderate - / T / D / ST	N/A	Weekday daytime: Negligible T / D / ST to Moderate - / T / D / ST
	All receptors in vicinity of out-of-hours works in section 8	Weekday evenings and weekend daytime: Minor - / T / D / ST to Major - / T / D / ST	Works outside Harbourside Caravan Park could be completed during weekday daytimes.	Weekday evenings and weekend daytime: Minor - / T / D / ST to Major - / T / D / ST
	All receptors in vicinity of out-of-hours works in section 8	Night-time: Minor - / T / D / ST to Major - / T / D / ST	Works outside Harbourside Caravan Park could be completed during weekday daytimes.	Night-time: Minor - / T / D / ST to Major - / T / D / ST

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Construction vibration effects	All receptors in Section 8	Daytime: Negligible T / D / ST to Minor - / T / D / ST	N/A	Daytime: Negligible T / D / ST to Minor - / T / D / ST
Section 9 – Moorings Way to Bransbury Road				

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Construction noise effects	All receptors in Section 9	Weekday daytime: Negligible T / D / ST to Moderate - / T / D / ST	N/A	Weekday daytime: Negligible T / D / ST to Moderate - / T / D / ST
	All receptors in vicinity of HDD-2	Weekend daytime: Minor - / T / D / ST	N/A	Weekend daytime: Minor - / T / D / ST
Construction vibration effects	All receptors in Section 9	Weekend daytime: Negligible T / D / ST to Minor - / T / D / ST	N/A	Weekend daytime: Negligible T / D / ST to Minor - / T / D / ST
Section 10 – Eastney (Landfall)				

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Construction noise effects	All receptors in Section 10	Weekday daytime: Negligible T / D / ST to Moderate - / T / D / ST	N/A	Weekday daytime: Negligible T / D / ST to Moderate - / T / D / ST
	All receptors in vicinity of HDD-1	Weekend daytime: Negligible T / D / ST Minor - / T / D / ST	N/A	Weekend daytime: Negligible T / D / ST Minor - / T / D / ST
Construction vibration effects	All receptors in Section 10	Weekend daytime: Negligible T / D / ST to Minor - / T / D / ST	N/A	Weekend daytime: Negligible T / D / ST to Minor - / T / D / ST
Construction traffic noise effects				
Sections 1 to 10				

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Construction traffic noise effects	All receptors within construction traffic noise study area	Negligible T / D / ST to Moderate - / T / D / ST	N/A	Negligible T / D / ST to Moderate - / T / D / ST
Operational Stage				
Section 1 – Lovedean (Converter Station Area)				

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Operational noise from Converter Station	Receptors within the Converter Station study area (excluding Hinton Daubnay (R12))	Negligible P / D / LT	N/A	Negligible P / D / LT
	Hinton Daubnay (R12)	Minor - / P / D / LT	To be confirmed at detailed design stage. However, a 3 m high noise barrier around the northern and eastern perimeter of the cooling fan banks is an example of a solution.	Negligible P / D / LT
Section 10 – Eastney (Landfall)				
Operational noise from ORS infrastructure	Southsea Leisure Park and 41-51 Fort Cumberland Road	Negligible P / D / LT	N/A	Negligible P / D / LT
Decommissioning Stage				

Description of Effects	Receptor	Significance and Nature of Effects Prior to mitigation	Summary of Mitigation/Enhancement	Significance and Nature of Residual Effects following Mitigation / Enhancement
Section 1 – Lovedean (Converter Station Area)				
Decommissioning noise from converter station	All receptors in section 1	Weekday daytime: Negligible T / D / ST	N/A	Weekday daytime: Negligible T / D / ST
Sections 2 to 10				
Decommissioning noise from onshore cable	All receptors in section 2-9	Weekday daytime: Negligible T / D / ST	N/A	Weekday daytime: Negligible T / D / ST

Key to table:

+ / - = Beneficial or Adverse P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term, N/A = Not Applicable

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