Norfolk Boreas Offshore Wind Farm

Appendix 25.2

Construction Phase Assessment

Environmental Statement

Volume 3

Applicant: Norfolk Boreas Limited
Document Reference: 6.3.25.2
RHDHV Reference: PB5640-006-2502
Pursuant to APFP Regulation: 5(2)(a)

Date: June 2019
Revision: Version 1
Author: Royal HaskoningDHV

Photo: Ormonde Offshore Wind Farm

Date	Issue No.	Remarks / Reason for Issue	Author	Checked	Approved
08/03/19	01D	First draft for Norfolk Boreas Limited review	DC	AB	CD
01/05/19	01F	Final for DCO submission	DC	RA	JL

Table of Contents

Tables

Glossary of Acronyms

AADT	Annual Average Daily Traffic
ATC	Automatic Traffic Count
BS	British Standard
CoCP	Code of Construction Practice
DCO	Development Consent Order
DfT	Department for Transport
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
ISO	International Standards Organisation

Glossary of Terminology

C	The spectrum adaptation terms C and C_{tr} are used to take into account different source spectra as indicated in the standard. C : A-weighted Pink Noise spectrum. C_{tr} : A-weighted urban traffic noise spectrum. C and C_{tr} corrections can also be added to R_w (see below)
C_{tr}	
Cable pulling	Installation of cables within pre-installed ducts from jointing pits located along the onshore cable route.
dB(A)	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Decibel (dB)	A unit of noise level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 µPa, the threshold of normal hearing is 0dB, and 140dB is the threshold of pain. A change of 1dB is only perceptible under controlled conditions. Under normal conditions a change in noise level of 3dB(A) is the smallest perceptible change.
Ducts	A duct is a length of underground piping, which is used to house electrical and communication cables.
Landfall	Where the offshore cables come ashore at Happisburgh South.
National Grid substation extension	The permanent footprint of the National Grid substation extension
Onshore cable route	The up to 35m working width within a 45m wide corridor which will contain the buried export cables as well as the temporary running track, topsoil storage and excavated material during construction.
Onshore project substation	A compound containing electrical equipment to enable connection to the National Grid. The substation will convert the exported power from HVDC to HVAC, to 400kV (grid voltage). This also contains equipment to help maintain

	stable grid voltage.
R_w	The weighted sound reduction index, R_w, is a single figure description of sound reduction index which is defined in BS EN ISO 717-1: 1997. The R_w is calculated from measurements in an acoustic laboratory to BS EN ISO 140-3:1997 and ratings to BS EN ISO 717-1:1997. Sound insulation ratings derived from site (which are invariably lower than the laboratory figures) are referred to as the R'w ratings (apparent weighted sound reduction index) and measured to BS EN ISO 140-4:1998
The project	Norfolk Boreas Offshore Wind Farm, including the onshore and offshore infrastructure.

This page is intentionally blank

1 Introduction

1. This document is Appendix 25.2 to Chapter 25 Noise and Vibration and details the results of the Norfolk Boreas construction noise impact assessment modelling and the construction phase road traffic emissions assessment.

2. The following section presents an unmitigated worst-case overview of potential noise and vibration impacts associated with construction of the onshore infrastructure.

3. Chapter 25 Noise and Vibration details the methodology, assessment criteria and assumptions relevant to the assessment of construction phase noise impacts.

4. The noise impact assessment modelling and the construction phase road traffic emissions assessment has been completed for each scenario, as Scenario 2 generally would result in the more significant impact it is therefore presented first below.

2 Construction Phase Noise Modelling Approach

5. The construction phase was modelled using SoundPLAN noise modelling software. This package directly implements the calculation methods outlined in British Standard (BS) 5228 and other nationally and internationally recognised acoustic standards.

6. The assessment has been broken down into the following phases within each study area, detailed in Table 2.1 and shown on Figure 25.2 in Chapter 25 Noise and Vibration. The table also identifies which construction phases are applicable to each scenario.

Table 2.1 Construction phasing

Study area	Construction phase	Scenario 1	Scenario 2
Landfall	Preconstruction Works	✓	✓
	Duct Installation	✓	✓
	Cable Pulling, Joint and Commissioning	✓	✓
Onshore cable route	Preconstruction Works	×	✓
	Duct Installation	×	✓
	Cable Pulling, Joint and Commissioning	✓	✓
Onshore project substation	Preconstruction Works	✓	✓
	Primary Works	✓	✓
	Electrical plant installation and Commissioning	✓	✓

7. BS 5228 receptor categories have been derived from the measured baseline noise levels (Appendix 25.1) using the 'ABC' assessment method (detailed in section 25.4 of Chapter 25 Noise and Vibration).

8. Standard construction noise mitigation techniques which could be applied in order to reduce impacts by between 5dB(A) up to 10dB(A) are detailed within section 25.8.5.6 of Chapter 25 Noise and Vibration. In line with the conservative approach taken in the assessment, a 5dB(A) reduction only was applied to represent the effect of incorporating these mitigation measures (these will be delivered through the Code of Construction Practice (CoCP)).

9. Where a residual impact remains following standard mitigation based on the worst-case construction phase assumptions, enhanced mitigation measures will only be required at these receptors (details of which are contained within section 25.8.5.7 of Chapter 25 Noise and Vibration).

10. The asterisk (*) in the results tables i.e. CRR17*, represents where a receptor has been identified as having a façade/receiver position closer/orientated towards the noise source as the project has evolved due to changes, for example, re-alignment of the onshore cable export route. The original location was also included for continuity and for completeness.

3 Construction Noise Modelling Scenario 2

3.1 Landfall Study Area

11. Table 3.1 to Table 3.3 detail the results of the daytime preconstruction and construction phase noise modelling at the landfall.

Table 3.1 Landfall – Preconstruction works daytime Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	42.0	No Impact	Negligible
LFR2H	50.5	No Impact	Negligible
LFR3H	36.7	No Impact	Negligible
LFR4H	34.8	No Impact	Negligible

Table 3.2 Landfall – Duct installation daytime Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	41.8	No Impact	Negligible
LFR2H	45.3	No Impact	Negligible

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR3H	42.8	No Impact	Negligible
LFR4H	42.2	No Impact	Negligible

Table 3.3 Landfall – Cable pulling, jointing and commissioning daytime Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	41.0	No Impact	Negligible
LFR2H	49.3	No Impact	Negligible
LFR3H	35.9	No Impact	Negligible
LFR4H	34.1	No Impact	Negligible

12. Table 3.4 details the results of the evening and weekend construction phase noise modelling at the landfall during duct installation (pre-construction works and cable installation will be daytime only).

Table 3.4 Landfall – Duct installation evening and weekends Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, T}$ (dB)	Impact magnitude	Impact significance
LFR1H	39.6	No Impact	Negligible
LFR2H	42.7	No Impact	Negligible
LFR3H	41.1	No Impact	Negligible
LFR4H	41.5	No Impact	Negligible

13. Table 3.5 details the results of the night time construction phase noise modelling at the landfall during duct installation (pre-construction works and cable installation will be daytime only).

Table 3.5 Landfall – Duct installation night-time Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 8hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	39.6	No Impact	Negligible
LFR2H	43.0	No Impact	Negligible
LFR3H	41.1	No Impact	Negligible
LFR4H	42.6	No Impact	Negligible

3.2 Onshore Cable Route Study Area

14. Table 3.6, Table 3.7 and Table 3.8 detail the results of the daytime construction phase noise modelling within the onshore cable route.

Table 3.6 Onshore cable route – Preconstruction works daytime Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
CRR1E	71.8	Major Adverse	Major Adverse
CRR1F	39.2	No Impact	Negligible
CRR1G	33.3	No Impact	Negligible
CRR2E	40.7	No Impact	Negligible
CRR2E*	40.3	No Impact	Negligible
CRR2F	38.4	No Impact	Negligible
CRR2G	35.7	No Impact	Negligible
CRR3E	39.5	No Impact	Negligible
CRR3F	69.0	Moderate Adverse	Moderate Adverse
CRR3G	34.1	No Impact	Negligible
CRR4E	49.7	No Impact	Negligible
CRR4G	35.2	No Impact	Negligible
CRR1	58.6	No Impact	Negligible
CRR2	64.4	No Impact	Negligible
CRR3	53.9	No Impact	Negligible
CRR4	48.8	No Impact	Negligible
CRR5	49.1	No Impact	Negligible
CRR6	51.3	No Impact	Negligible
CRR7	47.0	No Impact	Negligible
CRR8	46.0	No Impact	Negligible
CRR9	47.3	No Impact	Negligible
CRR10	76.6	Major Adverse	Major Adverse
CRR11	64.4	No Impact	Negligible
CRR12	51.2	No Impact	Negligible
CRR13	59.2	No Impact	Negligible
CRR14	51.7	No Impact	Negligible
CRR15	51.9	No Impact	Negligible
CRR16	50.8	No Impact	Negligible

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
CRR17	29.1	No Impact	Negligible
CRR17*	37.0	No Impact	Negligible
CRR18	34.6	No Impact	Negligible
CRR18*	57.2	No Impact	Negligible
CRR19	51.0	No Impact	Negligible
CRR20	54.9	No Impact	Negligible
CRR21	41.9	No Impact	Negligible
CRR22	46.0	No Impact	Negligible
CRR23	50.8	No Impact	Negligible
CRR24	42.6	No Impact	Negligible
CRR25	56.3	No Impact	Negligible
CRR26	58.0	No Impact	Negligible
CRR27	38.9	No Impact	Negligible
CRR27*	47.5	No Impact	Negligible
CRR28	41.7	No Impact	Negligible
CRR29	53.5	No Impact	Negligible
CRR30	48.5	No Impact	Negligible
CRR31	53.1	No Impact	Negligible
CRR32	46.7	No Impact	Negligible
CRR33	41.2	No Impact	Negligible

Table 3.7 Onshore cable route – Duct installation daytime Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
CRR1E	71.7	Major Adverse	Major Adverse
CRR1F	43.8	No Impact	Negligible
CRR1G	37.4	No Impact	Negligible
CRR2E	48.4	No Impact	Negligible
CRR2E*	46.4	No Impact	Negligible
CRR2F	42.4	No Impact	Negligible
CRR2G	39.8	No Impact	Negligible
CRR3E	43.8	No Impact	Negligible

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
CRR3F	66.7	Minor Adverse	Minor Adverse
CRR3G	39.4	No Impact	Negligible
CRR4E	50.9	No Impact	Negligible
CRR4G	38.6	No Impact	Negligible
CRR1	60.9	No Impact	Negligible
CRR2	65.3	No Impact	Negligible
CRR3	57.9	No Impact	Negligible
CRR4	48.2	No Impact	Negligible
CRR5	53.5	No Impact	Negligible
CRR6	52.8	No Impact	Negligible
CRR7	49.1	No Impact	Negligible
CRR8	50.0	No Impact	Negligible
CRR9	51.1	No Impact	Negligible
CRR10	71.8	Major Adverse	Major Adverse
CRR11	63.9	No Impact	Negligible
CRR12	52.9	No Impact	Negligible
CRR13	56.9	No Impact	Negligible
CRR14	52.5	No Impact	Negligible
CRR15	53.3	No Impact	Negligible
CRR16	52.2	No Impact	Negligible
CRR17	36.1	No Impact	Negligible
CRR17*	42.1	No Impact	Negligible
CRR18	39.0	No Impact	Negligible
CRR18*	58.2	No Impact	Negligible
CRR19	52.3	No Impact	Negligible
CRR20	56.8	No Impact	Negligible
CRR21	47.3	No Impact	Negligible
CRR22	50.6	No Impact	Negligible
CRR23	52.5	No Impact	Negligible
CRR24	45.1	No Impact	Negligible
CRR25	56.8	No Impact	Negligible
CRR26	61.7	No Impact	Negligible

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
CRR27	44.4	No Impact	Negligible
CRR27*	51.5	No Impact	Negligible
CRR28	48.3	No Impact	Negligible
CRR29	54.4	No Impact	Negligible
CRR30	58.8	No Impact	Negligible
CRR31	56.5	No Impact	Negligible
CRR32	49.8	No Impact	Negligible
CRR33	44.5	No Impact	Negligible

Table 3.8 Onshore cable route – Cable pulling, joint and commissioning daytime Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
CRR1E	70.9	Major Adverse	Major Adverse
CRR1F	40.1	No Impact	Negligible
CRR1G	33.2	No Impact	Negligible
CRR2E	45.2	No Impact	Negligible
CRR2E*	43.0	No Impact	Negligible
CRR2F	38.2	No Impact	Negligible
CRR2G	36.7	No Impact	Negligible
CRR3E	39.6	No Impact	Negligible
CRR3F	68.0	Moderate Adverse	Moderate Adverse
CRR3G	35.3	No Impact	Negligible
CRR4E	48.3	No Impact	Negligible
CRR4G	34.7	No Impact	Negligible
CRR1	57.6	No Impact	Negligible
CRR2	63.6	No Impact	Negligible
CRR3	53.0	No Impact	Negligible
CRR4	49.9	No Impact	Negligible
CRR5	48.0	No Impact	Negligible
CRR6	51.0	No Impact	Negligible
CRR7	46.0	No Impact	Negligible

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
CRR8	44.9	No Impact	Negligible
CRR9	39.6	No Impact	Negligible
CRR10	75.0	Major Adverse	Major Adverse
CRR11	64.2	No Impact	Negligible
CRR12	49.9	No Impact	Negligible
CRR13	58.2	No Impact	Negligible
CRR14	50.7	No Impact	Negligible
CRR15	50.8	No Impact	Negligible
CRR16	50.1	No Impact	Negligible
CRR17	27.9	No Impact	Negligible
CRR17*	35.9	No Impact	Negligible
CRR18	33.6	No Impact	Negligible
CRR18*	57.9	No Impact	Negligible
CRR19	49.6	No Impact	Negligible
CRR20	54.1	No Impact	Negligible
CRR21	40.9	No Impact	Negligible
CRR22	44.1	No Impact	Negligible
CRR23	50.0	No Impact	Negligible
CRR24	41.6	No Impact	Negligible
CRR25	55.4	No Impact	Negligible
CRR26	57.0	No Impact	Negligible
CRR27	39.3	No Impact	Negligible
CRR27*	47.6	No Impact	Negligible
CRR28	40.1	No Impact	Negligible
CRR29	52.5	No Impact	Negligible
CRR30	47.4	No Impact	Negligible
CRR31	52.0	No Impact	Negligible
CRR32	45.7	No Impact	Negligible
CRR33	39.7	No Impact	Negligible

15. Table 3.9 details the results of the evening and weekend construction phase noise modelling at the onshore cable route during duct installation for the closest sensitive receptors to the trenchless crossing works only.

Table 3.9 Onshore cable route – Duct installation evening and weekends Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, T}$ (dB)	Impact magnitude	Impact significance
CRR1	52.7	No Impact	Negligible
CRR2	55.6	No Impact	Negligible
CRR3	50.7	No Impact	Negligible
CRR4	29.3	No Impact	Negligible
CRR5	45.8	No Impact	Negligible
CRR6	28.8	No Impact	Negligible
CRR7	34.2	No Impact	Negligible
CRR8	43.7	No Impact	Negligible
CRR9	42.7	No Impact	Negligible
CRR15	36.3	No Impact	Negligible
CRR16	29.4	No Impact	Negligible
CRR17*	32.8	No Impact	Negligible
CRR18*	33.1	No Impact	Negligible
CRR21	39.2	No Impact	Negligible
CRR22	43.1	No Impact	Negligible
CRR26	54.4	No Impact	Negligible
CRR27	35.4	No Impact	Negligible
CRR27*	40.0	No Impact	Negligible
CRR28	38.6	No Impact	Negligible
CRR29	30.3	No Impact	Negligible
CRR30	57.4	No Impact	Negligible
CRR31	48.4	No Impact	Negligible
CRR32	41.8	No Impact	Negligible

16. Table 3.10 details the results of the night time construction phase noise modelling at the onshore cable route during duct installation for the closest sensitive receptors to the trenchless crossing works only.

Table 3.10 Onshore cable route – Duct installation night time Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, T}$ (dB)	Impact magnitude	Impact significance
CRR1	52.9	Major Adverse	Major Adverse
CRR2	57.0	Major Adverse	Major Adverse

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, T}$ (dB)	Impact magnitude	Impact significance
CRR3	50.8	Major Adverse	Major Adverse
CRR4	29.4	No Impact	Negligible
CRR5	47.8	Minor Adverse	Minor Adverse
CRR6	28.9	No Impact	Negligible
CRR7	34.2	No Impact	Negligible
CRR8	44.1	No Impact	Negligible
CRR9	43.6	No Impact	Negligible
CRR15	37.0	No Impact	Negligible
CRR16	32.0	No Impact	Negligible
CRR17*	32.8	No Impact	Negligible
CRR18	27.9	No Impact	Negligible
CRR18*	33.1	No Impact	Negligible
CRR21	39.2	No Impact	Negligible
CRR22	43.3	No Impact	Negligible
CRR26	54.5	Major Adverse	Major Adverse
CRR27	35.7	No Impact	Negligible
CRR27*	40.9	No Impact	Negligible
CRR28	39.1	No Impact	Negligible
CRR30	57.5	Major Adverse	Major Adverse
CRR31	49.7	Major Adverse	Major Adverse
CRR32	42.7	No Impact	Negligible

3.3 Onshore Project Substation Study Area

17. Table 3.11, Table 3.12 and Table 3.13 detail the results of the construction phase noise modelling at the onshore project substation.

Table 3.11 Onshore project substation – Preconstruction works Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR1	38.9	No Impact	Negligible
SSR2	39.6	No Impact	Negligible
SSR3	39.3	No Impact	Negligible
SSR3*	39.1	No Impact	Negligible

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR4	60.1	No Impact	Negligible
SSR4*	61.8	No Impact	Negligible
SSR5	47.0	No Impact	Negligible
SSR6	38.4	No Impact	Negligible
SSR6*	41.0	No Impact	Negligible
SSR7	57.7	No Impact	Negligible
SSR8	42.3	No Impact	Negligible
SSR9	40.9	No Impact	Negligible
SSR10	39.4	No Impact	Negligible
SSR11	54.1	No Impact	Negligible

Table 3.12 Onshore project substation – Primary works Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR1	38.3	No Impact	Negligible
SSR2	43.7	No Impact	Negligible
SSR3	41.8	No Impact	Negligible
SSR3*	41.6	No Impact	Negligible
SSR4	59.4	No Impact	Negligible
SSR4*	62.1	No Impact	Negligible
SSR5	40.8	No Impact	Negligible
SSR6	40.7	No Impact	Negligible
SSR6*	43.8	No Impact	Negligible
SSR7	43.6	No Impact	Negligible
SSR8	42.3	No Impact	Negligible
SSR9	43.0	No Impact	Negligible
SSR10	42.6	No Impact	Negligible
SSR11	39.5	No Impact	Negligible

Table 3.13 Onshore project substation – Electrical plant installation and commissioning including 400kV onshore cable route Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR1	32.0	No Impact	Negligible
SSR2	34.4	No Impact	Negligible
SSR3	37.0	No Impact	Negligible
SSR3*	37.3	No Impact	Negligible
SSR4	58.2	No Impact	Negligible
SSR4*	59.7	No Impact	Negligible
SSR5	34.8	No Impact	Negligible
SSR6	35.7	No Impact	Negligible
SSR6*	38.3	No Impact	Negligible
SSR7	38.7	No Impact	Negligible
SSR8	37.2	No Impact	Negligible
SSR9	38.6	No Impact	Negligible
SSR10	35.4	No Impact	Negligible
SSR11	34.1	No Impact	Negligible

4 Construction Noise Modelling Scenario 1

4.1 Landfall Study Area

18. Table 4.1 to Table 4.4 detail the results of the daytime construction phase noise modelling at the landfall for Scenario 1 Option A and Option B.

19. The pre-construction works required at the landfall under Scenario 1 would be the same as for Scenario 2, therefore please see section 3.1, Table 3.1 for details for the results of the modelling.

20. Duct installation Scenario 1, Option A is based on two drilling rigs operating simultaneously in the Norfolk Boreas Landfall compound. Under this option, landfall duct installation works will be undertaken prior to cable pulling in 2024 and 2025.

21. Duct installation Scenario 1, Option B is based on either:

- One drilling rig operating simultaneously in the Norfolk Boreas compound and with one drilling rig operating in the Norfolk Vanguard compound; or

- Two drilling rigs operating simultaneously in the Norfolk Boreas compound and two drilling rigs operating simultaneously in the Norfolk Vanguard compound.

22. Under Option B, landfall duct installation works will be undertaken concurrently with Norfolk Vanguard in 2022 and 2023.

Table 4.1 Landfall – Duct installation works Scenario 1 Option A daytime (Norfolk Boreas only)

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	39.5	No Impact	Negligible
LFR2H	42.7	No Impact	Negligible
LFR3H	41.1	No Impact	Negligible
LFR4H	41.5	No Impact	Negligible

Table 4.2 Landfall – Duct installation works Scenario 1 Option B daytime (Norfolk Boreas and Norfolk Vanguard; 1 drill rig operating in each compound)

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	42.7	No Impact	Negligible
LFR2H	46.0	No Impact	Negligible
LFR3H	43.3	No Impact	Negligible
LFR4H	43.8	No Impact	Negligible

Table 4.3 Landfall – Duct installation works Scenario 1 Option B daytime (Norfolk Boreas and Norfolk Vanguard; 2 drill rigs operating in each compound)

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	43.2	No Impact	Negligible
LFR2H	46.5	No Impact	Negligible
LFR3H	43.8	No Impact	Negligible
LFR4H	44.2	No Impact	Negligible

Table 4.4 Landfall – Cable pulling, jointing and commissioning daytime Scenario 1

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	41.0	No Impact	Negligible
LFR2H	49.3	No Impact	Negligible

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR3H	35.9	No Impact	Negligible
LFR4H	34.1	No Impact	Negligible

23. Table 4.5 to Table 4.7 detail the results of the evening and weekend construction phase noise modelling at the landfall during duct installation (pre-construction works and cable installation will be daytime only).

Table 4.5 Landfall – Duct installation works Scenario 1 Option A evenings and weekends (Norfolk Boreas only)

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	39.5	No Impact	Negligible
LFR2H	42.7	No Impact	Negligible
LFR3H	41.1	No Impact	Negligible
LFR4H	41.5	No Impact	Negligible

Table 4.6 Landfall – Duct installation Scenario 1 Option B evenings and weekends (Norfolk Boreas and Norfolk Vanguard; 1 drill rig operating in each compound)

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	42.7	No Impact	Negligible
LFR2H	46.0	No Impact	Negligible
LFR3H	43.3	No Impact	Negligible
LFR4H	43.8	No Impact	Negligible

Table 4.7 Landfall – Duct installation works Scenario 1 Option B evening and weekends (Norfolk Boreas and Norfolk Vanguard; 2 drill rigs operating in each compound)

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	43.2	No Impact	Negligible
LFR2H	46.5	No Impact	Negligible
LFR3H	43.8	No Impact	Negligible
LFR4H	44.2	No Impact	Negligible

24. Table 4.8 to Table 4.10 details the results of the night time construction phase noise modelling at the landfall during duct installation (pre-construction works and cable installation will be daytime only).

Table 4.8 Landfall – Duct installation works Scenario 1 Option A night time (Norfolk Boreas only)

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	39.5	No Impact	Negligible
LFR2H	42.7	No Impact	Negligible
LFR3H	41.1	No Impact	Negligible
LFR4H	41.5	No Impact	Negligible

Table 4.9 Landfall – Duct installation works Scenario 1 Option B night time (Norfolk Boreas and Norfolk Vanguard; 1 drill rig operating in each compound)

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	42.7	No Impact	Negligible
LFR2H	46.0	Minor Adverse	Minor Adverse
LFR3H	43.3	No Impact	Negligible
LFR4H	43.8	No Impact	Negligible

Table 4.10 Landfall – Duct installation works Scenario 1 Option B night time (Norfolk Boreas and Norfolk Vanguard; 2 drill rigs operating in each compound)

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1H	43.2	No Impact	Negligible
LFR2H	46.5	Minor Adverse	Minor Adverse
LFR3H	43.8	No Impact	Negligible
LFR4H	44.2	No Impact	Negligible

4.2 Onshore Cable Route Study Area

25. Table 4.11 details the results of the daytime construction phase noise modelling within the onshore cable route.

Table 4.11 Onshore cable route – Cable pull, joint and commissioning daytime Scenario 1

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
CRR1E	70.9	Major Adverse	Major Adverse
CRR1F	40.1	No Impact	Negligible
CRR1G	33.2	No Impact	Negligible
CRR2E	45.2	No Impact	Negligible
CRR2E*	43.0	No Impact	Negligible
CRR2F	38.2	No Impact	Negligible
CRR2G	36.7	No Impact	Negligible
CRR3E	39.6	No Impact	Negligible
CRR3F	68.0	Moderate Adverse	Moderate Adverse
CRR3G	35.3	No Impact	Negligible
CRR4E	48.3	No Impact	Negligible
CRR4G	34.7	No Impact	Negligible
CRR1	57.6	No Impact	Negligible
CRR2	63.6	No Impact	Negligible
CRR3	53.0	No Impact	Negligible
CRR4	49.9	No Impact	Negligible
CRR5	48.0	No Impact	Negligible
CRR6	51.0	No Impact	Negligible
CRR7	46.0	No Impact	Negligible
CRR8	44.9	No Impact	Negligible
CRR9	39.6	No Impact	Negligible
CRR10	75.0	Major Adverse	Major Adverse
CRR11	64.2	No Impact	Negligible
CRR12	49.9	No Impact	Negligible
CRR13	58.2	No Impact	Negligible
CRR14	50.7	No Impact	Negligible
CRR15	50.9	No Impact	Negligible
CRR16	50.1	No Impact	Negligible
CRR17	27.9	No Impact	Negligible
CRR17*	35.9	No Impact	Negligible
CRR18	33.5	No Impact	Negligible
CRR18*	58.2	No Impact	Negligible

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
CRR19	49.6	No Impact	Negligible
CRR20	54.1	No Impact	Negligible
CRR21	40.9	No Impact	Negligible
CRR22	44.2	No Impact	Negligible
CRR23	50.0	No Impact	Negligible
CRR24	41.6	No Impact	Negligible
CRR25	55.4	No Impact	Negligible
CRR26	57.0	No Impact	Negligible
CRR27	39.3	No Impact	Negligible
CRR27*	47.6	No Impact	Negligible
CRR28	40.1	No Impact	Negligible
CRR29	52.5	No Impact	Negligible
CRR30	47.4	No Impact	Negligible
CRR31	52.0	No Impact	Negligible
CRR32	45.7	No Impact	Negligible
CRR33	39.7	No Impact	Negligible

4.3 Onshore Project Substation Study Area

26. Table 4.12 to Table 4.14 detail the results of the construction phase noise modelling at the onshore project substation for Scenario 1.

Table 4.12 Onshore project substation – Pre-construction works Scenario 1

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR1	38.9	No Impact	Negligible
SSR2	39.7	No Impact	Negligible
SSR3	34.0	No Impact	Negligible
SSR3*	30.5	No Impact	Negligible
SSR4	39.2	No Impact	Negligible
SSR4*	40.7	No Impact	Negligible
SSR5	47.0	No Impact	Negligible
SSR6	33.4	No Impact	Negligible
SSR6*	35.4	No Impact	Negligible

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR7	57.7	No Impact	Negligible
SSR8	39.8	No Impact	Negligible
SSR9	35.2	No Impact	Negligible
SSR10	38.5	No Impact	Negligible
SSR11	54.1	No Impact	Negligible

Table 4.13 Onshore project substation – Primary works Scenario 1

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR1	36.2	No Impact	Negligible
SSR2	43.2	No Impact	Negligible
SSR3	35.9	No Impact	Negligible
SSR3*	27.3	No Impact	Negligible
SSR4	40.3	No Impact	Negligible
SSR4*	40.4	No Impact	Negligible
SSR5	36.9	No Impact	Negligible
SSR6	34.1	No Impact	Negligible
SSR6*	36.7	No Impact	Negligible
SSR7	40.1	No Impact	Negligible
SSR8	37.6	No Impact	Negligible
SSR9	35.2	No Impact	Negligible
SSR10	41.2	No Impact	Negligible
SSR11	36.2	No Impact	Negligible

Table 4.14 Onshore project substation –Electrical plant installation and commissioning Scenario 1

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR1	32.0	No Impact	Negligible
SSR2	36.0	No Impact	Negligible
SSR3	37.0	No Impact	Negligible
SSR3*	37.2	No Impact	Negligible
SSR4	54.5	No Impact	Negligible
SSR4*	60.6	No Impact	Negligible

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR5	34.9	No Impact	Negligible
SSR6	36.7	No Impact	Negligible
SSR6*	39.8	No Impact	Negligible
SSR7	38.2	No Impact	Negligible
SSR8	37.3	No Impact	Negligible
SSR9	38.5	No Impact	Negligible
SSR10	35.6	No Impact	Negligible
SSR11	34.2	No Impact	Negligible

5 In-Combination Construction Noise Modelling Scenario 2

27. The in-combination construction phase noise impacts associated with the extension of the National Grid substation (included as part of the Norfolk Boreas Development Consent Order (DCO) application) are considered within this assessment. In order to present a conservative assessment for the purposes of this assessment it has been assumed that the extension to the National Grid substation will be conducted during the same time as the construction of the onshore project substation and with the same plant requirements.

28. Table 5.1 to Table 5.3 detail the results of the in-combination construction noise modelling inclusive of the National Grid substation extension and onshore project substation Scenario 2.

Table 5.1 In Combination – Preconstruction Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR1	39.9	No Impact	Negligible
SSR2	39.9	No Impact	Negligible
SSR3	39.4	No Impact	Negligible
SSR3*	39.2	No Impact	Negligible
SSR4	60.1	No Impact	Negligible
SSR4*	61.8	No Impact	Negligible
SSR5	47.6	No Impact	Negligible
SSR6	38.5	No Impact	Negligible
SSR6*	41.1	No Impact	Negligible
SSR7	57.8	No Impact	Negligible

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR8	42.5	No Impact	Negligible
SSR9	40.9	No Impact	Negligible
SSR10	39.5	No Impact	Negligible
SSR11	54.4	No Impact	Negligible

Table 5.2 In Combination – Primary works Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR1	45.7	No Impact	Negligible
SSR2	45.9	No Impact	Negligible
SSR3	42.4	No Impact	Negligible
SSR3*	42.1	No Impact	Negligible
SSR4	59.5	No Impact	Negligible
SSR4*	62.2	No Impact	Negligible
SSR5	53.6	No Impact	Negligible
SSR6	41.4	No Impact	Negligible
SSR6*	44.3	No Impact	Negligible
SSR7	46.8	No Impact	Negligible
SSR8	44.3	No Impact	Negligible
SSR9	43.5	No Impact	Negligible
SSR10	43.5	No Impact	Negligible
SSR11	53.8	No Impact	Negligible

Table 5.3 In Combination – Electrical plant installation and commissioning Scenario 2

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR1	41.4	No Impact	Negligible
SSR2	39.8	No Impact	Negligible
SSR3	37.5	No Impact	Negligible
SSR3*	37.5	No Impact	Negligible
SSR4	58.2	No Impact	Negligible
SSR4*	59.7	No Impact	Negligible
SSR5	44.0	No Impact	Negligible

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR6	36.3	No Impact	Negligible
SSR6*	38.9	No Impact	Negligible
SSR7	41.2	No Impact	Negligible
SSR8	39.0	No Impact	Negligible
SSR9	39.1	No Impact	Negligible
SSR10	36.9	No Impact	Negligible
SSR11	46.4	No Impact	Negligible

6 Cumulative Construction Noise Modelling Scenario 1

6.1 Landfall Study Area

29. Table 6.1 and Table 6.2 details the results of the cumulative daytime construction phase noise modelling at the landfall for Scenario

Table 6.1 Cumulative – Duct Installation works Option A – 2 drills in landfall compound (Norfolk Boreas Only) Concurrent cable pulling, jointing and commissioning Norfolk Vanguard Scenario 1 daytime

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1	43.3	No Impact	Negligible
LFR2	50.1	No Impact	Negligible
LFR3	42.3	No Impact	Negligible
LFR4	42.2	No Impact	Negligible

Table 6.2 Cumulative – Duct Installation works Option B – 2 drills in landfall compounds (Norfolk Boreas and Norfolk Vanguard) Concurrent duct installation Norfolk Vanguard Scenario 1 daytime

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
LFR1	44.3	No Impact	Negligible
LFR2	47.7	No Impact	Negligible
LFR3	44.7	No Impact	Negligible
LFR4	44.6	No Impact	Negligible

6.2 Onshore Project Substation Study Area

30. Table 6.3 to Table 6.5 detail the results of the cumulative construction noise modelling inclusive of the Norfolk Vanguard, National Grid substation extension and onshore project substation Scenario 1.

Table 6.3 Cumulative – Pre-construction works Norfolk Boreas and Primary Works Norfolk Vanguard Scenario 1 daytime

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR1	41.7	No Impact	Negligible
SSR2	42.2	No Impact	Negligible
SSR3	42.2	No Impact	Negligible
SSR3*	41.6	No Impact	Negligible
SSR4	59.5	No Impact	Negligible
SSR4*	62.2	No Impact	Negligible
SSR5	47.9	No Impact	Negligible
SSR6	41.3	No Impact	Negligible
SSR6*	44.2	No Impact	Negligible
SSR7	57.8	No Impact	Negligible
SSR8	44.0	No Impact	Negligible
SSR9	43.5	No Impact	Negligible
SSR10	43.3	No Impact	Negligible
SSR11	54.2	No Impact	Negligible

Table 6.4 Cumulative – Primary works for Norfolk Boreas and electrical plant installation and commissioning for Norfolk Vanguard Scenario 1 daytime

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR1	40.5	No Impact	Negligible
SSR2	41.2	No Impact	Negligible
SSR3	37.6	No Impact	Negligible
SSR3*	37.5	No Impact	Negligible
SSR4	54.5	No Impact	Negligible
SSR4*	60.6	No Impact	Negligible
SSR5	42.2	No Impact	Negligible
SSR6	37.3	No Impact	Negligible

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR6*	40.3	No Impact	Negligible
SSR7	41.7	No Impact	Negligible
SSR8	39.1	No Impact	Negligible
SSR9	39.0	No Impact	Negligible
SSR10	37.4	No Impact	Negligible
SSR11	41.4	No Impact	Negligible

Table 6.5 Cumulative - Concurrent cable pulling, jointing and commissioning Norfolk Boreas and Norfolk Vanguard Scenario 1 daytime

Receptor	Predicted CoCP mitigated noise impact $L_{Aeq, 12hour}$ (dB)	Impact magnitude	Impact significance
SSR1	44.6	No Impact	Negligible
SSR2	46.6	No Impact	Negligible
SSR3	40.8	No Impact	Negligible
SSR3*	38.8	No Impact	Negligible
SSR4	54.8	No Impact	Negligible
SSR4*	60.7	No Impact	Negligible
SSR5	49.3	No Impact	Negligible
SSR6	39.9	No Impact	Negligible
SSR6*	42.6	No Impact	Negligible
SSR7	47.3	No Impact	Negligible
SSR8	43.7	No Impact	Negligible
SSR9	41.5	No Impact	Negligible
SSR10	43.9	No Impact	Negligible
SSR11	51.8	No Impact	Negligible

7 Construction Phase Road Traffic Emissions Scenario 2

31. Table 7.1 details the road links assessed for Scenario 2 (further information is provided in Chapter 24 Traffic and Transport).

Table 7.1 Assessment link classification and survey detail Scenario 2

Link No.	Road	Survey type	Survey year
1a	A47	DfT - AADT	2017
1b	A47	DfT - AADT	2017
2	A47	DfT - AADT	2017
3	A47	DfT - AADT	2017
4	A47	DfT - AADT	2017
5	A47	NDR Data	2017
6	A47	DfT - AADT	2017
7	A47	DfT - AADT	2017
8	A146	DfT - AADT	2017
9	A47	DfT - AADT	2017
10	A12	7-day ATC	2016
11	A1065	DfT - AADT	2017
12	A1065	DfT - AADT	2017
13a	A148	DfT - AADT	2017
13b	A148	DfT - AADT	2017
14	A148	DfT - AADT	2017
15	B1145 - Litcham	7-day ATC	2017
16	B1110/B1146 - Holt Road	7-day ATC	2017
17	B1145 - Billingford Road	7-day ATC	2017
18	A1067	DfT - AADT	2017
19	A148	DfT - AADT	2017
20	Mill Common Road	7-day ATC	2017
21	B1147 - Etling Green (Hoe Road South)	7-day ATC	2017
22	B1147 - Dereham Road	7-day ATC	2017
23	Northgate - from junction with B1146	7-day ATC	2017
24	A1067	DfT - AADT	2017
25	Elsing Lane	7-day ATC	2017
26	A1074	DfT - AADT	2017
27	A140	DfT - AADT	2017
28	A140	NDR Data	2017
29	A1067	DfT - AADT	2017
30	A1067	DfT - AADT	2017

Link No.	Road	Survey type	Survey year
31	A1067	NDR Data	2017
32	B1149 - Norwich Road	7-day ATC	2017
33	B1149 - Holt Road	7-day ATC	2017
34	B1145 - west of Cawston	7-day ATC	2017
35a	B1159 - Cost Road	7-day ATC	2017
35b	B1159 - Cost Road	7-day ATC	2017
36	B1149 - Holt Road	7-day ATC	2017
37	B1145 - Cawston road	7-day ATC	2017
38	A140 - Cromer Road	NDR Data	2017
39	A140 - Hevingham	NDR Data	2017
40a	A140 - Roughton	DfT - AADT	2017
40b	A140 - Roughton	DfT - AADT	2017
41	B1436 - Felbrigg	7-day ATC	2017
42	B1145 - Reepham Road	7-day ATC	2017
43	Cromer Road - Ingworth	7-day ATC	2017
44a	A149	DfT - AADT	2017
44b	A149	DfT - AADT	2017
45	A149	DfT - AADT	2017
46	B1145 - Lyngate Road	7-day ATC	2017
47a	North Walsham Road - Edingthorpe Green	7-day ATC	2017
47b	North Walsham Road - Edingthorpe Green	7-day ATC	2017
47c	North Walsham Road - Edingthorpe Green	7-day ATC	2017
48	B1159 - Bacton Road	7-day ATC	2017
49	B1159	7-day ATC	2017
50	A1151	DfT - AADT	2017
51	A1151	NDR Data	2017
52	A149 - Wayford Road	7-day ATC	2017
53	A149	DfT - AADT	2017
54	A149	7-day ATC	2016
55	A149	7-day ATC	2016
56	A149	DfT - AADT	2017
57	A149	DfT - AADT	2017
58	NDR - Link a	NDR Data	2017

Link No.	Road	Survey type	Survey year
59	NDR - Link b	NDR Data	2017
60	NDR - Link c	NDR Data	2017
61	B1436 - Roughton Road	7-day ATC	2017
62	A1042	NDR Data	2017
63	A1151	NDR Data	2017
64	A12	DfT - AADT	2017
65	A47	DfT - AADT	2017
66	Wendling – Dereham Road	Estimated	2017
67	North Walsham Road / Happisburgh Road	Estimated	2017
68	The Street/Heydon Road	HP3 Data	2018
69	Little London Road	Estimated	2017
70	Plantation Road	Estimated	2017
71	Vicarage Road / Whimpwell Street	Estimated	2017
72	Dereham Road / Longham Road - Dillington	Estimated	2017
73	Hoe Road South	Estimated	2017
74	Mill Street, Elsing Road – Swanton Morley	Estimated	2017
75	B1354 - Blickling	Estimated	2017
76	High Noon Road / Church Road	Estimated	2017
77	Hall Lane – North Walsham	Estimated	2017
78	Bylaugh	Estimated	2017
79	B1145 / Suffield Road	Estimated	2017

32. Table 7.2 and Table 7.3 detail the results of the construction phase road traffic noise emissions calculations for 2023 and 2024 respectively.

Table 7.2 Construction phase road traffic noise emissions assessment 2023 Scenario 2

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
1a	0.3	70.0	Negligible	Minor Adverse
1b	0.4	70.0	Negligible	Minor Adverse
2	0.2	70.0	Negligible	Minor Adverse
3	0.1	70.0	Negligible	Minor Adverse
4	0.1	70.0	Negligible	Minor Adverse
5	0.2	70.0	Negligible	Minor Adverse
6	0.4	70.0	Negligible	Minor Adverse

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
7	0.3	70.0	Negligible	Minor Adverse
8	0.5	40.0	Negligible	Minor Adverse
9	0.4	50.0	Negligible	Minor Adverse
10	0.6	49.2	Negligible	Minor Adverse
11	0.0	60.0	No change	Negligible
12	0.0	40.0	No change	Negligible
12	0.0	60.0	No change	Negligible
13a	0.9	30.0	Negligible	Minor Adverse
13a	0.8	40.0	Negligible	Minor Adverse
13a	0.7	60.0	Negligible	Minor Adverse
13b	1.0	30.0	Minor	Minor Adverse
13b	0.9	40.0	Negligible	Minor Adverse
13b	0.7	60.0	Negligible	Minor Adverse
14	0.8	30.0	Negligible	Minor Adverse
14	0.6	60.0	Negligible	Minor Adverse
15	0.0	54.5	No change	Negligible
16	0.8	48.8	Negligible	Minor Adverse
17	1.8	44.9	Minor	Minor Adverse
18	0.8	30.0	Negligible	Minor Adverse
18	0.6	60.0	Negligible	Minor Adverse
19	0.8	50.0	Negligible	Minor Adverse
20	0.0	32.1	No change	Negligible
21	3.0	46.6	Moderate	Moderate Adverse
22	2.5	38.5	Minor	Minor Adverse
23	0.0	54.5	No change	Negligible
24	0.7	60.0	Negligible	Minor Adverse
25	3.5	35.1	Moderate	Moderate Adverse
26	0.0	40.0	No change	Negligible
27	0.0	40.0	No change	Negligible
28	0.0	40.0	No change	Negligible
29	0.4	60.0	Negligible	Minor Adverse
30	0.6	50.0	Negligible	Minor Adverse
31	0.0	40.0	No change	Negligible

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
32	1.3	40.1	Minor	Minor Adverse
33	0.9	46.7	Negligible	Minor Adverse
34	2.0	43.3	Minor	Minor Adverse
35a	2.1	43.6	Minor	Minor Adverse
35b	1.9	43.6	Minor	Minor Adverse
36	0.7	44.9	Negligible	Minor Adverse
37	0.6	43.3	Negligible	Minor Adverse
38	0.0	30.0	No change	Negligible
38	0.0	40.0	No change	Negligible
39	0.3	50.0	Negligible	Minor Adverse
39	0.2	60.0	Negligible	Minor Adverse
40a	0.9	30.0	Negligible	Minor Adverse
40a	0.6	60.0	Negligible	Minor Adverse
40b	0.4	30.0	Negligible	Minor Adverse
40b	0.3	60.0	Negligible	Minor Adverse
41	1.7	36.2	Minor	Minor Adverse
42	2.0	43.0	Minor	Minor Adverse
43	0.1	35.9	No change	Negligible
44a	0.9	30.0	Negligible	Minor Adverse
44a	0.6	40.0	Negligible	Minor Adverse
44a	0.6	60.0	Negligible	Minor Adverse
44b	0.9	30.0	Negligible	Minor Adverse
44b	0.8	40.0	Negligible	Minor Adverse
44b	0.6	60.0	Negligible	Minor Adverse
45	0.8	30.0	Negligible	Minor Adverse
45	0.6	60.0	Negligible	Minor Adverse
46	1.1	42.5	Minor	Minor Adverse
47a	0.3	41.6	Negligible	Minor Adverse
47b	1.2	41.6	Minor	Minor Adverse
47c	2.2	41.6	Minor	Minor Adverse
48	0.0	45.8	No change	Negligible
49	1.5	32.1	Minor	Minor Adverse
50	0.0	30.0	No change	Negligible

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
51	0.0	30.0	No change	Negligible
51	0.0	40.0	No change	Negligible
51	0.0	60.0	No change	Negligible
52	0.4	45.2	Negligible	Minor Adverse
53	0.6	30.0	Negligible	Minor Adverse
54	0.3	30.0	Negligible	Negligible
55	0.4	60.0	Negligible	Minor Adverse
56	0.8	30.0	Negligible	Minor Adverse
56	0.5	60.0	Negligible	Minor Adverse
57	0.5	50.0	Negligible	Minor Adverse
58	0.2	60.0	Negligible	Minor Adverse
59	0.3	60.0	Negligible	Minor Adverse
60	0.3	60.0	Negligible	Minor Adverse
61	0.1	42.9	No change	Negligible
62	0.0	40.0	No change	Negligible
63	0.0	40.0	No change	Negligible
64	0.7	30.0	Negligible	Minor Adverse
64	0.6	40.0	Negligible	Minor Adverse
65	1.3	30.0	Minor	Minor Adverse
65	1.1	40.0	Minor	Minor Adverse
65	0.8	60.0	Negligible	Minor Adverse
66	2.0	50.0	Minor	Minor Adverse
66	1.8	60.0	Minor	Minor Adverse
67	1.5	60.0	Minor	Minor Adverse
68	2.4	34.5	Minor	Minor Adverse
69	4.9	60.0	Moderate	Moderate Adverse
70	2.7	60.0	Minor	Minor Adverse
71	0.5	30.0	Negligible	Minor Adverse
71	0.3	60.0	Negligible	Minor Adverse
72	2.2	60.0	Minor	Minor Adverse
73	2.5	60.0	Minor	Minor Adverse
74	2.1	30.0	Minor	Minor Adverse
74	1.9	40.0	Minor	Minor Adverse

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
74	1.5	60.0	Minor	Minor Adverse
75	0.6	60.0	Negligible	Minor Adverse
76	3.0	30.0	Minor	Minor Adverse
76	2.2	60.0	Minor	Minor Adverse
77	2.2	60.0	Minor	Minor Adverse
78	2.2	60.0	Minor	Minor Adverse
79	0.8	40.0	Negligible	Minor Adverse
79	0.7	60.0	Negligible	Minor Adverse

Table 7.3 Construction phase road traffic noise emissions assessment 2024 Scenario 2

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
1a	0.3	70.0	Negligible	Minor Adverse
1b	0.4	70.0	Negligible	Minor Adverse
2	0.2	70.0	Negligible	Minor Adverse
3	0.1	70.0	Negligible	Minor Adverse
4	0.1	70.0	No change	Minor Adverse
5	0.2	70.0	Negligible	Minor Adverse
6	0.4	70.0	Negligible	Minor Adverse
7	0.3	70.0	Negligible	Minor Adverse
8	0.5	40.0	Negligible	Minor Adverse
9	0.4	50.0	Negligible	Minor Adverse
10	0.6	49.2	Negligible	Minor Adverse
11	0.0	60.0	No change	Negligible
12	0.0	40.0	No change	Negligible
12	0.0	60.0	No change	Negligible
13a	0.9	30.0	Negligible	Minor Adverse
13a	0.8	40.0	Negligible	Minor Adverse
13a	0.7	60.0	Negligible	Minor Adverse
13b	1.0	30.0	Minor	Minor Adverse
13b	0.9	40.0	Negligible	Minor Adverse
13b	0.7	60.0	Negligible	Minor Adverse
14	0.8	30.0	Negligible	Minor Adverse
14	0.6	60.0	Negligible	Minor Adverse

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
15	0.0	54.5	No change	Negligible
16	0.7	48.8	Negligible	Minor Adverse
17	1.7	44.9	Minor	Minor Adverse
18	0.8	30.0	Negligible	Minor Adverse
18	0.6	60.0	Negligible	Minor Adverse
19	0.8	50.0	Negligible	Minor Adverse
20	0.0	32.1	No change	Negligible
21	3.0	46.6	Minor	Minor Adverse
22	2.5	38.5	Minor	Minor Adverse
23	0.0	54.5	No change	Negligible
24	0.7	60.0	Negligible	Minor Adverse
25	3.4	35.1	Moderate	Moderate Adverse
26	0.0	40.0	No change	Negligible
27	0.0	40.0	No change	Negligible
28	0.0	40.0	No change	Negligible
29	0.4	60.0	Negligible	Minor Adverse
30	0.5	50.0	Negligible	Minor Adverse
31	0.0	40.0	No change	Negligible
32	1.3	40.1	Minor	Minor Adverse
33	0.9	46.7	Negligible	Minor Adverse
34	2.0	43.3	Minor	Minor Adverse
35a	2.1	43.6	Minor	Minor Adverse
35b	1.9	43.6	Minor	Minor Adverse
36	0.7	44.9	Negligible	Minor Adverse
37	0.6	43.3	Negligible	Minor Adverse
38	0.0	30.0	No change	Negligible
38	0.0	40.0	No change	Negligible
39	0.3	50.0	Negligible	Minor Adverse
39	0.2	60.0	Negligible	Minor Adverse
40a	0.9	30.0	Negligible	Minor Adverse
40a	0.6	60.0	Negligible	Minor Adverse
40b	0.4	30.0	Negligible	Minor Adverse
40b	0.3	60.0	Negligible	Minor Adverse

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
41	1.6	36.2	Minor	Minor Adverse
42	1.9	43.0	Minor	Minor Adverse
43	0.1	35.9	No change	Negligible
44a	0.9	30.0	Negligible	Minor Adverse
44a	0.6	40.0	Negligible	Minor Adverse
44a	0.6	60.0	Negligible	Minor Adverse
44b	0.9	30.0	Negligible	Minor Adverse
44b	0.7	40.0	Negligible	Minor Adverse
44b	0.6	60.0	Negligible	Minor Adverse
45	0.8	30.0	Negligible	Minor Adverse
45	0.6	60.0	Negligible	Minor Adverse
46	1.1	42.5	Minor	Minor Adverse
47a	0.3	41.6	Negligible	Minor Adverse
47b	1.2	41.6	Minor	Minor Adverse
47c	2.2	41.6	Minor	Minor Adverse
48	0.0	45.8	No change	Negligible
49	1.5	32.1	Minor	Minor Adverse
50	0.0	30.0	No change	Negligible
51	0.0	30.0	No change	Negligible
51	0.0	40.0	No change	Negligible
51	0.0	60.0	No change	Negligible
52	0.4	45.2	Negligible	Minor Adverse
53	0.6	30.0	Negligible	Minor Adverse
54	0.3	30.0	Negligible	Negligible
55	0.4	60.0	Negligible	Minor Adverse
56	0.8	30.0	Negligible	Minor Adverse
56	0.5	60.0	Negligible	Minor Adverse
57	0.5	50.0	Negligible	Minor Adverse
58	0.2	60.0	Negligible	Minor Adverse
59	0.3	60.0	Negligible	Minor Adverse
60	0.3	60.0	Negligible	Minor Adverse
61	0.1	42.9	No change	Negligible
62	0.0	40.0	No change	Negligible

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
63	0.0	40.0	No change	Negligible
64	0.7	30.0	Negligible	Minor Adverse
64	0.6	40.0	Negligible	Minor Adverse
65	1.3	30.0	Minor	Minor Adverse
65	1.1	40.0	Minor	Minor Adverse
65	0.8	60.0	Negligible	Minor Adverse
66	2.0	50.0	Minor	Minor Adverse
66	1.8	60.0	Minor	Minor Adverse
67	1.4	60.0	Minor	Minor Adverse
68	2.4	34.5	Minor	Minor Adverse
69	4.8	60.0	Moderate	Moderate Adverse
70	2.7	60.0	Minor	Minor Adverse
71	0.5	30.0	Negligible	Minor Adverse
71	0.3	60.0	Negligible	Minor Adverse
72	2.1	60.0	Minor	Minor Adverse
73	2.5	60.0	Minor	Minor Adverse
74	2.1	30.0	Minor	Minor Adverse
74	1.8	40.0	Minor	Minor Adverse
74	1.5	60.0	Minor	Minor Adverse
75	0.6	60.0	Negligible	Minor Adverse
76	2.9	30.0	Minor	Minor Adverse
76	2.1	60.0	Minor	Minor Adverse
77	2.1	60.0	Minor	Minor Adverse
78	2.1	60.0	Minor	Minor Adverse
79	0.8	40.0	Negligible	Minor Adverse
79	0.7	60.0	Negligible	Minor Adverse

8 Construction Phase Road Traffic Emissions Scenario 1

33. Table 8.1 details the road links assessed for Scenario 1 (further information is provided in Chapter 24 Traffic and Transport).

Table 8.1 Assessment link classification and survey detail Scenario 1

Link No.	Road	Survey type	Survey year
1a	A47	DfT - AADT	2017
1b	A47	DfT - AADT	2017
2	A47	DfT - AADT	2017
3	A47	DfT - AADT	2017
4	A47	DfT - AADT	2017
5	A47	NDR Data	2017
6	A47	DfT - AADT	2017
7	A47	DfT - AADT	2017
8	A146	DfT - AADT	2017
9	A47	DfT - AADT	2017
10	A47	7-day ATC	2016
11	A1065	DfT - AADT	2017
12	A1065	DfT - AADT	2017
13a	A1065	DfT - AADT	2017
13b	A148	DfT - AADT	2017
14	A148	DfT - AADT	2017
15	A148	7-day ATC	2017
16	A148	7-day ATC	2017
17	A148	7-day ATC	2017
18	A148	DfT - AADT	2017
19	A148	DfT - AADT	2017
20	A148	7-day ATC	2017
21	B1145 - Litcham	7-day ATC	2017
22	B1110/B1146 - Holt Road	7-day ATC	2017
23	B1145 - Billingford Road	7-day ATC	2017
24	A1067	DfT - AADT	2017
25	A1067	7-day ATC	2017
26	A148	DfT - AADT	2017
27	Mill Common Road	DfT - AADT	2017
28	B1147 - Etling Green (Hoe Road South)	NDR Data	2017
29	B1147 - Dereham Road	DfT - AADT	2017
30	Northgate - from junction with B1146	DfT - AADT	2017

Link No.	Road	Survey type	Survey year
31	A1067	NDR Data	2017
32	Elsing Lane	7-day ATC	2017
33	A1074	7-day ATC	2017
34	A140	7-day ATC	2017
35a	A140	7-day ATC	2017
35b	A1067	7-day ATC	2017
36	A1067	7-day ATC	2017
37	A1067	7-day ATC	2017
38	B1149 - Norwich Road	NDR Data	2017
39	B1149 - Holt Road	NDR Data	2017
40a	B1145 - west of Cawston	DfT - AADT	2017
40b	B1159 - Cost Road	DfT - AADT	2017
41	B1159 - Cost Road	7-day ATC	2017
42	B1149 - Holt Road	7-day ATC	2017
43	B1145 - Cawston road	7-day ATC	2017
44a	A140 - Cromer Road	DfT - AADT	2017
44b	A140 - Cromer Road	DfT - AADT	2017
45	A140 - Hevingham	DfT - AADT	2017
46	A140 - Hevingham	7-day ATC	2017
47a	A140 - Roughton	7-day ATC	2017
47b	A140 - Roughton	7-day ATC	2017
47c	A140 - Roughton	7-day ATC	2017
48	A140 - Roughton	7-day ATC	2017
49	B1436 - Felbrigg	7-day ATC	2017
50	B1145 - Reepham Road	DfT - AADT	2017
51	Cromer Road - Ingworth	NDR Data	2017
52	A149	7-day ATC	2017
53	A149	DfT - AADT	2017
54	A149	7-day ATC	2016
55	A149	7-day ATC	2016
56	A149	DfT - AADT	2017
57	A149	DfT - AADT	2017
58	A149	NDR Data	2017

Link No.	Road	Survey type	Survey year
59	A149	NDR Data	2017
60	B1145 - Lyngate Road	NDR Data	2017
61	North Walsham Road - Edingthorpe Green	7-day ATC	2017
62	North Walsham Road - Edingthorpe Green	NDR Data	2017
63	North Walsham Road - Edingthorpe Green	NDR Data	2017
64	B1159 - Bacton Road	DfT - AADT	2017
65	B1159	DfT - AADT	2017
66	A1151	Estimated	n/a
67	A1151	Estimated	n/a
68	A1151	HP3 Data	2018
69	A1151	Estimated	n/a
70	A149 - Wayford Road	Estimated	n/a
71	A149	Estimated	n/a
72	A149	Estimated	n/a
73	A149	Estimated	n/a
74	A149	Estimated	n/a
75	A149	Estimated	n/a
76	A149	Estimated	n/a
77	NDR - Link a	Estimated	n/a
78	NDR - Link b	Estimated	n/a
79	NDR - Link c	Estimated	n/a
A	B1436 - Roughton Road	Estimated	n/a
B	A1042	Estimated	n/a
C	A1151	Estimated	n/a
D	A12	Estimated	n/a
E	A12	Estimated	n/a
F	A47	Estimated	n/a
G	A47	Estimated	n/a
H	A47	Estimated	n/a
I	Wendling – Dereham Road	Estimated	n/a
J	Wendling – Dereham Road	Estimated	n/a
K	North Walsham Road / Happisburgh Road	Estimated	n/a
L	The Street / Heydon Road	Estimated	n/a

Link No.	Road	Survey type	Survey year
M	Little London Road	Estimated	n/a
N	Plantation Road	Estimated	n/a
O	Vicarage Road / Whimpwell Street	Estimated	n/a
P	Vicarage Road / Whimpwell Street	Estimated	n/a
Q	Dereham Road / Longham Road - Dillington	Estimated	n/a
R	Hoe Road South	Estimated	n/a
S	Mill Street, Elsing Road – Swanton Morley	Estimated	n/a
T	Mill Street, Elsing Road – Swanton Morley	Estimated	n/a
U	Mill Street, Elsing Road – Swanton Morley	Estimated	n/a
V	B1354 - Blickling	Estimated	n/a

34. Table 8.2 and Table 8.3 detail the results of the construction phase road traffic noise emissions calculations for 2026 and 2027 respectively.

Table 8.2 Construction phase road traffic noise emissions assessment 2026 Scenario 1

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
1a	0.1	70.0	No change	Negligible
1b	0.1	70.0	No change	Negligible
2	0.1	70.0	No change	Negligible
3	0.0	70.0	No change	Negligible
4	0.0	70.0	No change	Negligible
5	0.1	70.0	Negligible	Minor Adverse
6	0.2	70.0	Negligible	Minor Adverse
7	0.1	70.0	No change	Negligible
8	0.1	40.0	Negligible	Minor Adverse
9	0.2	50.0	Negligible	Minor Adverse
10	0.3	49.2	Negligible	Minor Adverse
11	0.0	60.0	No change	Negligible
12	0.0	40.0	No change	Negligible
12	0.0	60.0	No change	Negligible
13a	0.5	30.0	Negligible	Minor Adverse
13a	0.4	40.0	Negligible	Minor Adverse
13a	0.4	60.0	Negligible	Minor Adverse

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
13b	0.5	30.0	Negligible	Minor Adverse
13b	0.4	40.0	Negligible	Minor Adverse
13b	0.3	60.0	Negligible	Minor Adverse
14	0.3	30.0	Negligible	Minor Adverse
14	0.2	60.0	Negligible	Minor Adverse
15	0.0	54.5	No change	Negligible
16	0.2	48.8	Negligible	Minor Adverse
17	0.5	44.9	Negligible	Minor Adverse
18	0.3	30.0	Negligible	Minor Adverse
18	0.2	60.0	Negligible	Minor Adverse
19	0.4	50.0	Negligible	Minor Adverse
20	0.0	32.1	No change	Negligible
21	0.5	46.6	Negligible	Minor Adverse
22	0.4	38.5	Negligible	Minor Adverse
23	0.7	54.5	Negligible	Minor Adverse
24	0.3	60.0	Negligible	Minor Adverse
25	1.8	35.1	Minor	Minor Adverse
26	0.0	40.0	No change	Negligible
27	0.0	40.0	No change	Negligible
28	0.0	40.0	No change	Negligible
29	0.2	60.0	Negligible	Minor Adverse
30	0.2	50.0	Negligible	Minor Adverse
31	0.0	40.0	No change	Negligible
32	0.6	40.1	Negligible	Minor Adverse
33	0.4	46.7	Negligible	Minor Adverse
34	1.2	43.3	Minor	Minor Adverse
35a	0.8	43.6	Negligible	Minor Adverse
35b	0.8	43.6	Negligible	Minor Adverse
36	0.3	44.9	Negligible	Minor Adverse
37	0.0	43.3	No change	Negligible
38	0.0	30.0	No change	Negligible
38	0.0	40.0	No change	Negligible
39	0.1	50.0	No change	Negligible

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
39	0.1	60.0	No change	Negligible
40a	0.3	30.0	Negligible	Minor Adverse
40a	0.2	60.0	Negligible	Minor Adverse
40b	0.4	30.0	Negligible	Minor Adverse
40b	0.3	60.0	Negligible	Minor Adverse
41	0.6	36.2	Negligible	Minor Adverse
42	0.5	43.0	Negligible	Minor Adverse
43	0.0	35.9	No change	Negligible
44a	0.3	30.0	Negligible	Minor Adverse
44a	0.2	40.0	Negligible	Minor Adverse
44a	0.2	60.0	Negligible	Minor Adverse
44b	0.3	30.0	Negligible	Minor Adverse
44b	0.3	40.0	Negligible	Minor Adverse
44b	0.2	60.0	Negligible	Minor Adverse
45	0.3	30.0	Negligible	Minor Adverse
45	0.2	60.0	Negligible	Minor Adverse
46	0.3	42.5	Negligible	Minor Adverse
47a	0.0	41.6	No change	Negligible
47b	0.5	41.6	Negligible	Minor Adverse
47c	0.4	41.6	Negligible	Minor Adverse
48	0.0	45.8	No change	Negligible
49	0.3	32.1	Negligible	Minor Adverse
50	0.0	30.0	No change	Negligible
51	0.0	30.0	No change	Negligible
51	0.0	40.0	No change	Negligible
51	0.0	60.0	No change	Negligible
52	0.1	45.2	Negligible	Minor Adverse
53	0.3	30.0	Negligible	Minor Adverse
54	0.1	30.0	Negligible	Minor Adverse
55	0.2	60.0	Negligible	Minor Adverse
56	0.3	30.0	Negligible	Minor Adverse
56	0.2	60.0	Negligible	Minor Adverse
57	0.2	50.0	Negligible	Minor Adverse

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
58	0.1	60.0	Negligible	Minor Adverse
59	0.2	60.0	Negligible	Minor Adverse
60	0.1	60.0	Negligible	Minor Adverse
61	0.0	42.9	No change	Negligible
62	0.0	40.0	No change	Negligible
63	0.0	40.0	No change	Negligible
64	0.2	30.0	Negligible	Minor Adverse
64	0.1	40.0	Negligible	Minor Adverse
65	0.7	30.0	Negligible	Minor Adverse
65	0.5	40.0	Negligible	Minor Adverse
65	0.4	60.0	Negligible	Minor Adverse
66	1.0	50.0	Minor	Minor Adverse
66	0.9	60.0	Negligible	Minor Adverse
67	1.1	60.0	Minor	Minor Adverse
68	1.9	34.5	Minor	Minor Adverse
69	1.8	60.0	Minor	Minor Adverse
70	0.6	60.0	Negligible	Minor Adverse
71	0.4	30.0	Negligible	Minor Adverse
71	0.3	60.0	Negligible	Minor Adverse
72	0.6	60.0	Negligible	Minor Adverse
73	0.7	60.0	Negligible	Minor Adverse
74	1.0	30.0	Negligible	Minor Adverse
74	0.9	40.0	Negligible	Minor Adverse
74	0.7	60.0	Negligible	Minor Adverse
75	0.6	60.0	Negligible	Minor Adverse
76	1.5	30.0	Minor	Minor Adverse
76	1.1	60.0	Minor	Minor Adverse
77	1.1	60.0	Minor	Minor Adverse
78	1.0	60.0	Minor	Minor Adverse
79	0.4	40.0	Negligible	Minor Adverse
79	0.3	60.0	Negligible	Minor Adverse
A	1.2	60	Minor	Minor Adverse
B	2.1	60	Minor	Minor Adverse

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
C	1.0	60	Minor	Minor Adverse
D	1.1	60	Minor	Minor Adverse
E	1.2	60	Minor	Minor Adverse
F	1.4	30	Minor	Minor Adverse
F	1.0	60	Minor	Minor Adverse
G	1.5	30	Minor	Minor Adverse
G	1.1	60	Minor	Minor Adverse
H	1.5	30	Minor	Minor Adverse
H	1.1	60	Minor	Minor Adverse
I	1.0	60	Minor	Minor Adverse
J	1.1	60	Minor	Minor Adverse
K	1.8	30	Minor	Minor Adverse
K	1.3	60	Minor	Minor Adverse
L	1.1	60	Minor	Minor Adverse
M	1.6	30	Minor	Minor Adverse
M	1.1	60	Minor	Minor Adverse
N	1.1	60	Minor	Minor Adverse
O	1.1	60	Minor	Minor Adverse
P	1.1	60	Minor	Minor Adverse
Q	1.1	60	Minor	Minor Adverse
R	1.1	60	Minor	Minor Adverse
S	1.1	60	Minor	Minor Adverse
T	1.1	60	Minor	Minor Adverse
U	1.4	30	Minor	Minor Adverse
V	1.1	60	Minor	Minor Adverse

Table 8.3 Construction phase road traffic noise emissions assessment 2027 Scenario 1

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
1a	0.1	70.0	No change	Negligible
1b	0.1	70.0	No change	Negligible
2	0.1	70.0	No change	Negligible
3	0.0	70.0	No change	Negligible
4	0.0	70.0	No change	Negligible

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
5	0.1	70.0	Negligible	Minor Adverse
6	0.2	70.0	Negligible	Minor Adverse
7	0.1	70.0	No change	Negligible
8	0.1	40.0	Negligible	Minor Adverse
9	0.2	50.0	Negligible	Minor Adverse
10	0.3	49.2	Negligible	Minor Adverse
11	0.0	60.0	No change	Negligible
12	0.0	40.0	No change	Negligible
12	0.0	60.0	No change	Negligible
13a	0.5	30.0	Negligible	Minor Adverse
13a	0.4	40.0	Negligible	Minor Adverse
13a	0.4	60.0	Negligible	Minor Adverse
13b	0.5	30.0	Negligible	Minor Adverse
13b	0.4	40.0	Negligible	Minor Adverse
13b	0.3	60.0	Negligible	Minor Adverse
14	0.3	30.0	Negligible	Minor Adverse
14	0.2	60.0	Negligible	Minor Adverse
15	0.0	54.5	No change	Negligible
16	0.2	48.8	Negligible	Minor Adverse
17	0.5	44.9	Negligible	Minor Adverse
18	0.3	30.0	Negligible	Minor Adverse
18	0.2	60.0	Negligible	Minor Adverse
19	0.4	50.0	Negligible	Minor Adverse
20	0.0	32.1	No change	Negligible
21	0.5	46.6	Negligible	Minor Adverse
22	0.4	38.5	Negligible	Minor Adverse
23	0.7	54.5	Negligible	Minor Adverse
24	0.3	60.0	Negligible	Minor Adverse
25	1.7	35.1	Minor	Minor Adverse
26	0.0	40.0	No change	Negligible
27	0.0	40.0	No change	Negligible
28	0.0	40.0	No change	Negligible
29	0.2	60.0	Negligible	Minor Adverse

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
30	0.2	50.0	Negligible	Minor Adverse
31	0.0	40.0	No change	Negligible
32	0.6	40.1	Negligible	Minor Adverse
33	0.4	46.7	Negligible	Minor Adverse
34	1.2	43.3	Minor	Minor Adverse
35a	0.7	43.6	Negligible	Minor Adverse
35b	0.7	43.6	Negligible	Minor Adverse
36	0.3	44.9	Negligible	Minor Adverse
37	0.0	43.3	No change	Negligible
38	0.0	30.0	No change	Negligible
38	0.0	40.0	No change	Negligible
39	0.1	50.0	No change	Negligible
39	0.1	60.0	No change	Negligible
40a	0.3	30.0	Negligible	Minor Adverse
40a	0.2	60.0	Negligible	Minor Adverse
40b	0.4	30.0	Negligible	Minor Adverse
40b	0.3	60.0	Negligible	Minor Adverse
41	0.6	36.2	Negligible	Minor Adverse
42	0.5	43.0	Negligible	Minor Adverse
43	0.0	35.9	No change	Negligible
44a	0.3	30.0	Negligible	Minor Adverse
44a	0.2	40.0	Negligible	Minor Adverse
44a	0.2	60.0	Negligible	Minor Adverse
44b	0.3	30.0	Negligible	Minor Adverse
44b	0.3	40.0	Negligible	Minor Adverse
44b	0.2	60.0	Negligible	Minor Adverse
45	0.2	30.0	Negligible	Minor Adverse
45	0.2	60.0	Negligible	Minor Adverse
46	0.3	42.5	Negligible	Minor Adverse
47a	0.0	41.6	No change	Negligible
47b	0.5	41.6	Negligible	Minor Adverse
47c	0.4	41.6	Negligible	Minor Adverse
48	0.0	45.8	No change	Negligible

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
49	0.3	32.1	Negligible	Minor Adverse
50	0.0	30.0	No change	Negligible
51	0.0	30.0	No change	Negligible
51	0.0	40.0	No change	Negligible
51	0.0	60.0	No change	Negligible
52	0.1	45.2	Negligible	Minor Adverse
53	0.3	30.0	Negligible	Minor Adverse
54	0.1	30.0	Negligible	Minor Adverse
55	0.2	60.0	Negligible	Minor Adverse
56	0.3	30.0	Negligible	Minor Adverse
56	0.2	60.0	Negligible	Minor Adverse
57	0.2	50.0	Negligible	Minor Adverse
58	0.1	60.0	Negligible	Minor Adverse
59	0.2	60.0	Negligible	Minor Adverse
60	0.1	60.0	Negligible	Minor Adverse
61	0.0	42.9	No change	Negligible
62	0.0	40.0	No change	Negligible
63	0.0	40.0	No change	Negligible
64	0.2	30.0	Negligible	Minor Adverse
64	0.1	40.0	Negligible	Minor Adverse
65	0.7	30.0	Negligible	Minor Adverse
65	0.5	40.0	Negligible	Minor Adverse
65	0.4	60.0	Negligible	Minor Adverse
66	1.0	50.0	Minor	Minor Adverse
66	0.9	60.0	Negligible	Minor Adverse
67	1.1	60.0	Minor	Minor Adverse
68	1.9	34.5	Minor	Minor Adverse
69	1.8	60.0	Minor	Minor Adverse
70	0.6	60.0	Negligible	Minor Adverse
71	0.4	30.0	Negligible	Minor Adverse
71	0.3	60.0	Negligible	Minor Adverse
72	0.6	60.0	Negligible	Minor Adverse
73	0.7	60.0	Negligible	Minor Adverse

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
74	1.0	30.0	Negligible	Minor Adverse
74	0.8	40.0	Negligible	Minor Adverse
74	0.7	60.0	Negligible	Minor Adverse
75	0.6	60.0	Negligible	Minor Adverse
76	1.5	30.0	Minor	Minor Adverse
76	1.1	60.0	Minor	Minor Adverse
77	1.0	60.0	Minor	Minor Adverse
78	1.0	60.0	Minor	Minor Adverse
79	0.4	40.0	Negligible	Minor Adverse
79	0.3	60.0	Negligible	Minor Adverse
A	1.2	60	Minor	Minor Adverse
B	2.1	60	Minor	Minor Adverse
C	1.0	60	Minor	Minor Adverse
D	1.1	60	Minor	Minor Adverse
E	1.2	60	Minor	Minor Adverse
F	1.4	30	Minor	Minor Adverse
F	1.0	60	Minor	Minor Adverse
G	1.5	30	Minor	Minor Adverse
G	1.1	60	Minor	Minor Adverse
H	1.5	30	Minor	Minor Adverse
H	1.1	60	Minor	Minor Adverse
I	1.0	60	Minor	Minor Adverse
J	1.1	60	Minor	Minor Adverse
K	1.8	30	Minor	Minor Adverse
K	1.0	60	Minor	Minor Adverse
L	1.1	60	Minor	Minor Adverse
M	1.6	30	Minor	Minor Adverse
M	1.1	60	Minor	Minor Adverse
N	1.1	60	Minor	Minor Adverse
O	1.1	60	Minor	Minor Adverse
P	1.1	60	Minor	Minor Adverse
Q	1.1	60	Minor	Minor Adverse
R	1.1	60	Minor	Minor Adverse

Link No.	dB Change $LA_{10, 18hr}$	Speed (mph)	Impact magnitude	Impact significance
S	1.1	60	Minor	Minor Adverse
T	1.1	60	Minor	Minor Adverse
U	1.4	30	Minor	Minor Adverse
V	1.1	60	Minor	Minor Adverse

9 Conclusion

35. For the assessed construction phases, impacts are predicted to range from negligible to major adverse under both scenarios. However, with the adoption of standard mitigation (outlined in Chapter 25 Noise and Vibration), enhanced mitigation measures and best practicable means, no residual impact is anticipated.

10 References

BSI, (2014); British Standards Institution [BS] 5228-1:2009+A1:2014 “Code of practice for noise and vibration control on construction and open sites – Part 1: Noise”.
BSI, (2014); British Standards Institution [BS] 5228-2: 2009+A1:2014 “Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration”.
Department of Transport, Welsh Office (1988); Calculation of Road Traffic Noise HMSO, London.
Highways Agency (2011); Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7: Noise and Vibration. The Highways Agency.

This page is intentionally blank.