NORTH FALLS

Offshore Wind Farm

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

Chapter 20 Onshore Air Quality

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Glossary of Acronyms

AADT	Annual Average Daily Traffic
ADMS-Roads	Atmospheric Dispersion Modelling System for Roads
APIS	Air Pollution Information System
ARN	Affected Road Network
ASR	Annual Status Report
AQMA	Air Quality Management Areas
CAS	Clean Air Strategy
CBS	Cement-Bound Sand
CEH	Centre for Ecology and Hydrology
CEA	Cumulative Effects Assessment
CoCP	Code of Construction Practice
CO_2	Carbon Dioxide
CTMP	Construction Traffic Management Plan
DCO	Development Consent Order
DPF	Diesel Particulate Filters
DECC	Department for Energy and Climate Change
Defra	Department for the Environment and Rural Affairs
DETR	Department of the Environment, Transport and the Regions
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DMT	Decision-Making Threshold
EA	Environmental Assessment
EC	European Commission
EFT	Emission Factor Toolkit
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EN-1	National Policy Statement for Energy
EN-3	National Policy Statement for Renewable Energy Infrastructure
EN-5	National Policy Statement for Electricity Networks Infrastructure
EPP	Evidence Plan Process
EPUK	Environmental Protection United Kingdom
ES	Environmental Statement
ETG	Expert Topic Group
EU	European Union
ETS	Emissions Trading System
HDD	Horizontal Directional Drilling
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicles
HMSO	His Majesty's Stationery Office

HVAC	High-Voltage Alternating Current
IAQM	Institute of Air Quality Management
IPC	Infrastructure Planning Commission (now Planning Inspectorate)
IRZ	Impact Risk Zone
JNCC	Joint Nature Conservation Committee
km	Kilometre
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles
LNR	Local Nature Reserve
LPA	Local Planning Authority
MCerts	Monitoring Certification Scheme
MW	Megawatts
N-dep	Nitrogen deposition
NOx	Nitrogen Oxide
NPS	National Policy Statement
NRMM	Non-Road Mobile Machinery
NSIP	Nationally Significant Infrastructure Project
oCoCP	outline Code of Construction Practice
OS	Ordnance Survey
PEIR	Preliminary Environmental Information Report
PM	Particulate Matter
RMSE	Root Mean Square
SAC	Special Area of Conservation
SI	Statutory Instrument
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
UK	United Kingdom
UN	United Nations

Glossary of Terminology

The Applicant	North Falls Offshore Wind Farm Limited (NFOW)
The Project or 'North Falls'	North Falls Offshore Wind Farm, including all onshore and offshore infrastructure
Landfall	The location where the offshore cables come ashore
Indicative landfall HDD compound area	Area within which the landfall HDD compound will be located
Transition joint bay	Underground structures that house the joints between the offshore export cables and the onshore export cables
Horizontal directional drill (HDD)	Trenchless technique to bring the offshore cables ashore at the landfall. The technique will also be used for installation of the onshore export cables at sensitive areas of the onshore cable route
Onshore project area	The boundary in which all onshore infrastructure required for the Project will be located (i.e. landfall; onshore cable route, accesses, construction compounds; onshore substation and National Grid substation extension), as considered within the PEIR
Onshore export cables	The cables which take the electricity from landfall to the onshore substation. These comprise High Voltage Alternative Current (HVAC) cables, buried underground
Onshore cable corridor(s)	Onshore corridor(s) within which the onshore export cables and associated infrastructure will be located. A final onshore cable route for which consent will be sought will be selected from within these corridor(s)
Onshore cable route	Onshore route within which the onshore export cables and associated infrastructure would be located
Jointing bay	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts
Link boxes	Underground chambers or above ground cabinets next to the onshore export cables housing low voltage electrical earthing links
Cable construction compound	Area set aside to facilitate construction of the onshore cable route. Will be located adjacent to the onshore cable route, with access to the highway
Haul road	The track along the onshore cable route used by construction traffic to access different sections of the onshore cable route
Trenchless crossing compound	Areas within the cable corridor which will house trenchless crossing (e.g. HDD) entry or exit points
Onshore substation	A compound containing electrical equipment required to transform and stabilise electricity generated by the Project so that it can be connected to the National Grid.
Onshore substation zone	Area within which the onshore substation will be located.
Onshore substation construction compound	Area set aside to facilitate construction of the onshore substation. Will be located adjacent to the onshore substation (location not yet defined)
National Grid connection point	The grid connection location for the Project. National Grid are proposing to construct new electrical infrastructure (a new substation) to allow the Project to connect to the grid, and this new infrastructure will be located at the National Grid connection point.
National Grid substation connection works	Infrastructure required to connect the Project to National Grid's connection point.

20 Onshore Air Quality

20.1 Introduction

1. This chapter of the Preliminary Environmental Information Report (PEIR) considers the likely significant effects of the North Falls offshore wind farm (hereafter 'North Falls' or 'the Project') on air quality. The chapter provides an overview of the existing environment for the proposed onshore project area, followed by an assessment of likely significant effects for the construction, and decommissioning phases of the Project.
2. This chapter has been written by Royal HaskoningDHV, with the assessment undertaken with specific reference to the relevant legislation and guidance, of which the primary sources are the National Policy Statements (NPS). The terminology and impact assessment methodologies used in this chapter differ from the generic impact assessment terminology presented within Chapter 6 EIA Methodology (Volume I), as air quality guidance documents include specific assessment criteria. Details of these and the methodology used for the EIA and Cumulative Effects Assessment (CEA) are presented in Section 20.4.
3. The Planning Inspectorate has agreed, as stated in the Scoping Opinion (the Planning Inspectorate, 2021), to scope out both 'Offshore Air Quality' impacts and 'Operational Impacts' on air quality as the effects of these impacts are unlikely to be significant. Therefore, these elements do not form part of this assessment.
4. At present, the onshore project area is the subject of ongoing refinement. Therefore, this chapter presents a preliminary assessment using the information available to date and will be updated once the onshore project area is further refined. The updated assessment will be presented in the Environmental Statement (ES) that will be prepared to accompany the Development Consent Order (DCO) application. Similarly, the CEA will be reviewed and updated where required once the onshore project area has been finalised.
5. The assessment should be read in conjunction with the following linked chapters (Volume I):
    - Chapter 23 Onshore Ecology;
    - Chapter 27 Traffic and Transport;
    - Chapter 28 Human Health; and
    - Chapter 33 Climate Change.
6. Additional information to support the onshore air quality assessment includes the following appendices (Volume III):
    - Appendix 20.1 Construction Dust and Particulate Matter Assessment Methodology;
    - Appendix 20.2 Air Quality Assessment Traffic Data; and
    - Appendix 20.3 Air Quality Ecological Receptor Assessment Tables.

20.2 Consultation

7. Consultation with regard to air quality has been undertaken in line with the general process described in Chapter 6 EIA Methodology (Volume I). The key elements to date have included scoping and ongoing technical engagement with Tendring District Council via the Evidence Plan Process. The feedback received has been considered in preparing the PEIR. Table 20.1 provides a summary of how the consultation and engagement responses received to date have influenced the approach that has been taken.

8. This chapter will be updated following the consultation on the PEIR in order to produce the final assessment, which will be presented in an ES that will be submitted with the DCO application. Full details of the consultation process will also be presented in the Consultation Report produced as part of the DCO application.

Table 20.1 Consultation responses

Consultee	Date / Document	Comment	Response / where addressed in the PEIR
Planning Inspectorate	August 2021 / Scoping Opinion: Proposed North Falls Offshore Wind Farm	Offshore Air Quality: The Scoping Report states that the main source of emissions is likely to be from vessels used during construction, operation and decommissioning emitting nitrogen oxides (NO_x), particular matter (PM) and sulphur dioxide (SO_2). It is stated that vessels operating in this area are required to comply with Emission Control Area restrictions in respect of NO_x and SO_2 limits. It is stated that in the context of existing vessel traffic in the North Sea, the contribution would be small, although no data is presented in terms of the baseline position or likely number of vessel movements as a result of the Proposed Development. It is also stated that vessel movements would be carried out at some distance from the shore and therefore unlikely to impact on land based human and ecological receptors, although no information is presented as to the likely routes of vessel movements. The Inspectorate agrees that this matter may be scoped out of the ES on the basis that the main source of emissions would be exhaust emissions from vessels, and due to the nature and location of the offshore components of the Proposed Development associated vessel movements would only generate a small increase in emissions in all phases, which is unlikely to result in significant effects to land based human and ecological receptors.	Offshore air quality impacts have been scoped out of the assessment.
		Dust and particulate matter during operation: The Inspectorate notes that the onshore components of the Proposed Development are underground cables and a substation; it is not considered that the operation and maintenance of these components would generate levels of dust and particulate matter sufficient to result in significant effects and this matter can be scoped out of out the ES.	Operational dust and particulate matter impacts have been scoped out of the assessment.

Consultee	Date / Document	Comment	Response / where addressed in the PEIR
		Plant and machinery emissions during operation: The Inspectorate agrees that impacts associated with plant and machinery emissions during operation of the Proposed Development can be scoped out of the ES on the basis that the substation will not generate any emissions, and that emissions associated with other plant and machinery will be small scale and for limited duration.	Operational plant and machinery emission impacts have been scoped out of the assessment.
		Road traffic emissions during operation: Given the nature of the onshore components of the Proposed Development, e.g. underground cables and a substation, and that maintenance activities are not expected to generate a significant increase in road vehicles compared to the baseline conditions as described in section 3.9.1.1 of the Scoping Report, the Inspectorate agrees that it is unlikely that there would be a significant change in vehicle flows and therefore it is also unlikely that significant effects would occur in respect of air quality. However, the ES should explain how the anticipated road vehicle movements, associated with the operational phase including those relating to offshore operational maintenance (see ID 5.9.2 of this Scoping Opinion), these relate to the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) screening values set out in paragraph 458 [of the Scoping Report].	With reference to Chapter 27 Traffic and Transport (Volume I), the preferred base port (or ports) for the offshore construction, operation and decommissioning of the Project is not known and any decision would not be expected until post-consent. Such facilities would be existing or would be provided or brought into operation by means of one or more planning applications or as port operations with permitted development rights. It has therefore been agreed with National Highways (at a meeting on the 7 June 2022) and Essex County Council (at a meeting on the 9 July 2021) to scope out of the assessment the onshore impacts of traffic and transport associated with offshore construction, operation and decommissioning activities. As such, the number of vehicle movements generated during operation has not been considered, and comparison to IAQM and EPUK criteria is therefore not possible. This approach has been accepted by the Planning Inspectorate for other recently consented offshore wind farm projects, e.g. Norfolk Vanguard

Consultee	Date / Document	Comment	Response / where addressed in the PEIR
			and Boreas, East Anglia Two, East Anglia One North and Hornsea Three.
		Ecological receptors: The Inspectorate notes that no reference is made to Riddles Wood SSSI and Stour and Copperas Wood, Ramsey SSSI, which are located to 0.5km south and 3km north-west of the scoping boundary respectively, and whether these designated sites would be potentially sensitive to air quality changes including from construction traffic movements once the onshore components of the Proposed Development are refined. This should be confirmed in the ES and where there is potential for likely significant effects, these receptors should be scoped into the assessment.	Riddles Wood SSSI and Stour and Copperas Wood and Ramsey SSSI are both located over 200m (see Section 20.3.1) from construction traffic routes. As such, there would be no significant impact on these designated sites and they were not considered in the assessment. The impact of construction traffic movements on other ecological receptors within 200m of construction traffic routes is considered in Section 20.6.1.3.2.
		Approach to data collection: The Scoping Report states that it is not anticipated that primary air quality data will be collected and that it is proposed to use data collected by Tendring District Council as part of its air quality monitoring, although the locations of monitoring sites are not currently known and it is not stated which pollutants are monitored. Effort should be made to agree the requirement for any additional baseline survey data with the relevant consultation bodies. The assessment in the ES should be carried out with reference to a robust baseline position reflecting the relevant study area, including an understanding of relevant pollutant concentrations. Where required further monitoring should be conducted to supplement available data taken from the Council's monitoring.	The existing air quality monitoring data coverage is considered to be appropriate, and Tendring District Council did not identify a requirement for additional monitoring during initial technical engagement. Existing air quality monitoring data are presented in Section 20.5.2.
		Baseline conditions: The Scoping Report does not describe whether there are any air quality management areas (AQMAs) within the scoping boundary or potential affected road network (ARN), which has not yet been defined, that may be affected by the Proposed Development. The ES should confirm whether there are any relevant AQMAs likely to experience impacts from the Proposed Development and, if so, identify their location on a figure.	There are no AQMAs within the air quality study area, as discussed in Section 20.5.1.
		Emissions from non-road mobile machinery (NRMM) and plant during construction and decommissioning:	The approach to the assessment of NRMM has been agreed with Tendring District Council as part of the

Consultee	Date / Document	Comment	Response / where addressed in the PEIR
		The Inspectorate considers that the Applicant should seek to agree the approach to assessment of NRMM with relevant consultation bodies. The ES should explain how emissions from NRMM will be managed.	technical engagement (as set out below). The assessment of NRMM emissions is set out in Section 20.6.1.2. Mitigation and management measures are also set out within Section 20.6.1.2.
		Figures: The ES should include a figure / figures to identify the final study area for air quality and the human and ecological receptors that have been considered in the assessment.	This chapter is supported by figures which illustrate the study area for air quality and the receptors which have been considered in the assessment.
		Relationship between air quality assessment and transport assessment: The air quality assessment should be informed by data from a transport assessment in respect of road vehicle movements on the ARN with regard to defining the study area and the potential impact from vehicle movements during construction and decommissioning.	The transport assessment has informed the air quality assessment, as discussed in Section 20.4.3.3.1.
		Odour: Section 3.1 of the Scoping Report, relating to ground conditions and contamination, identifies potential impact arising from the Proposed Development in terms of release of vapours / ground gases associated with former landfill sites within the scoping boundary during construction. This matter should be kept under review as the onshore components of the Proposed Development, including location and parameters are refined; where there is potential for likely significant effects to occur in respect of odour, this matter should be scoped into the ES.	With reference to Chapter 19 Ground Conditions and Contamination (Volume I), no historic landfill sites are located within the onshore project area. Therefore, there are not anticipated to be any impacts in relation to odour.
Tendring District Council	November 2022 / Detailed Proposed Methodology Sent via Email	Agreement with proposed methodology.	The methodology agreed with the Environmental Protection Officer at Tendring District Council has been used within this air quality assessment.

20.3 Scope

20.3.1 Study area

9. The study area for air quality has been defined on the basis of the Planning Inspectorate's Scoping Opinion (the Planning Inspectorate, 2021), and through consultation with Tendring District Council.

10. The Planning Inspectorate agreed that offshore and operational air quality impacts could be scoped out of the assessment, as they were unlikely to be significant (see Table 20.1).

11. During construction, the onshore elements of North Falls may give rise to construction phase dust and fine particulate matter, NRMM emissions and road traffic emissions. These aspects have been assessed as presented in this chapter.

12. The onshore project area is defined as the landfall area between Clacton-on-Sea and Frinton-On-Sea, the onshore cable corridor(s), and the onshore substation zone, including access requirements.

13. The study area for the air quality assessment is defined as follows:

- Construction phase dust and fine particulate matter emissions:
  - Human receptors within 350m of the onshore project area and within 50m of routes used by construction vehicles (for routes used by construction-generated traffic up to 500m from the onshore project area). These distances were obtained from IAQM guidance (IAQM, 2016); and
  - Ecological receptors within 200m of the onshore project area for construction related dust (from Natural England internal guidance) and within 50m of routes used by construction vehicles (for trackout on routes used by construction-generated traffic up to 500m from the onshore project area) (from IAQM guidance (IAQM, 2016)).
- Construction phase NRMM emissions:
  - Human and ecological receptors within 200m of the onshore project area where NRMM will be located. This distance was determined using professional judgement.
- Construction phase road traffic emissions:
  - Human and ecological receptors within 200m of routes which will experience traffic flows in exceedance of the relevant air quality screening criteria. Further information on construction traffic routes is provided in Chapter 27 Traffic and Transport (Volume I). This screening distance was based on criteria specified within Highways England (Highways England, 2019) and JNCC (Chapman and Kite, 2021a) guidance beyond which the impact of emissions from road traffic would be negligible.

14. The air quality study area is shown in Figure 20.1 (Volume II).

20.3.2 Realistic worst case scenario

20.3.2.1 General Approach

15. The final design of North Falls will be confirmed through detailed engineering design studies that will be undertaken post-consent. In order to provide a precautionary but robust impact assessment at this stage of the development process, realistic worst case scenarios have been defined in terms of the potential effects that may arise. This approach to EIA, referred to as the

Rochdale Envelope, is common practice for developments of this nature, as set out in Planning Inspectorate Advice Note Nine (2018). The Rochdale Envelope for a project outlines the realistic worst case scenario for each individual impact, so that it can be safely assumed that all other scenarios within the design envelope will have less impact. Further details are provided in Chapter 6 EIA Methodology (Volume I).

16. The realistic worst case scenarios for the likely significant effects scoped into the EIA for the air quality assessment are summarised in Table 20.2. These are based on North Falls parameters described in Chapter 5 Project Description (Volume I), which provides further details regarding specific activities and their durations.

Table 20.2 Realistic worst case scenarios

Potential impact	Parameter	Notes
Construction		
Impact 1: Construction Dust and Fine Particulate Matter	**Landfall** HDD temporary works area (4 circuits) = 100 x 200m Transition joint bay permanent footprint (each) = 4 x 15m No. of transition joint bays = 4 Maximum HDD depth = 20m Maximum number of HDD = 5 Duration: 13 months (of which HDD = 6 months) Working hours: 0700 to 1900 hours Monday to Saturdays, plus 24 hour / days working for HDD where required	Duration includes compound establishment, HDD, transition bays, and reinstatement.
	Onshore Cable Corridor(s) Working width = 60m (open trench), 82m (shallow HDD crossings), 122m (at deeper HDD crossings) Corridor length = 24km Cable trench width (max.) = 3.75m No. of trenches = 4 Maximum trench depth = 2m Minimum cable burial depth = 0.9m Haul road width = 6m Jointing bays = 80 - 192 (approximately every 500m) buried below ground Jointing bay construction footprint (per bay) = 13 x 5m Jointing bay depth = 2m Temporary construction compound footprint = 150 x 150 (primary construction compound) and 100 x 100m (small cable construction compounds) No. of compounds (est.) = 7 Maximum width of buried cable = 110m Maximum trenchless crossing depth = 20m Trenchless crossing compound dimensions (major HDD compounds) = 80 x 120m Trenchless crossing compound dimensions (minor HDD crossings) = 40 x 120m	Overall duration includes establishing / reinstating haul roads, cable installation (trench excavation, duct installation, cable jointing), HDD (includes compound establishment, HDD and reinstatement).

Potential impact	Parameter	Notes
	Overall duration = 18 – 24 months Cable installation = 12 months Major HDD (each location) = 8 months (of 4 months for HDD) Minor HDD crossings = 2 months Major HDD to include 24 hour / 7 days working where required	
	Onshore substation Permanent substation footprint = 267 x 300m Construction compound footprint = 150 x 250m Duration: 24 months (+ 6 months preparation works)	
Impact 2: Non-Road Mobile Machinery (NRMM) Emissions	**Landfall** HDD drilling rigs running concurrently = up to 2	
Impact 3: Road Vehicle Exhaust Emissions	The realistic worst-case parameters that were used to derive the construction-generated traffic flows are detailed in Chapter 27 Traffic and Transport (Volume I).	
Operation		
Operational phase air quality impacts have been scoped out of the assessment as detailed in the Scoping Report (North Falls, 2021) and Scoping Opinion (the Planning Inspectorate, 2021).		
Decommissioning		
No final decision has yet been made regarding the final decommissioning policy for the onshore project infrastructure including landfall, onshore cable corridor(s) and onshore substation. It is also recognised that legislation and industry best practice change over time. However, it is likely that the onshore project equipment, including the cable, will be removed, reused or recycled where possible, with the transition joint bays and cable ducts being left in place. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that, for the purposes of a worst-case scenario, the impacts will be no greater than those identified for the construction phase.		

20.3.3 Summary of mitigation embedded in the design

17. This section outlines the embedded mitigation relevant to the air quality assessment, which has been incorporated into the design of North Falls (Table 20.3). Where other mitigation measures are proposed, these are detailed in the impact assessment (Section 20.6), where applicable.

Table 20.3 Embedded mitigation measures

Parameter	Mitigation measures embedded into North Falls design
Site Selection	North Falls has undergone an extensive site selection process which has involved incorporating environmental considerations in collaboration with the engineering design requirements. Considerations include (but are not limited to) adhering to the Horlock Rules (for explanation see Chapter 4 Site Selection and Assessment of Alternatives (Volume I)) for the onshore substation and associated infrastructure, a preference for the shortest route length (where practical) and developing construction methodologies to minimise potential impacts. Key principles that have informed the location of the onshore cable corridor(s) include: • Preference for the shortest onshore cable corridor(s) to minimise the overall footprint and the number of receptors that will be affected; • Avoid key constraints, where possible; and • Avoid populated areas, where possible. Consideration has been taken into account for the following constraints: • Sites designated for nature conservation; • Residential properties; and • Other infrastructure (e.g. buried cables, railways, roads).
Best practice dust management mitigation measures	The Project will commit to the implementation of best practice dust mitigation measures. However, a project-specific dust assessment has been undertaken, taking into consideration the specific activities which will be carried out and the sensitivity of nearby receptors. This has resulted in the identification of site specific mitigation measures, as set out in Section 20.6.1.2.
NRMM	The following mitigation measures specific to NRMM will be outlined within the Project's Outline Code of Construction Practice (OCoCP) submitted as part of the Project's DCO application, and will be secured within the final CoCP submitted post-consent. NRMM and plant should be well maintained. If any emissions of dark smoke occur, then the relevant machinery should stop immediately, and any problem rectified. In addition, the following controls should apply to NRMM: • All NRMM should use fuel equivalent to ultralow sulphur diesel (fuel meeting the specification within EN590:2004) where practicable; • All NRMM should comply with the appropriate NRMM regulations; • All NRMM would be fitted with Diesel Particulate Filters (DPF) conforming to defined and demonstrated filtration efficiency (load/duty cycle permitting); • The ongoing conformity of plant retrofitted with DPF, to a defined performance standard, should be ensured through a programme of onsite checks; and • Fuel conservation measures should be implemented, including instructions to (i) throttle down or switch off idle construction equipment; (ii) switch off the engines of trucks while they are waiting to access the site and while they are being loaded or unloaded and (iii) ensure equipment is properly maintained to ensure efficient fuel consumption. Consideration will also be given to the siting of NRMM within the working area. Where practicable, locating generators and plant at the greatest distance from receptors will reduce the potential for air quality effects.

20.4 Assessment methodology

20.4.1 Legislation, guidance and policy

20.4.1.1 National Policy Statements

18. The assessment of likely significant effects upon air quality has been made with specific reference to the relevant NPSs. These are the principal decision making documents for Nationally Significant Infrastructure Projects (NSIPs). Those relevant to the Project are:

- Overarching NPS for Energy (EN-1) (Department of Energy and Climate Change (DECC) 2011a);
- NPS for Renewable Energy Infrastructure (EN-3) (DECC 2011b);
- NPS for Electricity Networks Infrastructure (EN-5) (DECC 2011c);
- Draft Overarching NPS for Energy (EN-1) (Department for Business, Energy and Industrial Strategy (BEIS) 2021a);
- Draft NPS for Renewable Energy Infrastructure (EN-3) (BEIS 2021b); and
- Draft NPS for Electricity Networks Infrastructure (EN-5) (BEIS 2021c).

19. The UK Government announced a review of the existing NPSs within its December 2020 Energy White Paper (HM Government, 2020) and issued a draft version of Overarching NPS for Energy EN-1, NPS for Renewable Energy Infrastructure EN-3 and NPS for Electricity Networks Infrastructure EN-5 for consultation on 6th September 2021 (BEIS, 2021a; BEIS, 2021b; BEIS, 2021d). At the time of writing this PEIR chapter, final versions of the revised NPSs are not available.

20. The specific assessment requirements for air quality, as detailed in the NPS, are summarised in Table 20.4 together with an indication of the section of the PEIR chapter where each is addressed.

Table 20.4 NPS assessment requirements

NPS Requirement	NPS Reference	PEIR Reference
Overarching NPS for Energy (EN-1)		
Any ES on air emissions will include an assessment of Carbon Dioxide (CO_2) emissions, but the policies set out in Section 2 [of EN-1], including the EU ETS, apply to these emissions. The IPC (now Planning Inspectorate) does not, therefore need to assess individual applications in terms of carbon emissions against carbon budgets.	Paragraph 5.2.2	This is not applicable to this assessment. The greenhouse gas assessment is included in Chapter 33 Climate Change (Volume I).
The ES should describe: • Any significant air emissions, their mitigation and any residual effects distinguishing between the Project stages and taking account of any	Paragraph 5.2.7	These matters have been assessed and are presented in Section 20.6.

NPS Requirement	NPS Reference	PEIR Reference
significant emissions from any road traffic generated by the Project; • The predicted absolute emission levels of the Project, after mitigation methods have been applied; • Existing air quality levels and the relative change in air quality from existing levels; and • Any potential eutrophication impacts.		
Other matters that the IPC may consider important and relevant to its decision-making may include Development Plan Documents or other documents in the Local Development Framework. In the event of a conflict between these or any other documents and an NPS, the NPS prevails for the purposes of IPC decision making given the national significance of the infrastructure.	Paragraph 4.1.5	Please refer to Section 20.4.1.2.
NPS for Renewable Energy Infrastructure (EN-3)		
A review of NPS EN-3 (2011b) did not identify requirements relating to air quality and are therefore not considered relevant to this chapter.		
NPS for Electricity Networks Infrastructure (EN-5)		
A review of NPS EN-5 (2011c) did not identify requirements relating to air quality and are therefore not considered relevant to this chapter.		
Draft Overarching NPS for Energy (EN-1)		
Other matters that the Secretary of State may consider important and relevant to its decision-making may include Development Plan Documents or other documents in the Local Development Framework. In the event of a conflict between these or any other documents and an NPS, the NPS prevails for the purposes of IPC decision making given the national significance of the infrastructure.	Paragraph 4.1.5	Please refer to Section 20.4.1.2.
The ES should describe: • Any significant air emissions, their mitigation and any residual effects distinguishing between the Project stages and taking account of any	Paragraph 5.2.7	These matters have been assessed and are presented in Section 20.6.

NPS Requirement	NPS Reference	PEIR Reference
significant emissions from any road traffic generated by the Project; • The predicted absolute emission levels of the Project, after mitigation methods have been applied; • Existing air quality levels and the relative change in air quality from existing levels; and • Any potential eutrophication impacts.		
Draft NPS for Renewable Energy Infrastructure (EN-3)		
A review of draft NPS EN-3 (2021b) did not identify requirements relating to air quality (landward of MHWS) and are therefore not considered relevant to this chapter.		
Draft NPS for Electricity Networks Infrastructure (EN-5)		
A review of draft NPS EN-5 (2021c) did not identify requirements relating to air quality (landward of MHWS) and are therefore not considered relevant to this chapter.		

20.4.1.2 Other legislation, policy and guidance

21. In addition to the NPS, there are a number of pieces of legislation, policy and guidance applicable to the assessment of air quality.

20.4.1.2.1 UK Legislation

22. Air pollution can have adverse effects on the health of humans and ecosystems. There are two type of air quality regulations that apply in England:

- Regulations implementing mandatory European Union (EU) Directive limit values originally set by the EU:
  - The EU Air Quality Framework Directive 96/62/EC on Ambient Air Quality Assessment and Management entered into force in 1996 (European Parliament, 1996). This was a framework for tackling air quality through setting European wide air quality limit values in a series of Daughter Directives, prescribing how air quality should be assessed and managed by the Member States. Directive 96/62/EC and the first three Daughter Directives were combined to form the new EU Directive 2008/50/EC (European Parliament, 2008) on Ambient Air Quality and Cleaner Air for Europe, which came into force in June 2008.
  - The Air Quality Standards Regulations 2010 (Statutory Instrument (SI) 2010 No. 1001) (HMSO, 2010) and The Air Quality Standards (Amendment) Regulations 2016 (SI 2016 No. 1184) (HMSO, 2016).
- Regulations implementing national air quality Objectives:
  - Air Quality (England) Regulations 2000 (SI 2000 No. 928) (HMSO, 2000) and Air Quality (England) (Amendment) Regulations 2002 (SI 2002 No. 3043) (HMSO, 2002)

20.4.1.2.2 Air Quality Limit Values or Objectives

23. The EU (Withdrawal Agreement) Act 2020 sets out arrangements for implementing the air quality limit values that are included in the EU Directive on Ambient Air Quality and Cleaner Air for Europe (2008/50/EC), included in air quality regulations (SI 2010 No. 1001) and as amended (SI 2016 No. 1184). The relevant air quality limit values for this assessment for the protection of human health are detailed further in the following sections and are presented in Table 20.5.

20.4.1.2.3 UK Air Quality Strategy

24. The 1995 Environment Act required the preparation of a national Air Quality Strategy which sets air quality standards for specified pollutants. The Act also outlined measures to be taken by local authorities in relation to meeting these standards and Objectives, which became the Local Air Quality Management (LAQM) system.

25. The UK Air Quality Strategy was originally adopted in 1997 (Department of Environment, 1997) and has been reviewed and updated to take account of the evolving EU legislation, technical and policy developments and the latest information on health effects of air pollution. The strategy was revised and reissued in 2000 as the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Department of the Environment, Transport and the Regions (DETR), 2000). This was subsequently amended in 2003 (DETR, 2003) and was last updated in July 2007 (Defra, 2007).

26. The Government published its Clean Air Strategy (CAS) in January 2019 (Defra, 2019), which reset the focus for the first time since the 2007 Air Quality Strategy revision (Defra, 2007). The CAS identifies a series of 'new' air quality issues, including biomass combustion, shipping emissions and releases from agricultural activities. There is a recognition that the effects of pollutant deposition on sensitive ecosystems and habitats needs greater focus. The concept of an overall exposure reduction approach is raised, in recognition that numerical standards are not safe dividing lines between a risk and a safe exposure, within a population with a varying age and health profile. Within the CAS, the government proposes an ambitious target to reduce the population exposed to concentrations of $PM_{2.5}$ above $10\mu g.m^{-3}$ by 50% by 2025. The CAS is supplemented by an Industrial Strategy, policy guidance for the ports sector, a developing approach for aviation, and by plans for road transport fuels shift to zero emissions by 2040.

27. The Environment Act achieved Royal Assent in November 2021. The Act requires the government to set targets on air quality, including for fine particulate matter, in order to deliver cleaner air for all. The Act introduces a legally binding duty on the government to bring forward at least two air quality targets by October 2022: one to reduce annual average $PM_{2.5}$ concentrations in ambient air and the second must be a long-term target (set a minimum of 15 years in the future) in order to encourage long-term investment and to provide certainty for businesses and other stakeholders. Public consultation on the proposed targets closed in June 2022 however, at the time of writing no new air quality targets have been established.

20.4.1.2.4 Local Air Quality Management (LAQM):

28. The standards and Objectives relevant to the LAQM framework have been prescribed through the Air Quality (England) Regulations (2000) (HMSO, 2000), and the Air Quality (England) (Amendment) Regulations (2002) (HMSO, 2002). The EU Limit Values have been implemented via the Air Quality Standards (England) Regulations (2010) set out the combined Daughter Directive Limit Values and Interim Targets for Member State compliance (HMSO, 2010). The Air Quality Standards (Amendment) Regulations 2016 (HMSO, 2016) were published on 6 December 2016.

29. The current air quality standards and Objectives of relevance to this assessment are presented in Table 20.5. Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health. Pollutant Objectives, however, incorporate target dates and averaging periods which take into account economic considerations, practicability and technical feasibility.

30. Under Part IV of the Environment Act 1995, as amended by Part 4 of the Environment Act 2021, all local authorities are responsible for LAQM, the mechanism by which the government's air quality Objectives are to be achieved. It is the responsibility of local authorities to periodically review and assess present and likely future local pollution levels against these Objectives. Where an air quality Objective is unlikely to be met by the relevant deadline, local authorities must designate those areas as AQMAs and take action to work towards meeting the Objectives. Following the designation of an AQMA, local authorities are required to develop an Air Quality Action Plan to work towards meeting the Objectives and to improve air quality locally. Under the current LAQM regime, local authorities are to publish reports (following consultation and review by Defra) on the regular review and assessment of local air quality.

31. Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health. Pollutant Objectives, however, incorporate target dates and averaging periods which take into account economic considerations, practicability and technical feasibility.

Table 20.5 Air quality strategy objectives (England) for the purposes of LAQM

Pollutant	Air Quality Objective		To be achieved by
	Concentration ($\mu g.m^{-3}$)	Measured as*	
Nitrogen dioxide (NO_2)	200	1-hour mean not to be exceeded more than 18 times per year	31/12/2005
	40	Annual mean	31/12/2005
Particles (PM_{10})	50	24-hour mean not to be exceeded more than 35 times per year	31/12/2004
	40	Annual mean	31/12/2004
Particles ($PM_{2.5}$)	25	Annual mean (target)	2020
	15% cut in annual mean (urban background exposure)	Annual mean	2010-2020

Pollutant	Air Quality Objective		To be achieved by
	Concentration ($\mu g.m^{-3}$)	Measured as*	
*The way the Objectives are to be measured is set out in the UK Air Quality (England) Regulations 2000 (as amended)			

32. It should be noted that the air quality Objectives only apply in locations likely to have 'relevant exposure', i.e. where members of the public are exposed for periods equal to or exceeding the averaging periods set for the standards. For this assessment, locations of relevant exposure include building facades of residential properties, and where relevant schools and medical facilities. Places of work are not included. The Environment Act 2021 is expected to deliver key aspects of the CAS with the aim of maximising health benefits for all and will sit alongside the wider action on air quality.

33. National air quality Objectives also apply for the protection of vegetation and ecosystems, which are termed Critical Levels. Critical Levels apply irrespective of habitat type and are based on the concentration of the relevant pollutants in air. Institute of Air Quality Management (IAQM) guidance (IAQM, 2020) recommends that only the annual mean Critical Level is used in assessments due to the comparative importance of annual effects to impacts upon vegetation, except where specifically required by the regulator where high short-term emissions may occur, such as from an industrial stack emission source. As such, given the consistent traffic exhaust emission source along road links, only annual mean Critical Levels were considered.

34. The Critical Levels of relevance to this assessment are detailed in Table 20.6.

Table 20.6 Critical levels

Pollutant	Critical Level	
	Concentration ($\mu g.m^{-3}$)	Measured as
Oxides of nitrogen (NO_x)	30	Annual mean
Ammonia (NH_3)	3*	Annual mean
*Critical Level is $1\mu g.m^{-3}$ if certain lichen/bryophyte species are present		

35. Critical Loads for habitat sites in the UK are published on the APIS website (CEH, 2022). These are the maximum levels of nutrient nitrogen and acid deposition that can be tolerated without harm to the most sensitive features of these habitat sites. An increase in Critical Load of less than 1% is typically considered to be insignificant, as a change in this level is within the magnitude of natural fluctuation and is unlikely to be measurable. The 1% threshold of insignificance is referenced in guidance provided by Natural England (2018), IAQM (2020) and Chapman & Kite (2021a, 2021b).

20.4.1.3 Local policy

36. The onshore project area falls within Tendring District Council's area of jurisdiction, located within Essex County Council's administrative area. The responsibility for Local Air Quality Management lies with Tendring District

Council rather than Essex County Council. Local planning policy documents and policies of relevance to the air quality assessment include:

20.4.1.3.1 Tendring District Council's Local Plan 2013-2033 and Beyond Section 1 (Tendring District Council, 2021a)

37. 'Policy SP1 Presumption in Favour of Sustainable Development' states that *"When considering development proposals the Local Planning Authorities will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. They will always work pro-actively with applicants to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area."*

20.4.1.3.2 Tendring District Council Local Plan 2013-2033 and Beyond Section 2 (Tendring District Council, 2021b)

38. 'Policy SPL 3 Sustainable Design Part C: Impacts and Compatibility' states that *"New development (including changes of use) should be compatible with surrounding uses and minimise any adverse environmental impacts. The following criteria must be met:[…] the development, including any additional road traffic arising, will not have unacceptable levels of pollution on: air."*

20.4.1.4 Guidance

39. The following guidance documents have been used within the assessment:

- Guidance on Decision-making Thresholds for Air Pollution: Main Report and Technical Report (Chapman & Kite, 2021a and 2021b).
- Guidance on the assessment of air quality impacts on designated nature conservation areas (IAQM, 2020).
- Guidance on the assessment of impacts from construction dust and fine particulate matter (IAQM, 2016).
- Design Manual for Roads and Bridges (DMRB) assessment methodology (Highways England, 2019).
- Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (Natural England, 2018).
- Land-Use Planning & Development Control: Planning For Air Quality (IAQM & EPUK, 2017).

20.4.2 Data sources

40. No primary data was collected, as it has been agreed with Tendring District Council that model verification would be undertaken using their own diffusion tube data, as part of technical engagement (Tendring District Council, pers. comm., 9 November 2022). Data sources that have been used to inform the assessment are listed in Table 20.7.

Table 20.7 Other available data and information sources

Data Set	Spatial Coverage	Year	Notes
Tendring District Council Air Quality Annual Status Report (ASR)	Tendring District Council boundary	2021	Local monitoring locations and baseline information
Defra LAQM Technical Guidance (TG22) (Defra, 2022)	UK	2022	Assessment methodology
Defra's LAQM support portal Mapped background pollutant concentrations	Study area	Assessment years (2019 to 2026)	2018-based 1km x 1km grid pollutant background maps
JNCC (Chapman & Kite, 2021a and 2021b)	UK	2021	Guidance on Decision-making Thresholds for Air Pollution: Main Report and Technical Report
Centre for Ecology and Hydrology (CEH), Air Pollution Information System (APIS)	UK	2022	Details of Critical Loads and Levels for ecological habitats

20.4.3 Impact assessment methodology

41. Chapter 6 EIA Methodology (Volume I) explains the general impact assessment methodology applied to North Falls. The following sections describe the methods used to assess the likely significant effects on air quality.

20.4.3.1 Construction phase dust and fine particulate matter

42. Assessment of potential impacts associated with construction phase dust and fine particulate matter emissions has been undertaken in accordance with the latest IAQM guidance (IAQM, 2016). The terminology and method differs from the generic impact assessment terminology presented within Chapter 6 EIA Methodology (Volume I).

43. A summary of the assessment process is provided below.

20.4.3.1.1 Assessment steps

44. The assessment steps are as follows:

    1. Screen the need for a more detailed assessment;
    2. Separately for demolition, earthworks, construction and trackout:
        a. Determine potential dust emission magnitude;
        b. Determine sensitivity of the area; and
        c. Establish the risk of dust impacts.
    3. Determine site specific mitigation; and
    4. Examine the residual effects to determine if additional mitigation is required.

45. It is anticipated that there will be no dust-generating demolition required as part of the construction phase of North Falls; therefore, this has been not considered as part of the assessment.

46. In addition, it should be noted that trackout is defined as the transport of dust and dirt from the construction site onto the public road network. Full details of the assessment methodology are provided in Appendix 20.1 (Volume III).

20.4.3.1.2 Sensitivity

47. Definitions of the different sensitivity levels for human and ecological receptors to dust (IAQM, 2016) are given in Table 20.8.

Table 20.8 Definitions of the different sensitivity levels for receptors to construction dust

Sensitivity	Sensitivity of people and property to dust soiling	Sensitivity of people to the health effects of PM_{10}	Sensitivity of ecological receptors
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.	Residential properties, hospitals, schools and residential care homes.	Internationally or nationally designated sites and features affected by dust soiling or locations with dust-sensitive species.
Medium	Parks, places of work.	Office and shop workers not occupationally exposed to PM_{10}.	Locations with important plant species or nationally designated sites with features affected by dust soiling.
Low	Playing fields, farmland, footpaths, short-term car parks and roads.	Public footpaths, playing fields, parks and shopping streets.	Locally designated sites where features may be affected by dust deposition.

20.4.3.1.3 Magnitude

48. The magnitude of construction phase dust emissions should be defined for each type of activity. These are broken down into four categories: demolition, earthworks, construction and trackout. The dust emission magnitudes can either be small, medium or large and are dependent on the methods of work undertaken and the scale of the activity.

49. The IAQM guidance provides broad ranges of the area of a site, the total building volume and the number of outward vehicle trips which are used to determine the dust emission magnitude.

50. The dust emission magnitudes for each activity are detailed in Table 20.9.

Table 20.9 Definitions of the different magnitudes of construction phase dust emissions

Activity	Criteria used to determine dust emission magnitude		
	Small	Medium	Large
Earthworks	Total site area <2,500m^2. Potentially dusty soil type (e.g. clay).	Total site area 2,500-10,000m^2. Moderately dusty soil type (e.g. silt).	Total site area >10,000m^2. Soil type with large grain size (e.g. sand)
Construction	Total building volume <25,000m^3.	Total building volume 25,000-100,000m^3.	Total building volume >100,000m^3.
Trackout	<10 outward Heavy Duty Vehicle (HDV) trips in any one day. Unpaved road length <50m.	10-50 outward HDV trips in any one day. Unpaved road length 50-100m.	>50 outward HDV trips in any one day. Unpaved road length >100m.

20.4.3.1.4 Significance of effect

51. In assessing the significance of construction dust effects using the IAQM guidance (2016), the dust emission magnitude is combined with the sensitivity of the area to determine the risk of effects prior to mitigation. This is shown in more detail in Appendix 20.1 (Volume III). This assessment deviates slightly from the methodology set out in Chapter 6 EIA Methodology (Volume I), as the IAQM guidance does not assign a significance before applying mitigation measures. Once appropriate mitigation measures have been identified as required, the significance of construction phase impacts can be determined. The IAQM considers it to be most appropriate to only assign significance post mitigation as it assumes mitigation is inherent in the design/construction approach. A matrix is therefore not provided in the guidance to determine significance. The guidance notes that, with the implementation of effective mitigation measures, the effects of dust generated during construction would be not significant.

20.4.3.2 Construction Phase NRMM Emissions

52. Defra technical guidance (Defra, 2022) states that emissions from NRMM used on construction sites are unlikely to have a significant impact on local air quality where relevant control and management measures are employed. However, intensive construction activities, for example HDD works, may temporarily increase pollutant concentrations in the vicinity of receptors.

53. In addition, the Scoping Opinion requested that *"the Applicant should seek to agree the approach to assessment of NRMM with relevant consultation bodies. The ES should explain how emissions from NRMM will be managed".* Therefore, a qualitative assessment of project-generated NRMM used during construction of the onshore cable corridor(s) and/or onshore substation has been undertaken, where impacts on receptors may occur. This approach has been agreed with Tendring District Council (pers. comm., 9 November 2022).

54. This assessment has taken into account:

- The number and type of plant to be used;
- The working hours to be employed and the duration of works;
- Distances from NRMM to the nearest human and ecological receptors;
- Existing air quality conditions in the area (based on either local monitoring (where available) and/or Defra background pollutant concentration maps (Defra, 2020a)); and
- Prevailing meteorological conditions.

55. The significance of effects have been determined using professional judgement, taking into account the factors above.

20.4.3.3 Construction road vehicle exhaust emissions

20.4.3.3.1 Traffic data

56. Traffic data for the assessment is detailed in Chapter 27 Traffic and Transport (Volume I).

57. Twenty-four-hour annual average daily traffic (AADT) flows and HGV percentages were derived for the worst-case construction year. The traffic data for the assessment is detailed in Appendix 20.2 (Volume III).

58. Traffic data has been factored to account for traffic growth between 2019 and 2026, by applying background growth factors that account for regional traffic growth from the Trip End Model Presentation Program (TEMPro), which takes into account traffic growth from committed developments (e.g. residential developments and employment developments).

20.4.3.3.2 Screening criteria and assessed road links

59. The requirement for a detailed assessment of construction vehicle exhaust emissions at human receptors has been considered using screening criteria provided by IAQM and EPUK (2017). Guidance from recently released reports by the JNCC (Chapman & Kite, 2021a and 2021b) has been used for the screening of ecological receptors, within 200m from affected road links. The assessment criteria are detailed in Table 20.10.

Table 20.10 Road traffic assessment screening criteria

Guidance Document	Receptor	Screening Criteria	
IAQM and EPUK (2017)	Human receptors	Light duty vehicles (LDVs)	A change in AADT of more than 100 within or adjacent to an AQMA, or more than 500 elsewhere.
		HDVs	An increase in HDV movements of more than 25 per day within or adjacent to an AQMA, or more than 100 elsewhere.
JNCC (Chapman & Kite, 2021a and 2021b)	Ecological receptors	AADT	An increase 0.15% or more of existing AADT (over 5 years) (i.e. the 'Decision-making Threshold' (DMT))

60. Ecological receptors are screened inclusive of in-combination traffic growth from the base year (2019) to the future base year (2026). Reasoning for this is provided in further detail in Section 20.4.3.3.

61. The increases in traffic flows on the road network associated with the construction phase of North Falls were screened using the criteria detailed in Table 20.10. All road links were anticipated to experience increases in traffic flows greater than the stringent JNCC DMT screening criteria (i.e. 0.15% of existing 2019 baseflow AADT). As such, sensitive ecological receptor locations were identified on all affected road links.

62. The road links which were predicted to experience increases in vehicle numbers and HGVs in exceedance of the human receptor screening criteria are detailed in Table 20.11.

63. More information on the derivation of the traffic flows is provided in Chapter 27 Traffic and Transport (Volume I) and the traffic data used in the assessment is provided in Appendix 20.2 (Volume III).

64. Traffic flows on the temporary haul roads along the cable corridor and within the landfall and substation areas within the onshore project area during construction have not been assessed at this stage; however, it is anticipated that the traffic flows along the haul road would not exceed the relevant screening criteria and would therefore not give rise to significant impacts. However, this assessment will be included within the ES once construction traffic numbers and access points are finalised.

Table 20.11 Human receptor screening – affected road links for North Falls (figures highlighted in a darker blue indicate traffic flows (LDV and/or HGVs) that exceed the IAQM & EPUK (2017) criteria)

Link ID	Road	Number of vehicles generated by the construction phase of North Falls (2026)	
		LDVs	HGVs
1	A120 from the A12 to the A133	434	444
2	A120 from the A133 to Harwich Road	242	444
3	A120 from Harwich Road to Bentley Road	277	444
4	Bentley Road from the A120 to Little Bromley	261	197
5	Bentley Road through Little Bromley	98	0
6	B1035 south of the A120 to Tendring Green	314	62
7	Bromley Road north of Little Bromley	98	0
8	Bromley Road south of the A137	98	0
9	A137 east-west through Lawford	0	0
10	A137 north-south through Lawford	296	0
11	Parsonage Lane and Wolves Hall Lane east of the B1035	42	0
12	Stones Green Road	42	0
13	B1035 south of the B1352	205	0
14	B1035 north of the A120	242	40
15	A120 from Bentley Road to the B1035	124	444
16	A120 from the B1035 to Colchester Road	173	444
17	Colchester Road south of the A120	170	62
18	A120 from Colchester Road to the B1352	7	444
19	A120 from the B1352 to Parkeston Road	0	444
20	A133 south of the A120	192	193
21	A133 to the B1033	205	193
22	A133 south of the B1033 to Progress Way	87	77
23	A133 south of Progress Way to the B1032	91	77
24	B1032 east of the A133 to Holland Road	97	77
25	B1032 from Holland Road to Kings Parade	80	77

Link ID	Road	Number of vehicles generated by the construction phase of North Falls (2026)	
		LDVs	HGVs
26	B1032 from Kings Parade to the south of Great Holland	139	77
27	B1032 through Great Holland	63	0
28	B1033 north of the B1032 through Kirby Cross to Pork Lane	63	0
29	B1033 from Pork Lane to the south of Thorpe-le-Soken	137	41
30	B1033 south of the B1414 through Thorpe-le-Soken	134	41
31	B1414 east of the B1033	1	0
32	B1033 north of the B1414 through Thorpe-le-Soken	133	41
33	B1033 from the B1441 to the B1035 through Weeley	122	116
34	B1033 from the A133 to the B1441	132	116
35	B1035 north of B1033 to Whitehall Lane	231	75
36	B1035 through Tendring Green from Parsonage Lane to Stones Green Road	195	0
37	B1035 north of Whitehall Lane to Swan Road	231	75
38	B1035 through Goose Green	153	0
39	B1035 north of Swan Road to the south of Tendring	231	75
40	B1035 through Tendring to Crown Lane	148	0
41	Crown Lane	5	0
42	B1035 from Crown Lane to Lodge Lane	153	0

20.4.3.3.3 Assessment scenarios

65. The onshore construction works for North Falls are expected to occur over an approximate 18 to 24 month period from 2026 at the earliest. To provide a conservative assessment, the maximum annual average project-generated traffic across the construction period has been combined with the earliest year of construction, where pollutant emission rates and background concentrations would be higher than in the later years of construction.

66. The average construction traffic flows were used to derive a representative AADT for the purposes of the air quality assessment. Peak construction flows were not used in the assessment, as peak construction would occur over a one or two month period (at worst) and using these to derive AADT across a full year would unrealistically inflate the impacts of construction generated traffic. The use of average construction flows has been deemed to be robust and a more appropriate representation of construction impacts from traffic over an

annual period, and aligns with the requirement for use of AADT flows in consideration of the resulting annual average pollutant concentrations, as set out in Defra Technical Guidance (Defra, 2022).

67. The assessment has therefore considered the following three scenarios:

- Verification / base year (2019);
- Earliest year of construction (2026) 'without North Falls';
- Earliest year of construction (2026) 'with North Falls'.

68. A base year of 2019 has been used in the assessment as it was considered that conditions in 2020 (or 2021) would not provide a representative baseline due to the Covid-19 outbreak in March 2020. Therefore, it would not be possible to represent short or longer term impacts on emissions in 2020 (and 2021) as a result of behavioural changes during national or local lockdowns within the dispersion model.

20.4.3.3.4 Background pollutant concentrations

69. The assessment requires the derivation of background pollutant concentration data that are factored to the year of assessment, to which contributions from the assessed roads are added.

70. For NO_2, 2019 background monitoring undertaken by Tendring District Council has been used in the assessment. Future year background concentrations were calculated by applying the ratio of the 2019 to 2026 Defra mapped background value, obtained from the UK Air website, (Defra, 2020a) to the 2019 monitored value. This approach has been agreed with the Environmental Protection Officer at Tendring District Council (pers. comm., 9 November 2022) .

71. Due to the absence in monitoring data for PM_{10} and $PM_{2.5}$, the latest 2018-based Defra background maps (Defra, 2020a) for the grid square corresponding to sensitive receptor locations were used in the assessment, for the for the 2019 and 2026 assessment years.

72. Background NH_3, nutrient nitrogen and acid deposition concentrations were obtained from the APIS website (CEH, 2022) and are provided for 5km x 5km grid squares. The data are provided as three-year averages (2017-2019) and are not factored forward to future years.

20.4.3.3.5 Human receptor assessment methodology

Dispersion model

73. The potential impact of exhaust emissions from construction-generated road vehicles accessing the onshore project area has been assessed using the Atmospheric Dispersion Modelling System for Roads (ADMS-Roads) v5.0.1.3. The main pollutants of concern for human health as a result of vehicle emissions are annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$. Concentrations of these pollutants were therefore the focus of the ADMS-Roads assessment.

74. Detailed dispersion modelling has not been undertaken for ecological receptors as a semi-quantitative approach has been taken, using data provided by the JNCC (Chapman & Kite, 2021a and 2021b) to consider impacts at designated sites. This is discussed in further detail in Section 20.4.3.3.6.

Traffic data

75. Twenty-four hour AADT flows and HGV percentages were derived for the worst-case construction year. The traffic data for the assessment is detailed in Appendix 20.2 (Volume III).

76. Traffic speeds were included in the air dispersion model as follows:

- Large roundabouts were modelled at 40km/h;
- Small roundabout and queues were modelled at 20km/h; and
- Speed data for free-flowing traffic conditions were obtained from average speeds recorded during the traffic count surveys (discussed in Chapter 27 Traffic and Transport (Volume I)) where applicable, or national speed limits.

Emission factors

77. Emission factors were obtained from the Emission Factor Toolkit (EFT) v11.0 provided by Defra (Defra, 2021a). 2019 emission factors were used in the verification/base year assessment and emission factors for 2026 were used in the future year 'without' and 'with' North Falls scenarios.

78. There has historically been uncertainty in the future vehicle emissions projections in previous versions of the EFT, particularly v8.0 and earlier. However, evidence was published to suggest that v9.0 of the EFT onwards provide a reasonable prediction of vehicle emissions into the future and therefore sensitivity testing is not required (Air Quality Consultants, 2020). Given this evidence, the use of 2026 emission factors in the assessment is considered to be appropriate.

79. The use of future year emission factors has been agreed with the Environmental Protection Officer at Tendring District Council during technical engagement (pers. comm., 9 November 2022).

80. The default fleet projections in EFT v11.0 are based on fleet growth assumptions which were current before the Covid-19 outbreak in the UK. In consequence, default fleet outputs from the tool do not reflect short- or longer-term impacts on emissions in 2020 or beyond resulting from behavioural change during the national or local lockdowns (Defra, 2021b).

Meteorological data

81. The two closest meteorological stations to the onshore project area are Wattisham and Shoeburyness, located 31.6km to the north-west and 39.4km to the south-west respectively. Wattisham station is located considerably further inland than the study area and the difference in elevation is 61.3m. Shoeburyness station borders the coastline and therefore the meteorological conditions experienced will be heavily influenced by the North Sea. In addition, the missing data in 2019 was 19.4%.

82. The next closest station is at Southend, located 43km to the south-west, with an elevation difference of -10.7km. This station is located 12km from the coastline, which is expected to be more representative of the general study area. The missing data in 2019 was 1.7%, and therefore data from the Southend station is considered to be more representative of the overall study area.

83. The use of the 2019 Southend recording station data has been agreed with the Environmental Health Officer at Tendring District Council during technical engagement (pers. comm., 9 November 2022).

Model verification

84. Model verification is the process of adjusting model outputs to improve the consistency of modelling results with respect to available monitored data. In this assessment, model uncertainty has been minimised following Defra (2022) and IAQM and EPUK (2017) guidance.

85. Dispersion models may perform differently at background, roadside, and kerbside sites. Therefore, as the assessment is mainly concerned with predicted pollutant concentrations near the roadside, only roadside monitoring sites located within the study area were used for the purpose of model verification and adjustment.

86. Monitoring locations within the study area were reviewed to establish the suitability for use in model verification. Locations were considered where the assessed road links provided sufficient representation of road traffic sources that would affect monitored concentrations at that point. Monitoring locations that were situated in proximity to several road links for which traffic data were not provided were discounted on the basis that modelled concentrations would be underestimated.

87. A review of the monitoring data identified six roadside NO_2 diffusion tubes located on the considered road network with available data for 2019. These diffusion tubes and the reason for their inclusion or exclusion in the verification process are detailed in Table 20.12.

88. As detailed previously in Section 20.4.3.3.3, a base year of 2020 has not been used in the assessment, as it was considered that monitored concentrations in 2020 would not be representative due to the Covid-19 outbreak in March 2020. Therefore it would not be possible to represent short or longer term impacts on emissions in 2020 in the dispersion model as a result of behavioural changes during national or local lockdowns.

Table 20.12 Model verification diffusion tubes

Site ID	Site Description	Site Type (from TDC's ASR)	Included or Excluded	Reasoning
DT14	Bypass A133	Roadside	Included	DT14, DT15 and DT16 are located in triplicate on Link 22. From satellite imagery the diffusion tube appears to be located within 1m of the kerb of A133. With reference to the Defra Technical Guidance (Defra, 2022), this site would therefore be classed as a kerbside site. Kerbside sites are generally not recommended for the adjustment of road traffic modelling results as the inclusion of these sites may lead to an over-adjustment of modelling at roadside sites. However, the classification allocated by Tendring District Council has been retained and the site has been included in the
DT15	Bypass A133	Roadside	Included	
DT16	Bypass A133	Roadside	Included	

Site ID	Site Description	Site Type (from TDC's ASR)	Included or Excluded	Reasoning
				verification process as this provides a robust, conservative assessment.
DT19	A120 Wix	Roadside	Included	DT19 is located on Link 18. The site is a suitable roadside monitoring site.
DT20	A120	Roadside	Included	DT20 is located on Link 16. The diffusion tube is located between the two lanes of the A120 dual carriageway and within 1m of the kerb of the west bound lane. With reference to Defra Technical Guidance (Defra, 2022), this site would therefore be classed as a kerbside site. As mentioned above, kerbside sites are generally not recommended for the adjustment of road traffic modelling; however, the site has been included to provide a robust assessment.
DT18	Bathside Bay	Roadside	Excluded	DT18 is located on Link 19 at Bathside Bay. The 2019 monitored concentration has been 13.9µg.m^{-3} which is comparable with the concentration recorded at the urban background triplicate sites DT11, DT12 and DT13 (13.8µg.m^{-3}) and the Defra background map concentration for the corresponding grid square (13.1µg.m^{-3}) for 2019. It was therefore considered that DT18 is more representative of background concentrations rather than roadside and has been excluded from model verification.

89. Details of the NO_2 model verification process, undertaken using 2019 monitoring data, are provided in Table 20.13.

Table 20.13 Model verification (the adjustment factor is highlighted in bold)

Model Verification	NO_2 Monitoring Location				
	DT14	DT15	DT16	DT19	DT20
2019 Annual Mean Monitored Total NO_2 Concentration (µg.m^{-3})	31.5	32	31.4	23.2	20.7
2019 Annual Mean Background NO_2 Concentration* (µg.m^{-3})	13.8	13.8	13.8	13.8	13.8
Monitored Road Contribution NOx (total - background) (µg.m^{-3})	34.7	35.7	34.5	17.7	12.9
Modelled Road Contribution NOx (excludes background) (µg.m^{-3})	9.6	9.6	9.6	7.0	7.3

Model Verification	NO_2 Monitoring Location				
	DT14	DT15	DT16	DT19	DT20
Ratio of Monitored Road Contribution NOx / Modelled Road Contribution NOx	3.6	3.7	3.6	2.5	1.8
Adjustment Factor for Modelled Road Contribution					**3.2**
Adjusted Modelled Road Contribution NOx ($\mu g.m^{-3}$)	31.1	31.1	31.1	22.7	23.5
Modelled Annual Mean Total NO_2 (based on empirical NOx / NO_2 relationship) ($\mu g.m^{-3}$)	29.8	29.8	29.8	25.7	26.1
Monitored Annual Mean Total NO_2 ($\mu g.m^{-3}$)	31.5	32	31.4	23.2	20.7
% Difference [(modelled - monitored) / monitored] x 100	-5%	-7%	-5%	11%	26%
*Obtained from the averaged 2019 concentrations recorded at the urban background triplicate monitoring sites DT11, DT12 and DT13.					

90. The Root Mean Square Error (RMSE) is "used to define the average error or uncertainty of the model" and should be within the ideal value of $4\mu g.m^{-3}$ (i.e. 10% of the annual mean NO_2 Objective of $40\mu g.m^{-3}$), as specified in Defra technical guidance (TG22) (Defra, 2022). If the RMSE value is higher than ± 25% of the Objective (i.e. $10\mu g.m^{-3}$), Defra guidance recommends that model inputs and verification should be revised. The RMSE of the model was $3\mu g.m^{-3}$. Model performance in this assessment was therefore considered to be suitable, as the RMSE was within the ideal value.

91. There is no monitoring of PM_{10} and $PM_{2.5}$ carried out along the links included in the air quality assessment. Therefore, the derived NOx adjustment factor has been applied to the modelled PM_{10} and $PM_{2.5}$ concentrations to provide a conservative assessment (in accordance with guidance in LAQM TG(22) (Defra, 2022)).

NOx to NO_2 conversion

92. NOx concentrations were predicted using the ADMS-Roads model. The modelled road contribution of NOx at the identified receptor locations was then converted to NO_2 using the NOx to NO_2 calculator (v8.1) (Defra, 2020b), in accordance with Defra guidance (Defra, 2022).

Calculation of short-term pollutant concentrations

93. Defra guidance (Defra, 2022) sets out the method for the calculation of the number of days, in which the PM_{10} 24-hour Objective is exceeded, based on a relationship with the predicted PM_{10} annual mean concentration. The relevant calculation utilised in the prediction of short-term PM_{10} concentrations was:

$$No.\,24\ hour\ mean\ exceedance = -18.5 + 0.00145\ x\ (annual\ mean)^3 + (\frac{206}{annual\ mean})$$

94. Research projects completed on behalf of Defra and the Devolved Administrations (Laxen and Marner, 2003; AEA Technology, 2008) concluded that the hourly mean NO_2 Objective is unlikely to be exceeded if annual mean concentrations are predicted to be less than 60 $\mu g.m^{-3}$. This value has therefore been used as an annual mean equivalent threshold to evaluate likely exceedance of the hourly mean NO_2 Objective.

Sensitivity

95. The sensitivity of a human receptor is not considered in the assessment of air quality impacts; the air quality Objectives in Table 20.5, which are health-based, only apply at locations where there is relevant public exposure as detailed in Table 20.14.

Table 20.14 Examples of where the air quality objectives should and should not apply

Averaging Period	Objectives should apply to:	Objectives should generally not apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes, etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-hour mean	All locations where the annual mean Objective would apply, together with hotels and gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual and 24-hour mean Objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

96. Sensitive receptor locations that experience pollutant concentrations close to, or in exceedance of the Objectives experience a larger impact magnitude with a smaller change in pollutant concentrations, as detailed below.

Magnitude and significance

97. Guidance is provided by the IAQM and EPUK (IAQM and EPUK, 2017) on determining the magnitude and significance of a project's effects on local air quality. The guidance was developed specifically for use in planning and assessing air quality effects associated with mixed-use and residential developments. However, due to the nature of the Project, the criteria detailed below were utilised in the assessment to provide consideration of the effects associated with North Falls.

98. The effect descriptors that take account of the magnitude of changes in pollutant concentrations, and the concentration in relation to the air quality Objectives, are detailed in Table 20.15.

Table 20.15 Impact descriptors for individual receptors

Long term average concentration at receptor in assessment year	% Change in Concentration Relative to the Air Quality Objective			
	1	2 to 5	6 to 10	>11
75% or less of Objective	*Negligible*	*Negligible*	*Slight*	*Moderate*
76 – 94% of Objective	*Negligible*	*Slight*	*Moderate*	*Moderate*
95 – 102% of Objective	*Slight*	*Moderate*	*Moderate*	*Substantial*
103 – 109% of Objective	*Moderate*	*Moderate*	*Substantial*	*Substantial*
110% or more of Objective	*Moderate*	*Substantial*	*Substantial*	*Substantial*
Note: Figures are to be rounded up to the nearest round number. Any value less than 1% after rounding (effectively less than 0.5%) will be described as "Negligible".				

99. Further to the determination of the effects upon individual receptors, the guidance recommends that assessment is made of the overall significance of the effects from a development on local air quality, which should be a binary judgement (i.e. significant or not significant). The overall significance will need to take into account the following factors:

- The existing and future air quality in the absence of North Falls;
- The extent of current and future population exposure to the effects; and
- The influence and validity of any assumptions adopted when undertaking the prediction of effects.

100. The guidance also states that a judgement of the significance should be made by a competent professional who is suitably qualified. This air quality assessment and determination of the significance of North Falls on local air quality has been undertaken by members of the IAQM.

20.4.3.3.6 Ecological receptor assessment methodology

101. The JNCC recently published a suite of documents (Chapman & Kite, 2021a and 2021b) which provide guidance on cumulative and in-combination effects assessment for projects and plans which generate increases in atmospheric nitrogen emissions. The reports deal with identifying thresholds for road traffic flow increases, above which detailed assessment of the effects upon Critical Level and/or Critical Loads for nitrogen at nearby designated sites would be required. The reports were solely concerned with the effects arising as a result

of permanent and lasting changes (increases) in operational phase road traffic flows, associated exhaust emissions of NH_3 and NO_x and consequent permanent effects on designated sites.

102. While any potential effects of North Falls traffic emissions on ecological sites during construction will be short-term, transient and temporary, the guidance, screening criteria and methodology provided in JNCC reports were used for this assessment of ecological receptors. The JNCC reports provide data on the magnitude of increases in pollutant concentrations and deposition (NO_x, NH_3, N-dep and acid) with different levels of traffic generation experienced, at varying distances from the road, based on detailed modelling and monitoring measurements. The JNCC Technical Report (Chapman & Kite, 2021b) states that the road-relevant approach provided in the report is expected to provide robust and representative, albeit indicative, information which will often be better than a detailed model if that model has not been verified against measurements. As such, the consideration of effects on designated ecological sites has been undertaken using a semi-quantitative approach, using the data provided within the JNCC reports, without project-specific detailed dispersion modelling.

103. Use of the JNCC guidance has allowed for a more conservative assessment of any potential road traffic emission impacts on ecological receptors, as the 0.15% increase in AADT screening criterion (or DMT) is more stringent than the screening criteria of a 1,000 AADT or 200 HGV increase provided in Natural England (2018), IAQM (2020) and Highways England (2019). As such, a greater number of links, and therefore a greater number of ecological receptors, have been screened into the assessment.

104. As discussed in Section 20.4.3.3.1, and provided in Table 20.10, the first step of the ecological assessment was to screen the road links for increases in AADT (inclusive of (a) project-generated traffic, and (b) 2019 to 2026 baseline traffic growth – see the following section) greater than a DMT of 0.15% of existing 2019 AADT flows. This resulted in the screening in of all road links considered in the assessment. Following this, a search of ecological receptors within 200m of these road links with habitats/features sensitive to air pollutants has then been undertaken. The ecological receptors present within 200m of road links are presented in Table 20.22, as well as reasoning for their inclusion/exclusion in the assessment.

In-combination assessment

105. A project or plan in isolation may not lead to significant effects, however the 2017 EIA Regulations require the consideration of effects associated with a project or plan both in isolation, and in addition to other plans or projects which may affect the same designated site (an ‘in-combination’ assessment). The outcome of recent court judgements (notably the Wealden Judgement (Wealden DC v SoS and Lewes DC [2017] EWHC 351 (Admin)) in 2017) has led to the requirement for the 1% criterion to be applied to the in-combination effect to determine whether effects remain insignificant, or whether further ecological investigation is required. As such, effects on ecological sites are therefore inherently considered cumulatively.

106. The road links which pass alongside the designated sites considered in the assessment will experience background traffic growth between the base year

(2019) and the year of earliest construction (2026), which may increase nutrient nitrogen/acid deposition or NOx at the designated sites. These in-combination effects have been considered in the impact assessment (see Section 20.6.1.3.2).

107. In addition, any consented agricultural or industrial projects in the vicinity of designated sites which may be affected by traffic generated by North Falls may also contribute to in-combination nutrient nitrogen/acid deposition and NOx concentrations. Natural England developed SSSI Impact Risk Zones (IRZs) which specify the types of projects which may impact on SSSIs based on the distance from the site, as shown in Table 20.16.

108. At present, the in-combination assessment does not take into consideration in-combination impacts from agricultural or industrial projects. However, for the ES these IRZ criteria will be applied to relevant habitats and features within Special Areas of Conservation (SACs), Special Protection Areas (SPAs), ancient woodlands and Local Nature Reserves (LNRs), in addition to SSSIs, to provide a conservative in-combination assessment.

Table 20.16 Natural England's SSSI IRZ

Distance from Designated Site	Proposals, permissions and permits	
	Air Pollution	Combustion
0 to 0.05km	All planning applications, except householder applications	
0.05 to 0.2km	Any development that could cause air pollution or dust either in its construction or operation (including industrial/commercial processes, livestock and poultry units, slurry lagoons and digestate stores, manure stores). All general combustion processes including energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.	All general combustion processes. Including: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.
0.2 to 0.5km	Any development that could cause air pollution (including industrial/commercial processes, livestock and poultry units, slurry lagoons and digestate stores, manure stores). All general combustion processes including energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.	
0.5 to 2km	Any industrial/agricultural development that could cause air pollution (including industrial processes, livestock and poultry units with floorspace > 500m², slurry lagoons and digestate	General combustion processes >20MW energy input. Including: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic

Distance from Designated Site	Proposals, permissions and permits	
	Air Pollution	Combustion
	stores > 200m², manure stores > 250t). General combustion processes >20MW energy input including energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.	digestion, sewage treatment works, other incineration/ combustion.
2 to 5km	Any industrial/agricultural development that could cause air pollution (including industrial processes, livestock and poultry units with floorspace > 500m², slurry lagoons and digestate stores > 750m², manure stores > 3500t). General combustion processes >50MW energy input including energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.	General combustion processes >50MW energy input. Including: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/combustion.

109. A search will be carried out for projects within the relevant distances of each ecological receptor screened into the assessment (see Table 20.22) which meet the above criteria. Additional contributions of nutrient nitrogen from these sources (from both NO_2 and NH_3) and airborne NOx will be included in the 'in-combination' assessment, where sufficient information is included within the application to quantify these emissions.

110. This approach to the assessment is also in accordance with the requirements of IAQM Guidance on the Assessment of Air Quality Impacts on Designated Nature Conservation Sites (IAQM, 2020).

Sensitivity

111. Designated ecological sites were considered only where they are sensitive to the effects of air pollution. Whilst Critical Levels (see Table 20.6) apply regardless of habitat type, Critical Loads are habitat-specific and take into account the sensitivity of each habitat to nitrogen or acidifying effects (see Table 20.25).

Magnitude and significance

112. It should be noted that European sites are considered in the Project's Habitats Regulations Assessment (HRA) Screening Report and Report to Inform Appropriate Assessment, published alongside this PEIR. This assessment has considered the impact on the qualifying features and habitats within those sites.

113. An increase in Critical Load or Level of less than 1% is typically considered to be insignificant, as a change of this magnitude is likely to be within the natural range of fluctuations in deposition and is unlikely to be perceptible. The 1% threshold of insignificance is referenced in Natural England (2018), IAQM

(2020) and Chapman & Kite (2021a, 2021b). The exceedance of a threshold is not decisive in and of itself, nor does it suggest that damage is likely to occur (in the case of SSSIs) or that it will not be possible to avoid adverse effects to site integrity (in the case of European sites) (Chapman & Kite, 2021a).

114. Using the JNCC reports (Chapman & Kite, 2021a and 2021b), it is possible to apply a road-relevant approach based on the distance between the affected road and the nearest boundary of a (European) designated site. The thresholds proposed in the JNCC reports focus on SSSI and European designated sites; however, they have also been applied to ancient woodlands and LNRs in this assessment in order to provide a conservative and robust assessment.

115. Table 20.17 provides the AADT change which is required to trigger an exceedance of 1% of the Critical Level for NOx and NH_3 at different distances from a roads edge. Table 20.18 contains similar values for nutrient nitrogen deposition (N-dep) Critical Loads at different distances from a road edge. As discussed above, the 1% threshold is taken from the Natural England (2018) guidance document on the assessment of traffic emissions as the threshold of insignificance to be applied as part of an in-combination assessment. It should be noted that these tables are based on an average vehicle fleet mix in 2019 for NOx and 2015 for NH_3; as such, changes in emissions of these pollutants into the future is not accounted for.

Table 20.17 AADT changes (for a typical fleet composition) required to cause a change of 1% of critical levels as a function of distance from the edge of a road (Chapman & Kite, 2021b) [Amended]

Distance from Road Edge (m)	AADT		
	1% CL for NOx ($30\mu g.m^{-3}$)	1% CL for lower NH3 ($1\mu g.m^{-3}$)	1% CL for higher NH3 ($3\mu g.m^{-3}$)
1	120	91	274
5	171	259	776
5-10	225	332	995
10	278	405	1,214
10-25	413	568	1,704
25	547	731	2,194
25-50	732	938	2,814
50	917	1,145	3,434
50-100	1,269	1,468	4,403
100	1,620	1,791	5,372
100-150	2,015	2,059	6,176
150	2,410	2,327	6,980
150-200	2,917	2,565	7,693
200	3,424	2,802	8,406
Colour coding:			
	AADT provided in the JNCC report (Chapman & Kite, 2021b)		
	Approximate AADT calculated from averaging AADT flows provided in the JNCC report for each distance band (Chapman & Kite, 2021b) (i.e. 100-150m band =		

Distance from Road Edge (m)	AADT		
	1% CL for NOx ($30\mu g.m^{-3}$)	1% CL for lower NH3 ($1\mu g.m^{-3}$)	1% CL for higher NH3 ($3\mu g.m^{-3}$)
	average of 1,620 AADT (100m 1% CL for NOx) and 2,410 AADT (150m 1% CL for NOx))		

Table 20.18 AADT changes (for a typical fleet composition) required to cause a change of 1% of critical loads as a function of distance from the edge of a road (Chapman & Kite, 2021b) [Amended]

Distance from Road Edge (m)	AADT			
	1% CL for N-Dep (5 kg-N.ha^{-1}.yr^{-1})	1% CL for N-Dep (10 kg-N.ha^{-1}.yr^{-1})	1% CL for N-Dep (15 kg-N.ha^{-1}.yr^{-1})	1% CL for N-Dep (20 kg-N.ha^{-1}.yr^{-1})
Deposition to Woodland				
1	35	71	106	142
5	86	171	257	343
5-10	106	211	317	423
10	125	251	376	502
10-25	166	333	499	666
25	207	415	622	829
25-50	255	511	766	1,021
50	303	606	909	1,212
50-100	373	747	1,120	1,493
100	443	887	1,330	1,773
100-150	499	998	1,496	1,994
150	554	1,108	1,661	2,215
150-200	601	1,203	1,803	2,405
200	648	1,297	1,945	2,594
Deposition to Short Vegetation				
1	59	118	177	236
5	145	291	436	582
5-10	180	360	540	720
10	215	429	644	858
10-25	287	573	860	1,146
25	359	717	1,076	1,434
25-50	444	888	1,332	1,775
50	529	1,058	1,587	2,116
50-100	655	1,310	1,964	2,619
100	780	1,561	2,341	3,121
100-150	880	1,760	2,640	3,520
150	980	1,959	2,939	3,918
150-200	1,066	2,131	3,196	4,261

Distance from Road Edge (m)	AADT 1% CL for N-Dep (5 kg-N.ha^{-1}.yr^{-1})	1% CL for N-Dep (10 kg-N.ha^{-1}.yr^{-1})	1% CL for N-Dep (15 kg-N.ha^{-1}.yr^{-1})	1% CL for N-Dep (20 kg-N.ha^{-1}.yr^{-1})
200	1,151	2,302	3,453	4,604
Colour coding:				
	AADT provided in the JNCC report (Chapman & Kite, 2021b)			
	Approximate AADT calculated from averaging AADT flows provided in the JNCC report for each distance band (Chapman & Kite, 2021b)			

116. As an example, whereby an affected road with an existing AADT of 5,000 is located 100m from the boundary of an ecological site (for which a Critical Load to a woodland feature of 10 kg-N.ha-1.yr-1 applies), a DMT of 7.5 vehicles applies (i.e. 0.15% of 5,000). However, the DMT is derived on a precautionary basis which assumes that a designated site is adjacent to the road concerned. It can be seen from Table 20.18 that a change in AADT of 887 vehicles would be required to trigger the 1% exceedance of the N-dep Critical Load at the site boundary, for this particular example. In this example, if the predicted change in traffic along the road from the development is 150 AADT, it may be reasonable to assert that there is no credible evidence that the effects of other plans and projects would ever be such to lead to an overall change of 887 AADT over the lifetime of the Project, in spite of the fact that the DMT (7.5 vehicles) is exceeded.

117. The distances from ecological receptor boundaries to affected road edges has therefore been taken into consideration in the next stage of ecological receptor screening. AADT flows (inclusive of (a) project-generated traffic and (b) background 2019 to 2026 traffic growth) were compared to those in Table 20.17 and Table 20.18, and ecological receptors were brought forward into the next stage of the ecological assessment if they exceeded thresholds corresponding to a 1% increase in the Critical Level or Load for the relevant habitat present in designated site.

118. These initial ecological receptor screening stages are shown in Appendix 20.3 (Volume III) for North Falls in isolation and in-combination with background traffic growth. Site-specific Critical Levels and Critical Loads are presented in Table 20.25, and these have been taken into consideration in the comparison to AADT flows shown in Table 20.17 and Table 20.18. Only links with ecological receptors within 200m of the roads edge are presented in Appendix 20.3 (Volume III).

119. Of the 15 ecological sites initially identified (this number includes some ecological sites more than once as, due to their size, they are within 200m of more than one road link) initially screened in (i.e. for being within 200m of affected road link(s)), 14 ecological sites have been brought forward for further assessment. This is because the AADT at the relevant distance from the road edge to the ecological site boundary exceeded those representative of greater than 1% increase in Critical Level and/or Load (see Table 20.17 and Table 20.18). Not all of the 14 ecological sites exceed the representative 1% AADT flows for all Critical Level and Critical Load values (for example, there may be

an impact of greater than 1% of the nitrogen Critical Load but not the NO_x Critical Level); therefore, ecological sites have only been assessed further for Critical Levels and/or Loads shown to be in exceedance of 1%. In addition, for some ecological sites not all of the designated features and Critical Load classes are exceeded, so only those in exceedance have been considered further in this assessment.

120. Following this detailed initial screening of ecological sites, those sites screened in for further assessment were assessed for effects from traffic emissions using the guidance and methodology provided in the JNCC reports (Chapman & Kite, 2021a and 2021b). Table 11 of the JNCC Technical Report (Chapman & Kite, 2021b) provides changes in concentrations (2019) and fluxes (2015) that could reasonably be expected from an increase of 1,000 AADT on a typical road. The guidance also states that these can be scaled to represent alternative increases in traffic flows, for example an increase in 250 AADT results in 25% of the impact of the values shown in Table 20.19, which is a slightly amended version of Table 11 in the JNCC Technical Report.

121. This approach has been adopted to quantify increases in annual mean NOx and NH_3, and N-dep in this assessment. The relationship between N-dep and its acidifying potential is linear, so a 1 kg $N.ha^{-1}.yr^{-1}$ reduction will always deliver a 0.07 $keq.ha^{-1}.yr^{-1}$ reduction in acidity. Therefore, increases in nitrogen-driven acidity, i.e. those from road traffic vehicle emissions, is directly proportional to increases in N-dep (Chapman & Kite, 2021b). Acid deposition has therefore been quantified in the assessment by multiplying the N-dep concentration by 0.07.

Table 20.19 Change in concentration (in 2019) and flux (in 2015) for an example flow of 1,000 AADT in a typical vehicle fleet (Chapman & Kite, 2021b) [Amended]

Distance from Road Edge (m)	Annual Mean NOx ($\mu g.m^{-3}$)	Annual Mean NH_3 ($\mu g.m^{-3}$)	N-Dep to Forest ($kgN.ha^{-1}.yr^{-1}$)	N-Dep to Short Vegetation ($kgN.ha^{-1}.yr^{-1}$)
1	2.5	0.109	1.41	0.85
5	1.8	0.039	0.58	0.34
5-10	1.45	0.032	0.49	0.285
10	1.1	0.025	0.4	0.23
10-25	0.825	0.0195	0.32	0.185
25	0.55	0.014	0.24	0.14
25-50	0.44	0.01135	0.2	0.1175
50	0.33	0.0087	0.16	0.095
50-100	0.26	0.00715	0.135	0.0795
100	0.19	0.0056	0.11	0.064
100-150	0.155	0.00495	0.1	0.0575
150	0.12	0.0043	0.09	0.051
150-200	0.1065	0.00395	0.0835	0.047
200	0.093	0.0036	0.077	0.043

Distance from Road Edge (m)	Annual Mean NOx ($\mu g.m^{-3}$)	Annual Mean NH_3 ($\mu g.m^{-3}$)	N-Dep to Forest ($kgN.ha^{-1}.yr^{-1}$)	N-Dep to Short Vegetation ($kgN.ha^{-1}.yr^{-1}$)
Colour coding:				
	Concentration/flux provided in the JNCC report (Chapman & Kite, 2021b)			
	Approximate concentration/flux calculated from averaging concentration/flux provided in the JNCC report for each distance band (Chapman & Kite, 2021b)			

North Falls alone compared to in-combination traffic flows

122. As detailed at the beginning of this section, an in-combination assessment has been undertaken to provide context around the proportion of AADT generated as a result of North Falls, and that from background traffic growth. Table 20.20 provides comparison between project-generated construction traffic flows and background traffic growth between 2019 (base year) and 2026 on all road links where a designated ecological site is present within 200m.

Table 20.20 North Falls AADT flows compared to in-combination project flows considered in the assessment (2026)

Link	Link Description	Project AADT	In-combination AADT	Project as % of Total
1	A120 from the A12 to the A133	878	5,788	15.2%
10	A137 north-south through Lawford	296	1,636	18.1%
19	A120 from the B1352 to Parkeston Road	444	1,598	27.8%
21	A133 to the B1033	397	3,805	10.4%
22	A133 south of the B1033 to Progress Way	164	2,581	6.4%
39	B1035 north of Swan Road to the south of Tendring	306	552	55.4%

123. As can be seen from Table 20.20, project-generated traffic contributes to approximately 6% to 28% of overall in-combination AADT, with the exception of Link 39 which has a low total AADT and therefore Project traffic contributes to a higher proportion of AADT increase, but no greater than 306 AADT.

124. Any development-generated or in-combination values above 1% of the Critical Load or Level requires additional assessment by an ecologist to determine whether any significant effects may be experienced at the affected habitats. The determination of the significance of effects associated with nutrient nitrogen/acid deposition and airborne NOx concentrations is detailed in Chapter 23 Onshore Ecology (Volume I) and Chapter 24 Onshore Ornithology (Volume I).

20.4.4 Cumulative effects assessment methodology

125. The CEA considers other plans, projects and activities that may result in cumulation with North Falls. Chapter 6 EIA Methodology (Volume I) provides further details of the general framework and approach to the CEA.

126. For air quality, these activities include other projects which have the potential for a temporal and geographical overlap with similar effects arising from:

- Construction dust and fine particulate matter;
- NRMM emissions; and
- Construction phase road traffic emissions.

127. The CEA utilised the same methodology as detailed above in Section 20.4.3. Further information is presented in Section 20.7.3.

20.4.5 Transboundary effects assessment methodology

128. There are no transboundary effects with regards to onshore air quality as the onshore development area is not sited in proximity to any international boundaries, and any effects would be localised. Transboundary effects are therefore scoped out of this assessment and were not considered further.

20.4.6 Assumptions and limitations

129. Traffic data were utilised in the prediction of impacts at sensitive human and ecological receptor locations. Any assumptions made in the derivation of the traffic data are therefore applicable to the air quality assessment. For further details please refer to Chapter 27 Traffic and Transport (Volume I).

130. Diffusion tube monitoring is a standard indicative monitoring method used by local authorities to measure air quality within their administrative areas. Diffusion tubes do not provide the same level of precision and accuracy as automatic monitoring methods; however, good quality assurance and quality control processes will minimise uncertainties insofar as possible. Furthermore, annual mean diffusion tube monitoring results are adjusted for bias using a factor derived using the Monitoring Certification Scheme (MCerts) reference method monitoring equipment. The uncertainties and limitations to monitored air pollution data are therefore unlikely to significantly affect the certainty of the EIA.

131. Background pollutant concentrations within the air quality study area for PM_{10} and $PM_{2.5}$ were derived using the pollution maps provided by Defra for 1km x 1km grid squares across the UK. These data are derived using an empirical model, calibrated using monitoring data from the UK Automatic Urban and Rural Network and, as such, there are inherent uncertainties associated with modelled data. However, the use of these maps is an industry-standard approach and has been agreed with stakeholders during consultation (see Table 20.1). Uncertainties in these mapped background values are unlikely to significantly affect the certainty of the EIA and the conclusions of the assessment.

132. The latest version of Defra's air quality assessment tools, including the background pollutant maps, are based on assumptions prior to the Covid-19 pandemic. As such, the tools do not reflect any short or long-term changes to emissions which may have occurred as a result of behavioural change during the pandemic.

20.5 Existing environment

133. A desk-based review has been undertaken to determine the air quality baseline within the study area. Monitoring data were obtained from Tendring District Council's website as well as supplied by the Environmental Protection Officer for use in the assessment (Pers. comm., 9 November 2022).

134. The characterisation of the existing environment has been undertaken using data sources listed in Table 20.7. The baseline data sources are sufficient to provide an assessment of potential air quality impacts arising from North Falls and were agreed with Tendring District Council during technical engagement (pers. comm., 9 November 2022).

20.5.1 Local Air Quality Management (LAQM)

135. The onshore cable corridor(s) and associated road links which will experience increases in project-related traffic do not pass through or adjacent to any statutory designated AQMAs.

136. The statutory designated Area 1 AQMA in Colchester, declared in 2018 by Colchester Borough Council for exceedances of the NO_2 hourly and annual mean, is located approximately 3.4km south of the A120, which forms part of the assessed road network. However, as North Falls generated traffic would not pass through the AQMA itself, it is not anticipated that, given the distance, there would be any significant increases in pollutant concentrations within the AQMA as a result of North Falls.

20.5.2 Air quality monitoring data

137. Tendring District Council undertakes ambient air quality monitoring within the air quality study area using NO_2 diffusion tubes. The Tendring District Council monitoring network was amended in 2020; therefore, results were obtained from the 2021 ASR (provided by Tendring District Council's Environmental Protection Officer and the latest available when the assessment was undertaken) (Tendring District Council, 2022) as well as the 2019 ASR (Tendring District Council, 2019) and are presented in Table 20.21.

Table 20.21 Annual mean NO_2 monitoring undertaken by Tendring District Council

Site ID	Location	Site Type	Monitored Annual Mean NO_2 Concentration ($\mu g.m^{-3}$)				
			2016	2017	2018	2019	2020
DT11	Town Hall Clacton	Urban Background	14.2	17	13.7	14	11.0
DT12	Town Hall Clacton	Urban Background	15.9	17.2	14.3	13.7	-

Site ID	Location	Site Type	Monitored Annual Mean NO_2 Concentration ($\mu g.m^{-3}$)				
			2016	2017	2018	2019	2020
DT13	Town Hall Clacton	Urban Background	18.9	17.2	14.5	13.8	-
DT14	Bypass A133	Roadside	34.2	42.7	32.8	31.5	20.6
DT15	Bypass A133	Roadside	36.3	42	32.7	32	-
DT16	Bypass A133	Roadside	23.9	42.3	33.7	31.4	-
DT18	Bathside Bay	Roadside	23.6	14.7	14.9	13.9	-
DT19	A120 Wix	Roadside	23.4	30.9	23.7	23.2	-
DT20	A120	Roadside	21.9	24.2	20.3	20.7	15.8
DT32	London Road, Clacton	Roadside	-	-	-	-	16.0

138. The results in Table 20.21 show that the annual mean NO_2 Objective of $40\mu g.m^{-3}$ has been not exceeded at any diffusion tube location across the five-year period. Monitoring data from 2020 should be treated with caution as the Covid-19 pandemic had a significant impact on traffic levels as well as low levels of data capture. Despite this, monitoring still indicates a declining trend in annual mean concentrations of NO_2 since at least 2017.

139. Tendring District Council does not undertake any monitoring of PM_{10} or $PM_{2.5}$ within the air quality study area.

20.5.3 Identification of receptors

20.5.3.1 Construction phase dust and fine particulate matter

140. IAQM guidance (IAQM, 2016) states that a detailed assessment is required where there are human receptors within 350m of the site boundary and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s). Internal guidance from Natural England recommends that ecological receptors within 200m of a site should be considered in a construction dust and fine particulate matter assessment, as opposed to only those ecological sites within 50m of the site (as stated in IAQM guidance).

141. The onshore cable corridor(s) connect the indicative landfall HDD compound area between Clacton-on-Sea and Frinton-on-Sea to the onshore substation zone to the south-west of Ardleigh. The precise location of the onshore substation and grid connection is subject to ongoing consultation therefore the worst-case location (i.e. anywhere within the onshore substation zone) has been assessed.

142. The construction dust and fine particulate matter assessment has been undertaken using a worst-case scenario whereby the maximum amount of works (e.g. cable trenching, a construction compound, jointing bay and link box construction) are undertaken in proximity to the greatest number of human and ecological receptors, as set out below. Recommended mitigation measures for these worst-case locations would then be applied to all onshore construction works, to provide a conservative assessment.

143. Receptor locations were identified in the areas closest to the potential maximum impacts due to construction within the onshore project area (as defined in Table 20.2). The identified receptors are set out in the following sections.

20.5.3.1.1 Human Receptors

144. There are human receptors within 350m of the onshore project area located in the towns and villages of Frinton-On-Sea, Great Holland, Thorpe-le-Soken, Tendring Green and Little Bromley. Elsewhere, there are isolated settlements along the onshore cable corridor(s).

145. As detailed in Appendix 20.1 (Volume III), the number of receptors potentially exposed to dust impacts is a factor that determines the receptor sensitivity. For North Falls, the areas with the most human receptors within 350m of the onshore project area are Frinton-On-Sea and Thorpe-le-Soken.

146. The Project will require up to seven temporary construction compounds, which may be located at any of the following indicative locations:

- Landfall;
- South of Great Holland;
- East of Great Holland Lodge;
- South of Thorpe Cross;
- East of Tendring;
- South of A120 at Hempstall's Hall;
- South of A120 at Goose Green;
- East of Little Bromley;
- South of Little Bromley; and
- Onshore substation.

147. The proximity of construction compounds to receptors has been taken into the consideration within the design of the Project and, therefore, the number of human receptors within 100m of the proposed construction compounds are limited. The following construction compounds have residential properties within 100m:

- Great Holland Lodge (a residential property 50m to the west);
- South of Thorpe Cross (a residential property 60m to the north-east);
- South of A120 at Hempstall's Hall (a residential property 30m to the west, 80m to the south and 90m to the north-west);
- South of A120 at Goose Green (a residential property 80m to the south); and
- East of Little Bromley (two residential properties 30m to the west).

148. The construction compound located nearest the highest concentration of human receptors is located to the south of Great Holland with between 10 to 100 receptors between 100m and 200m from the construction compound boundary.

149. The location of maximum impact along the onshore cable corridor(s), i.e. dustiest activities and greatest number of receptors within close proximity of the construction works, has been determined to be Great Holland. Therefore, this area has been the focus of the construction dust assessment for human receptors along the onshore cable corridor(s), to provide a conservative assessment, as the combined sources of dust from both the construction compounds and cable trenching activities is considered to represent the worst-case in terms of dust impact magnitude. Impacts of construction dust at landfall and the onshore substation were considered in the assessment separately, due to the large onshore project area footprint.

150. There are other areas along the onshore cable corridor(s) where a greater number of human receptors are present within 350m of the onshore project area; however these receptors would either be further away from construction works relating to the worst-case scenario mentioned above, or closer to a reduced level of construction works (i.e. close to cable trenching but away from a construction compound). It is therefore anticipated that the sensitivity of these receptors would be equal to, or less than, those located at landfall, Great Holland or the onshore substation zone (Appendix 20.1 (Volume III) provides further details on how the sensitivity of human receptors to dust soiling and human health impacts are determined).

151. It should be noted that the mitigation measures identified to suppress dust emissions (see Section 20.6.1.1.5) would be applied across the onshore project area and are not only applicable as mitigation for those receptors included within the assessment. As such, the assessment is considered to be robust.

20.5.3.1.2 Ecological Receptors

152. Designated ecological receptors that may be sensitive to dust impacts within 200m of the onshore construction works (or within 50m of access routes) are identified in Table 20.22, as well as the distance each ecological site is from the onshore project area. Figure 20.2 (Volume II) shows the location of the ecological receptors listed in Table 20.22.

Table 20.22 Designated sites within 200m of onshore project area

Designated Ecological Site	Distance from onshore project area
Holland Haven Marshes SSSI	0m from indicative landfall HDD compound area
Holland Haven LNR	0m from indicative landfall HDD compound area
Simons Wood Ancient Woodland	0m from onshore project area

153. As detailed in Section 20.4.3.1, three different construction activities are considered in a dust assessment: earthworks, construction and trackout. Holland Haven Marshes SSSI has been chosen as the worst-case ecological receptor location for dust from earthworks, construction and trackout activities, as it is adjacent to the indicative landfall HDD compound area as well as Link 27 (B1032 Clacton Road) and may be sensitive to dust. Its national designation also makes it more sensitive in accordance with IAQM guidance (IAQM, 2016).

20.5.3.2 Construction Phase NRMM Emissions Assessment

20.5.3.2.1 Landfall

154. The closest human receptors to the proposed NRMM works and indicative landfall HDD construction compound area are the residential properties on Second Avenue, approximately 350m east of the indicative landfall HDD compound area. The closest ecological receptors are the Holland Haven SSSI and Holland Haven LNR, located immediately adjacent to the indicative landfall HDD compound area.

20.5.3.2.2 Onshore Cable Corridor(s)

155. The closest human receptors to the works along the onshore cable corridor(s) include the residential areas of Frinton-On-Sea, Great Holland, Thorpe-le-Soken, Tendring Green and Little Bromley. The closest ecological receptors to works which may require NRMM (i.e. anywhere within the onshore project area) are listed in Table 20.22.

20.5.3.2.3 Onshore Substation

156. The onshore substation zone is located approximately 1.7km south of Lawford, with the nearest human receptor to the onshore substation zone located 240m to the east (Norman's Farm). The nearest ecological receptor is an unnamed ancient woodland, approximately 210m south of the onshore substation zone.

20.5.3.3 Construction Phase Road Traffic Emissions Assessment

20.5.3.3.1 Human Receptors

157. Existing sensitive receptor locations were identified within the air quality study area for consideration in the assessment. Predicted changes in NO_2, PM_{10} and $PM_{2.5}$ concentrations as a result of project-generated traffic were calculated at these locations.

158. The sensitive receptor locations were selected based on their proximity to road links affected by North Falls (as identified within Chapter 27 Traffic and Transport (Volume I)) and exceeding the screening criteria detailed in Table 20.10, where the potential effect of project-generated traffic emissions on local air pollution would be most significant. These links are identified in Table 20.11.

159. Receptors were included in the dispersion model at a height of 1.5m to represent expected exposure (breathing height). All modelled receptors were representative of residential exposure.

160. The sensitive receptor locations are detailed in Table 20.23 and shown in Figure 20.3 (Volume II).

Table 20.23 Sensitive human receptor locations

Receptor ID	Link	OS grid reference (m)	
		X	Y
R1	33	614292	222438
R2	33	615079	222494
R3	21	612982	222756
R4	21	610789	223486
R5	20	609931	224897
R6	2 + 20	609547	225080

Receptor ID	Link	OS grid reference (m)	
		X	Y
R7	1	603275	227865
R8	1	602012	228770
R9	3	611298	226517
R10	15	611504	226872
R11	18	613256	227626
R12	18	616304	228559
R13	18	620951	230209
R14	19	623605	231353
R15	19	624485	231851
R16	19	625800	232249
R17	19	625904	232659
R18	3	610770	225496
R19	18	618460	229686
R20	4	611221	226576
R21	34	614121	222455
R22	33	616341	222670

20.5.3.3.2 Designated Ecological Sites

161. A number of designated ecological sites are located within 200m of roads which are anticipated to experience increases in construction-related traffic flows above the criteria detailed in Table 20.10. The designated ecological sites that have been screened into the assessment (i.e. within 200m of affected road links) are detailed in Table 20.24, as well as reasoning for the exclusion of certain sites, and whether or not sites have been considered further in the assessment for exceeding the AADT flows (at the distance from the site boundary to the road edge) required to result in a 1% increase in the site-relevant Critical Level and/or Load.

162. Further details on this are provided in Section 20.4.3.3.6 and Appendix 20.3 (Volume III). The designated ecological sites listed in Table 20.24 are also shown in Figure 20.4 (Volume II).

Table 20.24 Sensitive ecological receptor locations

Link	Designated Ecological Site		Distance from affected road link (m)	Screened in for further assessment[1]?
	Site Type	Name		
10	SPA	Stour and Orwell Estuaries	0	Yes
	SSSI	Cattawade Marshes	0	Yes
	SSSI	Stour Estuary	11	Yes
	Ramsar	Stour and Orwell Estuaries	0	No[2]

Link	Designated Ecological Site		Distance from affected road link (m)	Screened in for further assessment[1]?
	Site Type	Name		
19	SPA	Stour and Orwell Estuaries	0	Yes
	SSSI	Stour Estuary	0	Yes
	Ramsar	Stour and Orwell Estuaries	0	No[2]
26	SSSI	Holland Marshes	0	Yes
1	Ancient Woodland	Walls Wood	7	Yes
	Ancient Woodland	Unnamed	150	Yes
21	Ancient Woodland	High Barn Wood	0	Yes
22	Ancient Woodland	Guttridgehall Wood	30	Yes
	Ancient Woodland	Unnamed Woodland	25	Yes
39	Ancient Woodland	Tendring Grove	95	No
	Ancient Woodland	Unnamed Wood	14	Yes

[1]See Section 20.4.3.3.6 and Appendix 20.3 (Volume III) for further details

[2]Ramsar sites are designated wetland sites and are not included in the APIS database for being sensitive to air quality impacts. Impacts on Ramsar sites have therefore been considered under the associated SPA designations for the same area.

163. The APIS website (CEH, 2022) has been consulted to identify any habitats or features of these designated sites that are sensitive to nutrient nitrogen and acid deposition. Where sensitive habitats or features were found, the Critical Loads for nutrient nitrogen and acid deposition were obtained. A full list of the designated ecological sites and associated Critical Level and Load values that have been considered is presented in Table 20.25. The most sensitive habitat types have been included to provide a conservative assessment.

Table 20.25 Designated Ecological Sites and Critical Level and Load Values

Link	Designated Ecological Site		Feature Name	Critical Level	Critical Load						
	Site Type	Name		NH_3	N-dep	Acid deposition $kgN.ha^{-1}.yr^{-1}$					
				$\mu g.m^{-3}$	$kgN.ha^{-1}.yr^{-1}$	MinCL MinN	MinCL MaxN	MinCL MaxS	MaxCL MinN	MaxCL MaxN	MaxCL MaxS
10	SPA	Stour and Orwell Estuaries	Numenius arquata (Europe - breeding)	1 to 3	20 to 30	0.223	0.703	0.48	0.438	4.568	4.13
	SPA	Stour and Orwell Estuaries	Numenius arquata (Europe - breeding)	1 to 3	20 to 30	0.856	4.856	4	1.071	5.071	4
	SSSI	Cattawade Marshes	Lowland damp grasslands	3	-	-	-	-	-	-	-
	SSSI	Stour Estuary	Numenius arquata	1 to 3	20 to 30	0.223	1.103	0.88	0.438	4.568	4.13
	SSSI	Stour Estuary	Numenius arquata	1 to 3	20 to 30	0.856	4.856	4	1.071	5.071	4
19	SPA	Stour and Orwell Estuaries	Numenius arquata	1 to 3	20 to 30	0.223	0.703	0.48	0.438	4.568	4.13
	SPA	Stour and Orwell Estuaries	Numenius arquata	1 to 3	20 to 30	0.856	4.856	4	1.071	5.071	4
	SSSI	Stour Estuary	Numenius arquata	1 to 3	20 to 30	0.223	1.103	0.88	0.438	4.568	4.13
	SSSI	Stour Estuary	Numenius arquata	1 to 3	20 to 30	0.856	4.856	4	1.071	5.071	4
26	SSSI	Holland Haven Marshes	Vascular plant assemblage	3	-	-	-	-	-	-	-

Link	Designated Ecological Site		Feature Name	Critical Level	Critical Load						
	Site Type	Name		NH_3	N-dep	Acid deposition $kgN.ha^{-1}.yr^{-1}$					
				$\mu g.m^{-3}$	$kgN.ha^{-1}.yr^{-1}$	MinCL MinN	MinCL MaxN	MinCL MaxS	MaxCL MinN	MaxCL MaxN	MaxCL MaxS
1	Ancient Woodland	Walls Wood	Broadleaved woodland	1 to 3	10 to 20	0.142	1.684	-	-	-	1.542
	Ancient Woodland	Unnamed	Broadleaved woodland	1 to 3	10 to 20	0.142	1.71	-	-	-	1.568
21	Ancient Woodland	High Barn Wood	Broadleaved woodland	1 to 3	10 to 20	0.357	2.883	-	-	-	2.256
22	Ancient Woodland	Guttridgehall Wood	Broadleaved woodland	1 to 3	10 to 20	0.142	1.798	-	-	-	1.656
	Ancient Woodland	Unnamed Woodland	Broadleaved woodland	1 to 3	10 to 20	0.142	1.798	-	-	-	1.656
39	Ancient Woodland	Simons Wood	Broadleaved woodland	1 to 3	10 to 20	0.357	2.9	-	-	-	2.543

20.5.4 Background pollutant concentrations

20.5.4.1 Human receptors

164. The approach to deriving appropriate background pollutant concentrations for the assessment is set out in Section 20.4.3.3.4. The background concentrations used in the assessment are provided in Table 20.26.

Table 20.26 Background pollutant concentrations

Receptor ID	2019 concentration (µg.m^{-3})			2026 concentration (µg.m^{-3})		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R1	13.8	15.0	9.2	10.9	8.3	8.4
R2	13.8	14.5	9.0	10.9	8.1	8.1
R3	13.8	15.8	9.4	10.9	8.5	8.8
R4	13.8	17.1	9.9	10.9	9.0	9.6
R5	13.8	15.5	9.5	10.9	8.6	9.7
R6	13.8	16.9	10.0	10.9	9.0	10.7
R7	13.8	15.5	9.9	10.9	9.0	12.1
R8	13.8	16.3	10.4	10.9	9.4	13.9
R9	13.8	16.0	9.6	10.9	8.7	8.8
R10	13.8	16.0	9.6	10.9	8.7	8.8
R11	13.8	16.7	9.7	10.9	8.8	8.6
R12	13.8	15.8	9.5	10.9	8.6	8.7
R13	13.8	15.5	9.3	10.9	8.4	8.9
R14	13.8	14.3	9.3	10.9	8.4	13.0
R15	13.8	14.6	9.6	10.9	8.7	14.3
R16	13.8	13.8	9.2	10.9	8.3	17.8
R17	13.8	13.8	9.2	10.9	8.3	17.8
R18	13.8	16.3	9.7	10.9	8.8	9.2
R19	13.8	16.0	9.5	10.9	8.6	8.6
R20	13.8	16.0	9.6	10.9	8.7	8.8
R21	13.8	15.0	9.2	10.9	8.3	8.4
R22	13.8	14.9	9.1	10.9	8.2	8.0

165. As detailed in Table 20.26, background pollutant concentrations were ‘well below’ (e.g. less than 75% of) and no greater than 50% of the relevant air quality Objectives. This is to be expected in areas that are largely rural in nature.

20.5.4.2 Ecological receptors

166. Background concentrations considered in the ecological assessment are provided in Table 20.27.

Table 20.27 Ecological receptors - background pollutant concentrations and deposition rates

Link	Designated Ecological Site		Background concentration			
	Site Type	Name	NOx $\mu g.m^{-3}$	NH_3 $\mu g.m^{-3}$	N-Dep $kgN.ha^{-1}.yr^{-1}$	Acid-Dep $kgN.ha^{-1}.yr^{-1}$
10	SPA	Stour and Orwell Estuaries	14.5	1.9	16.5	1.2
	SSSI	Cattawade Marshes	14.5	1.9	16.5	1.2
	SSSI	Stour Estuary	12.7	1.8	16.1	1.2
19	SPA	Stour and Orwell Estuaries	14.5	1.9	16.5	1.2
	SSSI	Stour Estuary	17.8	1.3	13.3	1
26	SSSI	Holland Haven	12.3	1.2	12.3	0.9
1	Ancient Woodland	Walls Wood	16.8	1.7	28.6	2.1
	Ancient Woodland	Unnamed	14.7	1.7	28.3	2.1
21	Ancient Woodland	High Barn Wood	12.2	1.0	21.3	1.6
22	Ancient Woodland	Guttridgehall Wood	12.1	1.0	21.3	1.6
	Ancient Woodland	Unnamed Woodland	12.1	1.0	21.3	1.6
39	Ancient Woodland	Simons Wood	10.9	1.0	20.4	1.5

20.5.5 Baseline Road Traffic Emissions

167. The ADMS-Roads model has been used to estimate contributions of vehicle exhaust emissions to annual and short term NO_2, PM_{10} and $PM_{2.5}$ concentrations for the 2019 base year and the 2026 'without North Falls' assessment. The 24-hour AADT flows and HGV percentages used in the assessment are detailed in Appendix 20.2 (Volume III).

168. Table 20.28 provides the results of the baseline assessment for the base year (2019) and the earliest year of construction 'without North Falls' (2026), which is inclusive of background concentrations as well as the traffic contribution.

Table 20.28 Baseline road traffic emissions assessment base year (2019) and earliest year of construction (2026) 'without North Falls'

Receptor ID	2019 concentration ($\mu g.m^{-3}$)			2026 concentration ($\mu g.m^{-3}$)		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R1	21.4	16.0	9.9	15.1	14.9	8.9
R2	19.6	15.3	9.5	14.1	14.2	8.6
R3	23.8	16.8	10.1	16.3	15.6	9.1
R4	27.7	18.5	10.8	18.5	17.3	9.8

Receptor ID	2019 concentration (µg.m^{-3})			2026 concentration (µg.m^{-3})		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R5	21.3	16.3	10.1	14.9	15.2	9.1
R6	31.4	18.4	11.1	20.4	17.2	10.0
R7	31.9	17.0	10.9	20.5	15.6	9.8
R8	24.9	17.1	11.0	16.7	15.8	9.9
R9	22.0	17.6	10.5	15.4	16.6	9.6
R10	18.9	17.0	10.2	13.7	15.9	9.2
R11	17.6	17.4	10.1	13.0	16.3	9.2
R12	17.2	16.5	9.9	12.7	15.4	9.0
R13	18.5	16.4	9.8	13.5	15.4	8.9
R14	16.9	14.9	9.7	12.6	13.8	8.8
R15	18.1	15.5	10.1	13.3	14.3	9.2
R16	18.4	14.8	9.7	13.4	13.6	8.8
R17	17.4	14.5	9.6	12.9	13.4	8.7
R18	21.2	17.2	10.3	14.9	16.0	9.3
R19	20.3	17.4	10.3	14.5	16.3	9.4
R20	16.0	16.3	9.8	12.1	15.2	8.9
R21	18.8	15.7	9.7	13.7	14.6	8.7
R22	19.4	15.7	9.6	14.0	14.6	8.7

169. As detailed in Table 20.28, annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations were predicted to be below the relevant Objectives at all receptors in both baseline years.

170. All predicted NO_2 concentrations were 'well below' 60µg.m^{-3} and therefore, in accordance with Defra guidance (Defra, 2022), the 1-hour mean Objective is unlikely to be exceeded (see Table 20.5). The short term PM_{10} Objective has been predicted to be met at all modelled locations (Objective being less than 35 exceedances of the daily mean objective of 50 µg.m^{-3}).

20.5.6 Future trends in baseline conditions

171. In the event that North Falls is not developed, an assessment of the future conditions for air quality has been carried out and is described within this section.

172. The baseline review of air quality in Section 20.5.2, 20.5.4 and 20.5.5 provide a clear indication that air quality in the North Falls air quality study area is good, which is to be expected in an area which is largely rural in nature, with areas of air quality concern and monitoring confined to urban areas. Air quality is managed, and improvement driven, by EU, UK and local legislation and policies. The UK's national air quality strategy and standards are enacted locally through management actions at a local authority level including a LAQM framework, as detailed in Section 20.4.1. There is a policy trend towards the achievement and maintenance of good air quality across the UK, which is reflected in the local planning policies also detailed in Section 20.4.1.

173. Air pollution in the study area is generally dominated by emissions from road vehicles. The quantity and composition of vehicle emissions is dependent on the type of fuel used, engine type, size and efficiency, vehicle speeds and the type of exhaust emissions abatement equipment employed. As such, it is anticipated that future pollutant concentrations will be reduced from baseline levels, as reflected in the predicted background concentrations, obtained from Defra's UK Air website, shown in Table 20.26.

20.6 Assessment of significance

20.6.1 Potential effects during construction

20.6.1.1 Impact 1: Construction dust and fine particulate matter

174. A qualitative assessment of construction phase dust and PM_{10} emissions has been carried out in accordance with the latest IAQM guidance (IAQM, 2016). Full details of the methodology and dust assessment undertaken are provided in Appendix 20.1 (Volume III).

175. The onshore construction works associated with North Falls have the potential to impact on local air quality conditions as described below:

- Dust emissions generated by excavation, construction and earthworks activities have the potential to cause nuisance to, and soiling of, sensitive receptors (see Section 20.5.3.1 for further details on the identification of sensitive receptors);
- Emissions of exhaust pollutants, especially NO_X and PM_{10} from construction traffic on the local road network, have the potential to impact upon local air quality at sensitive receptors situated adjacent to the routes utilised by construction vehicles; and
- Emissions of NO_X and PM_{10} from on-site plant, termed NRMM, operating within the onshore project area have the potential to impact local air quality at sensitive receptors in close proximity to the works.

176. The assessment consisted of four steps (Step 1, Step 2A, Step 2B and Step 2C) as outlined below.

177. Further details are provided in Section 20.5.3.1 on the focus areas for the assessment in relation to the locations of the expected worst-case construction works (i.e. landfall, Great Holland and the onshore substation zone for human receptors and Holland Haven SSSI and LNR for ecological receptors).

20.6.1.1.1 Step 1: Screen the need for a detailed assessment

178. The IAQM guidance states that a detailed assessment is required if there are human receptors located within 350m and ecological receptors within 200m (internal Natural England guidance) of the onshore project area. Human and ecological receptors are present within 350m and 200m respectively of the onshore project area, therefore a detailed assessment was required.

20.6.1.1.2 Step 2A: Define the potential dust emission magnitude

179. The IAQM guidance recommends that the dust emission magnitude is determined for demolition, earthworks, construction and trackout. It is anticipated that no buildings/structures would be demolished as part of construction of North Falls, therefore demolition has not been considered in the assessment.

180. The landfall, onshore cable corridor(s) and the onshore substation zone were assessed separately, due to the spatial scale of the Project (see Figure 20.1, Volume II). The worst-case scenarios for human and ecological receptors were identified based on the number of receptors within 350m and 200m respectively of the onshore project area and construction works. For trackout activities, receptors within 50m from the construction vehicle routes up to 500m from the onshore project area were considered, as this distance "takes account of the exponential decline in both airborne concentrations and the rate of deposition with distance" in accordance with IAQM (2016) guidance.

181. The potential dust emission magnitude for the onshore project area has been determined using the criteria detailed in Appendix 20.1 (Volume III). The dust emission magnitudes were determined from the worst-case assumptions identified in Table 20.2 and are detailed in Table 20.29.

Table 20.29 Defined dust emission magnitudes associated for each construction activity for the onshore project area

Construction activity	Dust emission magnitude	Rationale
Human Receptors (Worst-Case)		
Earthworks (site area and earth works)	Large (>10,000m^2)	**Landfall:** The proposed construction compound at landfall is anticipated to be 100 x 200m (i.e. 20,000m^2) and topsoil will be stripped within this area.
	Large (>10,000m^2)	**Great Holland (i.e. onshore cable corridor(s) and construction compounds):** The proposed construction compounds near Great Holland will have a combined footprint of up to 60,000m^2. Earthworks within the onshore cable corridor(s) will comprise removal and the storage of topsoil and subsoil separately at the side of the trench, followed by excavation of a trench approximately 2m deep and (max) 3.75m wide. The trench would be excavated in sections along the onshore cable corridor(s).
	Large (>10,000m^2)	**Onshore substation:** The maximum operational area at the onshore substation will have a footprint of approximately 80,100m^2, in addition to a

Construction activity	Dust emission magnitude	Rationale
		substation construction compound (37,500m^2) and soil will be stripped.
Construction (construction materials)	Medium	**All locations:** There are not anticipated to be any permanent buildings constructed within the construction compounds (offices, etc. at the onshore substation would be prefabricated); however, it has been assumed that cement bound sand (CBS) would be used to line the cable trench and pack around the ducts, and this is a potentially dusty construction material.
Trackout (no. HGV outward movements per day)	Medium	**All locations:** There would be between 10 to 50 outward daily HGV movements*
Ecological Receptors (Worst-Case)		
Earthworks (site area and earthworks)	Large (> 10,000m^2)	**Holland Haven SSSI and LNR:** The proposed construction compound at landfall is anticipated to be 100 x 200m (i.e. 20,000m^2) and topsoil will be stripped.
Construction (construction materials)	Medium	**Holland Haven SSSI and LNR:** It has been assumed that CBS would be used to line the cable trench and pack around the ducts, which is a potentially dusty construction material.
Trackout (no. HGV outward movements per day)	Medium	**Simons Wood ancient woodland:** It is assumed as a worst-case that there would be between 10 and 50 outward daily HGV movements
*HGV outward movements per day have been estimated from the HGV traffic flows presented in Table 20.10 and Appendix 20.2 (Volume III), where the number of outward HGV movements per day is half the HGV (per day) flow. While some construction routes (up to 500m from the onshore project area) have more than 50 HDV outward movements per day, very few human receptors (<10) and no ecological receptors are located on these routes, therefore assessing fewer HGV movements on routes with >10 human receptors results in the same dust emission magnitude overall.		

20.6.1.1.3 Step 2B: Define the sensitivity of the area

182. The sensitivity of receptors to dust soiling, impacts on human health and ecological effects has been determined using the criteria in Appendix 20.1 (Volume III). Figure 20.2 (Volume II) details the distance bands from the onshore project area used in determining the sensitivity of the area.

183. The sensitivity of the area is defined as:

- Sensitivity of receptors to dust soiling on people and property:
    - **Earthworks and construction**: High sensitivity residential receptors are located 350m east of the indicative compound area at landfall. There are between 10 to 100 high sensitivity residential receptors within 20m of the onshore cable corridor(s) and construction compounds at Great Holland, and there are between 1 and 10 high sensitivity residential receptors within 350m of the onshore substation zone. The sensitivity is therefore high at Great Holland and low at landfall and the onshore substation zone.
    - **Trackout**: There are no human receptors within 50m of roads used by construction vehicles up to 500m from the site at landfall. There are between 10 and 100 high sensitivity residential receptors within 20m of roads used at Great Holland, and between 1 to 10 high sensitivity residential receptors within 20m of roads used to access the onshore substation zone. The sensitivity is therefore high at Great Holland and medium at the onshore substation zone. There is no impact of dust soiling from trackout at landfall and therefore this has not been considered further.
- Sensitivity of receptors to human health effects of PM_{10}:
    - The highest annual mean background PM_{10} concentration across the study area is less than $24\mu g.m^{-3}$
    - **Earthworks and construction**: High sensitivity residential receptors are located 350m east of the indicative compound area at landfall. There are between 10 to 100 high sensitivity residential receptors within 20m of the onshore cable corridor(s) and construction compounds at Great Holland, and there are between 1 to 10 high sensitivity residential receptors within 350m of the onshore substation zone. The sensitivity is therefore low for all assessed locations; and
    - **Trackout**: There are no receptors within 50m of roads used by construction vehicles up to 500m from the site at landfall. There are between 10 and 100 high sensitivity residential receptors within 20m of roads used by construction vehicles up to 500m from the site at Great Holland, and between 1 to 10 high sensitivity residential receptors within 20m of roads used to access the onshore substation zone. The sensitivity is therefore low at all locations.
- Sensitivity of receptors to ecological effects:
    - **Earthworks and construction**: Holland Haven SSSI and LNR were conservatively assumed to be of high sensitivity (as the SSSI is a national designation and may be affected by dust soiling) and is within 20m of the indicative landfall HDD compound area. The sensitivity is therefore high.
    - **Trackout**: The ancient woodland Simons Wood has been conservatively assumed to be of high sensitivity (as it is a national designation and may be affected by dust soiling) and is within 20m of routes used by construction vehicles, up to 500m from the onshore project area. The sensitivity is therefore high.

184. The sensitivity of receptors to dust soiling, human health impacts and ecological impacts (as an assessment of the worst-case scenario location) for each activity is summarised in Table 20.30.

Table 20.30 Sensitivity of the area to each activity

Potential impact	Sensitivity of the surrounding area		
	Earthworks	Construction	Trackout
Dust soiling	High – Great Holland Low – Landfall and onshore substation zone	High – Great Holland Low – Landfall and onshore substation zone	High - Great Holland Medium - onshore substation zone N/A - landfall
Human health	Low – all locations	Low – all locations	Low – all locations
Ecological	High – all relevant locations	High – all relevant locations	High – all relevant locations

20.6.1.1.4 Step 2C: Define the risk of impacts

185. The dust and PM_{10} emission magnitude and sensitivity of the area(s) are combined, and the risk of effects determined using Appendix 20.1 (Volume III). The risks for dust soiling, human health and ecological effects are shown in Table 20.31.

Table 20.31 Risk of dust impacts

Potential impact	Dust Risk		
	Earthworks	Construction	Trackout
Dust soiling	High Risk – Great Holland Low Risk – Landfall and onshore substation zone	Medium Risk – Great Holland Low Risk – Landfall and onshore substation zone	Medium Risk – Great Holland Low Risk – Onshore substation zone
Human health	Medium Risk	Low Risk	Low Risk
Ecological	High Risk	Medium Risk	Medium Risk

186. It is anticipated that the risk of dust effects would be high for dust soiling at Great Holland during earthworks and medium during construction and from trackout. The risk of dust soiling at all other locations and during all activities is considered to be low.

187. The risk to human health is considered to be medium during earthworks and low during all other activities.

188. The risk to ecological receptors is considered to be high during earthworks and medium during construction and from trackout.

20.6.1.1.5 Mitigation – Step 3: Site specific mitigation

189. Step 3 of the IAQM guidance (2016) identifies the appropriate good practice mitigation measures required based on the findings of Step 2 of the assessment methodology. Step 2 of the dust assessment determined that the greatest risk of effects was 'high risk' under the worst-case scenario, without the implementation of mitigation measures. The aim of these mitigation measures is to achieve a residual impact that is not significant.

190. Recommended mitigation measures are listed in the IAQM guidance document according to the 'risk' of effects associated with the release of dust and PM_{10} from construction activities. Recommended mitigation measures include minimising the production and transmission of dust from construction activities, and the requirement to carry out regular visual on-site and off-site inspections of dust deposition levels, so that appropriate action can be taken in the event of any issues being identified.

191. A list of mitigation measures that are recommended for a high risk site, as determined by Step 2 of the dust assessment, by the IAQM are provided below. These measures will be outlined within the Project's OCoCP submitted as part of the Project's DCO application and will be secured within the final CoCP submitted post-consent.

- Communications:
  - Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
  - Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
  - Display the head or regional office contact information.
- Dust Management:
  - Develop and implement a Dust Management Plan (DMP) (this will form part of the CoCP), which may include measures to control other emissions, approved by the local authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site.
  - Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
  - Make the complaints log available to the local authority when asked.
  - Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the logbook.
  - Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.
  - Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of site boundary, with cleaning to be provided if necessary.

- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Manage stockpiles to prevent wind whipping.
- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing). Further details provided in Chapter 27 Traffic and Transport (Volume I).
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from handling equipment and use fine water sprays on such equipment wherever appropriate.

- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
- Avoid bonfires and burning of waste materials.

- Construction:
  - Ensure sand and other aggregates are stored in appropriate manner to minimise dust generation for example the use of bunded areas.
  - Avoid scabbling (roughening of concrete surfaces) if possible.
  - Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
  - For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
- Earthworks:
  - Manage earthworks and exposed areas/soil stockpiles to stabilise surfaces.
  - Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Trackout:
  - Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site.
  - Avoid dry sweeping of large areas.
  - Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
  - Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
  - Record all inspections of haul routes and any subsequent action in a site logbook.
  - Install hard surfaced haul routes where practicable, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
  - Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
  - Locate access gates at least 10m from receptors where possible.

20.6.1.1.6 Residual Impacts – Step 4: Determine significant effects

192. With the implementation of the above mitigation measures, which will be secured in the final CoCP, the residual effects are considered to be not significant, in accordance with IAQM guidance (2016).

20.6.1.2 Impact 2: NRMM emissions

193. A qualitative assessment of North Falls-generated NRMM used during construction at landfall, the onshore substation zone and along the onshore cable corridor(s) has been undertaken where effects on receptors may occur, as requested by the Planning Inspectorate in the Scoping Opinion (see Table 20.1).

194. This qualitative assessment takes into account:

- The number and type of plant to be used;
- The working hours to be employed and the duration of works;
- Existing air quality conditions in the area (based on Defra background pollutant concentration maps);
- Prevailing meteorological conditions (see Plate 20.1); and
- Distances from NRMM to the nearest receptors.

195. The greatest anticipated number of plant working at one location at the same time is anticipated to be for the onshore substation construction works. Elsewhere within the onshore project area the construction works would utilise relatively standard construction plant relevant to the works undertaken.

196. The anticipated working hours for construction of North Falls are 7am-7pm Monday to Saturday (i.e., 84 hours per week), subject to any essential activities that are required to be undertaken outside of these times. The duration of trenchless crossing (i.e., HDD) at landfall is anticipated to take up to six months.

197. Typically each team would work on the onshore cable corridor(s) in sections, which would minimise the extent of open trenching being undertaken at any one time. The trench would be excavated at one end and backfilled at the other as works progress along each section, and therefore works would be undertaken in the vicinity of a receptor for only a relatively short duration, and not for the duration of the onshore cable corridor(s) construction programme (18 – 24 months).

198. The onshore project area is largely rural in nature and, as shown in Table 20.32, the future 2026 background concentrations of NO_2, PM_{10} and $PM_{2.5}$ at landfall, along the onshore cable corridor(s) and at the onshore substation zone are 'well below' (i.e. less than 75% of) and no greater than 50% of their respective annual mean Objectives and are expected to continue to decrease into the future.

Table 20.32 2026 Defra (2020a) background pollutant concentrations along the onshore project area

Onshore works (landfall, onshore cable corridor(s) and onshore substation) Background Concentrations		
NO_2 ($\mu g.m^{-3}$)	PM_{10} ($\mu g.m^{-3}$)	$PM_{2.5}$ ($\mu g.m^{-3}$)
5.99 to 6.95	11.42 to 15.52	7.51 to 8.79

199. Plate 20.1 shows the wind rose of meteorological conditions recorded at the Southend station in 2019. The prevailing wind direction over the five-year period was from the south-west.

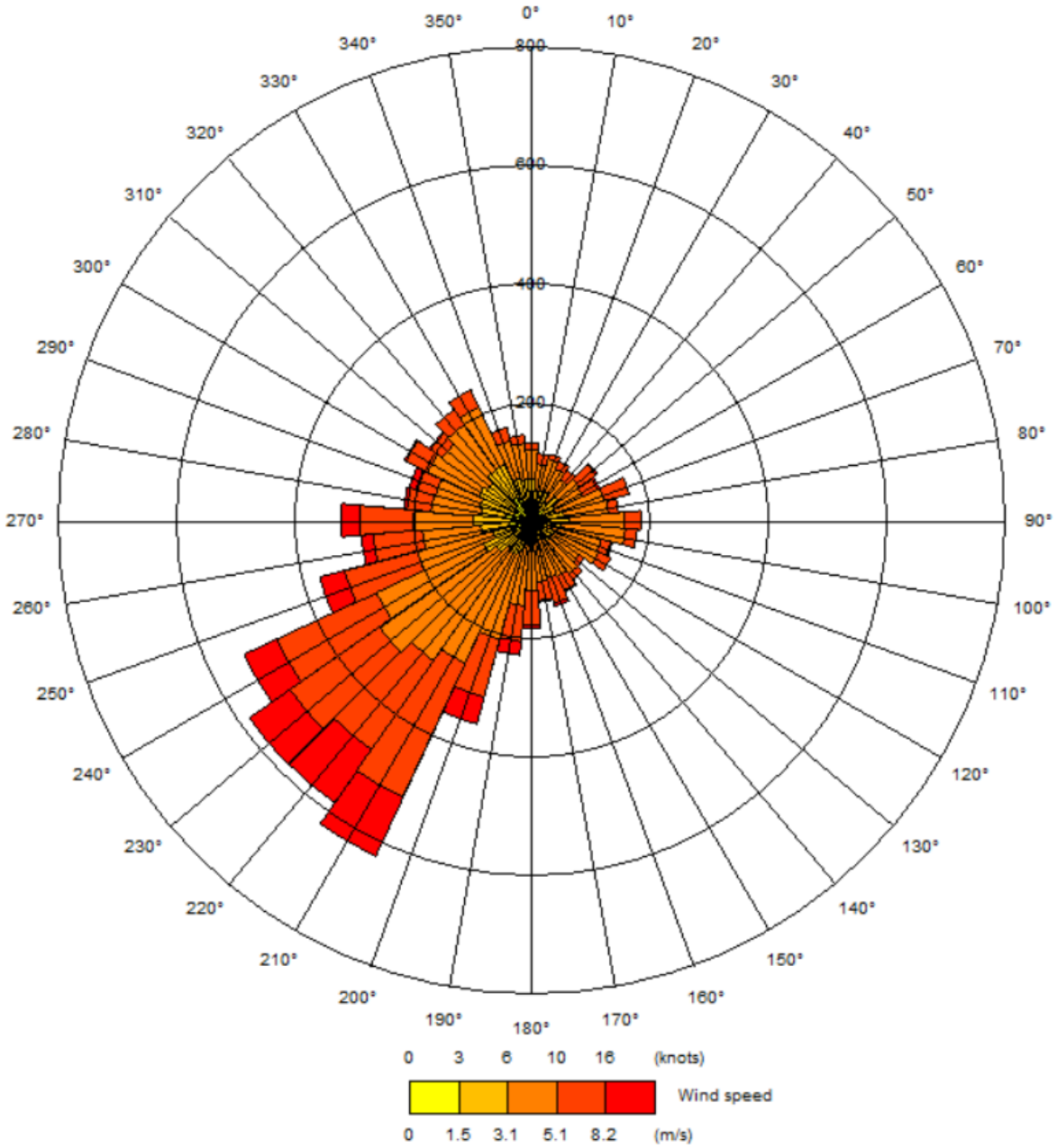

Plate 20.1 Southend Recording Station Wind Rose (2019)

200. The potential impacts associated with NRMM used at the indicative landfall HDD compound area, the onshore cable corridor(s) and the onshore substation zone are set out below.

20.6.1.2.1 NRMM at Landfall

201. NRMM at the indicative landfall HDD compound area will be associated with the HDD plant and activities within the proposed construction compound. At this stage, the exact location of the works associated with HDD at landfall within the indicative compound area is unknown, therefore the worst-case location for HDD works has been assessed i.e. assuming all NNRM are located at the closest edge of the indicative landfall HDD compound area from the nearest receptor. The closest downwind human receptors to this compound area at

landfall are the residential properties off Second Avenue, in Frinton-on-Sea approximately 350m east of the indicative HDD compound area. It is considered that this distance would provide sufficient dilution and dispersion of pollutant emissions from NRMM within the indicative landfall construction compound. HDD works may, by necessity, be required to operate 24/7 rather than only during the Project's working hours (7am-7pm Monday to Saturday). However, the duration of HDD works at landfall is expected to be approximately six months, and therefore emissions would not occur over a full year. As such, in consideration of annual mean pollutant concentrations, the impact would be reduced. Given the above, and the low background pollutant concentrations in the area, it is therefore considered highly unlikely that the health-based air quality Objectives would be exceeded. The effect of emissions from NRMM used at the landfall is therefore considered to be not significant.

202. Holland Haven SSSI is located adjacent to the indicative landfall HDD compound area (shown in Figure 1.2, Volume II), while Holland Haven LNR is located adjacent to the south-western tip of the indicative landfall HDD compound area. At this stage, the exact location of the works associated with HDD at landfall within the indicative compound is unknown, therefore the worst-case location for HDD works has been assessed i.e. located at the closest edge of the indicative landfall HDD compound area from the nearest receptor. For the SSSI, the worst-case location is midway along the southern boundary near Frinton Golf Course where the indicative HDD compound area is surrounded by the SSSI to the north, east and south. For the LNR the worst-case location is in the south-western corner of the indicative landfall HDD compound area.

203. With reference to the wind rose in Plate 20.1, the prevailing winds at Southend are consistently from the south-west. Therefore, if the HDD works took place in the south-west of the construction compound area closest to the LNR, emissions from the HDD would be dispersed away from this site.

204. Should HDD works take place in the vicinity of Frinton Golf Course where the indicative landfall HDD compound area is surrounded by the SSSI to the north, east and south, then the prevailing wind conditions will cause emissions from the HDD plant to disperse to the north-east and therefore into the northern part of the SSSI.

205. Works associated with the construction compound and transition joint bays would be intermittent in nature. Once construction of the landfall elements has been completed no pollution sources would be present (i.e. there are no operational phase impacts on local air quality) as a result of North Falls. As the works at landfall would be short-term and temporary, and relevant control and management measures are embedded into the design of North Falls (see Table 20.3), it is highly unlikely significant impacts would occur as a result of emissions from NRMM.

206. The primary activities that would occur along the onshore cable corridor(s) are temporary haul road construction and removal/excavation/backfilling works associated with the trench.

207. The onshore cable corridor(s) works would be undertaken in a practical, logical and sequential manner, e.g., topsoil stripping would be undertaken prior to

construction of the haul road in advance of trench excavation. Furthermore, each item of plant present would not necessarily be fully utilised throughout the working day.

208. It is not anticipated that NRMM would be in excess of that required on a 'standard' construction site due to:

- the linear nature of works area;
- the number of items of each type of plant active in the vicinity of receptors for each activity, along the length of each section of cable corridor; and
- the short duration NRMM and plant would be active in each section.

209. As noted above, background pollutant concentrations are less than 50% of the relevant air quality Objectives. Therefore, it is unlikely that NRMM along the onshore cable corridor(s) would have a significant impact on local air quality with the relevant control and management measures employed (see Table 20.3). With regard to ecological receptors, there is only one receptor, Simons Wood Ancient Woodland, in the vicinity of the onshore cable corridor(s). The intermittent and short-term nature of the plant usage during the construction of the onshore cable corridor(s) would also reduce the potential for significant impacts at this location. It is therefore expected that with the employment of management and control measures, particularly siting plant and other emission sources as far from the woodland as is practicable (as detailed in Table 20.3), will mean that effects would be not significant.

20.6.1.2.2 NRMM at the Onshore Substation

210. The onshore substation zone for North Falls is located in arable land south-west of Ardleigh. Construction activities in the onshore substation zone include site preparation and earthworks, and construction of the onshore substation and permanent access routes.

211. The onshore substation zone is located approximately 1.7km south of Lawford, with the nearest human receptor to the onshore substation zone off Ardleigh Road approximately 250m to the east. The nearest ecological receptor is an unnamed ancient woodland, approximately 220m south of the onshore substation zone.

212. Construction works at the onshore substation would occur for up to 24 months. However, emissions would only occur during working hours, rather than continually. In addition, given that the prevailing wind direction (see Plate 20.1) is from the south-west, NRMM emissions would be dispersed away from any nearby human receptors for the majority of the time. It is anticipated that the distance between the unnamed ancient woodland and the potential closest works at the onshore substation would allow for sufficient dilution and dispersion of pollutant emissions from NRMM. Also, given the low background pollutant concentrations in the area, the fact that the source of NRMM emissions would be temporary during construction only, and relevant control and management measures are embedded into the design of North Falls (see Table 20.3), it is unlikely NRMM in the onshore substation zone would have a significant impact on local air quality.

20.6.1.2.3 NRMM Significance

213. Defra technical guidance (Defra, 2022) states that emissions from NRMM used on construction sites are unlikely to have a significant impact on local air quality where relevant control and management measures are employed (see Table 20.3). As such, given the results of the qualitative assessment above and that management measures are incorporated into the design of the Project, impacts are considered to be not significant.

20.6.1.2.4 Mitigation measures Specific to NRMM

214. Mitigation measures specific to NRMM are embedded mitigation measures which have been incorporated into the design of North Falls. These measures are detailed in Table 20.3.

20.6.1.3 Impact 3: Construction Road vehicle exhaust emissions

20.6.1.3.1 Human Receptors

215. The 24-hour AADT flows and HGV percentages used in the air quality assessment are detailed in Appendix 20.2 (Volume III).

216. Predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations for the earliest year of construction (2026) 'with North Falls' scenario are detailed in Table 20.33 to Table 20.36. Concentrations for the 'without North Falls' assessment are also shown for comparison purposes. All concentrations are inclusive of the background concentration at each receptor.

Table 20.33 Predicted annual mean NO_2 concentrations and impact of North Falls at sensitive human receptors

Receptor	2026 Annual Mean NO_2 Concentrations				
	Without North Falls ($\mu g.m^{-3}$)	With North Falls ($\mu g.m^{-3}$)	Change ($\mu g.m^{-3}$)	Change as % of Objective	Impact Descriptor
R1	15.1	15.4	0.3	1%	Negligible
R2	14.1	14.3	0.3	1%	Negligible
R3	16.3	16.4	0.1	0%	Negligible
R4	18.5	18.7	0.2	0%	Negligible
R5	14.9	15.0	0.1	0%	Negligible
R6	20.4	20.6	0.2	1%	Negligible
R7	20.5	20.7	0.2	1%	Negligible
R8	16.7	16.8	0.1	0%	Negligible
R9	15.4	15.8	0.3	1%	Negligible
R10	13.7	13.9	0.2	0%	Negligible
R11	13.0	13.1	0.1	0%	Negligible
R12	12.7	12.9	0.1	0%	Negligible
R13	13.5	13.7	0.2	0%	Negligible
R14	12.6	12.7	0.1	0%	Negligible
R15	13.3	13.4	0.2	0%	Negligible
R16	13.4	13.6	0.2	0%	Negligible
R17	12.9	13.1	0.2	0%	Negligible
R18	14.9	15.1	0.2	1%	Negligible

Receptor	2026 Annual Mean NO_2 Concentrations				
	Without North Falls ($\mu g.m^{-3}$)	With North Falls ($\mu g.m^{-3}$)	Change ($\mu g.m^{-3}$)	Change as % of Objective	Impact Descriptor
R19	14.5	14.8	0.3	1%	Negligible
R20	12.1	12.3	0.3	1%	Negligible
R21	13.7	13.9	0.2	0%	Negligible
R22	14.0	14.2	0.2	1%	Negligible

Table 20.34 Predicted annual mean PM_{10} concentrations and impact of North Falls at sensitive human receptors

Receptor	2026 Annual Mean PM_{10} Concentrations				
	Without North Falls ($\mu g.m^{-3}$)	With North Falls ($\mu g.m^{-3}$)	Change ($\mu g.m^{-3}$)	Change as % of Objective	Impact Descriptor
R1	14.9	15.0	0.1	0%	Negligible
R2	14.2	14.3	0.1	0%	Negligible
R3	15.6	15.6	0.0	0%	Negligible
R4	17.3	17.3	0.0	0%	Negligible
R5	15.2	15.2	0.0	0%	Negligible
R6	17.2	17.2	0.0	0%	Negligible
R7	15.6	15.7	0.0	0%	Negligible
R8	15.8	15.8	0.0	0%	Negligible
R9	16.6	16.7	0.1	0%	Negligible
R10	15.9	16.0	0.1	0%	Negligible
R11	16.3	16.4	0.1	0%	Negligible
R12	15.4	15.4	0.1	0%	Negligible
R13	15.4	15.4	0.1	0%	Negligible
R14	13.8	13.9	0.1	0%	Negligible
R15	14.3	14.4	0.1	0%	Negligible
R16	13.6	13.7	0.1	0%	Negligible
R17	13.4	13.5	0.1	0%	Negligible
R18	16.0	16.1	0.0	0%	Negligible
R19	16.3	16.4	0.1	0%	Negligible
R20	15.2	15.3	0.1	0%	Negligible
R21	14.6	14.6	0.0	0%	Negligible
R22	14.6	14.7	0.1	0%	Negligible

Table 20.35 Short term PM_{10} results at sensitive human receptor locations

Receptor	2026 Number of Days >50$\mu g.m^{-3}$ (Objective being fewer than 35 exceedances per year)		
	Without North Falls	With North Falls	Change
R1	0	0	0
R2	0	0	0
R3	0	0	0

Receptor	2026 Number of Days >50µg.m^{-3} (Objective being fewer than 35 exceedances per year)		
	Without North Falls	With North Falls	Change
R4	1	1	0
R5	0	0	0
R6	1	1	0
R7	0	0	0
R8	0	0	0
R9	0	0	0
R10	0	0	0
R11	0	0	0
R12	0	0	0
R13	0	0	0
R14	0	0	0
R15	0	0	0
R16	0	0	0
R17	0	0	0
R18	0	0	0
R19	0	0	0
R20	0	0	0
R21	0	0	0
R22	0	0	0

Table 20.36 Predicted annual mean $PM_{2.5}$ concentrations and impact of North Falls at sensitive human receptors

Receptor	2026 Annual Mean $PM_{2.5}$ Concentrations				
	Without North Falls (µg.m^{-3})	With North Falls (µg.m^{-3})	Change (µg.m^{-3})	Change as % of Objective	Impact Descriptor
R1	8.9	9.0	0.0	0%	Negligible
R2	8.6	8.6	0.0	0%	Negligible
R3	9.1	9.1	0.0	0%	Negligible
R4	9.8	9.8	0.0	0%	Negligible
R5	9.1	9.1	0.0	0%	Negligible
R6	10.0	10.0	0.0	0%	Negligible
R7	9.8	9.8	0.0	0%	Negligible
R8	9.9	9.9	0.0	0%	Negligible
R9	9.6	9.7	0.1	0%	Negligible
R10	9.2	9.3	0.0	0%	Negligible
R11	9.2	9.2	0.0	0%	Negligible
R12	9.0	9.0	0.0	0%	Negligible
R13	8.9	9.0	0.0	0%	Negligible
R14	8.8	8.8	0.0	0%	Negligible
R15	9.2	9.2	0.0	0%	Negligible
R16	8.8	8.9	0.0	0%	Negligible

Receptor	2026 Annual Mean $PM_{2.5}$ Concentrations				
	Without North Falls ($\mu g.m^{-3}$)	With North Falls ($\mu g.m^{-3}$)	Change ($\mu g.m^{-3}$)	Change as % of Objective	Impact Descriptor
R17	8.7	8.7	0.0	0%	Negligible
R18	9.3	9.4	0.0	0%	Negligible
R19	9.4	9.4	0.1	1%	Negligible
R20	8.9	8.9	0.0	0%	Negligible
R21	8.7	8.8	0.0	0%	Negligible
R22	8.7	8.7	0.0	0%	Negligible

217. The results of the construction phase road traffic emissions assessment show that annual mean concentrations of NO_2 (see Table 20.33), PM_{10} (see Table 20.34) and $PM_{2.5}$ (see Table 20.36) are predicted to be well below (i.e. less than 75% of) the respective air quality Objectives in the earliest year of construction (2026).

218. The changes in NO_2, PM_{10} and $PM_{2.5}$ concentrations were 1% or less at all receptors; this corresponded to a 'negligible' impact due to low total pollutant concentrations at all receptors, in accordance with IAQM and EPUK guidance (IAQM & EPUK, 2017).

219. All predicted NO_2 concentrations were well below 60$\mu g.m^{-3}$ and therefore, in accordance with Defra guidance (Defra, 2021a), the 1-hour mean Objective is unlikely to be exceeded (see Table 20.5). Based on the calculation provided by Defra, as detailed in Section 20.4.3.3.5 (paragraph 93), the short-term PM_{10} Objective was predicted to be met at all modelled locations (the Objective being less than 35 exceedances of 50 $\mu g.m^{-3}$ as a daily mean). As shown in Table 20.35, there was no change in the number of days exceeding the daily mean Objective between the 'without' and 'with' North Falls assessments, using the Defra (2022) calculation.

220. The assessment concluded that impacts of North Falls construction-generated road traffic upon local air quality are not significant based upon:

- A predicted negligible impact at all receptor locations;
- Predicted pollutant concentrations were well below the relevant air quality Objectives/target at all considered human receptor locations; and
- North Falls-generated traffic has not been predicted to cause a breach of any of the air quality Objectives at any identified sensitive receptor locations.

20.6.1.3.2 Ecological Receptors

221. Table 20.37 and Table 20.38 below presents the impact of the Project alone and in-combination respectively, on the most sensitive feature(s) under each designation, i.e. the most stringent Critical Levels and Loads of designated features have been presented below and may not all relate to the same feature. Table 20.37 presents the Project contribution (i.e. 'North Falls in isolation') and Table 20.38 presents the in-combination contribution (i.e. Project traffic and 2019 to 2026 traffic growth) (see Section 20.4.3.3.6). Values in exceedance of

1% of the Critical Load or Level, i.e. those which cannot be considered to be insignificant, are shown in **bold** text.

222. It should be noted that the most sensitive Critical Levels and Loads for feature(s) under each designated ecological site are presented below and all features may not be present in each designated site, nor may they be located within 200m of the affected road network.

Table 20.37 North Falls in isolation - Maximum contribution of project-generated NOx, NH_3, N-dep and acid deposition from traffic on feature(s) under designated ecological sites

Link	Designated Ecological Site		'North Falls in Isolation' Road Traffic Contribution										
			Concentration or Flux				% of Critical Level or Critical Load						
	Site Type	Name	NOx	NH3	N-dep	Acid dep.	NOx	NH_3		N-dep		Acid dep	
			$\mu g.m^{-3}$	$\mu g.m^{-3}$	$kgN.ha^{-1}.yr^{-1}$	$kgN.ha^{-1}.yr^{-1}$	-	% of lower CL	% of upper CL	% of lower CL	% of upper CL	% of lower CL	% of upper CL
10	SPA	Stour and Orwell Estuaries	0.7	0.03	0.3	0.018	**2.5%**	**3.2%**	**1.1%**	**1.3%**	0.8%	**2.5%**	0.4%
	SSSI	Cattawade Marshes	0.7	0.03	-	-	**2.5%**	-	**1.1%**	-	-	-	-
	SSSI	Stour Estuary	0.7	0.03	0.3	0.018	**2.5%**	**3.2%**	**1.1%**	**1.3%**	0.8%	**1.6%**	0.4%
19	SPA	Stour and Orwell Estuaries	0.5	0.01	0.1	0.007	**1.6%**	**1.1%**	0.4%	0.5%	0.3%	**1.0%**	0.2%
	SSSI	Stour Estuary	1.1	0.05	0.4	0.026	**3.7%**	**4.8%**	**1.6%**	**1.9%**	**1.3%**	**2.4%**	0.6%
26	SSSI	Holland Haven	0.5	0.02	-	-	**1.8%**	-	0.8%	-	-	-	-
1	Ancient Woodland	Walls Wood	1.3	0.03	0.4	0.030	**4.2%**	**2.8%**	0.9%	**4.3%**	**2.2%**	**1.8%**	**1.8%**
	Ancient Woodland	Unnamed Woodland	0.1	0.00	0.1	0.006	0.4%	0.4%	0.1%	0.8%	0.4%	0.3%	0.3%
21	Ancient Woodland	High Barn Wood	1.0	0.04	0.6	0.039	**3.3%**	**4.3%**	**1.4%**	**5.6%**	**2.8%**	**1.4%**	**1.4%**
22	Ancient Woodland	Guttridgehall Wood	0.1	0.00	0.0	0.002	0.2%	0.2%	0.1%	0.3%	0.2%	0.1%	0.1%
	Ancient Woodland	Unnamed Woodland	0.1	0.00	0.0	0.003	0.3%	0.2%	0.1%	0.4%	0.2%	0.2%	0.2%
39	Ancient Woodland	Simons Wood	0.3	0.01	0.1	0.007	0.8%	0.6%	0.2%	1.0%	0.5%	0.2%	0.2%

Table 20.38 North Falls in combination (background growth) - Maximum contribution of project-generated NOx, NH_3, N-dep and acid deposition from traffic on feature(s) under designation ecological sites

Link	Designated Ecological Site		'North Falls in Isolation' Road Traffic Contribution										
			Concentration or Flux				% of Critical Level or Critical Load						
	Site Type	Name	NOx	NH3	N-dep	Acid dep.	NOx	NH_3		N-dep		Acid dep	
			$\mu g.m^{-3}$	$\mu g.m^{-3}$	$kgN.ha^{-1}.yr^{-1}$	$kgN.ha^{-1}.yr^{-1}$	-	% of lower CL	% of upper CL	% of lower CL	% of upper CL	% of lower CL	% of upper CL
10	SPA	Stour and Orwell Estuaries	4.1	0.18	1.4	0.097	**13.6%**	**17.8%**	**5.9%**	**7.0%**	**4.6%**	**13.8%**	**2.1%**
	SSSI	Cattawade Marshes	4.1	0.18	-	-	**13.6%**	-	**5.9%**	-	-	-	-
	SSSI	Stour Estuary	4.1	0.18	1.4	0.097	**13.6%**	**17.8%**	**5.9%**	**7.0%**	**4.6%**	**8.8%**	**2.1%**
19	SPA	Stour and Orwell Estuaries	1.8	0.04	0.4	0.026	**5.9%**	**4.0%**	**1.3%**	**1.8%**	**1.2%**	**3.7%**	0.6%
	SSSI	Stour Estuary	4.0	0.17	1.4	0.095	**13.3%**	**17.4%**	**5.8%**	**6.8%**	**4.5%**	**8.6%**	**2.1%**
26	SSSI	Holland Marshes	2.4	0.11	-	-	**8.1%**	-	**3.5%**	-	-	-	-
1	Ancient Woodland	Walls Wood	8.4	0.19	2.8	0.199	**28.0%**	**18.5%**	**6.2%**	**28.4%**	**14.2%**	**11.8%**	**11.8%**
	Ancient Woodland	Unnamed Woodland	0.7	0.02	0.5	0.036	**2.3%**	**2.5%**	0.8%	**5.2%**	**2.6%**	**2.1%**	**2.1%**
21	Ancient Woodland	High Barn Wood	9.5	0.41	5.4	0.376	**31.7%**	**41.5%**	**13.8%**	**53.7%**	**26.8%**	**13.0%**	**13.0%**

Link	Designated Ecological Site		'North Falls in Isolation' Road Traffic Contribution										
			Concentration or Flux				% of Critical Level or Critical Load						
	Site Type	Name	NOx	NH3	N-dep	Acid dep.	NOx	NH_3		N-dep		Acid dep	
			$\mu g.m^{-3}$	$\mu g.m^{-3}$	$kgN.ha^{-1}.yr^{-1}$	$kgN.ha^{-1}.yr^{-1}$	-	% of lower CL	% of upper CL	% of lower CL	% of upper CL	% of lower CL	% of upper CL
22	Ancient Woodland	Guttridge hall Wood	1.1	0.03	0.5	0.036	**3.8%**	**2.9%**	**1.0%**	**5.2%**	**2.6%**	**2.0%**	**2.0%**
	Ancient Woodland	Unnamed Woodland	1.4	0.04	0.6	0.043	**4.7%**	**3.6%**	**1.2%**	**6.2%**	**3.1%**	**2.4%**	**2.4%**
39	Ancient Woodland	Simons Wood	0.5	0.01	0.2	0.012	**1.5%**	**1.1%**	0.4%	**1.8%**	0.9%	0.4%	0.4%

223. As shown in Table 20.38, there are several sites which are predicted to experience in-combination impacts significantly in excess of 1% of the Critical Load or Level. However, comparison with Table 20.37 shows that only a small percentage of impacts at almost all sites is due to the contribution from North Falls. Furthermore, as previously discussed, the impact of North Falls is temporary and would be experienced only during construction. The impact of other in-combination plans and projects, for example traffic generated as a result of residential and employment developments associated with regional Local Plan allocations, would be experienced over a significantly longer duration. However, all sites where the NOx, NH_3, N-dep and/or Acid deposition were predicted to be above 1% of the relevant Critical Level or Load, cannot be considered to be insignificant based on the use of the 1% screening criteria alone. The significance of impacts is therefore discussed in Chapter 23 Onshore Ecology (Volume I) and Chapter 24 Onshore Ornithology (Volume I). These chapters conclude the following:

- Effects upon the qualifying / interest features of designated sites for nature conservation arising from changes to NO_x, NH_3, N-Dep and acid dep. from road traffic emissions considered within Chapter 23 Onshore Ecology are at worst minor adverse, i.e. not significant in EIA terms and
- Effects upon the qualifying / interest features of designated sites for nature conservation arising from changes to NO_x, NH_3, N-Dep and acid dep. from road traffic emissions considered within Chapter 24 Onshore Ornithology (Volume I) are at worst minor adverse, i.e. not significant in EIA terms.

20.6.2 Potential effects during operation

224. Operational phase impacts were scoped out of the assessment, as agreed by the Planning Inspectorate (Planning Inspectorate, 2021; also see Table 20.1) and therefore have not been considered within this assessment.

20.6.3 Potential effects during decommissioning

225. No decision has been made regarding the final decommissioning policy for North Falls, as it is recognised that industry best practice, rules and legislation change over time. It is likely the cables would be pulled through the ducts and recycled, with the transition pits and ducts capped and sealed then left in situ.

226. A full EIA will be carried out ahead of any decommissioning works being undertaken at the onshore substation. The detailed activities and methodology for decommissioning would be determined later within lifetime of North Falls, in line with relevant policies at that time, but would be expected to include:

- Dismantling and removal of electrical equipment;
- Removal of cabling from site;
- Removal of any building services equipment;
- Demolition of the buildings and removal of fences; and
- Landscaping and reinstatement of the sites.

227. Whilst details regarding the decommissioning of the onshore substation are currently unknown, considering the worst-case assumptions for all scenarios which would be the removal and reinstatement of the current land use at the site, it is anticipated that the impacts would be similar to those during construction and therefore no significant impact.

228. The decommissioning methodology cannot be finalised until immediately prior to decommissioning but would be in line with relevant policy at that time.

20.7 Cumulative effects

20.7.1 Identification of potential cumulative effects

229. The first step in the CEA process is the identification of which residual effects assessed for North Falls on their own have the potential for a cumulative effect with other plans, projects and activities. This information is set out in Table 20.39.

Table 20.39 Potential cumulative effects

Impact	Potential for cumulative effect	Rationale
Construction		
Construction Impact 1: Construction dust and fine particulate matter	Yes	There is potential for cumulative construction dust impacts where projects occur within 700m of each other, as dust impacts are considered within a 350m buffer from each project, as detailed in Section 20.4.3.1. Therefore, two projects would need to be within 700m of each other for cumulative dust impacts to occur.
Construction Impact 2: NRMM Emissions	Yes	There is potential for cumulative NRMM emission impacts where projects overlap.
Construction Impact 3: Construction phase road traffic emissions	Yes	Where the construction phase of North Falls overlaps with other projects, there is the potential for cumulative impacts associated with North Falls-generated traffic emissions on the local road network.
Operation		
Operation impacts were scoped out of the assessment, as detailed in Section 20.6.2, therefore there would be no cumulative operational impacts.		
Decommissioning		
The detail and scope of the decommissioning works would be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. A decommissioning plan would be provided. As such, cumulative impacts during the decommissioning stage are assumed to be the same as those identified during the construction stage.		

20.7.2 Other plans, projects and activities

230. The second step in the cumulative assessment is the identification of the other plans, projects and activities that may result in cumulative effects for inclusion in the CEA (described as 'project screening'). This information is set out in Table 20.40 below, together with a consideration of the relevant details of each, including current status (e.g. under construction), planned construction period,

closest distance to North Falls, status of available data and rationale for including or excluding from the assessment.

231. The North Falls screening has been informed by the development of a CEA project list which forms an exhaustive list of plans, projects, and activities within the study area (Section 20.3.1) relevant to North Falls. The list has been appraised, based on the confidence in being able to undertake an assessment from the information and data available, enabling individual plans, projects, and activities to be screened in or out.

Table 20.40 Summary of projects considered for the CEA in relation to air quality (project screening)

Project	Status	Construction period	Closest distance from the onshore project area	Confidence in data	Included in the CEA (Y/N)	Rationale
Bradwell B new nuclear power station	Pre-application	Pre-application	21km	High	No	As detailed in Chapter 27 Traffic and Transport (Volume I), traffic and transport study area for these projects does not overlap with the North Falls onshore project area. these schemes have been screened out of the CEA for road traffic emissions. The projects are greater than 700m from North Falls, therefore there would be no potential for cumulative dust impacts. The projects are also sufficiently distance to preclude cumulative NRMM emission impacts. Therefore, these projects have been scoped out of the CEA.
Anglia TWO Offshore Windfarm	Approved (DCO Issued 2022)	Information unavailable.	47km north-east	High	No	
Sizewell C Project	Approved (DCO Issued 2022)	2022 – 2034	49km north-east	High	No	
Lake Lothing Third Crossing	Approved (DCO Issued 2020)	Construction over 2 years	76km north-east	High	No	
Manston Airport		Information unavailable.	53km south	High	No	
Thanet Extension Offshore Wind Farm	Application refused	Application refused	52km east	High	No	
Sea Link	Pre-application	Pre-application	20km east	High	No	
Ipswich Rail Chord	Approved (DCO Issued 2012)	Built	17km north-east	High	No	These projects have already concluded construction, and due to their nature, could not be expected to have any operational phase emissions. As such, they will therefore not contribute to cumulative effects during North Falls construction, operation, or decommissioning periods.
Richborough Connection Project	Approved (DCO Issued 2017)	Built	55km south	High	No	
Kentish Flats Extension	Approved (DCO Issued 2013)	Built	46km south	High	No	
Galloper Offshore Wind Farm	Approved	Built	15km north-east	High	No	
Nautilus Interconnector	Pre-application	Pre-application	44km north-east	Low	No	The location of onshore infrastructure associated with this project is not known; however, it is highly unlikely to be within close proximity to the onshore project

Project	Status	Construction period	Closest distance from the onshore project area	Confidence in data	Included in the CEA (Y/N)	Rationale
						area so is unlikely to have a cumulative effect on onshore air quality.
Five Estuaries Offshore Wind Farm	Pre-application	2028 - 2030	Scoping area directly overlaps with North Falls onshore project area.	High	Yes	There is potential for the construction phases of the proposed project and North Falls to overlap and traffic movements for both projects could use the same road links. This project has therefore been considered in the air quality CEA.
East Anglia GREEN	Pre-application	2027 - 2031	Directly overlaps with North Falls onshore project area.	Low	Yes	The proposed substation area for East Anglia GREEN is in close proximity to North Falls proposed onshore substation zone. This project has therefore been considered in the air quality CEA.
East Anglia TWO Offshore Wind Farm	Approved (DCO Issued 2022)	Mid 2020s	47km	High	No	The project is not in close proximity to the onshore project area and the study areas do not overlap. As such, there are not anticipated to be cumulative effects on onshore air quality.
A12 Chelmsford to A120 Widening Scheme	Pre-examination	Information unavailable.	27km south-west	Low	No	As detailed in Chapter 27 Traffic and Transport (Volume I), the location of the proposed scheme is beyond the extents of the Traffic and Transport Study Area (TTSA). Routes that extend outside of the TTSA are where construction traffic has dissipated and/or links with negligible sensitive receptors and therefore significant effects upon users of the highway network are unlikely. No cumulative effects are therefore anticipated.

Project	Status	Construction period	Closest distance from the onshore project area	Confidence in data	Included in the CEA (Y/N)	Rationale
						The project is greater than 700m from North Falls, therefore there would be no potential for cumulative dust impacts. The project is also sufficiently distant from North Falls to remove the potential for cumulative NRMM emission impacts. Therefore, these projects have been scoped out of the CEA.
Elmstead Hall, Elmstead, Colchester, Essex	Approved	Information unavailable.	5km	N/A	No	As detailed in Chapter 27 Traffic and Transport (Volume I), no assessment of traffic and transport impacts (e.g., a Transport Assessment/Statement) has been submitted in support of these applications. Traffic impacts are therefore anticipated to be not significant, and no cumulative effects are anticipated. The projects are greater than 700m from North Falls, therefore there would be no potential for cumulative dust impacts. The project is also sufficiently distant from North Falls to remove the potential for cumulative NRMM emission impacts. Therefore, these projects have been scoped out of the CEA.
Elmstead Hall, Elmstead, Colchester, Essex, CO7 7AT	Approved	Information unavailable.	5km	N/A	No	
Old Heath County Primary School, Old Heath Road, Colchester, Essex, CO2 8DD	Approved	Information unavailable.	8km	N/A	No	
Crown Quarry (Wick Farm), Old Ipswich Road, Ardleigh, CO7 7QR	Approved	Information unavailable.	6km	N/A	No	
Wivenhoe Quarry, Alresford Road Wivenhoe, Essex CO7 9JU	Approved	Information unavailable.	7km	N/A	No	
Land at Martells Quarry, Slough	Approved	Information unavailable.	3km	N/A	No	

Project	Status	Construction period	Closest distance from the onshore project area	Confidence in data	Included in the CEA (Y/N)	Rationale
Lane, Ardleigh, Essex, CO7 7RU						
Tendring Education Centre, Jaywick Lane, Clacton on Sea, Essex, CO16 8BE	Approved	Information unavailable.	3km	N/A	No	
Ardleigh Waste Transfer Station, A120, Ardleigh, Colchester, CO7 7SL	Approved	Information unavailable.	5km	N/A	No	
35 Roach Vale, Colchester, CO4 3YN	Approved	Information unavailable.	4km	N/A	No	

20.7.3 Assessment of cumulative effects

232. Following a review of projects (presented in Table 20.40) which have the potential to overlap temporally or spatially with North Falls, two developments have been scoped into the CEA for this chapter, these are:

- East Anglia GREEN; and
- Five Estuaries Offshore Wind Farm ('Five Estuaries').

233. These two projects are further considered further in Table 20.41.

Table 20.41 Cumulative effects from other projects on air quality during construction

Project	Construction Impact 1: Construction dust and fine particulate matter	Construction Impact 2: NRMM Emissions	Construction Impact 3: Construction phase road traffic emissions
Five Estuaries Offshore Wind Farm	The Five Estuaries onshore search area overlaps a very similar geographical area to the North Falls onshore project area. The Five Estuaries onshore search area will include a landfall, onshore cable corridor and onshore substation. Although exact location details are not known at this stage, the Applicant is in regular and on-going dialogue with Five Estuaries Offshore Wind Farm Ltd. and have established that the location of the landfall, onshore cable corridors and onshore substations will be broadly the same as North Falls and construction could occur at the same time and for a similar duration. The overlapping nature of both project areas means that there is the potential for cumulative dust impacts associated Five Estuaries construction activities as they intersect the onshore project boundary and therefore are located within 700m of each other. It is anticipated that a construction dust assessment would be undertaken and/or best practice mitigation methods will be recommended for Five Estuaries. IAQM guidance (IAQM, 2016) states that, with the implementation of the recommended mitigation, effects would be not significant. It is therefore not anticipated that there would be significant cumulative effects associated with construction phase dust emissions from these other projects combined with North Falls.	Due to the potential for overlapping construction programmes and intersecting footprints of Five Estuaries, there is the potential for NRMM associated with North Falls to be located and operating at the same time, and in the same area as NRMM associated with the project. However, pollutant concentrations at all receptors considered in this assessment were well below the relevant Objectives. It is anticipated that Five Estuaries will employ mitigation measures to control and manage NRMM emissions and it is highly unlikely NRMM would be present in the same area at the same time for any extended period of time due to the sequential nature of North Falls and Five Estuaries. Therefore, it is unlikely that there would be significant cumulative effects associated with construction phase NRMM. Inter-project engagement will seek to avoid temporal overlap.	At the time of drafting this PEIR, the level of information publicly available for Five Estuaries would not be sufficient to undertake a full CEA. With reference to Chapter 27 Traffic and Transport (Volume I), the Applicant are in regular and on-going dialogue with Five Estuaries Offshore Wind Farm Ltd and have established that the location of the landfall, onshore cable corridors and onshore substations will be broadly the same as North Falls and construction could occur at the same time and for a similar duration. At this stage, in advance of further information regarding Five Estuaries becoming available, it has been assumed that should Five Estuaries be granted consent it will be under a requirement to have reduced construction traffic emission effects to a non-significant level in EIA terms. Therefore, it is anticipated that cumulative effects with North Falls will also remain not significant in EIA terms. Assessment of the in-combination impacts will be considered within the CEA in the ES when sufficient information is available.
East Anglia GREEN	A new onshore substation is proposed to be built as part of the East Anglia GREEN proposals by National Grid, close to the preferred location for the North Falls onshore substation. North Falls is	Due to the potential for overlapping construction programmes and intersecting footprints of East Anglia GREEN, there is the potential for NRMM associated with	As discussed in Chapter 27 Traffic and Transport (Volume I), at the time of drafting this PEIR the latest publicly available information for East

Project	Construction Impact 1: Construction dust and fine particulate matter	Construction Impact 2: NRMM Emissions	Construction Impact 3: Construction phase road traffic emissions
	planned for construction from 2026 , compared to 2027 to 2031 for East Anglia GREEN. It is anticipated that a construction dust assessment would be undertaken and/or best practice mitigation methods will be recommended for East Anglia GREEN. IAQM guidance (IAQM, 2016) states that, with the implementation of the recommended mitigation, effects would be not significant. It is therefore not anticipated that there would be significant cumulative effects associated with construction phase dust emissions from these other projects combined with North Falls.	North Falls to be located and operating at the same time, and in the same area as NRMM associated with the project. However, pollutant concentrations at all receptors considered in this assessment were well below the relevant Objectives. It is anticipated that East Anglia GREEN will employ mitigation measures to control and manage NRMM emissions and it is highly unlikely NRMM would be present in the same area at the same time for any extended period of time due to the sequential nature of North Falls and East Anglia GREEN. Therefore, it is unlikely that there would be significant cumulative effects associated with construction phase NRMM. Inter-project engagement will seek to avoid temporal overlap.	Anglia GREEN comprises of non-statutory consultation (National Grid, 2022). The level of information contained within these documents would not be sufficient to undertake a full CEA. However, the Applicant is in regular and on-going dialogue with National Grid and will seek to continue working closely with National Grid, and with statutory consultees to assess potential cumulative effects. This approach complies with the relevant EIA Regulations and is consistent with that taken for other applications, where relevant environmental information has become available after the point of the DCO application submission. At this stage, in advance of further information regarding East Anglia GREEN becoming available, it has been assumed that should East Anglia GREEN be granted consent it will be under a requirement to have reduced construction traffic emission effects to a non-significant level in EIA terms. Therefore, it is anticipated that cumulative effects with North Falls will also remain not significant in EIA terms. The Applicant will incorporate relevant new information presented by East Anglia GREEN within the CEA in the ES.

20.8 Interactions

234. The chapters detailed in Table 20.42 have been identified as having interactions with air quality.

Table 20.42 Air quality interactions

Topic and description	Related chapter (Volume I)	Where addressed in this chapter	Rationale
Construction			
Impact 1: Construction dust and fine particulate matter	Chapter 28 Human Health	Section 20.6.1.1.	There could be the potential for human health impacts associated with increases in pollutant concentrations at sensitive receptors.
	Chapter 23 Onshore Ecology and Chapter 24 Onshore Ornithology	Section 20.6.1.1.	Ecological receptors may be impacted by changes to air quality.
Impact 2: NRMM emissions	Chapter 28 Human Health	Section 20.6.1.2.	There could be the potential for human health impacts associated with NRMM emissions.
	Chapter 23 Onshore Ecology and Chapter 24 Onshore Ornithology	Section 20.6.1.2.	Ecological receptors may be impacted by changes to air quality resulting from NRMM emissions.
Impact 3: Construction road vehicle exhaust emissions	Chapter 27 Traffic and Transport	Section 20.6.1.3	Pollutant emissions from traffic movements associated with North Falls have the potential to impact on air quality.
	Chapter 23 Onshore Ecology and Chapter 24 Onshore Ornithology	Section 20.6.1.3.1	Ecological receptors may be impacted by changes to air quality resulting from construction road vehicle exhaust emissions. Impacts and their significance are discussed in Chapter 23 Onshore Ecology (Volume I) and Chapter 24 Ornithology (Volume I).
	Chapter 28 Human Health	Section 20.6.1.3.2	There could be the potential for human health impacts associated with increases in pollutant concentrations at sensitive receptors.

20.9 Inter-relationships

235. The impacts identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic impacts as a result of that interaction. The areas of potential interaction between impacts are presented in Table 20.43. This provides a screening tool for which impacts have the potential to interact. For clarity the areas of potential interaction between impacts are presented in Table 20.43, along with an indication as to whether the interaction may give rise to synergistic impacts.

Table 20.43 Inter-relationships between impacts

Potential interactions between impacts			
Construction			
	Impact 1: Construction dust and fine particulate matter	Impact 2: NRMM emissions	Impact 3: Construction road vehicle exhaust emissions
Impact 1: Construction dust and fine particulate matter		Yes	Yes
Impact 2: NRMM emissions	Yes		Yes
Impact 3: Construction road vehicle exhaust emissions	Yes	Yes	
Operation			
Operational impacts on air quality have been scoped out.			
Decommissioning			
It is anticipated that the decommissioning impacts would be similar in nature to those of construction.			

236. Table 20.44 provides an assessment for each receptor group (i.e. human or ecological) as related to these impacts. Within Table 20.44 the impacts are assessed relative to construction (it is assumed decommissioning impacts would be no greater than those during construction, so have not been included to prevent repetition) to see if multiple construction impacts affecting the same receptor could increase the level of impact upon that receptor. The worst-case impacts assessed within the chapter take these interactions into account and for the impact assessments are considered conservative and robust.

Table 20.44 Inter-relationships between impacts during construction

Receptor	Highest significance level during construction	Construction phase assessment
Human receptors	Impact 1: **not significant** with the implementation of mitigation measures detailed in Section 20.6.1.1.5. Impact 2: **not significant** with the implementation of best available technique mitigation measures detailed in Section 20.6.1.2.4. Impact 3: **not significant** (negligible impact at all receptors)	**No greater than individually assessed impact** The proposed mitigation will minimise the potential for significant impacts on human receptors (Impact 1 and 2) within the study area and no significant impacts are predicted for Impact 3 during the construction phase of North Falls. Very few human receptors have the potential to be affected by all three construction impacts.

Receptor	Highest significance level during construction	Construction phase assessment
		Background pollutant concentrations in the study area are low (see Table 20.26) and therefore it is unlikely that the air quality Objectives would be exceeded even in the unlikely event of the impacts interacting. It is therefore considered that there will be no pathway for interaction to exacerbate the potential impacts associated with these activities during construction.
Ecological receptors	Impact 1: **not significant** with the implementation of mitigation measures detailed in Section 20.6.1.1.5. Impact 2: **not significant** with the implementation of best available technique mitigation measures detailed in Section 20.6.1.2.4. Impact 3: **not significant** with the implementation of best available technique mitigation measures detailed in Section 20.6.1.2.4 (see Chapter 23 Onshore Ecology (Volume I) and Chapter 24 Ornithology (Volume I)).	**No greater than individually assessed impact** The proposed mitigation will minimise the potential for significant impacts on ecological receptors (Impact 1 and 2) within the study area during the construction phase of North Falls. Very few ecological receptors (i.e. Holland Haven SSSI, Holland Haven LNR and Simons Wood ancient Woodland (near Links 26 and 37) have the potential to be affected by all three construction phase impacts. It is therefore considered that there will therefore be no pathway for interaction to exacerbate the potential impacts associated with these activities during construction.

20.10 Summary

237. A summary of the potential impacts identified with relation to air quality is provided in Table 20.45.

Table 20.45 Summary of potential likely significant effects on air quality

Potential impact	Receptor	Sensitivity	Magnitude of impact	Pre-mitigation effect	Mitigation measures proposed	Residual effect
Construction						
Impact 1: Construction dust and fine particulate matter	Human receptors within 350m of the onshore project area (and/or within 50m of HGV routes up to 500m from the onshore project area for trackout effects)	Dust soiling: low to high	Low to high risk	Assessment methodology does not assign significance before mitigation.	Measures as recommended by the IAQM (see Section 20.6.1.1.5).	Not significant
		Human health: low	Low to medium risk			
	Ecological receptors within 200m of the onshore project area (and/or within 50m of HGV routes up to 500m from the onshore project area for trackout effects)	Ecological effects: high	Medium to high risk			
Impact 2: NRMM emissions	Human and ecological receptors within close proximity to NRMM works within the onshore project area	High	N/A	Defra technical guidance (Defra, 2022) states that emissions from NRMM used on construction sites are unlikely to have a significant impact on local air quality where relevant control and management measures are employed.	Good practice mitigation measures (see Section 20.6.1.2.4).	Not significant
Impact 3: Construction road vehicle exhaust emissions	Residential properties, schools, hospitals and		The predicted impact of the scheme at all receptors for all	Not significant.	No additional mitigation measures required.	Not significant

Potential impact	Receptor	Sensitivity	Magnitude of impact	Pre-mitigation effect	Mitigation measures proposed	Residual effect
	care homes within 200m of roads		pollutants was 'negligible'.			
	Designated ecological sites within 200m of affected roads	High	The predicted impact of the scheme at all receptors for all pollutants was 'negligible[1]'.	Not significant.	No additional mitigation measures required.	Not significant
Operation						
Operational impacts on air quality have been scoped out.						
Decommissioning						
As per construction						

[1] See Chapters 23 Onshore Ecology (Volume I) and 24 Onshore Ornithology (Volume I) for details of how conclusions of 'negligible' impact magnitude was reached.

20.11 References

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