

7. Noise and Vibration

7.1. Introduction

This chapter considers the assessment of impacts from noise and vibration expected from construction of the Scheme. The impacts of noise and vibration on ecological receptors is discussed in (chapter 8 Biodiversity, Marine Ecology and Fish of this Environmental Statement (ES)).

7.1.1. Scheme overview

The overall Scheme overview plan is shown in Figure 7.0, which provides a brief summary of the key features. A more detailed description of the Scheme is provided in chapter 3 The Preferred Option, of this ES.

7.1.2. Scheme impacts

The Scheme will provide a number of key benefits in the long-term that will enhance or improve the environment. The key noise and vibration adverse effects arise during the proposed construction phase. The operational phase (considered to occur immediately post construction; following the breaching of the site) is not considered to have any negative noise or vibration impacts.

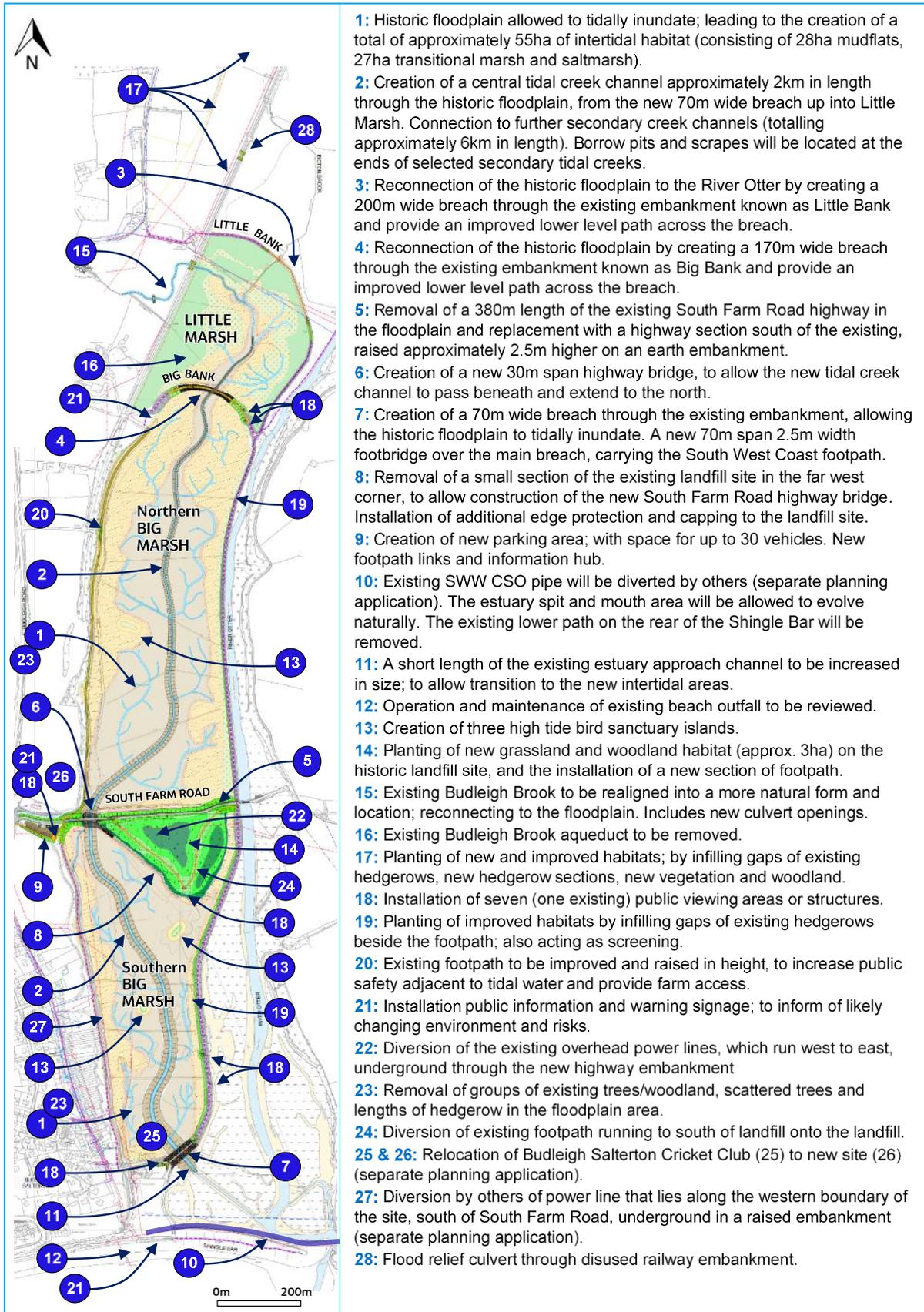


Figure 7.0. Scheme Overview Plan

7.2. Study Area

The study area for noise and vibration considers the closest receptors that may be impacted from the construction and/or operation of the Scheme. For construction noise a distance of 300m from the works generating noise is considered to be the furthest where impact may be possible, and for construction vibration this is 100m from the works generating vibration. These distances are based on professional judgement and experience of other similar schemes. The activities within the Scheme works likely to generate noticeable levels of vibration are from piling works. The closest receptors to any piling works are South Farm Cottages, which are located around 100m from the works to construct the new highway bridge. Since the closest distance where any vibration impacts are likely is 100m, no assessment of impacts from vibration has been undertaken.

Since there are no elements of the Scheme expected to make noise or cause vibration once finished, there is no assessment of the operation of the Scheme.

7.3. Environmental Impact Assessment Methodology

The noise impact assessment follows the EIA methodology as set out in chapter 4 The Environmental Assessment Process of this ES.

7.3.1. Noise impact assessment calculation methodology

This section describes the calculation methodology used in the assessment to estimate the noise levels from each of the Scheme's construction activities at the closest noise receptors.

7.3.2. Noise calculation

For the calculation of construction noise levels at the closest receptors, this assessment has followed the methods within BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites: Part 1 Noise (British Standards Institution, 2014). This standard is hereafter referred to as BS 5228-1.

BS 5228-1 covers noise and provides suitable methods for the calculation of noise from construction activities, including basic information regarding noise levels from a range of construction equipment. For the calculation of construction noise at the receptor locations, the selected A-weighted sound power levels of the plant and equipment are corrected to consider: the "Percentage On-time" (portion of time in which the equipment is operating at its maximum power); "Duration of Activity" (number of hours within the working day in which the equipment is expected to operate); distance between sound sources and receptors; percentage of soft ground; and any screening corrections from obstacles between the sound propagation path.

7.3.3. Construction activities

The Scheme will involve undertaking a number of construction activities, for which the noise impacts have been assessed. Table 7.1 summarises the proposed construction activities, grouped within different areas, which have the potential to affect noise receptors. These activities have been based on information supplied by consultation with a contractor and also professional judgement. The activities and plant used may vary depending upon the location of works and may be subject to change once the ground investigation works and the final design have been undertaken.

Table 7.1 - Construction activity per Works Area

Works Area	Construction Activity
South Farm Road	Car park (vegetation clearance, earthworks, surfacing) Existing highway section to be removed New highway (vegetation clearance, earthworks and surfacing) Highway bridge (earthworks, piling, concreting, surfacing)
Floodplain	Little Bank & Big Bank breach excavations Intertidal works (earthwork scrapes & features) Landfill (earthworks capping, piling, edge protection)
Pedestrian footbridge & main breach	Vegetation clearance Earthworks (breach excavations of existing bank) Footbridge (Piling, concreting, deck installations)
Main creek channel	Earthworks (excavations of channels) Construction of high tide bird islands
Remaining works	Utility diversions Demolition of the existing concrete aqueduct Re-alignment of the Budleigh Brook section Material storage areas preparation and usage Temporary haul routes & compound installation Haul route usage

Within the scheme description are other activities that generate very little noise and are unlikely to generate potential significant effects. These include activities such as landscaping, planting and the installation of viewing platforms. These have not been included within the construction calculations. In addition, there are some activities that involve similar plant and equipment to those being undertaken in the vicinity. An example is the reinforced concrete structures required for the box culverts at Little

and Big Bank, where the required works are similar to those for the landfill edge protection. For these situations, where the receptors are a similar distance away, the works have not been included within the calculations.

7.3.4. Assessment of significance

Sensitivity of resource

The identification of the sensitivity of the receptors in proximity to the construction works is set out in Table 7.2 This is based on the project criteria from chapter 4 The Environmental Assessment Process of this ES. This classification is only relevant where a building is occupied.

Table 7.2 - Criteria for classifying the sensitivity of receptors

Receptor Sensitivity	Receptor Type Definition for noise/vibration
High	Residential, educational buildings, medical facilities
Medium	Hotel, community facilities and places of worship, footpaths and amenity areas
Low	Commercial buildings (e.g. offices)
Negligible	Farmland, industrial premises

Magnitude of impact

Assessment of the magnitude of impacts on human receptors is undertaken using the criteria presented in Table 7.3. Magnitude is only assessed for increases of noise and/or vibration (negative impacts) as there would not be any decreases expected. Table 7.3 sets criteria and change in decibel values for the magnitude of impact as set out in BS 5228-1 and discussed in section 7.4.1.

Table 7.3 - Criteria for classifying the magnitude of impact

Magnitude	Noise Criteria
High negative	>10 dB above the threshold criteria of the relevant ABC ¹ category
Medium negative	5.0 to 9.9 dB above the threshold criteria of the relevant ABC ¹ category
Low negative	3.0 to 4.9 dB above the threshold criteria of the relevant ABC ¹ category
Negligible	Less than 3.0 dB above the threshold criteria of the relevant ABC ¹ category, or below the threshold criteria.
¹ Refer to Table 7.5 where the criteria of the ABC method contained in BS 5228-1 is presented.	

Significance of effect

The significance of effect is determined from the combination of a receptor's sensitivity and the magnitude of impact based on the criteria presented in Table 7.4. In addition, the duration of the activity is considered. An effect of moderate or above would be considered significant as shown in Table 7.4.

Table 7.4 - Assessment of potential effect and likely significant effect

Magnitude	Sensitivity			
	High	Medium	Low	Negligible
High	Major (Significant)	Major (Significant)	Moderate (Significant)	Negligible (Not significant)
Medium	Major (Significant)	Moderate (Significant)	Minor (Not significant)	Negligible (Not significant)
Low	Moderate (Significant)	Minor (Not significant)	Minor (Not significant)	Negligible (Not significant)
Negligible	Negligible (Not significant)			

The noise from construction would constitute a significant effect where, if it is determined that a major or moderate magnitude of impact will occur, the duration of the activity will exceed:

- 1) 10 or more days or nights in any 15 consecutive days or nights; or
- 2) a total number of days exceeding 40 in any 6 consecutive months.

Where necessary, appropriate mitigation measures to reduce predicted effects to an acceptable level are proposed. Identification of the residual effects of the Scheme, assuming the successful implementation of recommended mitigation, are presented when applicable.

7.4. Regulatory and Policy Context

The following legislation, planning policies and British Standards and relevant to the noise impact assessment.

7.4.1. Regulatory context

Control of Pollution Act 1974 (CoPA)

The Control of Pollution Act 1974 (CoPA) grants powers to deal with noise nuisances. Much of CoPA has been replaced and extended by the Environmental Protection Act 1990. CoPA Sections 60 and 61 which relate to noise and vibration from construction sites remain relevant.

Section 60 (S60) of CoPA allows a local authority to serve a notice of its requirements for the control of site noise to the individual or entity carrying out or controlling the works. The notice may stipulate noise limits for work, particular plant or machinery that should be avoided, hours during which construction activities may be carried out and provide for any change in circumstances.

Section 61 (S61) of CoPA concerns the procedures adopted when a contractor or developer approaches the local authority prior to any construction activities taking place, with the intention of agreeing noise and vibration limits in advance of works.

If consent is granted under S61, then this would be considered a valid defence by the Magistrate's court if the local authority was to later reverse its position and pursue an action under S60.

Environmental Protection Act (EPA) 1990

The Environmental Protection Act 1990 (EPA) Part III, Section 79, defines what activities may constitute a Statutory Nuisance, and what activities are specifically exempt. Section 79 imposes a duty on local authorities to periodically survey environmental noise levels and to investigate noise complaints. The Act requires local authorities to serve notice when noise nuisance exists. Under these statutory nuisance provisions, the operators of a site or facility could be required to adopt best practicable means to abate noise nuisance at any time once operations have commenced. It is essential that potential nuisance effects are properly considered, so as to ensure that the operators are seen to adopt best practice, and that any potential requirements for mitigation are considered.

BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (British Standards Institution, 2014)

This code of practice provides guidance and recommendations on methods for the measurement of construction noise and assessing its impact on those exposed to it. It also references the legislative background to noise control on construction sites and gives recommendations for basic methods of noise control. Suitable methods are provided for the calculation of noise from construction activities, including basic information regarding noise levels from a range of construction equipment. The significance of effect from noise caused by the construction activities can be evaluated according to the methods described in Annex E of the BS 5228-1. Annex E describes methods for evaluating the potential significant effect of construction noise depending on the existing noise level at the site. The Annex presents the ABC method which considers that a potential adverse effect is indicated when the site noise level exceeds the value listed in an A/B/C category which is dictated by the existing noise level.

Table 7.5, reproduced from Table E.1 in BS 5228-1 Annex E, shows the impact thresholds for construction activities at dwellings based on the ABC Method. In relation to construction noise, day is 07:00 to 19:00, evening is 19:00 to 23:00 and night is 23:00 to 07:00. These hours are those stated in BS 5228-1 and do not refer to the proposed working hours for this Scheme.

Table 7.5 – ABC Method for assessing construction noise at dwellings

Reference period	Threshold value L_{Aeq} , daytime [dB]		
	Category A ¹	Category B ²	Category C ³
Daytime weekdays (07:00–19:00) and Saturdays (07:00–13:00)	65	70	75
Evenings weekday (19:00-23:00), Saturdays (13:00-23:00) and Sundays (07:00-23:00)	55	60	65
Night-time (23:00-07:00)	45	50	55
¹ Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. ² Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. ³ Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.			
Note 1: A potential effect is indicated if the L_{Aeq} daytime noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.			

Although the above criteria only apply to residential receptors within BS 5228-1 guidance it is considered suitable for this assessment to apply it to the other sensitive receptors such as the children’s play area and skate park.

The effects of construction noise are temporary and defined by the intrusion that construction noise causes in the existing noise environment (or soundscape) of the area. If when considering mitigation the noise levels are still above the relevant threshold in Table 1 BS 5228-1 states that noise insulation may be offered (using the discretionary powers provided by Regulation 5 of the Noise Insulation Regulations) if those noise levels remain for a long enough period of time (i.e. for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months).

The magnitude of the impact from the results of the construction noise when applying the ABC method are assessed following the criteria in Table 7.3.

BS 5228-1 also contains a methodology for calculating the noise level from vehicles using haul routes.

LA 111 Noise and Vibration (Highways England, 2020)

LA 111 is produced by Highways England and provides a framework for assessing and managing the noise and vibration effects associated with construction, improvement, use and maintenance of motorways and all-purpose trunk roads. This document sets out the requirements for noise and vibration assessments from road projects, applying a proportionate and consistent approach using best practice and ensuring compliance with relevant legislation.

Although LA 111 is primarily designed for the assessment of impacts from large road projects, it also provides a magnitude of impact scale that can be used to determine the potential impact from the construction traffic. This scale states that a change in noise of 3 dB(A) is a potential significant effect.

LA 111 also contains guidance on the temporal scope for construction activities and whether the activity is of sufficient duration to be significant effect. It states that *“Construction noise and construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:*

- 1) 10 or more days or nights in any 15 consecutive days or nights;*
- 2) a total number of days exceeding 40 in any 6 consecutive months.”*

7.4.2. Policy context

The relevant policy documents identified in chapter 5 Planning Policy Context of this ES have been reviewed and a summary of the relevant national and local development plan policies is presented in Table 7.6 (note only the points relevant to noise and vibration are listed). These policies have been considered during the development of the Scheme and have informed the level of mitigation required to ensure compliance with planning policy as far as possible. A full assessment of the Scheme’s compliance against these policies, taking account of the mitigation described in section 7.8 of this chapter, is provided in the Planning Statement.

Table 7.6 Relevant policy

Document	Overview
National Planning Policy	
National Planning Policy Framework (NPPF)	<p>Para. 180: Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:</p> <p>a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.</p>
Local Planning Policy	
East Devon District Council Local Plan 2013-2031	
EN14 - Control of Pollution	<p>Permission will not be granted for development which would result in unacceptable levels, either to residents or the wider environment of:</p> <ol style="list-style-type: none"> 1. Pollution of the atmosphere by gas or particulates, including. smell, fumes, dust, grit, smoke and soot. 2. Pollution of surface or underground waters including: <ol style="list-style-type: none"> a) Rivers, other watercourses, water bodies and wetlands. b) Water gathering grounds including water catchment areas, aquifers and groundwater protection areas. c) Harbours, estuaries or the sea. 3. Noise and/or vibration. 4. Light intrusion, where light overspill from street lights or floodlights on to areas not intended to be lit, particularly in areas of open countryside and areas of nature conservation value. 5. Fly nuisance. 6. Pollution of sites of wildlife value, especially European designated sites or species. 7. Odour.

7.5. Limitations and Assumptions

For purposes of this noise assessment, the normal working hours that have been considered for the calculations are 08:00 to 18:00 Monday to Friday, and 08:00 to 13:00 on Saturday (with the exception below). No work activity will be undertaken on

Sundays and bank holidays. Night time working hours will be very limited but has been considered for the new South Farm Road highway tie-ins.

Any working outside normal working hours would need to be discussed with the local Environmental Health Officer (EHO). Section 7.8 of this chapter contains details of any proposed mitigation on construction outside standard working hours.

A noise assessment requires the prediction of the noise and vibration produced by various activities which use various items of plant. Until a contractor is actually on-site there is always uncertainty surrounding exact methods of construction and items of plant that will be used. Although every effort has been made to gather this information, there will remain some uncertainty over these assumptions. The plant lists assumed for the purpose of this assessment is presented in Appendix D3.

A baseline noise survey (see section 7.6.2) has been undertaken during one visit over two days, during day time working hours, this is considered to be representative of the noise climate during this time.

It has been assumed that there will not be any screening between construction activities and receptors and that the ground cover is assumed to be acoustically hard (i.e. reflective).

7.6. Existing Environment

7.6.1. Receptors

The area surrounding the works has been examined to determine the receptor sensitivities as defined in Table 7.2. The closest noise receptors to the Scheme are residential dwellings which are assigned a high category for sensitivity. These receptors are shown on Figure 7.1 in Appendix D1 (see representative location in Table 7.7).

There are a few isolated residential receptors along South Farm Road (South Farm Cottages to the west and Otter Rise to the east of the scheme). These receptors are assigned a high sensitivity.

To the north and north-west of the Scheme there are isolated receptors off the B3187 (East Budleigh Road) and Pulhayes Farm. These receptors are assigned a High sensitivity.

To the south-west of the Scheme there are many relevant receptors of high sensitivity within the eastern edge of Budleigh Salterton and along Granary Lane. There are no receptors of high sensitivity identified to the south of the Scheme. Commercial buildings, including BSCC, have a low sensitivity within this assessment.

7.6.2. Baseline noise environment

A baseline noise survey was undertaken in April 2019 to define the noise climate at locations likely to be most affected by the construction works (and representative of others approximately equidistant). Table 7.7 describes each measurement location and the representative receptors. Figure 7.1 in Appendix D1 identifies the noise survey locations. The baseline noise survey has informed the assessment of the potential effects from construction noise at the closest residential receptor location.

The noise measurement equipment used comprised two 01dB Solo Sound Level Meters (serial numbers 061046 and 061083). The meters were calibrated using a Bruel&Kjaer Model 4231 Sound Level Calibrator (serial number 1807572). These were

calibrated prior to and on completion of each survey. No material drifts in calibration level occurred. For each measurement position the microphone was located in free-field position at a height between 1.2m and 1.5m above ground level.

The sound level meters and acoustic calibrator employed in the baseline survey comply with national and international standards IEC 61672–1:2013, IEC 61260-1:2014, and IEC 60942:2017.

Attended noise monitoring was undertaken between 24th and 25th April 2019 during daytime hours. The weather conditions during the survey were dry with some intermittent light rain and temperatures of 12 - 16 °C. The wind speeds varied, with occasional gusts up to 4 m/s. Overall, the weather conditions were suitable for environmental noise measurements.

Table 7.7 – Noise measurement locations

Location	Coordinates	Representative location
N1	50° 38' 52" 3° 18' 49"	Pulhayes Farm
N2	50° 38' 21" 3° 18' 56"	South Farm Cottages
N3	50° 38' 22" 3° 18' 28"	Otter Rise
N4	50° 38' 12" 3° 18' 54"	Properties towards the northern end of Granary Lane
N5	50° 37' 59" 3° 18' 53"	Properties towards the southern end of Granary Lane
N6	50° 37' 60" 3° 18' 38"	Ecology measurement*
N7	50° 37' 55" 3° 18' 42"	Ecology measurement*
*These measurements were undertaken to provide baseline information for the ecology assessment.		

Table 7.8 presents the measured noise levels in the L_{Aeq} , L_{Amax} , and L_{A90} noise indices. For the purpose of this assessment the L_{Aeq} is used to select the category in which the site will be assessed when applying the ABC method defined in BS 5228-1. This baseline has been also added to the predicted construction noise in order to calculate the overall noise level expected during the construction works.

Table 7.8 – Baseline noise levels during day time

Location	Time Start (hh:mm)	Time Finish (hh:mm)	Measured Noise Level, dB		
			L_{Aeq}	L_{Amax}	L_{A90}
N1	14:49	15:49	45.6	76.1	40.5
N2	16:14	16:40	46.6	74.7	42
	17:11	17:33	46.2	64.4	42
N3	16:48	17:03	44.9	62.7	38.2

Location	Time Start (hh:mm)	Time Finish (hh:mm)	Measured Noise Level, dB		
			L _{Aeq}	L _{Amax}	L _{A90}
	17:40	17:55	41.5	59.5	37.9
N4	16:23	16:38	45.4	63.6	36.6
	17:15	17:30	47.1	63.9	39.5
N5	09:15	09:30	50.1	75.6	47.3
	10:45	11:00	49.7	68.7	45.4
N6	09:46	10:16	52	68.9	48.8
N7	09:43	10:20	54	75.6	51.7

The measured baseline noise levels are considered to be representative of the noise climate in the areas of each measurement location. The main noise sources noted during the monitoring periods include wind noise and birdsong. Distant road traffic noise from the B3178 (East Budleigh Road) and cars using South Farm Road was also noted during the monitoring. Trees rustling, and aircraft noise also contributed to the monitored levels.

The lowest noise levels are the locations furthest from noise sources such as busy roads (e.g. N1, N2, N3 and N4). At locations N5 and N7, which are closer to roads and human activity, the noise level is higher. For location N6, which is away from roads and a lot of human activity, the measured noise level was not as low as other remote locations due to the survey location being exposed and subject to some wind noise.

Existing baseline noise levels for the night time period were not measured during the baseline survey. For this reason, a conservative approach of considering the night time noise level to be 10 dB(A) lower than the measured day time noise level has been adopted to assess the potential effects from construction noise during night time¹. This approach is considered to be suitable for the purpose of this assessment.

7.7. Likely Significant Effects

7.7.1. Construction noise

The calculation methodology set out in BS 5228-1 has been employed to estimate the noise level at the closest receptor from each of the Scheme's proposed activities. The predicted noise levels from the construction activities have been added to the most applicable measured baseline L_{Aeq} to provide an overall noise level. The predicted overall noise level from each construction activity is presented in Table D2 Appendix D2.

¹ This relationship is supported by the finding reported by WHO in their Inter-Noise 99 paper entitled "Announcement of New World Health Organization Guidelines on Community Noise" (Schwela, 1999). This document states that night time noise levels tend to be between 5 and 10 dBA lower than daytime noise levels (WHO, 1999, p. 4). The highest value of this range (i.e. 10 dBA) has been subtracted from measured daytime noise levels so to obtain the lowest night time noise levels and hence considering the worst-case scenario.

The assumed plant lists are presented in Appendix D3. The baseline measured noise levels at all of the measurement locations during day time are below 65 dB $L_{Aeq,T}$ which indicates that the Category A threshold of 65 dB $L_{Aeq,T}$ shown in Table 7.4 applies for the determination of potential effects during day time activities.

For the night works the assumed baseline noise levels at the closest receptors are below 45 dB $L_{Aeq,T}$. This indicates that the Category A threshold of 45 dB $L_{Aeq,T}$ shown in Table 7.5 applies for the determination of potential effects. The magnitude of the impact and resultant potential effect are presented in Tables 7.9 to 7.13. All of the receptors included within these tables are of high sensitivity.

Table 7.9 – Assessment of effects from construction noise potential effects during the South Farm Road works area

Receptor	Increase over Category A [dBA] ¹	Magnitude of Impact	Potential Significance of Effect
Day Time Activities			
Car park - vegetation clearance			
South Farm Cottages	9	Medium negative	Major adverse (Significant)
Car park - site clearance			
South Farm Cottages	3	Low negative	Moderate adverse (Significant)
Car park – surfacing			
South Farm Cottages	8	Medium negative	Major adverse (Significant)
New highway – vegetation clearance			
South Farm Cottages	1	Negligible	Negligible (Not significant)
Otter Rise	1	Negligible	Negligible (Not significant)
Existing road to be removed			
South Farm Cottages	1	Negligible	Negligible (Not significant)
Otter Rise	1	Negligible	Negligible (Not significant)
New highway – earthworks and paving			
South Farm Cottages	0	Negligible	Negligible (Not significant)
Otter Rise	0	Negligible	Negligible (Not significant)
Highway bridge – earthworks			

Receptor	Increase over Category A [dBA] ¹	Magnitude of Impact	Potential Significance of Effect
South Farm Cottages	0	Negligible	Negligible (Not significant)
Highway bridge- piling			
South Farm Cottages	0	Negligible	Negligible (Not significant)
Highway bridge- concreting			
South Farm Cottages	1	Negligible	Negligible (Not significant)
Highway bridge – surfacing			
South Farm Cottages	0	Negligible	Negligible (Not significant)
Night Time Activities			
Tie-ins for the new highway embankment			
South Farm Cottages	9	Medium negative	Major adverse (Significant)
Otter Rise	9	Medium negative	Major adverse (Significant)
¹ Increase above the threshold criteria of the relevant ABC category. Category determined based on the existing noise level at the site.			

Table 7.10 – Significance of effect from construction noise potential effects during works on the floodplain

Receptor	Increase over Category A [dBA] ¹	Magnitude of Impact	Potential Significance of Effect
Day Time Activities			
Little Bank & Big Bank excavations			
Property on Frogmore Lane	0	Negligible	Negligible (Not significant)
Pulhayes Farm	0	Negligible	Negligible (Not significant)
Intertidal works – earthworks			
Pulhayes Farm	0	Negligible	Negligible (Not significant)
Landfill – earthworks			

Receptor	Increase over Category A [dBA] ¹	Magnitude of Impact	Potential Significance of Effect
South Farm Cottages	0	Negligible	Negligible (Not significant)
Otter Rise	0	Negligible	Negligible (Not significant)
Landfill – piling			
South Farm Cottages	0	Negligible	Negligible (Not significant)
Otter Rise	0	Negligible	Negligible (Not significant)
Landfill – edge protection			
Properties on Granary Lane	0	Negligible	Negligible (Not significant)
¹ Increase above the threshold criteria of the relevant ABC category. Category determined based on the existing noise level at the site.			

Table 7.11 – Significance of effect from construction noise during the pedestrian footbridge works area

Receptor	Increase over Category A [dBA] ¹	Magnitude of Impact	Potential Significance of Effect
Vegetation clearance			
Properties on Granary Lane	0	Negligible	Negligible (Not significant)
Children’s play area and skate park	7	Medium	Moderate adverse (Significant)
Foundations & concreting			
Properties on Granary Lane	0	Negligible	Negligible (Not significant)
Children’s play area and skate park	0	Negligible	Negligible (Not significant)
Earthworks & Breach			
Properties on Granary Lane	0	Negligible	Negligible (Not significant)
Children’s play area and skate park	0	Negligible	Negligible (Not significant)
Piling			

Receptor	Increase over Category A [dBA] ¹	Magnitude of Impact	Potential Significance of Effect
Properties on Granary Lane	0	Negligible	Negligible (Not significant)
Children's play area and skate park	1	Negligible	Negligible (Not significant)
Bridge deck installation			
Properties on Granary Lane	0	Negligible	Negligible (Not significant)
Children's play area and skate park	0	Negligible	Negligible (Not significant)
¹ Increase above the threshold criteria of the relevant ABC category. Category determined based on the existing noise level at the site.			

Table 7.12 – Significance of effect from construction noise during the main creek channel works area

Receptor	Increase over Category A [dBA] ¹	Magnitude of Impact	Potential Significance of Effect
Earthworks & channel excavations			
Pulhayes Farm	0	Negligible	Negligible (Not significant)
South Farm Cottages	0	Negligible	Negligible (Not significant)
Properties on Granary Lane	0	Negligible	Negligible (Not significant)
Construction of high tide birds islands			
Properties on Granary Lane	0	Negligible	Negligible (Not significant)
¹ Increase above the threshold criteria of the relevant ABC category. Category determined based on the existing noise level at the site.			

Table 7.13 – Significance of effect from construction noise during the remaining works

Receptor	Increase over Category A [dBA] ¹	Magnitude of Impact	Potential Significance of Effect
Utility diversions			

Receptor	Increase over Category A [dBA] ¹	Magnitude of Impact	Potential Significance of Effect
South Farm Cottages	0	Negligible	Negligible (not significant)
Otter Rise	0	Negligible	Negligible (not significant)
Demolition of the concrete aqueduct			
Pulhayes Farm	0	Negligible	Negligible (not significant)
Re-alignment of Budleigh Brook section			
Pulhayes Farm	0	Negligible	Negligible (not significant)
Material storage areas (construction and usage)			
Otter Rise	0	Negligible	Negligible (not significant)
South Farm Cottages	0	Negligible	Negligible (not significant)
Properties on Granary Lane	0	Negligible	Negligible (not significant)
Temporary haul route & compound installation			
Pulhayes Farm	0	Negligible	Negligible (not significant)
Otter Rise	0	Negligible	Negligible (not significant)
South Farm Cottages	7	Medium negative	Major (significant)
Properties on Granary Lane	0	Negligible	Negligible (not significant)
¹ Increase above the threshold criteria of the relevant ABC category. Category determined based on the existing noise level at the site.			

Tables 7.9 to 7.13 have identified seven potential significant effects, which in summary are:

- Vegetation clearance for the car park impacting upon South Farm Cottages;
- Site clearance for the car park impacting upon South Farm Cottages;
- Surfacing of the car park impacting upon South Farm Cottages;
- Tie-in work at night for the new highway embankment impacting upon South Farm Cottages;

- Tie-in work at night for the new highway embankment impacting upon Otter Rise;
- Vegetation clearance for the new pedestrian footbridge impacting upon the children’s play area and skate park; and
- Haul route construction impacting upon South Farm Cottages.

Of these activities, only the site clearance work for the car park are considered likely to exceed the temporal scope described in LA 111 of 10 or more days or nights in any 15 consecutive days or nights. Therefore, the only identified significant effect is:

- Site clearance for the car park impacting upon South Farm Cottages.

7.7.2. Construction traffic using haul routes

The impact of vehicles using the haul routes has been calculated for an assumed worst case of 80 movements per day, which is 160 passages of a vehicles passed a receptor.

Table 7.14 shows the potential significance of effect from the use of the haul routes at the two receptors that would be closest. The predicted overall noise level from the haul route usage is presented in Table D2 Appendix D2, with the calculations presented in Appendix D3.

Table 7.14 – Significance of effect from construction noise during the use of the haul routes

Receptor	Increase over Category A [dBA] ¹	Magnitude of Impact	Potential Significance of Effect
South Farm Cottages	0	Negligible	Negligible (not significant)
Otter Rise	0	Negligible	Negligible (not significant)
¹ Increase above the threshold criteria of the relevant ABC category. Category determined based on the existing noise level at the site.			

The predicted noise level at South farm Cottages is 54 dB(A) and at Otter Rise it is 60 dB(A). Both of these predicted noise levels are below the 65 dB(A) for category A and would be considered as a negligible magnitude of impact, which for receptors of high sensitivity would be negligible effect which is not significant effect.

7.7.3. Construction traffic on the local roads

The impact of the construction traffic using the local road network has also been considered. Using data from chapter 13 Traffic and Transport, the highest increase in construction traffic in terms of percentage is 22% (i.e. from 55 to 67 vehicles). This increase is along South Farm Lane and Granary Lane in the period 07:00 to 08:00. Using a basic acoustic relationship between a change in two flows, this would equate

to 0.9 dB(A). From the guidance within LA 111 this would be a negligible increase which for receptors of high value would be a not significant effect.

7.8. Mitigation

The use of Best Practicable Means (BPM) (as defined in Section 72 of the Control of Pollution Act 1974) is recommended on-site in order to reduce construction noise levels. Where practicable the control measures set out in BS 5228-1 should be implemented. These could include:

- Restriction of day time working hours to 08:00 am to 18:00 pm Mondays to Fridays, 08:00 to 13:00 on Saturdays, and no working on Sundays or Bank Holidays. Any night time working would need to be discussed with the Local Authority;
- Programming and phasing the works over a number of stages to restrict impacts within any one area to the minimum time;
- Keeping local residents and property owners fully informed about the nature and timing of the works, including traffic controls, via such means as newsletters or individual contact, where appropriate. Consideration of temporary re-housing if required;
- Having a representative available on site during working hours to answer queries or address any concerns expressed;
- Careful selection of equipment, for example any compressors brought to site will be super-silenced or sound reduced models fitted with acoustic enclosures or any pneumatic tools will be fitted with silencers or mufflers, wherever practicable;
- Through design, opt for auger piling instead of hammered driven wherever possible;
- Consideration of some material off site before being processed (e.g. vegetation to be shredded);
- All plant and equipment will be properly maintained and operated in accordance with manufacturers' recommendations and in such a manner as to avoid causing excessive noise;
- Equipment will be shut down when not in use for a period longer than five minutes;
- No vehicles will wait or queue on public highways with engines running and care will be taken when unloading deliveries; and,
- Provision of temporary noise barriers.

It is recognised that there will be challenges encountered in attempting to reduce these levels through mitigation, in particular due to the distance between the receptors and activities (i.e. South Farm Cottages). Some activities can be controlled to some extent by the provision of temporary noise barriers, which may be expected to generate between 5 and 10 dB(A) attenuation, where practicable.

The application of BPM would be expected to reduce the construction noise levels by up to 10 dB(A). Since the extent of BPM which can be utilised is not known, a conservative 5 dB(A) has been taken off the predicted levels to allow for the reduced noise levels following BPM.

7.9. Residual Effects

With the application of BPM being implemented on site during the construction activities, the residual effects are summarised in Table 7.15. Only effects which were significant before mitigation are shown within Table 7.15.

Table 7.15 – Residual effects

Area (Receptor)	Activity causing effect	Pre-mitigation increase over Category A [dBA] ¹	Pre-mitigation effect	With mitigation increase over Category A [dBA] ¹	Residual Effect (Significant or not significant)
Day time					
South Farm Cottages	Car park – site clearance	3	Moderate (Significant)	0	Negligible (Not significant)

Following mitigation the significant effect at South Farm Cottages due to site clearance activities is removed.

7.10. Conclusion

The construction of the Scheme has seven potential significant adverse effects. Due to the short duration of some construction activities, six of these are removed. The remaining potential significant moderate adverse effect is for the site clearance for the new car park, which is close to South Farm Cottages. Following mitigation in the form of Best Practicable Means, this potential significant adverse effect is also removed. There are therefore predicted to be no significant adverse effects from the scheme from noise and vibration.

Due to these potential significant adverse effects being temporary and controllable by Best Practicable Means it is considered that these will not give rise to significant adverse impacts on health and the quality of life in the long term. The Scheme will therefore meet the aims of the National Planning Policy Framework (NPPF) in terms of noise and vibration. The significant effects would not be considered as unacceptable and so would meet criteria EN14 from the East Devon District Council Local Plan for a development to proceed.

7.11. References

British Standards Institution, 2014. BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites: Part 1 - Noise

East Devon District Council, 2016. East Devon District Council Local Plan 2013-2031

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International Electrotechnical Commission, 2017. Electroacoustics – Sound calibrators

Highways England, 2020. LA 111 Noise and Vibration (Revision 2)

Schwela, 1999. Announcement of New World Health Organization Guidelines on Community Noise

UK Government, 1974. Control of Pollution Act

UK Government, 1990. Environmental Protection Act

7.12. Abbreviations

BPM	Best Practicable Means
CoPA	Control of Pollution Act
DCC	Devon County Council
EHO	Environmental Health Officer
EPA	Environmental Protection Act
ES	Environmental Statement
NPPF	National Planning Policy Framework