RWE Renewables UK Dogger Bank South (West) Limited

RWE Renewables UK Dogger Bank South (East) Limited

Dogger Bank South Offshore Wind Farms

Environmental Statement

Volume 7

Chapter 26 – Air Quality (Revision 2) (Tracked)

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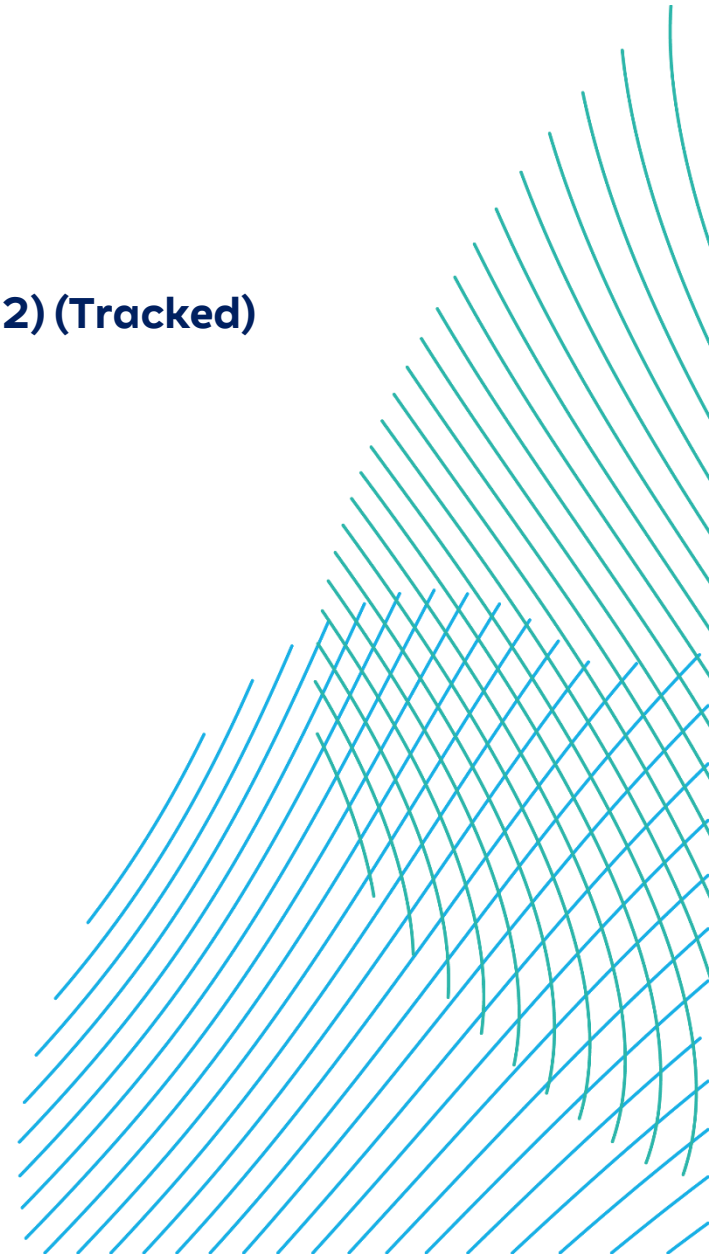

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Company:	**RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited**	Asset:	**Development**
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01	June 2024	Final for DCO Application	RHDHV	RWE	RWE
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Revision Change Log			
Rev No.	**Page**	**Section**	**Description**
01	N/A	N/A	Submitted for DCO Application
02	Various	Various	Chapter 26 Air Quality has been updated at the request of the Examining Authority within the Rule 17 [PD-018] to accurately reflect the proposed development and contains all the updated information within the chapter as a result of **Project Change Request 2** (document reference 10.53).

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Glossary

Term	Definition
Concurrent Scenario	A potential construction scenario for the Projects where DBS East and DBS West are both constructed at the same time.
Development Scenario	Description of how the DBS East and/or DBS West Projects would be constructed either in isolation, sequentially or concurrently.
Dogger Bank South (DBS) Offshore Wind Farms	The collective name for the two Projects, DBS East and DBS West.
EIA Regulations	The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach, and information to support, the Environmental Impact Assessment (EIA) and Habitats Regulations Assessment (HRA) for certain topics.
Habitats Regulations	Conservation of Habitats and Species Regulations 2017 and Conservation of Offshore Marine Habitats and Species Regulations 2017.
Haul Road	The track along the Onshore Export Cable Corridor used by traffic to access different sections of the onshore export cable route for construction.
Horizontal Directional Drill (HDD)	HDD is a trenchless technique to bring the offshore cables ashore at the landfall and can be used for crossing other obstacles such as roads, railways and watercourses onshore.
In Isolation Scenario	A potential construction scenario for one Project which includes either the DBS East or DBS West array, associated offshore and onshore cabling and only the eastern Onshore Converter Station within the Onshore

Term	Definition
	Substation Zone and only the northern route of the onward cable route to the proposed Birkhill Wood National Grid Substation.
Jointing Bays	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.
Landfall	The point on the coastline at which the Offshore Export Cables are brought onshore, connecting to the onshore cables at the Transition Joint Bay (TJB) above mean high water.
Landfall Zone	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) and the Transition Joint Bays (TJBs) inclusive of all construction works, including the landfall compounds, Onshore Export Cable Corridor and intertidal working area including the Offshore Export Cables.
Onshore Converter Stations	A compound containing electrical equipment required to transform HVDC and stabilise electricity generated by the Projects so that it can be connected to the electricity transmission network as HVAC. There will be one Onshore Converter Station for each Project.
Onshore Development Area	The Onshore Development Area for ES is the boundary within which all onshore infrastructure required for the Projects would be located including Landfall Zone, Onshore Export Cable Corridor, accesses, Temporary Construction Compounds and Onshore Converter Stations.
Onshore Export Cables	Onshore Export Cables take the electric from the Transition Joint Bay to the Onshore Converter Stations.
Onshore Grid Connection Points	The Onshore Grid Connection Points is the location where the electricity produced by the Projects would be

Term	Definition
	transferred to the national grid. There are two Onshore Grid Connection Points, one for each Project, which will be located in the same place.
Onshore Substation Zone	Parcel of land within the Onshore Development Area where the Onshore Converter Station infrastructure (including the haul roads, Temporary Construction Compounds and associated cable routeing) would be located.
Onward Cable Connection	Area of 400kV HVAC onshore export cable from the Onshore Converter Stations to the Proposed Birkhill Wood National Grid Substation.
Project Change Request 2	The changes to the DCO application for the Projects set out in **Project Change Request 2 - Onshore Substation Zone** [AS-152] which was accepted into Examination on 21st January 2025.
Sequential Scenario	A potential construction scenario for the Projects where DBS East and DBS West are constructed with a lag between the commencement of construction activities. Either Project could be built first.
Temporary Construction Compound	An area set aside to facilitate construction of the Projects. These will be located adjacent to the Onshore Export Cable Corridor and within the Onshore Substation Zone, with access to the highway.
The Applicants	The Applicants for the Projects are RWE Renewables UK Dogger Bank South (East) Limited and RWE Renewables UK Dogger Bank South (West) Limited. The Applicants are themselves jointly owned by the RWE Group of companies (51% stake) and Masdar (49% stake).
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South Offshore Wind Farms)

Term	Definition
Transition Joint Bay (TJB)	The Transition Joint Bay (TJB) is an underground structure at the landfall that houses the joints between the Offshore Export Cables and the Onshore Export Cables.
Transmission infrastructure	The structures and equipment required to convey electricity.

Acronyms

Term	Definition
AADT	Annual Average Daily Traffic
ADMS-Roads	Atmospheric Dispersion Modelling System for Roads
APIS	Air Pollution Information System
AQMA	Air Quality Management Area
ARN	Affected Road Network
ASR	Annual Status Report
CAS	Clean Air Strategy
CBS	Cement Bound Sand
CEA	Cumulative Effects Assessment
CEH	Centre for Ecology and Hydrology
CLRTAP	Convention on Long-range Transboundary Air Pollution
CoCP	Code of Construction Practice
CO_2	Carbon Dioxide
CTMP	Construction Traffic Management Plan
DBS	Dogger Bank South
DCO	Development Consent Order
DEFRA	Department for the Environment and Rural Affairs
DESNZ	Department of Energy Security and Net Zero
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges

Term	Definition
DMT	Decision-making Threshold
EFT	Emission Factor Toolkit
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
EPUK	Environmental Protection United Kingdom
ES	Environmental Statement
ETG	Expert Topic Group
EU	European Union
HCC	Hull City Council
HDD	Horizontal Directional Drilling
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicles
HVDC	High-Voltage Direct Current
IAQM	Institute of Air Quality Management
IPC	Infrastructure Planning Commission (now Planning Inspectorate)
IPMP	In-Principal Monitoring Plan
IRZ	Impact Risk Zone
JNCC	Joint Nature Conservation Committee
km	Kilometre
LAQM	Local Air Quality Management

Term	Definition
LDV	Light Duty Vehicles
LNR	Local Nature Reserve
LPA	Local Planning Authority
MAGIC	Multi-Agency Geographic Information for the Countryside
MHCLG	Ministry of Housing, Communities and Local Government (now the Department for Levelling Up, Housing and Communities)
MW	Megawatts
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NPS	National Policy Statement
NRMM	Non-Road Mobile Machinery
NSIPs	Nationally Significant Infrastructure Projects
OcoCP	Outline Code of Construction Practice
OS	Ordnance Survey
PEIR	Preliminary Environmental Information Report
PM	Particulate Matter
PPG	Planning Practice Guidance
RHDHV	Royal HaskoningDHV
RMSE	Root Mean Square Error
SAC	Special Area of Conservation
SPA	Special Protection Area

Term	Definition
SPD	Supplementary Planning Guidance
SSSI	Site of Special Scientific Interest
TJB	Transition Joint Bay
UK	United Kingdom
UNECE	United Nations Economic Commission for Europe

26 Air Quality

26.1 Introduction

1. This chapter of the Environmental Statement (ES) considers the likely significant effects of the Projects on local air quality. The chapter provides an overview of the existing environment for the proposed Onshore Development Area, followed by an assessment of likely significant effects for the construction, operation, and decommissioning phases of the Projects.

2. As detailed in **Volume 7, Chapter 1 Introduction (application ref: 7.1),** Chapter 26 has been updated to incorporate the changes to the Projects Design Parameters resulting from **Project Change Request 2 – Onshore Substation Zone (document reference 10.53)**, and the incorporation of any associated responses and corrections provided on Air Quality throughout the Examination process.

~~2.~~3. This assessment has been undertaken with specific reference to the relevant policy, legislation and guidance, which are summarised in section 26.4.1 of this chapter. Further information on the international, national and local planning policy and legislation relevant to the Projects is provided in **Volume 7, Chapter 3 Policy and Legislative Context (application ref: 7.3)**.

~~3.~~4. Details of the methodology used for the Environmental Impact Assessment (EIA) and Cumulative Effect Assessment (CEA), are presented in section 26.4 of this chapter and **Volume 7, Chapter 6 EIA Methodology (application ref: 7.6)**.

~~4.~~5. The assessment should be read in conjunction with the following linked chapters:

- **Volume 7, Chapter 9 Benthic and Intertidal Ecology (application ref: 7.9)**;
- **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18)**;
- **Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)**;
- **Volume 7, Chapter 27 Human Health (application ref: 7.27)**; and
- **Volume 7, Chapter 30 Climate Change (application ref: 7.30)**.

~~5.~~6. Additional information to support the air quality assessment includes:

- **Volume 7, Appendix 26-1 Air Quality Consultation Responses (application ref: 7.26.26.1)**;
- **Volume 7, Appendix 26-2 Construction Dust and Fine Particulate Matter Assessment Methodology (application ref: 7.26.26.2)**;

- **Volume 7, Appendix 26-3 Air Quality Assessment Traffic Data (application ref: 7.26.26.3)**; ~~and~~
- **Volume 7, Appendix 26-4 Air Quality Assessment – Construction Phase Road Traffic Emissions Receptor Locations (application ref: 7.26.26.4)**; and
- **Volume 7, Figure 26-1 to 26-4 (application ref: 7.26.1).**

7. **Volume 7, Figure 26-1 to Figure 26-4 (application reference: 7.26.1)** has been updated as a result of the changes referenced in paragraph 2. Following a review of the changes listed in paragraph 2 above, it has not been necessary to update any appendices to this Chapter.

~~6.~~8. Inter-relationships with these chapters are further described in section 26.11.

~~7.~~9. This ES chapter:

- Presents the existing environmental baseline established from desk studies and consultation;
- Presents the potential environmental effects on air quality arising from the Projects, based on the information gathered and the analysis and assessments undertaken;
- Identifies any assumptions and limitations encountered in compiling the environmental information; and
- Highlights any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

26.2 Consultation

~~8.~~10. Consultation with regard to air quality has been undertaken in line with the general process described in **Volume 7, Chapter 7 Consultation (application ref: 7.7)** and the **Consultation Report (Volume 5, application ref: 5.1).** The key elements to date have including scoping, the ongoing Evidence Plan Process (EPP) via the via the Dogger Bank South Traffic and Access, Onshore Noise and Air Quality Expert Topic Group (ETG) and the Preliminary Environmental information Report (PEIR).

~~9.~~11. The feedback received throughout this process has been considered in preparing the ES. This chapter has been updated following consultation in order to produce the final assessment submitted within the Development Consent Order (DCO) application. **Volume 7, Appendix 26-1 Air Quality Consultation Responses (application ref: 7.26.26.1)** provides a summary of the consultation responses received to date relevant to this topic, and details how the comments have been addressed within this chapter.

26.3 Scope

26.3.1 Effects Scoped In and Scoped Out

~~10.~~12. Upon consideration of the baseline environment, the project description outlined in **Volume 7, Chapter 5 Project Description (application ref: 7.5)**, and Scoping Opinion, potential impacts upon air quality have been scoped in or out. These impacts are outlined, together with a justification for why they are or are not considered further.

~~11.~~13. The Planning Inspectorate, as indicated in the Scoping Opinion (Planning Inspectorate Scoping Opinion, 2022), has agreed to exclude the assessment of 'Offshore Air Quality' impacts on air quality, deeming them unlikely to be significant.

~~12.~~14. Additionally, the Inspectorate agreed that operational impacts are scoped out of the assessment as they are unlikely to be significant. However, the Inspectorate considered that back-up generators, and other equipment, in particular battery storage infrastructure if proposed, has the potential to result in air quality effects during the operational phase. Therefore, the Inspectorate requested a reasoned justification supported by evidence to demonstrate why a detailed assessment is not required.

~~13.~~15. It is reasoned that the details of the number and capacity of back-up generators are not yet known; however, any local air quality impact is very unlikely to be significant. Given their purpose, such plant operate very infrequently, although need to be regularly tested, but typically this is for a short time, on a periodic basis, such as weekly or monthly. Generators which have a thermal input rating greater than 1 MWth will require an operational Environmental Permit. Emergency standby generators which are tested <50 hours/year are exempt from the 'Specified Generator' requirements, but they are still classed as 'Medium Combustion Plants'. The new units would be considered in aggregate capacity, according to the rated thermal input not electrical output. Depending on various factors including the location, a Standard Rules Permit may be required. The Applicants will apply for and have in place the requisite Permit(s) for its back-up power provision at the appropriate time. In addition, the design of the Projects does not include Battery Energy Storage Systems (BESS). Therefore, operational impacts have been scoped out, which is also in alignment with stakeholders' agreement as part of the EPP (Evidence Plan Process) via the Dogger Bank South Traffic and Access, Onshore Noise, and Air Quality Expert ETG workshops in November 2023 (**Volume 7, Appendix 26-1 (application ref: 7.26.26.1)**).

~~14.~~16. During construction, the onshore elements of the Projects may give rise to construction phase dust and fine particulate matter, Non-Road Mobile Machinery (NRMM) emissions and road traffic emissions which have the potential to impact on human and ecological receptors. These aspects have been assessed as presented in this chapter.

~~15.~~17. No final decision regarding the final decommissioning plan for the onshore project infrastructure including the Landfall Zone, Onshore Export Cable Corridor and Onshore Converter Stations has yet been made. 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 wherever possible and the transition bays and cable ducts 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 worst case scenario, the impacts will be no greater than those identified for the construction phase. Decommissioning has been assessed on this basis within this chapter.

26.3.2 Study Area

~~16.~~18. Details of the location of the Project and the onshore elements are set out within **Volume 7, Chapter 5 Project Description (application ref: 7.5)**.

~~17.~~19. The air quality study area has been defined on the basis of the Planning Inspectorate's Scoping Opinion (the Planning Inspectorate, 2022), through consultation with East Riding of Yorkshire Council and Hull City Council and using the criteria detailed below. Offshore and operational air quality impacts are scoped out of the assessment, as they are unlikely to be significant.

~~18.~~20. The Onshore Development Area consists of the following elements:

- A Landfall (within the Landfall Zone) at Skipsea;
- An approximately 32km long Onshore Export Cable Corridor (construction easement typically 75m wide, and extending to up to 90m at complex trenchless crossings), and associated Temporary Construction Compounds;
- Up to two Onshore Converter Stations (within the Onshore Substation Zone) to the south of Beverley; and
- An approximately 2.5km Onward Cable Connection to the proposed Birkhill Wood National Grid Substation.

~~19.~~21. The air quality study area is shown on **Volume 7, Figure 26-1 (application ref: 7.26.1)** and has been defined as follows:

- Construction phase dust and fine particulate matter emissions (**Volume 7, Figure 26-2 (application ref: 7.26.1)**):
  - Human receptors within 250m of the boundary of the Onshore Development Area and/or within 50m of trackout (the transport of dust and dirt from the construction site onto the public road network) routes, extending up to 250m from the Onshore Development Area at the trackout location (as shown on **Volume 7, Figure 26-2 (application ref: 7.26.1)**); and
  - Ecological receptors within 200m of the Onshore Development Area and/or within 50m of trackout routes used by construction vehicles on the public highway, extending up to 250m from the Onshore Development Area at the trackout location (as shown on **Volume 7, Figure 26-2 (application ref: 7.26.1)**).
- Construction phase NRMM emissions:
  - Human and ecological receptors within 200m of the Onshore Development Area where NRMM will be located.
- Construction phase road traffic emissions **Volume 7, Figure 26-3 (application ref: 7.26.1)**:
  - Human and ecological receptors within 200m of all roads that trigger the traffic screening criteria and adjoining roads within 200m, referred to as the Affected Road Network (ARN)**.** Further information on construction traffic routes is provided in **Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)**.

26.3.3 Realistic Worst Case Scenario

26.3.3.1 General Approach

~~20.~~22. The realistic worst case design parameters for likely significant effects scoped into the ES for the air quality assessment are summarised in **Table 26-1**. These are based on the project parameters described in **Volume 7, Chapter 5 Project Description (application ref: 7.5),** which provides further details regarding specific activities and their durations.

~~21.~~23. In addition to the design parameters set out in **Table 26-1,** consideration is also given to the different Development Scenarios still under consideration as set out in section 26.3.3.2 to section 26.3.3.4.

~~22.~~24. **Table 26-1**, presents the realistic worst case scenario elements considered for the assessment of air quality.

Table 26-1 Realistic Worst Case Design Maximum Parameters

	Parameter			
	DBS East or DBS West In Isolation	**DBS East and DBS West Concurrently**	**DBS East and DBS West Sequentially**	**Notes and rationale**
Construction				
~~Intertidal~~	~~• A trenchless solution is to be used to install ducts that will house the cables under the beach. The ducts will run from the Transition Joint Bay (TJB), located landward of landfall, to an exit location which may be at an intertidal location ("short trenchless landfall") or further offshore ("long trenchless landfall").~~ ~~• Duct extensions may be required to enable the landfall HDD ducts to be extended further offshore to facilitate cable installation from an installation vessel situated offshore.~~ ~~• Exit pits would be located at each HDD exit location, approximately 20m x 10m per trenchless landfall exit.~~			
Landfall Zone	• Total Landfall Zone area: 420,000m^2 • Number of completed trenchless crossing ducts (maximum): 3 (2 ~~for~~ power cables, ~~1~~ 2 ~~for~~ fibre optic cables) • Number of trenches: Up to 2 • Indicative trenchless crossing depth (m): 20 • No. of transition joint bays: 2 • Transition joint bay dimensions (m): 5 x 20 • Permanent land take for TJBs (m^2): 200 – including below ground infrastructure • Number of Link Boxes (2.5 x 4m): 2 – the only above ground infrastructure • Permanent land take for total number of Link Boxes (m^2): 20 • Landfall TJB compound works area (m): 110 x 75 • Landfall satellite compound (m): 75x 75 • Temporary access: Route from the existing road system • Temporary lighting during working hours. Temporary out-of-hours security lighting.	• Total Landfall Zone area: 420,000m^2 • Number of completed trenchless crossing ducts: 6 (4 ~~for~~ power cables, 4~~2~~ ~~for~~ fibre optic cables) • Number of trenches: Up to 4 • Indicative trenchless crossing depth (m): 20 • No. of transition joint bays: 4 • Transition joint bay dimensions (m): 5 x 20 • Permanent land take for TJBs (m^2): 400 – including below ground infrastructure • Number of Link Boxes (2.5 x 4m): 4 – the only above ground infrastructure • Permanent land take for total number of Link Boxes (m^2): 40 • Landfall TJB compound works area (m): 190 x 75 • Landfall satellite compound (m): 75x 75 • Temporary access: Route from the existing road system • Temporary lighting during working hours. Temporary out-of-hours security lighting. • Duration of works: up to 18 months overall (not continuous)	• Total Landfall Zone area: 420,000m^2 • Number of completed trenchless crossing ducts: 6 (4 ~~for~~ power cables, 4~~2~~ ~~for~~ fibre optic cables) • Number of trenches: Up to 4 • Indicative trenchless crossing depth (m): 20 • No. of transition joint bays: 4 • Transition joint bay dimensions (m): 5 x 20 • Permanent land take for TJBs (m^2): 400 – including below ground infrastructure • Number of Link Boxes (2.5 x 4m): 4 – the only above ground infrastructure • Permanent land take for total number of Link Boxes (m^2): 40 • Landfall TJB compound works area (m): 190 x 75 • Landfall satellite compound (m): 75x 75 Temporary access: Route from the existing road system • Temporary lighting during working hours. Temporary out-of-hours security lighting. • Duration of works: up to 48 months overall (not continuous)	Landfall TJB compound and satellite construction compound considered as one compound installed for duration of construction. The trenchless crossing works should not require any prolonged periods of restrictions or closures to the beach for public access, although it is possible that some work activities will be required to be performed on the beach that may require short periods of restricted access.

	Parameter			
	DBS East or DBS West In Isolation	**DBS East and DBS West Concurrently**	**DBS East and DBS West Sequentially**	**Notes and rationale**
	• Duration of works: 18 months overall (not continuous)			
Onshore Export Cable Corridor from Landfall Zone to the Substation Zone	• Indicative corridor length between Landfall Zone and the Substation Zone (km): 32 • Cable corridor width: 41m (up to 45m at trenchless crossings) • Maximum cable burial depth (where restrictions aren't present): 2 m • Indicative cable burial depth: 1.6 m • Access routes: Various from public highway to single tracks • Haul road: 5m (increasing to 8m at passing places) • Main construction compound • Number: 2 • Area: 100 x 100 m • Satellite construction compounds • Number: 15 • Area: 75 x 75m • Trenchless crossing compounds: Number: min 41 up to 147 entry points and min 41 up to 147 exit points. • Trenchless crossing compound dimensions: 60 x 40m assumed for the Project's compounds on each side of the obstacle. • Duration: 33 months	• Indicative corridor length between Landfall Zone and the Substation Zone (km): 32 • Cable corridor width: 75m (up to 90m at trenchless crossings) • Maximum cable burial depth (where restrictions aren't present): 2 m • Indicative cable burial depth: 1.6 m • Access routes: Various from public highway to single tracks • Haul road: 5m (increasing to 8m at passing places) • Main construction compound: • Number: 2 • Area: 100 x 100 m • Satellite construction compound: • Number: 15 • Area: 75 x 75m • Trenchless crossing compounds • Number: min 82 up to 294 entry points and min 82 up to 294 exit points • Trenchless crossing compound dimensions: 60 x 40m per project assumed for the Project's compounds on each side of the obstacle. • Duration: 33 months	• Indicative corridor length between Landfall Zone and the Substation Zone (km): 32 • Cable corridor width: 75m (up to 90m at trenchless crossings) • Maximum cable burial depth (where restrictions aren't present): 2 m • Indicative cable burial depth: 1.6 m • Access routes: Various from public highway to single tracks • Haul road: 5m (increasing to 8m at passing places) • Main construction compound: • Number: 2 • Area: 100 x 100 m • Satellite construction compound: • Number: 15 • Area: 75 x 75m • Trenchless crossing compounds: • Number: min 82 up to 294 entry points and min 82 up to 294 exit points • Trenchless crossing compound dimensions: 60 x 40m per project assumed for the Project's compounds on each side of the obstacle. • Duration of works: up to 57 months overall (note this would not be continuous working within that timeframe)	Deeper burial depth may be required if open cut crossing of obstacle such as utility / watercourse / road etc.
Onshore Substation Zone	• Operational compounds for Onshore Converter Station (m): 122~~44~~ x 264 (HVDC Converter) • Permanent area (m2): 32,208~~64,000~~m² (based on one HVDC converter station) • Total construction area (m2): 62,208~~94,000~~ (based on one HVDC	• Operational compounds for Onshore Converter Station (m): 122~~44~~ x 264 (HVDC Converter) plus 122~~44~~ x 264 (HVDC Converter) • Permanent area (m²): 64,416~~129,000~~ (based on two HVDC converter stations)	• Operational compounds for Onshore Converter Station (m): 122~~44~~ x 264 (HVDC Converter) plus 122~~44~~ x 264 (HVDC Converter) • Permanent area (m²): 64,416~~129,000~~ (based on two HVDC converter stations)	

	Parameter			
	DBS East or DBS West In Isolation	**DBS East and DBS West Concurrently**	**DBS East and DBS West Sequentially**	**Notes and rationale**
	converter station + temporary construction compound area) • Duration: 4 years	• Total construction area (m^2): 124,416~~189,000~~ (based on two HVDC converter station + temporary construction compound areas) • Duration: 4 years	• Total construction area (m^2): 124,416~~189,000~~ (based on two HVDC converter station + temporary construction compound area) • Duration: 6 years	
Onward Cable Connection to Proposed Birkhill Wood National Grid Substation	• Onward corridor length from Onshore Converter Station to proposed Birkhill Wood National Grid Substation (km): 2.5 • Number of export circuits: 4x400kV • Technology: HVAC • Cabling from Project's Converter Station to National Grid Substation: Buried • General cable corridor approximate permanent easement swathe (m): 20 • Cable corridor construction swathe (m): 53.5 • Cable construction satellite construction compound dimensions (m): 75x75 • Number of earth / link boxes: 35	• Onward corridor length from Onshore Converter Station to proposed Birkhill Wood National Grid Substation (km): 2.5 • Number of export circuits: 8x400kV • Technology: HVAC • Cabling from Projects' Converter Stations to National Grid Substation: Buried • General cable corridor approximate permanent easement swathe (m): 34 • Cable corridor construction swathe (m): 100 • Cable construction satellite construction compound dimensions (m): 75x75 • Number of earth / link boxes: 70	• Onward corridor length from Onshore Converter Station to proposed Birkhill Wood National Grid Substation (km): 2.5 • Number of export circuits: 8x400kV • Technology: HVAC • Cabling from Projects' Converter Stations substation to National Grid Substation: Buried • General cable corridor approximate permanent easement swathe (m): 34 • Cable corridor construction swathe (m): 100 • Cable construction satellite construction compound dimensions (m): 75x75 • Number of earth / link boxes: 70	
Impacts relating to construction traffic	DBS East or DBS West In Isolation was assessed. The realistic worst case scenario upon which these flows were derived is set out in **Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)** and presented in **Volume 7, Appendix 26-3 (application ref: 7.26.26.3)**.	DBS East and DBS West together Concurrently construction traffic was assessed as a worst case scenario for air quality. The realistic worst case scenario upon which these flows were derived is set out in **Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)** and presented in **Volume 7, Appendix 26-3 (application ref: 7.26.26.3)**.		
Operation				
Scoped out of assessment				
Decommissioning				

	Parameter			
	DBS East or DBS West In Isolation	**DBS East and DBS West Concurrently**	**DBS East and DBS West Sequentially**	**Notes and rationale**
No final decision regarding the final decommissioning policy for the onshore project infrastructure including landfall, Onshore Export Cable Corridor and Onshore Converter Stations has yet been made. 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 wherever possible and the transition 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 worst case scenario, the impacts will be no greater than those identified for the construction phase. A decommissioning plan for the onshore works would be submitted prior to any decommissioning commencing.				

26.3.3.2 Development Scenarios

~~23.~~25. Following Statutory Consultation high voltage alternating current (HVAC) technology (previously assessed in PEIR) was removed from the Projects' design envelope (see **Volume 7, Chapter 4 Site Selection and Assessment of Alternatives (application ref: 7.4)** for further information). As a result, only high voltage direct current (HVDC) technology has been taken forward for assessment purposes. The ES considers the following development scenarios:

- Either DBS East or DBS West is built In Isolation; or
- DBS East and DBS West are both built either Sequentially or Concurrently.

~~24.~~26. An In Isolation Scenario has been assessed within the ES on the basis that, theoretically, one Project could be taken forward without the other being built out. If an In Isolation Scenario is taken forward, either DBS East or DBS West may be constructed. As such, the onshore assessment considers both DBS East and DBS West in isolation.

~~25.~~27. If an In Isolation Scenario is taken forward, only the eastern Onshore Converter Station within the Onshore Substation Zone would be constructed. In either the Concurrent or Sequential Scenario, both Onshore Converter Station locations within the Onshore Substation Zone would be taken forward for the onshore assessment.

~~26.~~28. In order to ensure that a robust assessment has been undertaken, all Development Scenarios have been considered to ensure the realistic worst case scenario for each topic has been assessed. A summary is provided here, and further details are provided in **Volume 7, Chapter 5 Project Description (application ref: 7.5).**

~~27.~~29. The three Development Scenarios to be considered for assessment purposes are outlined in **Table 26-2**.

Table 26-2 Development Scenarios and Construction Durations

Development Scenario	Description	Total Maximum Construction Duration (Years)	Maximum construction Duration Offshore (Years)	Maximum construction Duration Onshore (Years)
In Isolation	Either DBS East or DBS West is built In Isolation	Five	Five	Four
Sequential	DBS East and DBS West are both built Sequentially, either Project could commence construction first with staggered / overlapping construction.	Seven	A five year period of construction for each project with a lag of up to two years in the start of construction of the second project (excluding landfall duct installation) – reflecting the maximum duration of effects of seven years.	Construction works (i.e. onshore cable civil works, including duct installation) to be completed for both Projects simultaneously in the first four years, with additional works at the landfall, Onshore Substation Zone and cable joint bays in the following two years. Maximum duration of effects of six years.
Concurrent	DBS East and DBS West are both built Concurrently reflecting the maximum peak effects	Five	Five	Four

~~28.~~30. Any differences between the Projects, or differences that could result from the manner in which the first and the second Projects are built (Concurrent or Sequential and the length of any gap) are identified and discussed where relevant in section 26.6. For each potential impact, the worst case construction scenario for the In Isolation Scenario and the Concurrent or Sequential Scenario is presented. The worst case scenario presented for the Concurrent or Sequential Scenario will depend on which of these is the worst case for the potential impact being considered. The justification for what constitutes the worst case is provided, where necessary, in section 26.6.

~~29.~~31. The Projects' construction-generated road traffic flows have been determined for the worst case scenario which is DBS East and DBS West Concurrent construction (see **Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)**). It is anticipated that the magnitude of impacts of the Sequential Scenario would be no greater, or less than Concurrent (as the Sequential Scenario-generated construction traffic flows would be lower) and therefore have not been considered further in the assessment. Construction generated traffic impacts for the scenario DBS East or DBS West In Isolation have been considered in this chapter.

26.3.3.3 Operation Scenarios

~~30.~~32. Operational phase air quality impacts have been scoped out of the assessment, as detailed in the Scoping Report (RWE, 2022) and Scoping Opinion (the Planning Inspectorate, 2022).

26.3.3.4 Decommissioning Scenarios

~~31.~~33. Decommissioning scenarios are described in **Volume 7, Chapter 5 Project Description (application ref: 7.5).** Decommissioning arrangements would be agreed through the submission of a Decommissioning Plan to be submitted and approved following cessation of commercial operation prior to decommissioning commencing. For the purpose of this assessment it is assumed that decommissioning of the Projects could be conducted separately, or at the same time.

26.3.4 Embedded Mitigation

~~32.~~34. This section outlines the embedded mitigation relevant to the air quality assessment, which has been incorporated into the design of the Projects or constitutes standard mitigation measures for this topic (**Table 26-3**). Mitigation is also detailed within the **Commitments Register (Volume 8, application ref: 8.6)** and cross-referenced within **Table 26-3**. Where other mitigation measures are proposed, these are detailed in the impact assessment (section 26.6).

~~33.~~35. The embedded mitigation measures are those defined in the Institute of Environmental Management and Assessment (IEMA) guidance as either primary or tertiary mitigation. As these measures have been embedded, the assessment of effects is undertaken on the basis that these forms of mitigation will definitely be delivered. Therefore, any effects that might have arisen without these forms of mitigation do not need to be identified as 'potential effects', as there would be no potential for them to arise.

Table 26-3 Embedded Mitigation Measures

Parameter	Embedded Mitigation Measures	Where commitment is secured
Site selection	The Projects have undergone extensive site selection processes which have 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 **Volume 7, Chapter 4 Site Selection and Assessment of Alternatives (application ref: 7.4)**) for the Onshore Converter Stations and associated infrastructure. Key principles that have informed the location of the Onshore Export Cable Corridor include: • Preference for the shortest Onshore Export Cable Corridor, where possible, 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.	DCO Schedule 1

Parameter	Embedded Mitigation Measures	Where commitment is secured
	• Avoid sites designated for nature conservation, where possible.	
Best practice dust management mitigation measures	The Projects will commit to the implementation of best practice dust mitigation measures as per the **Outline Code of Construction Practice (OCoCP) (Volume 8, application ref: 8.9)**. 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 embedded mitigation measures, as set out in section 26.6.1.1.5.	DCO Requirement 19
NRMM	The following mitigation measures specific to NRMM will be outlined within the Project's **Outline Code of Construction Practice (OCoCP) (Volume 8, application ref: 8.9)**, which will form the basis of the final Code of Construction Practice (CoCP) which will be secured as a DCO Requirement. NRMM and plant should be well maintained. If any emissions of dark smoke occur, then the relevant machinery should cease operation 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	DCO Requirement 19

Parameter	Embedded Mitigation Measures	Where commitment is secured
	• 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 would 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.	

26.4 Assessment Methodology

26.4.1 Policy, Legislation and Guidance

26.4.1.1 National Policy Statements

~~34.~~36. The assessment of likely significant effects upon air quality has been made with specific reference to the relevant National Policy Statements (NPS). These are the principal decision-making documents for Nationally Significant Infrastructure Projects (NSIPs). These were published in November 2023 and came into force in January 2024. Those relevant to the Projects are:

- Overarching NPS for Energy (EN-1) (DESNZ 2023a);
- NPS for Renewable Energy Infrastructure (EN-3) (DESNZ 2023b); and
- NPS for Electricity Networks Infrastructure (EN-5) (DESNZ 2023c).

~~35.~~37. The specific assessment requirements for air quality, as detailed in the NPS, are summarised in **Table 26-4** together with an indication of the section of this chapter where each is addressed.

~~36.~~38. EN-3 and EN-5 do not include specific details on the assessment of air quality.

Table 26-4 NPS Assessment Requirements

NPS Requirement	NPS Reference	ES Section Reference
EN-1 NPS for Energy		
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.	EN-1, Paragraph 5.2.2	Not applicable to this air quality assessment. The greenhouse gas assessment is presented in **Volume 7, Chapter 30 Climate Change (application ref: 7.30).**
The ES should describe: • Existing air quality levels and the relative change in air quality from existing levels; • Any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project; • The predicted absolute emission levels of the proposed project, after mitigation methods have been applied; and • Any potential eutrophication impacts.	EN-1, Paragraph 5.2.8	Please refer to sections 26.5 and 26.6.
Defra publishes future national projections of air quality based on estimates of future levels of emissions, traffic, and vehicle fleet. Projections are updated as the evidence base changes and the applicants should ensure these are current at the point of an application. The applicant's assessment should be consistent with this but may include more detailed modelling to demonstrate local impacts.	EN-1, Paragraph 5.2.9	Please refer to sections 26.5 and 26.6.

NPS Requirement	NPS Reference	ES Section Reference
Where a proposed development is likely to lead to a breach of the air quality thresholds or affect the ability of a non-compliant area to achieve compliance within the timescales set out in the most recent relevant air quality plan at the time of the decision, the applicants should work with the relevant authorities to secure appropriate mitigation measures to ensure that those thresholds are not breached.	EN-1, Paragraph 5.2.10	Please refer to sections 26.5 and 26.6.
The Secretary of State should consider whether mitigation measures are needed both for operational and construction emissions over and above any which may form part of the project application. A construction management plan may help codify mitigation at this stage. In doing so the Secretary of State should have regard to the Air Quality Strategy or any successor to it and should consider relevant advice within Local Air Quality Management guidance.	EN-1, Paragraph 5.2.11	Please refer to sections 26.5 and 26.6.
The mitigations identified in section 5.14 on traffic and transport impacts will help mitigate the effects of air emissions from transport	EN-1, Paragraph 5.2.12	Please refer to sections 26.5 and 26.6.
Other matters that the Secretary of State may consider important and relevant to their decision-making may include Development Plan Documents or other documents in the Local Development Framework.	EN-1, Paragraph 4.1.12	Please refer to sections 26.5 and 26.6.
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.	EN-1, Paragraph 4.1.15	Please refer to sections 26.5 and 26.6.

26.4.1.2 Other Legislation, Policy and Guidance

~~37.~~39. In addition to the NPS, there a number of pieces of legislation, policy and guidance applicable to the assessment of air quality.

26.4.1.3 National Planning Policy Framework

~~38.~~40. The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, updated December 2023) is the primary source of national planning guidance in England. Sections relevant to this aspect of the ES are summarised in **Table 26-5**.

Table 26-5 Summary of NPPF Policy relevant to air quality

Summary	**How and where this is considered in the ES**
Paragraph no.180 *"Planning policies and decisions should contribute to and enhance the natural and local environment by:* *[…]* *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans"*	The impacts of the Project on receptors susceptible to air pollutants have been considered in section 26.6.1.

Summary	How and where this is considered in the ES
Paragraph no.192 *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."*	The impact of the Project on receptors susceptible to air pollutants, including those located within Air Quality Management Areas, have been considered in section 26.6.1.

26.4.1.3.1 National Legislation

~~39.~~41. European Union (EU) legislation forms the basis for UK air quality policy. The air quality limit values that are included in the EU Directive on Ambient Air Quality (1996) and 2008/50/EC and Cleaner Air for Europe are transposed into English law within the Air Quality Standards Regulations 2010.

~~40.~~42. 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 26-6**.

26.4.1.3.2 Air Quality Strategy

~~41.~~43. The EU Air Quality Framework Directive 96/62/EC on Ambient Air Quality Assessment and Management entered into force in November 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 on Ambient air Quality and Cleaner Air for Europe, which came into force June 2008.

~~42.~~44. The Environment Act 1995 required the preparation of a national Air Quality Strategy (AQS) which set air quality standards and Objectives for specified pollutants. The Act also outlined measures to be taken by local planning authorities in relation to meeting these standards and Objectives (the Local Air Quality Management (LAQM) system).

~~43.~~45. The UK AQS was originally adopted in 1997 and has been reviewed and updated in order 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 AQS for England, Scotland, Wales and Northern Ireland. This was subsequently amended in 2003 and was last updated in July 2007.

~~44.~~46. The UK Government published its Clean Air Strategy (CAS) in January 2019, which reset the focus for the first time since the 2007 Air Quality Strategy revision. 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 $PM_{2.5}$.

~~45.~~47. The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 sets two $PM_{2.5}$ targets into law and contains provisions on how they will be monitored and assessed. The targets are as follows:

- An annual mean concentration target – limiting $PM_{2.5}$ to 10 µg m^{-3}, to be met across England by the end of 2040.
- A population exposure reduction target – a 35% reduction in population exposure (compared to 2018) to $PM_{2.5}$ by the end of 2040.

~~46.~~48. The new Environmental Improvement Plan was published in January 2023 and includes non-statutory interim $PM_{2.5}$ targets of five years in duration as milestones to meeting the full long-term targets.

26.4.1.3.3 Local Air Quality Management (LAQM)

~~47.~~49. The standards and Objectives relevant to the LAQM framework have been prescribed through the Air Quality (England) Regulations 2000. The EU Limit Values have been implemented via the Air Quality Standards Regulations 2010 which set out the combined Daughter Directive limit values and interim targets for Member State compliance.

~~48.~~50. The current air quality standards and Objectives of relevance to this assessment are outlined in **Table 26-6**. Pollutant standards relate to ambient pollutant concentrations in air, set based on medical and scientific evidence of how each pollutant affects human health. Pollutant Objectives, however, incorporate target dates and averaging periods by which each standard is to be achieved, taking into account economic considerations, practicability and technical feasibility.

~~49.~~51. 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.

~~50.~~52. The pollutants of concern in the context of the air quality assessment are NO_2, PM_{10} and $PM_{2.5}$, as these pollutants are most likely to be present in ambient air at concentrations close to or above the air quality criteria at sensitive receptors near to roads and are hence the focus of the assessment of vehicle emissions associated with the Projects. Air quality thresholds relevant to the air quality assessment are summarised in **Table 26-6.**

Table 26-6 Air Quality Strategy Objectives (England) for the Purpose of LAQM

Pollutant	**Air Quality Objective**		**To be achieved by**
	Concentration (µg 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

Pollutant	Air Quality Objective		To be achieved by
	Concentration (µg m^{-3})	Measured as*	
	40	Annual mean	31/12/2004
Particles ($PM_{2.5}$)	20 (10**)	Annual mean (target)	2020 (2040**)
	15% cut in annual mean (urban background exposure)	Annual mean	2010-2020
	35%** cut in annual mean (urban background exposure)	Annual mean	2040
*The way the Objectives are to be measured is set out in the UK Air Quality (England) Regulations 2000 ** Environmental targets required by section 1 of the Environment Act were adopted in January 2023 (HMSO, 2023b).			

~~51.~~53. 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.

26.4.1.3.4 Critical Levels for the Protection of Vegetation and Ecosystems

~~52.~~54. 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.

~~53.~~55. The Critical Levels of relevance to this assessment relate to concentrations of oxides of nitrogen (NOx) and ammonia (NH_3) and are detailed in **Table 26-7**. The Critical Level for ammonia is not included within the Air Quality Standards Regulations; however, a Critical Level for this pollutant is set out within the United Nations Economic Commission for Europe (UNECE) Convention on Long-range Transboundary Air Pollution (CLRTAP) and is adopted within air quality assessments.

~~54.~~56. NOx Critical Levels are provided as both long and short-term averaging periods. IAQM guidance (IAQM, 2020) recommends that only the annual mean NOx Critical Level is used in assessments due to the comparative importance of annual effects 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 the annual mean Critical Level was considered.

Table 26-7 Critical Levels for the Protection of Vegetation and Ecosystems

Pollutant	Concentration (µg m^{-3})	Measured as	To be achieved by
Oxides of Nitrogen (NOx)	30	Annual mean	31/12/2000
Ammonia (NH_3)	3	Annual mean	-
	1 (for lichens and bryophytes)	Annual mean	-

~~55.~~57. Critical Loads for habitat sites in the UK are published on the APIS website (CEH, 2023) and are habitat specific. 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 and Kite (2021a, 2021b).

26.4.1.3.5 Local Policy

~~56.~~58. The East Riding Local Plan Strategy Document (East Riding of Yorkshire Council, 2016) was adopted in April 2016 and sets out the management of growth and development in the region until 2029. Hull City Council adopted its Local Plan (Hull City Council, 2017) in November 2017, which guides development in the city until 2032. The Local Plan Strategy Document was reviewed, and the policy summarised in **Table 26-8** was identified with regard to air quality and health and the Projects.

Table 26-8 Summary of Local Planning Policy on Decision Making Relevant to Air Quality

Summary of Local Planning Policy	**How and where considered in the ES**
East Riding of Yorkshire Council	
"Policy EC5: Supporting the energy sector *A. Proposals for the development of the energy sector, excluding wind energy but including the other types of development listed in Table 7, will be supported where any significant adverse impacts are addressed satisfactorily, and the residual harm is outweighed by the wider benefits of the proposal. Developments and associated infrastructure should be acceptable in terms of:* *1. The cumulative impact of the proposal with other existing and proposed energy sector developments;* *[…]* *3. The effects of development on:* *i. local amenity, including noise, air and water quality, traffic, vibration, dust and visual impact;* *ii. biodiversity, geodiversity and nature, particularly in relation to designations, displacement, disturbance and collision and the impact of emissions/contamination;* *[…]* *B. Where appropriate, proposals should include provision for decommissioning at the end of their operational life. Where decommissioning is necessary, the site should be restored, with*	The impact of construction-generated traffic from the Projects was assessed at both human and ecological receptors as presented in section 26.6.1.3. Cumulative effects have been considered as described in section 26.4.4 and presented in section 26.7.1.3 Decommissioning effects have been considered as detailed in section 26.6.3.

Summary of Local Planning Policy	How and where considered in the ES
minimal adverse impact on amenity, landscape and biodiversity, and opportunities taken for enhancement of these features. […]"	
Hull City Council	
"Policy 18 Renewable and low carbon energy *[…]* *2. Development that generates, transmits and/or stores renewable and/or low carbon energy will be supported where the impact is or can be made acceptable. Potential impacts that are particularly relevant to this type of development are:* *a. local amenity, including noise, air quality, water quality, traffic,* *vibration, dust, visual impact, shadow flicker and odour;* *b. biodiversity, particularly in relation to national and international* *designations, and priority species and habitats and geodiversity; […]"*	Air quality impacts resulting from the Projects has been considered in section 26.6.
"Policy 47 Atmospheric Pollution *[…]* *2. An assessment of air quality must accompany applications for major development which could individually, or cumulatively with planning permissions and/or developments under construction:* *a. worsen air quality within an Air Quality Management Area;* *[…]* *3. The scope of any assessment of air quality should be agreed prior to the submission of a planning application and will be required to:* *a. identify the site, development proposal and area in which the impacts will be assessed;*	Air quality impacts resulting from the Projects have been considered in section 26.6. The scope and methodology has been agreed with East Riding of Yorkshire Council and Hull City Council. A cumulative assessment is discussed in section 26.7. Impacts on receptors within the AQMA and the ecological designated sites which are adjacent to a potential construction traffic route have been considered as presented in section 26.6.1.3.

Summary of Local Planning Policy	How and where considered in the ES
b. assess the existing air quality; *c. assess the impact of the proposal on air quality individually and in conjunction with any outstanding planning permission or development under construction; and* *d. identify mitigation measures and quantify the impact of those* *measures.* *4. In additional to criteria 2 and 3 above, if the development is located within 200m of the Humber Estuary SAC, the application should specifically address the impact of the proposal on the SAC designated saltmarsh. Where effects cannot be avoided, appropriate mitigation measures should be provided to ensure that there is no adverse effect on the integrity of the Humber Estuary SAC.* *5. Development which cannot appropriately mitigate air quality concerns, including dust and odour, will only be supported where the social and economic benefits significantly outweigh the negative impact on air quality."*	Coastal saltmarsh within the Humber Estuary is not present within 200m of the Onshore Development Area and the affected road network. Further details are provided in section 26.5.3.3.
Hull City Council has produced a Supplementary Planning Document (SPD) on Environmental Quality (SPD3) (Hull City Council, 2019b). This document and its appendices detail Hull City Council's requirements with regard to environmental assessment of a project, including air quality. SPD3 provides additional planning guidance on Policy 47 – Atmospheric Pollution included within the Hull Local Plan 2016 to 2032 (Hull City Council, 2017). Appendix E of SPD3 contains air quality guidance for planners and developers (Hull City Council, 2018).	The requirements of the Hull City Council SPD3 and its appendices on environmental quality (Hull City Council, 2019b) are considered within this assessment and discussed in section 26.6.

26.4.1.3.6 Guidance

~~57.~~59. The following guidance documents have been used within the assessment:

- Appendix E of SPD3: Air Quality Guidance for Planners and Developers (Hull City Council, 2018).
- Defra's LAQM Technical Guidance (TG22) August 2022 (Defra, 2022).
- Guidance on Decision-making Thresholds for Air Pollution: Main Report and Technical Report (Chapman and 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, 2024).
- 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 and Development Control: Planning For Air Quality (IAQM and EPUK, 2017).

26.4.2 Data and Information Sources

26.4.2.1 Data Sources

~~58.~~60. A desk study was undertaken to obtain information on baseline air quality within the air quality study area. Data has been acquired within the air quality study area through a detailed desktop review of existing studies and datasets. The following sources of information that have been used to inform the assessment are listed in **Table 26-9**.

Table 26-9 Key Sources of Air Quality Data

Data Set	Spatial Coverage	Year	Notes
East Riding of Yorkshire Council Air Quality Annual Status Report	Covers area within East Riding of Yorkshire Council's jurisdiction	2018 - 2022	Local monitoring data and baseline information
Hull City Council Air Quality Annual Status Report	Outside of Projects' development areas but within the air quality study area	2018 - 2022	

Data Set	Spatial Coverage	Year	Notes
Defra LAQM Technical Guidance (TG22) (Defra, 2022b)	UK	2022	Assessment methodology
Defra's LAQM Support Portal	UK	Assessment years	2018-based 1 x 1km grid background pollution maps
JNCC (Chapman and 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)	UK	2024	Air Pollution Information System (APIS). Details of Critical Levels and Loads for ecological habitats
Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK)	UK	2017	Assessment methodology for categorising effects at human receptors
IAQM	UK	2024	Guidance on the assessment of impacts from construction dust and fine particulate matter
	UK	2020	Guidance on the assessment of air quality impacts on designated nature conservation areas
Natural England	UK	2018	Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations

26.4.3 Impact Assessment Methodology

~~59.~~61. **Volume 7, Chapter 6 EIA Methodology (application ref: 7.6)** provides a summary of the general impact assessment methodology applied to the Projects. The following sections describe the methods used to assess the likely significant effects on local air quality.

26.4.3.1 Construction Phase Dust and Fine Particulate Matter

~~60.~~62. Assessment of potential impacts associated with construction phase dust and fine particulate matter emissions was undertaken in accordance with the latest IAQM guidance (IAQM, 2024). The terminology therefore differs from the generic impact assessment terminology presented within **Volume 7, Chapter 6 EIA Methodology (application ref: 7.6).**

~~61.~~63. A summary of the assessment process is provided below. Full details of the assessment methodology are provided in **Volume 7, Appendix 26-2 (application ref: 7.26.26.2).**

26.4.3.1.1 Construction Phase Assessment Steps

~~62.~~64. The assessment steps are as follows:

1. Screen the need for a more detailed assessment;
2. Assessment conducted separately for demolition, earthworks, construction and trackout (the transport of dust and dirt from the construction site onto the public road network):
    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.

~~63.~~65. It is anticipated that there will be no dust-generating demolition required as part of the construction phase of the Projects; therefore, this has been not considered as part of the assessment.

26.4.3.1.2 Sensitivity

~~64.~~66. Definitions of the different sensitivity levels for human and ecological receptors to dust (IAQM, 2024) are given in **Table 26-2-2** presented in **Volume 7, Appendix 26-2 (application ref: 7.26.26.2)**.

26.4.3.1.3 Magnitude

~~65.~~67. The magnitude of construction phase dust emissions are 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.

~~66.~~68. 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.

~~67.~~69. The dust emission magnitudes for each activity of relevance to the Projects are detailed in **Table 26-2-1** presented in **Volume 7, Appendix 26-2 (application ref: 7.26.26.2)**.

26.4.3.1.4 Significance

~~68.~~70. The assessment of significance of construction dust effects using the IAQM guidance (2023), the dust emission magnitude is combined with the sensitivity of the area to determine the risk of impacts prior to mitigation. This is shown in more detail in **Volume 7, Appendix 26-2 (application ref: 7.26.26.2)**. This assessment deviates slightly from the methodology set out in **Volume 7, Chapter 6 EIA Methodology (application ref: 7.6)**, 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 guidance considers it to be most appropriate to only assign significance post mitigation, as it assumes mitigation is inherent in the design/construction approach. The aim is to prevent significant effects at receptors due to the implementation of effective mitigation. 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.

26.4.3.2 Construction Phase NRMM Emissions

~~69.~~71. Defra technical guidance (Defra, 2022b) 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 trenchless crossing technique works, may temporarily increase pollutant concentrations in the vicinity of receptors.

~~70.~~72. NRMM control measures will be implemented as embedded mitigation and therefore, a qualitative assessment of emissions from project-generated NRMM used at landfall and during construction of the Onshore Export Cable Corridor and/or Onshore Converter Stations, where impacts on receptors may occur, has been undertaken. The assessment has therefore focused on locations of intensive construction activities (i.e., Temporary Construction Compounds).

~~71.~~73. 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 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.

~~72.~~74. The significance of effects has been determined using professional judgement, taking into account the factors above.

26.4.3.3 Construction Road Vehicle Exhaust Emissions

26.4.3.3.1 Traffic Data

~~73.~~75. The derivation of the traffic data used in the air quality assessment is detailed in **Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)**.

~~74.~~76. Twenty-four hour annual average daily traffic (AADT) flows and HGV percentages have been derived for the worst case construction year scenarios. The traffic data for the assessment is detailed in **Volume 7, Appendix 26-3 (application ref: 7.26.26.3)**. Whilst the traffic data has minor updates as a result of **Project Change Request 2 (document reference 10.53)**, there are no changes to the peak-year i.e. worst case construction year scenarios twenty--four hour AADT flows and HGV percentages and as a result no update to **Volume 7, Appendix 26-3 (application ref: 7.26.26.3)**.

~~75.~~77. Traffic data have been factored to account for traffic growth between 2022 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).

~~76.~~78. Project(s)-generated road traffic during the construction phase will affect a similar study area as presented at PEIR stage. However, as a result of changes to the construction traffic routes to be used by the Projects since PEIR, Project-generated construction traffic will no longer be routed along the A63 Clive Sullivan Way (Traffic Links 25 and 26).

26.4.3.3.2 Screening Criteria and Assessed Road Links/Haulage Routes

~~77.~~79. 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 and Kite, 2021a and 2021b) has been used for the screening of ecological receptors, within 200m from the ARN. The assessment screening criteria are detailed in **Table 26-10.**

Table 26-10 Road Traffic Assessment Screening Criteria

Guidance Document	Receptor	Screening Criteria	
IAQM and EPUK (2017)	Human receptors	Light Duty Vehicles (LDVs)	A change in annual average daily traffic (AADT) of more than 100 within or adjacent to an AQMA, or more than 500 elsewhere.
		Heavy Duty Vehicles (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 and 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))

~~78.~~80. Ecological receptors are screened inclusive of in-combination traffic growth from the base year (2022) to the future base year (2026). Reasoning for this is provided in further detail in section 26.4.3.3.

~~79.~~81. The increases in traffic flows on the road network associated with the construction phase of DBS East and/or DBS West have been screened using the criteria detailed in **Table 26-10.**

~~80.~~82. As mentioned previously in section 26.3.3, this was undertaken for DBS East or DBS West In Isolation and for the Concurrent Scenario as they represent the worst cases with regard to construction traffic. See **Volume 7, Chapter 5 Project Description (application ref: 7.5)** for further detail on the different construction scenarios.

~~81.~~83. All road links are anticipated to experience increases in traffic flows greater than the stringent JNCC DMT screening criteria (i.e., 0.15% of existing 2022 baseflow AADT). As such, all affected ARN links for DBS East or DBS West In Isolation and DBS East and DBS West Concurrent construction, and therefore all ARN within 200m of a designated ecological site, have been screened into the assessment. This affected ARN links and designated sites are shown in **Volume 7, Figure 26-4 (application ref: 7.26.1)**.

~~82.~~84. The road links which are predicted to experience increases in vehicle numbers and HGVs in exceedance of the human receptor screening criteria for DBS East or DBS West In Isolation and DBS East and DBS West Concurrent construction are detailed in **Table 26-11**.

~~83.~~85. Traffic flows on the temporary haul roads within the Onshore Development Area to be used for DBS East and/or DBS West during construction have also been screened against the criteria detailed in **Table 26-10** and discussed in section 26.4.3.3.7.5.

Table 26-11 Human Receptor Screening – Affected Road Links Under DBS East or DBS West In Isolation and DBS East and DBS West Concurrent Construction. Boxes Shaded in Green Show 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 DBS East and DBS West as AADT– Human Receptor Screening (2026)****			
		DBS East or DBS West In Isolation		**DBS East and DBS West Concurrent Construction**	
		LDVs	**HGVs**	**LDVs**	**HGVs**
9	A165 Brandesburton to Leven	167	78	208	107
12	A1035 Leven to A165	223	99	275	136

Link ID	Road	Number of vehicles generated by the construction phase of DBS East and DBS West as AADT- Human Receptor Screening (2026)**			
		DBS East or DBS West In Isolation		DBS East and DBS West Concurrent Construction	
		LDVs	HGVs	LDVs	HGVs
13	A165 from A1035 to Skirlaugh	106	197	121	261
14	A165 through Skirlaugh	14	197	16	261
15	A165 from Skirlaugh to Coniston	14	197	16	261
16	A165 from Coniston to Holderness Road	14	197	16	261
17	A165/Holderness Road	8	197	10	261
19	Mount Pleasant/A1033	6	338	7	471
20	A1033 Slip Road	6	324	7	451
21	A1033/Hedon Road	6	338	7	486
22	A1033/Hedon Road	14	338	17	471
23	A1033/Hedon Road	0	197	0	261
24 (in AQMA) *	A63	0	338	0	471
27	A63	161	338	188	471
28	A15/Boothferry Road	161	338	188	471
30	A164	324	338	379	471
31	A164	324	338	379	471

Link ID	Road	Number of vehicles generated by the construction phase of DBS East and DBS West as AADT- Human Receptor Screening (2026)**			
		DBS East or DBS West In Isolation		DBS East and DBS West Concurrent Construction	
		LDVs	HGVs	LDVs	HGVs
32	A164	428	338	501	471
33	A164	428	338	501	471
34	A164	537	338	633	471
35	A164	529	330	624	462
38	A164	339	202	404	269
40	A1033/Thomas Clarkson Way	36	338	42	471
45	A1033	106	338	124	471
50	A164/ Woodmansey	318	202	382	269
51	A164/Woodmansey	318	202	382	269
52	A1174/A164	375	202	449	269
53	A1174/A164/Swinemoor Lane	375	202	449	269
54	A1035	359	205	430	272
55	A1035	401	205	478	272
56	A1035	479	205	574	272
63	A1079	321	120	355	169
66	A1079	199	338	239	486

Link ID	Road	Number of vehicles generated by the construction phase of DBS East and DBS West as AADT- Human Receptor Screening (2026)**			
		DBS East or DBS West In Isolation		DBS East and DBS West Concurrent Construction	
		LDVs	HGVs	LDVs	HGVs
74	Mount Pleasant/A1033 and Stoneferry Rd/A1165	22	338	26	471
75	Sutton Road/A1033	36	338	42	471
76	Marfleet Road	8	197	10	261

* The Port of Hull is a potential origin of construction material. As the Port of Hull is located within an AQMA (see further details in section 26.5.1), Link 24 has been extended along Commercial Road to the Port to ensure a robust assessment of the impacts of the Projects on sensitive receptors within the AQMA.

Peak traffic flows (AADT) reported in **Table 26-11 are not expected to change as a result of **Project Change Request 2 (document reference 10.53)**.

26.4.3.3.3 Assessment Scenarios

~~84.~~86. The onshore construction works of both DBS East or DBS West In Isolation and DBS East and DBS West Concurrent construction are expected to occur over an approximate five-year period from 2026.

~~85.~~87. To provide a conservative assessment, the annual average project-generated traffic across the construction period was combined with the earliest year of construction, where pollutant emission rates and background concentrations would be higher than in later years of construction.

~~86.~~88. Peak construction flows were not used in the assessment, as peak construction would occur over a 1 or 2-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 was deemed to be robust and a more appropriate representation of construction impacts from traffic over an annual period and aligns with the requirements for use of AADT flows.

~~87.~~89. The assessment has therefore considered the following scenarios:

- Verification / Base year (2022);
- Worst case Construction Year (2026) without and with DBS East or DBS West In Isolation; and
- Worst case Construction Year (2026) without and with DBS East and DBS West constructed Concurrently.

~~88.~~90. It should be noted that traffic data does not include any changes to baseline traffic flows as a result of the A63 Castle Street improvements in Hull, nor the A164 and Jocks Lodge Improvement Scheme which are under construction and will be operational prior to construction of the Projects. **Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)** outlines that the approach to derivation of baseline traffic flows has been agreed with the relevant highway authorities (namely, East Riding of Yorkshire Council, Hull City Council and National Highways).

~~89.~~91. A63 Castle Street improvements in Hull and the A164 and Jocks Lodge Improvement Scheme, have otherwise been considered as part of the cumulative effects assessment discussed in section 26.7.

26.4.3.3.4 Background Pollutant Concentrations

~~90.~~92. 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. Background NO_2, PM_{10} and $PM_{2.5}$ concentrations are therefore obtained from Defra mapping (Defra, 2020a) for the 1km x 1km grid squares covering the study area and receptor locations for the 2022 and 2026 assessment years. This has been agreed with the relevant highway authorities (namely, East Riding of Yorkshire Council, Hull City Council and National Highways).

~~91.~~93. Background NOx concentrations have also been obtained from Defra mapping (Defra, 2020a) for the 1km x 1km grid squares covering affected ecological receptors for the 2026 assessment year. Background NH_3, nutrient nitrogen and acid deposition fluxes have been obtained from the APIS website (CEH, 2023) and are provided for 1km x 1km grid squares. The data are provided as three-year averages (2019-2021) and are not factored forward to future years.

26.4.3.3.5 Human Receptor Assessment Methodology

26.4.3.3.5.1 Dispersion Model

~~92.~~94. The potential impact of exhaust emissions from construction road vehicles accessing the Onshore Development Area was 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 are therefore the focus of the ADMS-Roads assessment.

~~93.~~95. 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 and Kite, 2021a and 2021b) to consider impacts at designated sites. This is discussed in further detail in section 26.4.3.3.7.

26.4.3.3.5.2 Traffic Data

~~94.~~96. Traffic speeds included in the air dispersion model were as follows:

- Large roundabouts modelled at 40km h^{-1};
- Small roundabouts and queues modelled at 20km h^{-1}; and
- Speed data for free-flowing traffic conditions have been obtained from average speeds recorded during the traffic count surveys (discussed in **Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)**) where applicable, or national speed limits.

26.4.3.3.5.3 Emission Factors

~~95.~~97. Emission factors have been obtained from the Emission Factor Toolkit (EFT) v12.0 provided by Defra (Defra, 2021b). 2022 emission factors have been used in the verification/base year assessment and emission factors for 2026 have been used in the future year 'without Projects' and 'with Projects' scenarios.

~~96.~~98. 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.

~~97.~~99. The use of future year emission factors was agreed with the EHOs at East Riding of Yorkshire Council and Hull City Council during technical engagement (pers. Comm., 9 December 2022).

~~98.~~100. The default fleet projections in EFT v12.0 are based on fleet growth assumptions which are after 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 and 2021 or beyond resulting from behavioural change during the national or local lockdowns (Defra, 2021b).

26.4.3.3.5.4 Meteorological Data

~~99.~~101. Leconfield meteorological station is located within the study area and has therefore been used to replicate meteorological conditions within the ADMS-Roads model.

~~100.~~102. The use of the Leconfield meteorological station data (2022) was agreed with the EHOs at East Riding of Yorkshire Council and Hull City Council during technical engagement (pers. Comm., 9 December 2022).

26.4.3.3.5.5 Surface Roughness

~~101.~~103. Surface roughness is a value (in metres) which is used to modify the wind profile within the model to represent the spatial density, orientation and height of obstacles on the Earth's surface to the approaching wind. A variable surface roughness file was used in the model to represent the varying surface roughness within the air quality study area. A surface roughness of 1m was selected to represent the city of Hull as well as the more built-up area of Beverley town centre which is representative of 'Cities, woodland'. A surface roughness of 0.3m was selected to represent the remainder of the study area as well as the met site which is representative of 'Agricultural areas (max)'.

26.4.3.3.5.6 Model Verification

~~102.~~104. 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 was minimised following Defra (2022b) and IAQM and EPUK (2017) guidance.

~~103.~~105. Dispersion models may perform differently at background, roadside, and kerbside sites. 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 (Defra, 2022b).

~~104.~~106. Monitoring locations within the study area have been reviewed to establish the suitability for use in model verification. Locations have been considered where the assessed road links provided sufficient representation of road traffic sources that would affect monitored concentrations at that point. Monitoring locations that are situated in proximity to several road links which are not considered in the assessment are discounted on the basis that modelled concentrations would be underestimated.

~~105.~~107. Two separate model adjustment factors have been derived to represent the difference in local conditions within the city of Hull and East Riding of Yorkshire, the latter being more rural or suburban in nature.

~~106.~~108. Background concentrations of NO_2, PM_{10} and $PM_{2.5}$ were obtained from the latest 2018-based air pollutant concentration maps provided by Defra for the grid squares covering the study area.

26.4.3.3.5.6.1 East Riding of Yorkshire Council

~~107.~~109. A review of the monitoring data collected by East Riding of Yorkshire Council identified two roadside NO_2 diffusion tubes sites which were suitable for use in the model verification. East Riding of Yorkshire Council undertakes monitoring of NO_2, PM_{10} and $PM_{2.5}$ within the study area at one roadside continuous monitoring site (Bev_Zephyr). However, due to the low valid data capture in 2022 (73%), this continuous monitoring site was not considered suitable for model validation. East Riding of Yorkshire Council does not undertaken monitoring of PM10 or PM2.5.107.

~~108.~~110. Details of the NO_2 model verification process, undertaken using 2022 monitoring data, are provided in **Table 26-12**.

*Table 26-12 Model Verification (the Adjustment Factor is Highlighted in **bold**) – East Riding of Yorkshire Council*

Model Verification	**NO_2 Monitoring Location**	
	S30	**S33**
2022 Annual Mean Monitored Total NO_2 Concentration (µg.m^{-3})	21.5	22.8
2022 Annual Mean Background NO_2 Concentration* (µg.m^{-3})	9.3	9.3
Monitored Road Contribution NOx (total - background) (µg.m^{-3})	22.9	25.5
Modelled Road Contribution NOx (excludes background) (µg.m^{-3})	5.2	5.6
Ratio of Monitored Road Contribution NOx / Modelled Road Contribution NOx	4.4	4.5
Adjustment Factor for Modelled Road Contribution	**4.5**	
Adjusted Modelled Road Contribution NOx (µg.m^{-3})	23.8	25.5
Modelled Annual Mean Total NO_2 (based on empirical NOx / NO_2 relationship) (µg.m^{-3})	21.7	22.6
Monitored Annual Mean Total NO_2 (µg.m^{-3})	21.5	22.8
% Difference [(modelled - monitored) / monitored] x 100	1%	-1%

~~109.~~111. 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 4µg m^{-3} (i.e., 10% of the annual mean NO_2 Objective of 40µg m^{-3}), as specified in Defra technical guidance (TG22) (Defra, 2022b). If the RMSE value is higher than ± 25% of the Objective (i.e., 10µg m^{-3}), Defra guidance recommends that model inputs and verification should be revised. The RMSE of the model was 0µg m^{-3}. Model performance in this assessment was therefore considered to be suitable, as the RMSE was within the ideal value range.

~~110.~~112. Due to the absence of sufficient monitoring data for PM_{10} and $PM_{2.5}$ within East Riding of Yorkshire Council to undertake model verification, 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, 2022b)).

26.4.3.3.5.6.2 Hull City Council

~~111.~~113. A review of the monitoring data identified one continuous monitoring site (CM3) and one NO_2 diffusion tube (DT13) located within Hull City Council's area of jurisdiction which are suitable for use in the model verification. The continuous monitoring site CM3 also monitors roadside concentrations of PM_{10}. Details of the NO_2 model verification process, undertaken using 2022 monitoring data, are provided in **Table 26-13**. Verification of modelled PM_{10} concentrations are detailed in **Table 26-14.**

*Table 26-13 NO_2 Model Verification (the Adjustment Factor is Highlighted in **bold**) – Hull City Council*

Model Verification	**NO_2 Monitoring Location**	
	CM3	**DT13**
2022 Annual Mean Monitored Total NO_2 Concentration ($\mu g.m^{-3}$)	22.0	26.2
2022 Annual Mean Background NO_2 Concentration* ($\mu g.m^{-3}$)	15.7	18.4
Monitored Road Contribution NOx (total - background) ($\mu g.m^{-3}$)	12.0	15.1
Modelled Road Contribution NOx (excludes background) ($\mu g.m^{-3}$)	5.2	11.4
Ratio of Monitored Road Contribution NOx / Modelled Road Contribution NOx	2.3	1.3
Adjustment Factor for Modelled Road Contribution	**1.5**	
Adjusted Modelled Road Contribution NOx ($\mu g.m^{-3}$)	7.7	17.0
Modelled Annual Mean Total NO_2 (based on empirical NOx / NO_2 relationship) ($\mu g.m^{-3}$)	19.8	27.1
Monitored Annual Mean Total NO_2 ($\mu g.m^{-3}$)	22.0	26.2

Model Verification	NO_2 Monitoring Location	
	CM3	DT13
% Difference [(model-ed - monitored) / monitored] x 100	-10%	4%

~~112.~~114. The RMSE of the model was 2 µg m^{-3}. Model performance in this assessment was therefore considered to be suitable, as the RMSE was within the ideal value of 4 µg m^{-3} as specified in Defra technical guidance (TG22) (Defra, 2022b).

*Table 26-14 PM_{10} Model Verification (the Adjustment Factor is Highlighted in **bold**) – Hull City Council*

Model Verification	PM_{10} Monitoring Location
	CM3
2022 Annual Mean Monitored Total PM_{10} Concentration (µg.m^{-3})	19.0
2022 Annual Mean Background PM_{10} Concentration (µg.m^{-3})	15.2
Monitored Road Contribution PM_{10} (total - background) (µg.m^{-3})	3.8
Modelled Road Contribution PM_{10} (excludes background) (µg.m^{-3})	0.7
Ratio of Monitored Road Contribution PM_{10} / Modelled Road Contribution PM_{10}	**5.4**

~~113.~~115. The derived PM_{10} adjustment factor has been applied to the modelled $PM_{2.5}$ concentrations to provide a conservative assessment (in accordance with guidance in LAQM TG (22) (Defra, 2022b)).

~~114.~~116. The adjustment factor for the City of Hull was applied to all receptors within the administrative boundary of Hull City Council as well receptors along the A63 as the location is considered more consistent with the urban nature of Hull than the rural and suburban nature of East Riding of Yorkshire Council.

26.4.3.3.5.7 NOx to NO_2 Conversion

~~115.~~117. NOx concentrations have been 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, 2020c), in accordance with Defra guidance (Defra, 2022b).

26.4.3.3.5.8 Calculation of Short-term Pollutant Concentrations

~~116.~~118. Defra guidance (Defra, 2022b) 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:

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

~~117.~~119. Research projects completed on behalf of Defra and the Devolved Administrations (Laxen and Marner, 2003; AEAT, 2008) concluded that the hourly mean NO_2 Objective is unlikely to be exceeded if annual mean concentrations are predicted to be less than 60µg m^{-3}. This value was therefore used as an annual mean equivalent threshold to evaluate likely exceedance of the hourly mean NO_2 Objective.

26.4.3.3.5.9 Sensitivity

~~118.~~120. The sensitivity of a human receptor is not considered in the assessment of air quality impacts; the air quality Objectives in **Table 26-6**, which are health-based, only apply at locations where there is relevant public exposure as detailed in **Table 26-15**.

Table 26-15 Examples of Where the Air Quality Objectives Should/Should Not Apply

Averaging Period	Objectives Should Apply At:	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.
24-hour mean and 8-hour mean	All locations where the annual mean Objective would apply, together with hotels and gardens of residential properties.	Hotels, unless people live there as their permanent residence.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean Objectives apply. Kerbside sites (for example, pavements of busy shopping streets).	Gardens of residential properties.

~~119.~~121. 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.

26.4.3.3.6 Magnitude and Significance

~~120.~~122. Guidance is provided by the IAQM and EPUK (IAQM and EPUK, 2017) on determining the magnitude and significance of a project's impact on local air quality. The guidance was developed specifically for use in planning and assessing air quality impacts associated with mixed-use and residential developments. However, due to the nature of the Projects, the criteria detailed below has been utilised in the assessment to provide consideration of the impacts associated with the Projects.

~~121.~~123. The impact 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 26-16**.

Table 26-16 Impact Descriptors for Individual Receptors

Long Term Average Concentration at Receptor in Assessment Year	**% Change in Concentration Relative to the Air Quality Objective**			
	1	**2-5**	**6-10**	**>10**
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".				

~~122.~~124. Further to the determination of the impact at individual receptors, the guidance recommends that assessment is made of the overall significance of the impact from a development on local air quality. The overall significance will need to take into account the following factors:

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

~~123.~~125. 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 the Projects on local air quality was undertaken by members of the IAQM.

~~124.~~126. Hull City Council provides guidance on determining the significance of a development's impact on air quality in its supplementary planning guidance 'Air Quality Guidance for Planners and Developers' (Hull City Council, 2018). The guidance is largely based on the IAQM and EPUK Guidance (IAQM and EPUK, 2017) and therefore the approach to determining significance is in line with that detailed above. However, during consultation with Hull City Council, the Air Quality Officer also requested that existing monitored concentrations be the criteria for significance, rather than the air quality Objectives (pers. comm., 9 January 2023 and Dogger Bank South Offshore Wind Farms –CO - Noise and Air Quality ETG Meeting 23rd Nov 2023 (see **Volume 7, Appendix 26-1 (application ref: 7.26.26.1)**). Both approaches have been included to determine the significance of the Projects on air quality within Hull City Council.

26.4.3.3.7 Ecological Receptor Assessment Methodology

~~125.~~127. The JNCC 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, which are published more recently than Natural England (2018) and IAQM (2020) guidance, 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 NOx and NH_3 and consequent permanent effects on designated sites.

~~126.~~128. While any potential effects of DBS East and/or DBS West traffic emissions on ecological sites during construction will be short-term, transient and temporary, the guidance, screening criteria and methodology provided in JNCC reports have been used for this assessment of ecological receptors. The JNCC reports provide data on the magnitude of increases in pollutant concentrations and deposition (NOx, NH_3, N-dep and acid-dep) 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 and 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 DBS East and/or DBS West traffic flows combined with data provided within the JNCC reports, without project-specific detailed dispersion modelling.

~~127.~~129. Use of the JNCC guidance has allowed for a more conservative assessment of any potential road traffic emission impacts on ecological receptors, as the initial screening criterion stage (or DMT) of an 0.15% increase in AADT is more stringent than the screening criteria of a 1,000 AADT or 200 HGV increase provided in Natural England (2018), IAQM (2020) and National Highways (2019). As such, a greater number of road links, and therefore a greater number of ecological receptors, have been screened into the assessment.

~~128.~~130. As discussed in section 26.4.3.3.1 and provided in **Table 26-10,** the first step of the ecological assessment was to screen the road links for increases in AADT (inclusive of (a) project-generated traffic, (b) 2022 to 2026 baseline traffic growth, and (c) cumulative projects traffic – see the following section) greater than a DMT of 0.15% of existing 2022 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 affected road links are presented in Appendix 26.4 and **Table 26-26**, as well as reasoning for their inclusion/ exclusion in the assessment.

~~129.~~131. This guidance and thresholds proposed in the JNCC guidance focus on European designated sites (i.e., Special Protection Areas (SPAs) and Special Areas of Conservation (SACs)) and Sites of Special Scientific Interest (SSSIs); however, the guidance has also been used to guide the assessment of other designated sites (i.e., ancient woodlands (AWs) and Local Nature Reserves (LNRs)), where relevant, in order to provide a conservative and robust assessment.

26.4.3.3.7.1 In-Combination Assessment

~~130.~~132. A project or plan in isolation may not lead to significant effects, however the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 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 a recent court judgement 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 (Royal Courts of Justice, 2017). As such, effects on ecological sites are therefore inherently considered cumulatively.

~~131.~~133. The road links which pass alongside the designated sites considered in the assessment will experience background traffic growth between the base year (2022) and the year of earliest construction (2026), which may increase NOx, NH_3 and/or nutrient nitrogen/acid deposition at the designated sites. These in-combination effects have been considered as part of the impact assessment (see section 26.6.1.3).

~~132.~~134. In addition, any consented agricultural or industrial projects in the vicinity of designated sites which may be affected by traffic generated by DBS East and/or DBS West may also contribute to in-combination NOx or NH_3 concentrations and/or nutrient nitrogen/acid deposition. 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 26-17**.

~~133.~~135. These IRZ criteria will be applied to relevant Special Areas of Conservation (SACs), Special Protection Areas (SPAs), AWs and Local Nature Reserves (LNRs), in addition to SSSIs, to provide a conservative in-combination assessment.

Table 26-17 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 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.	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.

Distance from Designated Site	Proposals, Permissions And Permits	
	Air Pollution	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 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.	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.
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.

~~134.~~136. A search was carried out using Natural England's SSSI IRZs to determine relevant projects for inclusion within the relevant distances of each ecological receptor screened into the assessment which meet the above criteria. 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). No consented agricultural or industrial projects in the vicinity of designated sites which may be affected by traffic generated by DBS East and/or DBS West were identified for inclusion.

26.4.3.3.7.2 Sensitivity

~~135.~~137. Designated ecological sites have been considered only where they are sensitive to the effects of air pollution. Whilst Critical Levels (see **Table 26-7**) apply regardless of habitat type, Critical Loads for habitat sites in the UK are published on the Air Pollution Information System (APIS) website (CEH, 2024). 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 (see **Table 26-27**).

26.4.3.3.7.3 Magnitude and Significance

~~136.~~138. An increase in Critical Level (CLe) or Critical Load (CL) 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 long-term fluctuations in deposition and is unlikely to be perceptible. The 1% threshold of insignificance is referenced in Natural England (2018), IAQM (2020) and Chapman and Kite (2021a, 2021b) guidance. 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 and Kite, 2021a). Where an increase is greater than 1%, impacts cannot be considered insignificant; however, as noted in the IAQM (2020) guidance *"... a change of more than 1% does not necessarily indicate that a significant effect (or adverse effect on integrity) will occur; it simply means that the change in concentration or deposition rate cannot in itself be described as numerically inconsequential or imperceptible and therefore requires further consideration"*.

~~137.~~139. Using the JNCC reports (Chapman and Kite, 2021a and 2021b), it is possible to apply a road-relevant approach based on the distance between the edge of a road link within the ARN and the nearest boundary of a designated site. The thresholds proposed in the JNCC reports focus on SSSI and European designated sites; however, they have also been applied to AWs and LNRs in this assessment in order to provide a conservative and robust assessment.

~~138.~~140. **Table 26-18** provides the AADT change which is required to trigger an exceedance of 1% of the CLe for NOx and NH_3 at different distances from a road's edge. **Table 26-19** contains values for nutrient nitrogen deposition (N-dep) CLs 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 and an assessment on this basis will be conservative.

Table 26-18 AADT Changes (for a Typical Fleet Composition) Required to Cause a Change of 1% of Critical Levels (CLe) as a Function of Distance from the Edge of a Road

Distance from Road Edge (m)	**AADT***		
	1% of NOx CLe ($30\mu g.m^{-3}$)	**1% of lower NH_3 CLe ($1\mu g.m^{-3}$)**	**1% of upper NH_3 CLe ($3\mu g.m^{-3}$)**
1	120	91	274
5	171	259	776
10	278	405	1,214
25	547	731	2,194
50	917	1,145	3,434
100	1,620	1,791	5,372
150	2,410	2,327	6,980
200	3,424	2,802	8,406

***Approximate AADT change required to cause a change of 1% of CLe at each metre distance back from the roads edge has also been calculated from the equation of the line between each CLe distance band. For example, 1% of CLe for NOx equation of the line between 1m (120 AADT) and 5m (171 AADT) is:

$y = 12.75x + 107.25$

where y is the AADT change required at x distance from the roads edge.

Table 26-19 AADT Changes (for a Typical Fleet Composition) Required to Cause a Change of 1% of N-dep Critical Loads (CL) as a Function of Distance from the Edge of a Road

Distance from Road Edge (m)	AADT*			
	1% of N-Dep CL (5 kgN.ha^{-1}.yr^{-1})	1% of N-Dep CL (10 kgN.ha^{-1}.yr^{-1})	1% of N-Dep CL (15 kgN.ha^{-1}.yr^{-1})	1% of N-Dep CL (20 kgN.ha^{-1}.yr^{-1})
Deposition to Woodland				
1	35	71	106	142
5	86	171	257	343
10	125	251	376	502
25	207	415	622	829
50	303	606	909	1,212
100	443	887	1,330	1,773
150	554	1,108	1,661	2,215
200	648	1,297	1,945	2,594
Deposition to Short Vegetation				
1	59	118	177	236
5	145	291	436	582
10	215	429	644	858
25	359	717	1,076	1,434
50	529	1,058	1,587	2,116

Distance from Road Edge (m)	AADT*			
	1% of N-Dep CL (5 kgN.ha^{-1}.yr^{-1})	1% of N-Dep CL (10 kgN.ha^{-1}.yr^{-1})	1% of N-Dep CL (15 kgN.ha^{-1}.yr^{-1})	1% of N-Dep CL (20 kgN.ha^{-1}.yr^{-1})
100	780	1,561	2,341	3,121
150	980	1,959	2,939	3,918
200	1,151	2,302	3,453	4,604

* Approximate AADT change required to cause a change of 1% of CL at each metre distance back from the roads edge has also been calculated from the equation of the line between each CL distance band. For example, the 1% of 5 kgN/ha/yr CL (woodland habitat) equation of the line between 1m (35 AADT) and 5m (86 AADT) is:

$y = 12.75x + 22.25$

where y is the AADT change required at x distance from the roads edge.

~~139.~~141. 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 CL of 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 immediately adjacent to the road concerned. It can be seen from **Table 26-19** 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 Projects 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, despite the fact that the DMT (7.5 vehicles) is exceeded.

~~140.~~142. 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 2022 to 2026 traffic growth and (c) cumulative projects traffic) have been compared to those in **Table 26-18** and **Table 26-19** and ecological receptors have been brought forward into the next stage of the ecological assessment if they exceeded thresholds corresponding to a 1% increase in the CLe or CL for the relevant habitat present in the designated site.

~~141.~~143. **Table 26-20** details the road distance screening for DBS East or DBS West In Isolation and DBS East and DBS West Concurrently, respectively, and also identifies which sites have been brought forward for further consideration in the ecological assessment presented in section 26.6.1.3.

*Table 26-20 Critical Level and Critical Load 1% Screening of Ecological Receptors – DBS East or DBS West In Isolation and DBS East and DBS West in Concurrent Construction. Red Filled Cells Indicate an Exceedance of the AADT Flows Presented in **Table 26-18** and **Table 26-19**, and Required Further Assessment of Feature / Site.*

Link	Designated Ecological Site		Distance from ARN link (m)	Feature Name or Critical Load Class	Woodland Present	Total AADT Change[1] (In Isolation)	Total AADT Change[1] (Concurrent)	AADT Required for 1% Critical Level or Load Increase (See Table 26-18 and Table 26-19)							Further Assessment Required?*
								NOx	NH_3		N-dep				
	Site Type	Name						30 µg.m^{-3}	1 µg.m^{-3}	3 µg.m^{-3}	5 kg N.	10 kg N.	15 kg N.	20 kg N.	
4 / 5 / 6	SSSI	Skipsea Bail Mere[2]	0 / 100 / 138	No features sensitive to air quality impacts											No
24	SAC, SPA, SSSI	Humber Estuary	72	Mudflats and sandflats not covered by seawater at low tide[3]	No	2,447	2,580	1,226	1,429	4,278	NC	NC	NC	NC	Yes
28	LNR	Humber Bridge	150	Broadleaved deciduous woodland (MAGIC)	Yes	2,358	-[4]	2,410	-	6,980	-[5]	-[5]	-[5]	-[5]	No
						-[4]	2,519	2,410	-	6,980	-[5]	-[5]	-[5]	-[5]	Yes
29	SAC, SPA, SSSI	Humber Estuary	30[6]	Mudflats and sandflats not covered by seawater at low tide[3]	No	1,355	1,379	621	814	2,442	NC	NC	NC	NC	Yes
	LNR	Humber Bridge	35	Broadleaved deciduous woodland (MAGIC)	Yes	1,355	1,379	695	-	2,690	-[5]	-[5]	-[5]	-[5]	Yes
62	SSSI	Burton Bushes	48	*Carpinus and Quercus mesic* deciduous forest / *Quercus Robur - Pteridium Aquilinum - Rubus Fruticosus* Woodland	Yes	398	409	887	1,112	3,335	-	-	886	1,181	No

Link	Designated Ecological Site		Distance from ARN link (m)	Feature Name or Critical Load Class	Woodland Present	Total AADT Change[1] (In Isolation)	Total AADT Change[1] (Concurrent)	AADT Required for 1% Critical Level or Load Increase (See Table 26-18 and Table 26-19)							Further Assessment Required?*
								NOx	NH_3		N-dep				
	Site Type	Name						30 µg.m^{-3}	1 µg.m^{-3}	3 µg.m^{-3}	5 kg N.	10 kg N.	15 kg N.	20 kg N.	
	AW	Burton Bushes	88	Broadleaved deciduous woodland (MAGIC)	Yes	398	409	1,451	1,636	4,907	-	-	1,229	1,638	No
63	AW	Bentley Moor Wood	162	Broadleaved deciduous woodland	Yes	1,933	2,016	2,653	2,441	7,322	-	1,153	1,729	-	Yes

*Only for relevant CLe or CL screened into the assessment (red highlighted boxes).
[1]AADT change shown are inclusive of project-generated traffic, in-combination traffic growth (from 2022 to 2026) and cumulative projects traffic.
[2]Excluded from assessment as no feature(s) sensitive to air quality impacts.
[3]Mudflat habitat was identified as the only sensitive habitat within 200m of ARN links and the Humber Estuary SAC is the only Humber Estuary site designated for mudflats.
[4]Screening for this site was split into separate rows for the 'In Isolation' and 'Concurrent' Scenarios as the outcomes were different.
[5]As the specific details of habitats within LNRs are not known and LNRs are not provided on the APIS website, habitat-specific CLs were not assessed. Impacts on CLe were considered.
[6]The height of the Humber Bridge has been used as the distance between the roads edge and the Humber Estuary SAC, SPA and SSSI, given the bridge road deck is 30m above high water level to enable passage of ships beneath.
NC: No comparable habitat with established CL estimates available.

~~142.~~144. Only links with ecological receptors within 200m of the roads edge are presented in **Table 26-20**. Site-specific CLe's and CLs are presented in **Table 26-27**, and these have been taken into consideration in the comparison to AADT flows shown in **Table 26-18** and **Table 26-19**.

~~143.~~145. Of the five ecological sites initially screened in (i.e., for being within 200m of the ARN; see **Table 26-20**), three ecological sites (Humber Estuary SAC/SPA/SSSI, Humber Bridge LNR and Bentley Moor Wood AW) 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 CLe and/or CL.

~~144.~~146. Not all of the three sites exceed the representative 1% AADT flows for all CLe and CL values, e.g., on Link 28 the Humber Bridge LNR only exceeds the 1% NOx CLe but not the 1% NH_3 CLe. Therefore, ecological sites have only been assessed further for CLe's and/or CLs shown to be in exceedance of 1%.

~~145.~~147. Following this detailed initial screening of ecological sites, those sites screened in for further assessment have been assessed for effects from traffic emissions using the guidance and methodology provided in the JNCC reports (Chapman and Kite, 2021a and 2021b). Table 11 of the JNCC Technical Report (Chapman and 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 26-21**.

~~146.~~148. This approach has been adopted to quantify increases in annual mean NOx, NH_3 and N-dep, where relevant, in this assessment. The relationship between N-dep and its acidifying potential is linear, so a 1kgN.ha^{-1}.yr^{-1} reduction will always deliver a 0.07keq.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 and Kite, 2021b). Acid deposition has therefore been quantified in the assessment by multiplying the N-dep concentration by 0.07.

Table 26-21 Change in Concentration (in 2019 for NOx and 2015 for NH_3) and Flux (in 2015) for an Example Flow of 1,000 AADT in a Typical Vehicle Fleet (Chapman and Kite, 2021b)

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
10	1.1	0.025	0.4	0.23
25	0.55	0.014	0.24	0.14
50	0.33	0.0087	0.16	0.095
100	0.19	0.0056	0.11	0.064
150	0.12	0.0043	0.09	0.051
200	0.093	0.0036	0.077	0.043

* Approximate change in concentration (in 2019) and flux (in 2015) for an example flow of 1,000 AADT in a typical vehicle fleet at each meter distance back from the roads edge have also been calculated from the equation of the line between each distance band provided in the JNCC report. For example, the annual mean NOx equation of the line between 1m ($2.5\mu g.m^{-3}$) and 5m ($1.8\mu g.m^{-3}$) is:

$y = -0.175x + 2.675$

where y is the concentration/flux change for a flow of 1,000 AADT at x distance from the roads edge.

~~147.~~149. As mentioned previously in this section, changes in concentrations and fluxes as a result of increases in AADT on affected road links are based on the 2019 and 2015 vehicle fleet and emissions, for NOx and NH_3, respectively. It is likely the changes detailed in **Table 26-21** and used in the assessment are greater than those that would be anticipated in the opening years (2026) as the vehicle fleet evolves, with the successful introduction of tighter emission standards for petrol cars and all types of new diesel vehicles over the last decade, in addition to the deployment of in addition to the deployment more exhaust emission abatement equipment.

~~148.~~150. Any development-generated or in-combination values above 1% of the Critical Load or Level require 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 will be discussed in **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18)** and **Report to Inform Appropriate Assessment (RIAA) - Habitats Regulations Assessment (Volume 6, application ref: 6.1)**.

26.4.3.3.7.4 Project(s) Alone Compared to In-Combination Traffic Flows

~~149.~~151. 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 DBS East and/or DBS West, and that from other in-combination traffic sources (background growth and cumulative projects). **Table 26-22** provides project-generated construction traffic flows (i.e., 'Project AADT'), background traffic growth between 2022 (base year) and 2026 and cumulative projects traffic, on all road links where a sensitive designated ecological site is present within 200m.

Table 26-22 DBS East and/or DBS West Project AADT Flows Compared to In-Combination Project Flows Considered in the Assessment (2026)

Link	DBS East or DBS West In Isolation			DBS East and DBS West Concurrent Construction		
	Project AADT	In combination AADT	Project as % of Total	Project AADT	In combination AADT	Project as % of Total
24	338	2,447	14%	471	2,580	18%
28	498	2,358	21%	659	2,519	26%
29	139	1,355	10%	163	1,379	12%

Link	DBS East or DBS West In Isolation			DBS East and DBS West Concurrent Construction		
	Project AADT	In combination AADT	Project as % of Total	Project AADT	In combination AADT	Project as % of Total
62	57	398	14%	69	409	17%
63	441	1,933	23%	524	2,016	26%

~~150.~~152. As can be seen from **Table 26-22** , the majority of in-combination AADT considered in this assessment comprises traffic other than DBS East and/or DBS West construction traffic; approximately 10 to 23% of the total traffic flows, if DBS East or DBS West are built In Isolation, and 12 to 26% of the overall in-combination AADT when DBS East and DBS West are built Concurrently.

26.4.3.3.7.5 Haul Road Traffic

~~151.~~153. The potential impacts on designated ecological sites as a result of LDVs and HGVs travelling along the haul roads have been considered.

~~152.~~154. The average daily number of vehicles travelling along the haul road was calculated where the Onshore Development Area is within 200m of a designated ecological site, as described in section 26.4.3.3.2.

~~153.~~155. There are no ecological sites sensitive to exhaust emissions present within 200m of the indicative Landfall Transition Joint Bay (TJB) Compound and the Satellite Temporary Construction Compound. Therefore, the impact of haul road traffic at the Landfall Zone has not been considered further.

~~154.~~156. The sensitive ecological receptors within 200m of the cable route and Onshore Substation Zone are detailed in **Table 26-23**.

Table 26-23 Traffic Flows on the Haul Road Within 200m of Designated Ecological Sites

Haul Road Traffic	Designated Ecological Site	Distance from Haul Road*	Accesses	AADT Generated During Construction**	
				DBS East or DBS West In Isolation	DBS East and DBS West Concurrent Construction
Onshore Substation Zone	Bentley Moor Wood AW	20m	AC-SP4	208	240
Onshore Export Cable Corridor Route	Burton Bushes SSSI and AW	120m	AC-15(S)	62	82
	Birkhill Wood AW	150m	N/A	178	194
*Where the exact location of the haul route is not known, a worst case distance has been assumed (i.e., the haul road is located adjacent to the closest Onshore Development Area boundary). **Peak traffic flows (AADT) reported in **Table 26-23** are not expected to change as a result of **Project Change Request 2 (document reference 10.53)**.					

~~155.~~157. As shown above, the number of vehicles travelling along the haul road would not exceed the screening criteria detailed in **Table 26-18** and **Table 26-19** that correspond to a 1% change in Critical Level or Load, at the respective distances from the (assumed worst case) haul road edge. As such, impacts on designated sites as a result of haul road traffic have not been considered further in the assessment, as they are considered to be insignificant.

26.4.4 Cumulative Effect Assessment Methodology

~~156.~~158. The cumulative effect assessment (CEA) considers other schemes, plans, projects and activities that may result in significant effects in cumulation with the Projects. **Volume 7, Chapter 6 EIA Methodology (application ref: 7.6)** (and accompanying **Volume 7, Appendix 6-1 Onshore Cumulative Assessment (application ref: 7.6.6.1)** provides further details of the general framework and approach to the CEA.

~~157.~~159. 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
- Construction phase road traffic emissions.

~~158.~~160. The CEA utilised the same methodology as detailed above in section 26.4.

26.4.5 Transboundary Effects Assessment Methodology

~~159.~~161. There are no transboundary effects with regard 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 not considered further.

26.4.6 Assumptions and Limitations

~~160.~~162. Traffic data has been 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 **Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)**.

~~161.~~163. 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 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.

~~162.~~164. Background pollutant concentrations within the air quality study area for NO_2, PM_{10} and $PM_{2.5}$ have been 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. Uncertainties in these mapped background values are unlikely to significantly affect the certainty of the EIA and the conclusions of the assessment.

~~163.~~165. 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.

26.4.6.1 Ecological Assessment

~~164.~~166. The worst case impacts are presented in section 26.6.1.3 for this assessment, as the closest boundary of ecological sites to affected road links was assessed. As can be seen from **Table 26-18** to **Table 26-21**, impact from road traffic rapidly decreases with distance from the roads edge. Section 26.6.1.3 also presents all Critical Levels and/or Loads for feature(s) under each designated ecological site; however, not all of these features (i.e. lichen and bryophytes in woodlands which are assessed to the lower NH_3 Critical Level) may be present at the closest designated site boundary to the affected road link.

~~165.~~167. As detailed in section 26.6.1.3, the AADT change required to cause a change of 1% of CLe or CL presented in **Table 26-18** and **Table 26-19**, and the corresponding concentration change in **Table 26-21**, are based on an average vehicle fleet mix in 2015 for NH_3 and N-dep and 2019 for NOx; as such, changes in emissions of these pollutants into the future are not accounted for. This is likely to provide a conservative assessment for some pollutants as the opening year for the Project(s) is 2026. This means the increase in AADT required to cause a change of 1% of the CLe or CL (see **Table 26-21**) are likely to be greater than those used in the assessment and the impacts presented in section 26.6.1.3 are greater than those that would be experienced at ecological receptors in 2026.

26.5 Existing Environment

~~166.~~168. A desk-based review has been undertaken to determine the air quality baseline within the study area.

~~167.~~169. The characterisation of the existing environment has been undertaken using data sources listed in **Table 26-9.** The baseline data sources are sufficient to provide an assessment of potential air quality impacts arising from the Projects and have been agreed with East Riding of Yorkshire Council and Hull during technical engagement (pers. comm., 9 and 14 Dec 2022).

26.5.1 Local Air Quality Management (LAQM)

~~168.~~170. As stated in its Annual Status Report for 2022 (East Riding of Yorkshire Council, 2023), East Riding of Yorkshire Council has not declared any statutory AQMAs within its area of jurisdiction.

~~169.~~171. The air quality study area extends into the jurisdiction of Hull City Council, which has declared a statutory AQMA for exceedances of the NO_2 annual mean around the A63 trunk road which runs through the centre of the city (Hull City Council, 2023). The air quality study area falls within the Hull AQMA No.1.

26.5.2 Air Quality Monitoring Data

~~170.~~172. Recent monitoring data within the East Riding of Yorkshire Council administrative area show that concentrations of NO_2 are below the annual mean Objective at locations of relevant exposure.

~~171.~~173. Recent air quality monitoring data collected by Hull City Council show that NO_2 concentrations continue to fall across the city, and there were no exceedances of the Objective in 2022, including within the AQMA. The highest monitored NO_2 concentration within the AQMA was at DT15, with a monitored annual mean NO_2 concentration of 31.9µg m^3. Receptors have been included in the road traffic dispersion model representative of residential properties within the AQMA, along the A1033 Hedon Road, to ensure a conservative assessment.

~~172.~~174. The NO_2 diffusion tube monitoring results within 200m of the road network have been listed **Table 26-24** and results show that the annual mean NO_2 Objective of 40µg m^3 has been not exceeded at any diffusion tube location across the five-year period for both the local authorities, except for one diffusion site in 2018 which is located within the Hull City Council AQMA No.1 in 2018 (DT14). Monitoring data from 2020 and 2021 should be treated with caution as the Covid-19 pandemic had a significant impact on traffic levels as well as upon levels of data capture. Despite this, monitoring still indicates a declining trend in annual mean concentrations of NO_2 since at least 2018.

Table 26-24 Annual Mean NO_2 Monitoring Undertaken by East Riding of Yorkshire Council and Hull City Council

Site ID	Location	Site Type	Monitored Annual Mean NO_2 Concentration ($\mu g.m^{-3}$)				
			2018	2019	2020	2021	2022
East Riding of Yorkshire Council							
Bev_Zephyr	Swinemoor Lane, Beverley	Roadside	-	-	-	-	14.2
S10	Queensgate (No.16), Beverley	Kerbside	24.0	25.0	20.4	21.8	20.0
S12	Dunoon, Main Street, Skipsea	Roadside	-	-	-	10.0	10.1
S26	Albion Court/Grove hill Rd. Roundabout, Beverley	Roadside	21.0	19.0	16.6	17.9	16.7
S27	Hull Rd (No. 3), Saltend	Roadside	27.0	27.0	22.6	23.5	22.9
S30	Swinemoor Lane/Barmston Road, Beverley	Roadside	26.0	23.0	19.9	22.1	21.5
S33	Swinemoor Lane (No. 9), Beverly	Roadside	34.0	29.0	23.7	26.6	22.8

Site ID	Location	Site Type	Monitored Annual Mean NO_2 Concentration ($\mu g.m^{-3}$)				
			2018	2019	2020	2021	2022
S34	Swinemoor Lane (No.83), Beverly	Roadside	18.0	17.0	13.4	14.6	14.0
S48	Hull Rd/Grovehill Rd. Roundabout, Beverley	Roadside	21.0	20.0	15.8	17.6	15.9
S89	Main Street, Catwick	Roadside	-	-	14.2	16.0	14.0
S92	Rycote House, Routh	Roadside	-	-	-	-	20.8
Hull City Council							
CM1	Hull ABP	Industrial	-	-	25.3	24.8	23.0
DT1	Plimsoll Way	Roadside	24.9	23.6	18.3	20.2	18.5
DT11	Daltry St	Roadside	28.8	29.5	23.0	24.9	24.0
DT13	Princes Dock Side	Roadside	37.7	36.9	30.3	27.8	26.2
DT14	Castle St (Road)	Kerbside	**41.5**	36.3	26.1	26.4	26.0
DT15	Castle St (Wall)	Urban Centre	33.2	31.5	30.7	32.8	31.9
DT44	Ashcombe Rd	Roadside	21.3	19.6	15.2	16.3	19.7
DT48	Marfleet Lane	Kerbside	-	-	-	21.4	23.9

Site ID	Location	Site Type	Monitored Annual Mean NO_2 Concentration ($\mu g.m^{-3}$)				
			2018	2019	2020	2021	2022
DT49	Hall Rd - Marfleet Junction (7/7)	Kerbside	35.4	29.8	27.4	26.4	27.8
DT50	Hedon Road /Marfleet	Roadside	39.1	36.7	31.9	30.5	35.8
DT51	Hedon Road/Valetta St	Roadside	34.6	34.3	28.5	32.2	31.4
DT52	Diadem	Roadside	-	-	-	-	31.9
DT54	Glebe Rd	Kerbside	39.5	38.2	32.7	33.4	33.6
DT55	Rivaulx Court	Kerbside	-	-	-	30.6	32.2
DT56	Stoneferry Road	Kerbside	34.2	34.6	29.8	27.0	30.9
DT62	Bedford St	Kerbside	-	-	-	24.6	26.5
DT65, 66, 67	ABP c	Industrial	-	-	19.5	23.7	22.9

- Data not available as monitoring site was not installed yet.

Bold values indicate exceedance of air quality Objective

~~173.~~175. Particulate matter continuous analyser monitoring was also undertaken within both the East Riding of Yorkshire Council and Hull City Council areas. The PM_{10} and/or $PM_{2.5}$ monitoring results within 200m of the road network have been listed in **Table 26-25**. The results detail that annual mean PM concentrations were well below the annual mean Objectives of 40µg m^3 and 20µg m^3, respectively.

Table 26-25 Annual Mean PM Monitoring Undertaken by East Riding of Yorkshire Council and Hull City Council

Site ID	Site Type	Valid Data Capture in 2022	Monitored Annual Mean PM_{10} Concentration ($\mu g.m^{-3}$)				Monitored Annual Mean $PM_{2.5}$ Concentration ($\mu g.m^{-3}$)
			2019	2020	2021	2022	2022
East Riding of Yorkshire Council							
Bev_Zephyr	Roadside	73%	-	-	-	13.8	12.8
Hull City Council							
CM3	Roadside	95%	15	15	14	15	NM
- Data not available as monitoring site was installed in 2022 NM: Not monitored by continuous analyser							

26.5.3 Identification of Receptors

26.5.3.1 Construction Phase Dust and Fine Particulate Matter

~~174.~~176. IAQM guidance (IAQM, 2024) states that a detailed assessment is required where there are human receptors within 250m of the site boundary and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 250m 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).

~~175.~~177. The Onshore Export Cable Corridor from landfall at Skipsea to the Onshore Substation Zone to the south-west of Beverley was assessed (see **Volume 7, Figure 26-2 (application ref: 7.26.1)**). The precise location of the Onshore Converter Stations and grid connection point are subject to ongoing consultation therefore the worst case location (i.e., anywhere within the Onshore Substation Zone) has been assessed.

~~176.~~178. 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.

~~177.~~179. Receptor locations have been identified in the areas closest to the potential maximum impacts due to construction within the Onshore Development Area (as defined in **Table 26-1**) within the study area. The identified receptors are set out in the following sections.

26.5.3.1.1 Human Receptors

~~178.~~180. There are human receptors within 250m of the Onshore Development Area located in north and south Beverley, Routh, and Skipsea, with additional isolated farmsteads located along the cable route.

~~179.~~181. As detailed in **Volume 7, Appendix 26-2 (application ref: 7.26.26.2)**, the number of receptors potentially exposed to dust impacts is a factor that determines the receptor sensitivity. For DBS East and/or DBS West, the area with the most human receptors within 250m of the Onshore Development Area is in the north of Beverley.

~~180.~~182. The current proposed locations for the Satellite and Main Temporary Construction Compounds are shown on **Volume 7, Figure 5-2 (application ref: 7.5.1)**.

~~181.~~183. The proximity of Temporary Construction Compounds to receptors has been taken into consideration within the design of the Projects and, therefore, the numbers of human receptors within 100m of the proposed Temporary Construction Compounds are limited. The following Temporary Construction Compounds have residential properties within 100m:

- Landfall Zone;
- North of Beverley;
- South-west of Beverley;
- North-west of Catfoss;
- Routh;
- North of Tickton; and
- Onshore Substation Zone.

~~182.~~184. The construction compound located nearest the highest concentration of human receptors is located to the north of Beverley adjacent to the A1035 with between 10 to 100 receptors up to 100m from the construction compound boundary.

~~183.~~185. The location of maximum impact along the Onshore Export Cable Corridor, i.e., dustiest activities and greatest number of receptors within close proximity of the construction works, has been determined to be to the north of Beverley adjacent to the A1035. Therefore, this area has been the focus of the construction dust assessment for human receptors along the Onshore Export Cable Corridor, to provide a conservative assessment, as the combined sources of dust from both the Temporary Construction Compounds and cable trenching activities is considered to represent the worst case in terms of dust impact magnitude. Impacts of construction dust at the Landfall Zone and the Onshore Substation Zone have been considered in the assessment separately, due to the large Onshore Development Area.

~~184.~~186. There are other areas along the Onshore Export Cable Corridor where human receptors are present within 250m of the Onshore Development 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, in the north of Beverley or the Onshore Substation Zone (**Volume 7, Appendix 26-2 (application ref: 7.26.26.2)** provides further details on how the sensitivity of human receptors to dust soiling and human health impacts are determined).

~~185.~~187. It should be noted that the mitigation measures identified to suppress dust emissions (see section 26.6.1.1.5) would be applied across the onshore works and are not only applicable as mitigation for those receptors included within the assessment. As such, the assessment is considered to be robust.

26.5.3.1.2 Ecological Receptors

~~186.~~188. 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 26-26**; as well as the distance each ecological site is from the Onshore Development Area. **Volume 7, Figure 26-2 (application ref: 7.26.1)** shows the location of the ecological receptors listed in **Table 26-26**.

Table 26-26 Designated Sites within 200m of the Onshore Development Area

Designated Ecological Site	Distance from Onshore Development Area
Birkhill Wood AW	150m from Onshore Development Area
Unnamed (Bentley Moor Wood)* AW	Located within the indicative Onshore Substation Zone, 280~~30~~m from the location of the Eastern Onshore Converter Station
Burton Bushes SSSI & AW	120m from Onshore Development Area
Whilst Greater Wash SPA is within 200m of the Onshore Development Boundary, it is beyond 200m from dust generating activities. *The AW within the indicative Onshore Substation Zone is an 'Unnamed' AW and has been referenced as the Bentley Moor Wood AW for context in the Chapter, as it covers a portion of the Bentley Moor Wood.	

~~187.~~189. As detailed in section 26.4.3.1, three different construction activities are considered in a dust assessment: earthworks, construction and trackout. Bentley Moor Wood AW has been chosen as the worst case ecological receptor for dust from earthworks, construction and trackout activities, due to its proximity to construction activities.

26.5.3.2 Construction Phase NRMM Emissions Assessment

26.5.3.2.1 Landfall Zone

~~188.~~190. There is an indicative Landfall Zone TJB Compound and a Satellite Temporary Construction Compound as shown on **Volume 7, Figure 5-2 (application ref: 7.5.1)**. For the purposes of the Air Quality Assessment, they are referred to as one Temporary Construction Compound. The closest human receptors to the Landfall Temporary Construction Compound are the caravan parks located off Hornsea Road and Green Lane, approximately 230m and 450m to the south and north, respectively. There are no ecological receptors sensitive to exhaust emissions located within 200m of the Landfall Zone Temporary Construction Compound.

26.5.3.2.2 Onshore Cable Export Corridors

~~189.~~191. The closest human receptors to the works along the Onshore Export Cable Corridor include the residential areas in the north and south-west of Beverley. The closest ecological receptors to the Onshore Export Cable Corridor works which may require NRMM (i.e., anywhere within the Onshore Export Cable Corridor) is the Burton Bushes SSSI and AW located 120m from the indicative Onshore Development Area**.** There are no ecological receptors within 200m of a Temporary Construction Compound.

26.5.3.2.3 Onshore Substation Zone

~~190.~~192. There is one Onshore Substation Zone located to the south of Beverley. The closest human receptors to the Onshore Substation Zone are the residential properties in Bentley to the south and the Butts Farm Caravan site to the north. The nearest ecological receptor is the Bentley Moor Wood AW located within the Onshore Substation Zone as shown on **Volume 7, Figure 26-4 (application ref: 7.26.1)**. The Bentley Moor Wood AW is approximately 400~~280~~m from the nearest Onshore Substation Zone Temporary Construction Compound.

26.5.3.3 Construction Phase Road Traffic Emissions Assessment

26.5.3.3.1 Human Receptors

~~191.~~193. Existing sensitive receptor locations have been 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 have been calculated at these locations.

~~192.~~194. The sensitive receptor locations are selected based on their proximity to road links affected by the Projects (as identified within **Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)**) where the potential effect of development-generated traffic emissions on local air pollution would be most significant, including within the Hull AQMA. This includes residential dwellings, schools and hospitals. The Hull City Council Air Quality Officer requested that the assessment should include the whole area within the administrative boundary of Hull City Council, not just the AQMA (pers. comm., 9 January 2023, see **Volume 7, Appendix 26-1 (application ref: 7.26.26.1)**). Therefore, sensitive receptor locations have been included adjacent to all roads which exceed the IAQM and EPUK screening criteria (IAQM and EPUK, 2017).

~~193.~~195. Other receptors within 200m of the assessed road network may also experience changes in pollutant concentrations, but to a lesser degree than those considered.

~~194.~~196. Two additional road links (links 9 and 12) were screened into the Concurrent construction scenario compared to the In Isolation Scenario, see **Table 26-10**. Therefore, results for the receptors on the additional road links screened in for the Concurrent Scenario were not reported in the In Isolation Scenario.

~~195.~~197. As detailed in section 26.4.3.3.1, the construction traffic route to be used by the Projects has been amended since PEIR. Project-generated construction traffic will no longer be routed along the A63 Clive Sullivan Way (traffic links 25 and 26). In addition, due to Projects refinements, some road links which were considered in the detailed assessment at PEIR have not been screened in for detailed assessment at the ES. Therefore, receptors located along these road links have been removed from the assessment. Additional receptors introduced since the PEIR are prefixed with 'ES'. All other receptors remain unchanged from the PEIR.

~~196.~~198. Receptors have been included in the dispersion model at a height of 1.5m to represent expected exposure (breathing height).

~~197.~~199. The sensitive receptor locations are detailed in **Table 26-3-1** presented in **Volume 7, Appendix 26-4 (application ref: 7.26.26.4)** and shown on **Volume 7, Figure 26-3 (application ref: 7.26.1)**.

26.5.3.3.2 Designated Ecological Sites

~~198.~~200. 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 26-10**. The designated ecological sites that have been screened into the assessment (i.e. within 200m of ARN links) are detailed in **Table 26-3-2** presented in **Volume 7, Appendix 26-4 (application ref: 7.26.26.4)**, as well as reasoning for the exclusion of certain sites, and **Table 26-20** details 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 CLe and/or CL. The designated ecological sites considered in the assessment are shown in **Volume 7, Figure 26-4 (application ref: 7.26.1)**.

~~199.~~201. The APIS website (CEH, 2024) 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 have been found, the CLs for nutrient nitrogen and acid deposition have been obtained. A full list of the designated ecological sites and associated Critical Level and Load values that have been considered is presented in **Table 26-27**. The most sensitive habitat types have been included to provide a conservative assessment. LNRs have been assessed against CLe's only as CLs are not provided for LNRs on the APIS website (CEH, 2024).

~~200.~~202. Project(s)-generated road traffic during the construction phase will affect a similar study area as presented at PEIR stage. However, as a result of changes to the construction traffic routes to be used by the Projects since PEIR, Project-generated construction traffic will no longer be routed along the A63 Clive Sullivan Way (traffic Links 25 and 26). Within the Traffic and Transport study area, Link 26 (A63 from A63/A1166/St Andrews Quay roundabout to A63/A15 junction) is the road link located in closest proximity to the Humber Estuary SPA, Ramsar Site, SAC and SSSI, including sensitive saltmarsh habitat.

~~201.~~203. As a result of this rerouting, Project-generated traffic during construction will now affect significantly smaller areas of the Humber Estuary SPA, Ramsar Site, SAC and SSSI than presented at PEIR, namely a small portion of the Humber Estuary SPA, Ramsar Site, SAC and SSSI within 200m of Link 24 (A63 from Mount Pleasant Roundabout to Castle Street junction) and Link 29 (A15 Humber Bridge). In both of these areas, 'mudflat' is the main habitat type (Natural England, 2024), which is a habitat that is not sensitive to either nutrient nitrogen or acid deposition. Sensitive saltmarsh within the Humber Estuary SPA, Ramsar Site, SAC and SSSI is therefore no longer present within 200m of the affected road network.

Table 26-27 Designated Ecological Sites and Critical Load Values

Link(s)	Designated Ecological Site			Critical Level		Critical Load						
	Site Type	Name	Feature Name or CL Class	NOx	NH_3	N-dep*	Acid Deposition					
							MinCL MinN	MinCL MaxN	MinCL MaxS	MaxCL MinN	MaxCL MaxN	MaxCL MaxS
				$\mu g.m^{-3}$		$kgN.ha^{-1}.yr^{-1}$	$keq.ha^{-1}.yr^{-1}$					
24 and 29	SAC, SPA, SSSI	Humber Estuary**	Mudflats and sandflats not covered by seawater at low tide	30	1 to 3	NC	NS	NS	NS	NS	NS	NS
28 and 29	LNR	Humber Bridge	Broadleaved deciduous woodland (MAGIC)	30	3	-***	-***	-***	-***	-***	-***	-***
62	SSSI	Burton Bushes	*Carpinus and Quercus mesic* deciduous forest / *Quercus Robur – Pteridium Aquilinum – Rubus Fruticosus* Woodland	30	1 to 3	15 to 20	0.142	10.993	10.851	0.142	11.003	10.861
63	AW	Bentley Moor Wood	Broadleaved deciduous woodland	30	1 to 3	10 to 15	0.142	10.993	10.851	0.142	10.993	10.851

NC: No comparable habitat with established CL estimate available. NS: Not Sensitive.
*Review and revision of empirical critical loads of nitrogen for Europe 2022 report.
**As detailed above the table, Project(s)-generated construction traffic will no longer be routed along A63 Clive Sullivan Way (Link 25 and 26), as was previously assessed at PEIR. Link 26 is the road link located in the closest proximity to the Humber Estuary SPA, Ramsar Site, SAC and SSSI, including sensitive saltmarsh habitat. As a result of the rerouting, Project(s) traffic will affect a much smaller proportion of the Humber Estuary SPA, Ramsar Site, SAC and SSSI than presented in the PEIR, namely a small portion of the Humber Estuary within 200m of Links 24 and 29. In both of these areas, 'mudflat' is the main habitat type (Natural England, 2024), which is a habitat that is not sensitive to nutrient nitrogen or acid deposition.
***CLs were not assessed for LNRs as information regarding the specific habitats present within them was not available.

26.5.4 Background Pollutant Concentrations

26.5.4.1 Human Receptors

~~202.~~204. The approach to deriving appropriate background pollutant concentrations for the assessment is set out in section 26.4.3.3.4. The background concentrations used in the assessment are provided in **Table 26-28**.

Table 26-28 Background Pollutant Concentrations

Receptor ID	2022 Concentration (µg.m^{-3})			2026 Concentration (µg.m^{-3})		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
Hull City Council						
R1	18.4	15.4	9.6	16.3	14.9	9.3
R2	18.4	15.4	9.6	16.3	14.9	9.3
R30	17.5	14.7	9.4	15.7	14.3	9.0
R31	16.2	14.8	9.2	14.6	14.4	8.8
R32	16.2	14.8	9.2	14.6	14.4	8.8
R33	21.9	14.1	9.0	20.2	13.7	8.6
R34	17.1	16.0	10.4	15.1	15.5	10.0
R35	17.1	16.0	10.4	15.1	15.5	10.0
R36	16.6	14.9	9.9	15.0	14.4	9.5
R37	16.1	15.0	9.7	14.5	14.5	9.3
R38	16.1	15.0	9.7	14.5	14.5	9.3
R39	16.1	15.0	9.7	14.5	14.5	9.3
R40	18.7	15.4	10.0	17.1	14.7	9.4
R41	12.6	14.9	9.2	11.3	14.5	8.8
R42	12.6	14.9	9.2	11.3	14.5	8.8

Receptor ID	2022 Concentration (µg.m^{-3})			2026 Concentration (µg.m^{-3})		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R45	10.9	14.4	8.6	9.8	14.0	8.3
ES R67	13.5	13.9	9.1	12.1	13.5	8.7
ES R68	13.5	13.9	9.1	12.1	13.5	8.7
ES R69	16.2	14.8	9.2	14.6	14.4	8.8
ES R70	15.7	15.2	9.4	13.9	14.8	9.0
ES R71	18.4	15.4	9.6	16.3	14.9	9.3
ES R72	18.4	15.4	9.6	16.3	14.9	9.3
East Riding of Yorkshire Council						
R6	10.9	15.0	8.6	9.4	14.5	8.3
R7	9.3	15.1	8.3	8.3	14.7	7.9
R8	8.3	14.9	8.1	7.4	14.5	7.8
R9	9.1	13.8	7.9	8.1	13.4	7.6
R10	9.5	14.6	8.1	8.5	14.1	7.7
R11	8.8	14.9	8.1	7.7	14.5	7.8
R12	8.3	14.1	7.9	7.3	13.7	7.6
R13	8.3	14.2	7.9	7.4	13.8	7.6
R14	8.3	14.2	7.9	7.4	13.8	7.6
R15	9.3	13.3	8.1	8.3	12.9	7.8
R16	9.3	13.3	8.1	8.3	12.9	7.8
R17	9.2	12.8	7.7	8.2	12.4	7.4
R18	7.9	14.0	7.7	7.0	13.7	7.4

Receptor ID	2022 Concentration (µg.m^{-3})			2026 Concentration (µg.m^{-3})		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R19	7.3	14.0	7.6	6.5	13.6	7.3
R20	7.3	14.7	7.8	6.5	14.3	7.5
R24	9.1	14.8	8.2	8.1	14.4	7.8
R25	8.8	14.9	8.1	7.7	14.5	7.8
R26	8.1	15.0	8.0	7.1	14.6	7.7
R27	8.1	15.0	8.0	7.1	14.6	7.7
R46	7.8	14.7	8.0	7.0	14.3	7.7
R55	9.2	12.8	7.7	8.2	12.4	7.4
ES R64	6.4	12.4	7.2	5.8	12.0	6.8
ES R65	8.8	15.1	8.3	8.0	14.6	8.0
ES R66	7.2	14.6	7.8	6.5	14.2	7.5

~~203.~~205. As detailed in **Table 26-28**, background pollutant concentrations are 'well below' (e.g., less than 75% of) the relevant air quality Objectives. Background concentrations predicted in East Riding of Yorkshire Council administrative boundary are lower than those in the administrative boundary of Hull City Council. This is to be expected as East Riding of Yorkshire is largely rural and suburban in nature.

26.5.4.2 Ecological Receptors

~~204.~~206. Background concentrations of NOx have been obtained from the latest 2018-based Defra background maps for 2026 for the 1km x 1km grid squares covering the study area. Background NH_3 concentrations, nutrient nitrogen and acid deposition fluxes have been obtained from the APIS website and are provided for 1km x 1km grid squares. The data are provided as three year averages (2019-2021) and are not factored forward.

~~205.~~207. The Nitrogen Futures study (JNCC, 2020) forecast a minimum rate of improvement in background nitrogen of 0.07 kgN.ha^{-1}.yr^{-1} at Ashdown Forest, with other forecasts indicating a greater rate of reduction. In line with the forecast for Ashdown Forest, and therefore taking a precautionary approach, this assessment applies a projected decrease in background N-dep of 0.07 kgN.ha-^{1}.yr^{-1}. Over the six-year period (i.e., from 2020 to 2026), this equates to a reduction in the APIS background nitrogen deposition rate (ranging from 17.3 to 31.1 kg N ha^{-1} yr^{-1} depending on designated site and habitat type) of 0.42 kg N ha^{-1} yr^{-1} for the 2026 assessment, respectively. This decrease is also reflected in the total average acid deposition rate for nitrogen in 2026 (yearly reduction of 0.0049 keq.ha^{-1}.yr^{-1} N).

~~206.~~208. Background concentrations considered in the ecological assessment are provided in **Table 26-29** for ecological receptors screened in for further assessment in **Table 26-20**.

~~207.~~209. As shown by comparing the CLe and CL in **Table 26-27** and existing background concentrations in **Table 26-29**, NOx and acid deposition concentrations are well below (i.e. less than 75% of) the relevant Critical Level and Load, respectively.

~~208.~~210. Background concentrations of NH_3 are above the lower CL (1µg.m^{-3}) but well below the upper CL (3µg.m^{-3}). Nutrient nitrogen deposition backgrounds are above Critical Load range at Bentley Moor Wood AW adjacent to Link 63.

Table 26-29 Ecological Receptors – Background Pollutant Concentrations and Deposition Rates

Link	Designated Ecological Site		2026 Defra Mapped Concentration (Defra, 2020a)	2019-2021 data from APIS (CEH, 2023)	N-Dep 2026	Acid Dep 2026
	Site Type	Name	NOx	NH_3		
			µg.m^{-3}	µg.m^{-3}	kgN.ha^{-1}.yr^{-1}	keq.ha^{-1}.yr
24	SAC, SPA, SSSI	Humber Estuary[A]	21.9	1.7	NS	NS
28	LNR	Humber Bridge[B]	13.7	1.9	-	-
29	SAC, SPA, SSSI	Humber Estuary[A]	14.1	1.8	NS	NS

Link	Designated Ecological Site		2026 Defra Mapped Concentration (Defra, 2020a)	2019-2021 data from APIS (CEH, 2023)	N-Dep 2026	Acid Dep 2026
	Site Type	Name	NOx	NH_3		
			$\mu g.m^{-3}$	$\mu g.m^{-3}$	$kgN.ha^{-1}.yr^{-1}$	$keq.ha^{-1}.yr$
29	LNR	Humber Bridge[B]	14.1	1.8	-	-
63	AW	Bentley Moor Wood[B]	9.9	1.9	30.2*	2.13**
Critical Level/Critical Load value, see Table 26-27 for further details			**30**	**1 to 3**	**10 – 15*** **	**10.993**

A Moorland (short vegetation)
B Forest
NS: Not Sensitive.
*Average N-dep rate (kg N ha-1 yr-1) projected to decrease by 0.42 kg N ha-1 yr-1 from background concentration year (2020) to future year (2026) (i.e., 0.07 x 6 years = 0.42 $kgN.ha^{-1}.yr^{-1}$).
**This results in a corresponding decrease in Acid-dep of 0.0294 $keq.ha^{-1}.yr^{-1}$ N.
***The Critical Loads on APIS website were revised on 25/05/2023 to align with the 'Review and revision of empirical critical loads of nitrogen for Europe 2022 report, German Environmental Agency, 2022.

26.5.4.3 Onshore Development Area

~~209.~~211. The background concentrations used in the construction phase NRMM emission assessment are provided in in **Table 26-30**.

Table 26-30 Defra (2020a) Background Pollutant Concentrations Along the Onshore Development Area

Onshore Works (Landfall Zone, Onshore Export Cable Corridor and Onshore Converter Stations) Background Concentrations 2026 (μgm^{-3})		
NO_2	**PM_{10}**	**$PM_{2.5}$**
4.7 – 7.1	11.9– 14.6	6.6 – 7.7

~~210.~~212. As detailed in **Table 26-30**, background pollutant concentrations are 'well below' (e.g., less than 75% of) the relevant air quality Objectives across the Onshore Development Area.

26.5.5 Baseline Road Traffic Emissions

~~211.~~213. 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 2022 base year and the 2026 'without DBS East or DBS West' assessment. The 24-hour AADT flows and HGV percentages used in the assessment are detailed in **Volume 7, Appendix 26-3 (application ref: 7.26.26.3).** These are unchanged as a result of **Project Change Request 2 (document reference 10.53).**

~~212.~~214. **Table 26-31** provides the results of the baseline assessment for the base year (2022) and the earliest year of construction 'without DBS East or DBS West' (2026), which is inclusive of background concentrations as well as the traffic contribution.

Table 26-31 Baseline Road Traffic Assessment Base Year (2022) and Earliest Year of Construction (2026) 'Without DBS East or DBS West' Concentrations

Receptor ID	Base year 2022 Concentration (µg m^{-3})			Year of Construction 2026 "Without DBS East or DBS West" Concentration (µg m^{-3})		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
Hull City Council						
R1	34.3	30.2	18.0	26.0	29.2	17.1
R2	27.9	23.4	14.2	21.9	22.3	13.3
R30	22.2	18.6	11.5	18.4	17.9	10.9
R31	19.4	17.4	10.6	16.5	16.9	10.2
R32	20.2	17.9	10.9	17.0	17.4	10.4
R33	24.9	16.8	10.4	22.1	16.2	10.0
R34	20.2	18.8	11.9	17.0	18.2	11.4
R35	19.1	17.7	11.3	16.3	17.1	10.8
R36	25.5	23.4	14.6	20.5	22.7	13.9

Receptor ID	Base year 2022 Concentration (µg m^{-3})			Year of Construction 2026 "Without DBS East or DBS West" Concentration (µg m^{-3})		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R37	21.6	19.3	12.0	17.9	18.6	11.5
R38	23.7	20.6	12.8	19.2	19.9	12.2
R39	29.0	24.4	14.8	22.6	23.6	14.1
R40	23.5	19.0	12.0	20.1	18.1	11.2
R41	17.9	19.1	11.4	14.6	18.5	10.9
R42	15.0	17.0	10.3	12.8	16.5	9.9
R45	15.7	15.6	9.3	12.8	15.1	8.9
ES R67	15.0	15.2	9.8	12.8	14.3	9.2
ES R68	18.6	18.2	11.4	15.0	17.0	10.6
ES R69	21.1	18.4	11.2	17.6	17.9	10.7
ES R70	19.7	19.0	11.5	15.8	17.6	10.5
ES R71	21.1	17.6	10.9	17.4	16.2	10.0
ES R72	20.8	17.3	10.7	17.5	16.2	10.0
East Riding of Yorkshire Council						
R6	26.5	22.2	13.3	18.9	21.3	12.4
R7	18.1	16.6	9.1	13.7	16.1	8.7
R8	16.9	16.1	8.9	12.7	15.6	8.5
R9	20.6	15.5	8.9	15.3	15.0	8.5
R10	19.5	16.5	9.2	14.8	16.0	8.8
R11	23.9	17.8	9.8	17.4	17.3	9.4

Receptor ID	Base year 2022 Concentration (µg m^{-3})			Year of Construction 2026 "Without DBS East or DBS West" Concentration (µg m^{-3})		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R12	27.7	18.7	10.4	19.9	18.2	10.0
R13	10.8	14.6	8.2	9.0	14.2	7.8
R14	13.9	15.3	8.5	10.9	14.8	8.2
R15	16.6	15.2	9.1	12.9	14.7	8.7
R16	21.6	16.6	9.9	16.1	16.1	9.4
R17	13.9	14.0	8.3	11.1	13.5	8.0
R18	23.5	17.8	9.9	16.9	17.4	9.4
R19	21.3	17.4	9.5	15.4	16.9	9.1
R20	27.1	18.7	10.1	19.2	18.2	9.6
R24	15.2	15.7	8.7	12.0	15.2	8.3
R25	19.5	16.4	9.0	14.5	15.9	8.6
R26	18.8	16.3	8.8	13.9	15.8	8.4
R27	13.6	15.7	8.4	10.6	15.2	8.1
R46	18.6	17.6	9.6	13.9	17.1	9.2
R55	16.0	14.2	8.5	12.5	13.7	8.1
ES R64	7.9	12.7	7.3	6.7	12.3	7.0
ES R65	13.0	16.0	8.8	10.5	15.6	8.5
ES R66	8.6	14.8	7.9	7.4	14.4	7.6

~~213.~~215. Annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ are predicted to be below the relevant Objectives at all receptors in both baseline years.

~~214.~~216. All predicted NO_2 concentrations are 'well below' 60µg m^{-3} and therefore, in accordance with Defra guidance (Defra, 2022b), the 1-hour mean Objective is unlikely to be exceeded (see **Table 26-6**). 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 50µg.m^{-3}).

26.5.6 Future Trends

~~215.~~217. In the event that the Projects are not developed, an assessment of future conditions for air quality has been carried out and is described within this section.

~~216.~~218. The baseline review of air quality in sections 26.5.2 and 26.5.4, provides a clear indication that air quality in the Projects' air quality study area is generally 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, 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 26.4.1. 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 26.4.1.

~~217.~~219. 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 provided by Defra, shown in **Table 26-28**.

26.6 Assessment of Significance

26.6.1 Potential Effects During Construction

26.6.1.1 Impact 1 Construction Dust and Fine Particulate Matter

~~218.~~220. A qualitative assessment of construction phase dust and PM_{10} emissions has been carried out in accordance with the latest IAQM guidance (IAQM, 2024). Full details of the methodology and dust assessment undertaken are provided in **Volume 7, Appendix 26-2 (application ref: 7.26.26.2)**.

~~219.~~221. The onshore construction works associated with DBS East and/or DBS West 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 26.5.3.1 for further details on the identification of sensitive receptors);
- Emissions of exhaust pollutants, especially NOx 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 NOx and PM_{10} from on-site plant, termed NRMM, operating within the Onshore Development Area have the potential to impact local air quality at sensitive receptors in close proximity to the works.

~~220.~~222. The assessment consisted of four steps (Step 1, Step 2A, Step 2B and Step 2C) as outlined below.

~~221.~~223. Further details are provided in section 26.5.3.1 on the focus areas for the assessment in relation to the locations of the expected worst case construction works (i.e. landfall, the north of Beverley and the Onshore Substation Zone for human receptors and Bentley Moor Wood AW for ecological receptors).

~~222.~~224. Both concurrent and sequential construction have similar potential for generating construction dust and fine particulate matter impacts on receptors, as overall they both cover the maximum footprint of construction works. However, the Sequential build may result in the same area of land being affected twice, which would affect the duration of impacts. The duration of construction works is not explicitly accounted for within the IAQM assessment methodology (IAQM, 2024). It is therefore anticipated that the magnitude of impacts of the Sequential Scenario would be no greater than Concurrent Scenario and so is not considered further in the assessment.

26.6.1.1.1 Step 1: Screen the Need for a Detailed Assessment

26.6.1.1.1.1 All Scenarios

~~223.~~225. The IAQM guidance states that a detailed assessment is required if there are human receptors located within 250m and ecological receptors within 200m (internal Natural England guidance) of the Onshore Development Area. Human and ecological receptors are present within 250m and 200m respectively of the Onshore Development Area, therefore a detailed assessment was required.

26.6.1.1.2 Step 2A: Define the Potential Dust Emission Magnitude

~~224.~~226. 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 DBS East and/or DBS West, therefore demolition has not been considered in the assessment.

~~225.~~227. The Landfall Zone, Onshore Export Cable Corridor and the Onshore Converter Stations have been assessed separately, due to the spatial scale of the Projects (see **Volume 7, Figure 26-2 (application ref: 7.26.1)**). The worst case scenarios for human and ecological receptors have been identified based on the number of receptors within 250m and 200m of the Onshore Development Area respectively. For trackout activities, receptors within 50m from the construction vehicle routes up to 250m from the Onshore Development Area have been 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 (2024) guidance.

26.6.1.1.2.1 DBS East or DBS West In Isolation

~~226.~~228. The potential dust emission magnitude for the Onshore Development Area for DBS East or DBS West In Isolation has been determined using the criteria detailed in **Volume 7, Appendix 26-2 (application ref: 7.26.26.2)**. The dust emission magnitudes have been determined from the worst case assumptions identified in **Table 26-1** and are detailed in **Table 26-32**.

Table 26-32 Defined Dust Emission Magnitudes Associated for Each Construction Activity for the Onshore Development Area - DBS East and DBS West In Isolation Construction

Construction Activity	Dust Emission Magnitude	Rationale
Human Receptors (Worst case)		
Earthworks (site area and earth works)	Small (<18,000m^2)	**Landfall Zone:** The proposed Satellite Temporary Construction Compound at the Landfall Zone is anticipated to be 110 x 75m (i.e., 8,250m^2) and topsoil will be stripped within this area.
	Medium (18,000 - 110,000m^2)	**The north of Beverley (i.e., Onshore Export Cable Corridor and Temporary Construction Compounds):** The proposed Temporary Construction Compounds to the north of Beverley will have a combined footprint of up to 40,560m^2. Earthworks within the Onshore Export Cable Corridor 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. The trench would be excavated in sections along the Onshore Export Cable Corridor.
	Medium (18,000 - 110,000m^2)	**Onshore Converter Station:** The maximum operational area at the Onshore Converter Station will have a footprint of approximately 32,208~~64,000~~m^2, with a total substation construction compound of (62,208~~94~~,000m^2) and soil will be stripped.

Construction Activity	Dust Emission Magnitude	Rationale
Construction (construction materials)	Medium	**All locations:** There are not anticipated to be any buildings constructed within the Temporary Construction Compounds (offices, etc. at the Onshore Converter Station 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 20 to 50 outward daily HGV movements*
Ecological Receptors (worst case)		
Earthworks (site area and earthworks)	Medium (18,000 - 110,000m^2)	**Bentley Moor Wood AW within the Substation Zone:** The maximum operational area at the Onshore Converter Station will have a footprint of approximately 32,208~~64,000~~m^2, with a total substation construction compound of (62,208~~94~~,000m^2) and soil will be stripped.
Construction (construction materials)	Medium	**Bentley Moor Wood AW within the Substation Zone:** 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)	Large	**Bentley Moor Wood AW within the Substation Zone:** It is assumed as a worst case that there would be between > 50 outward daily HGV movements*

Construction Activity	Dust Emission Magnitude	Rationale
*HGV outward movements per day have been estimated from the HGV traffic flows presented in **Table 26-11** and **Volume 7, Appendix 26-3 (application ref: 7.26.26.3)**, where the number of outward HGV movements per day is half the HGV (per day) flow. While some construction routes (up to 250m from the Onshore Development Area) have more than 50 HDV outward movements per day, very few human receptors (<10) are located on these routes, therefore assessing fewer HGV movements on routes with >10 human receptors result in the same dust emission magnitude overall. Peak daily traffic flows reported are not expected to change as a result of **Project Change Request 2 (document reference 10.53).** As such, HGV movements reported in **Table 26-32** are unchanged.		

26.6.1.1.2.2 DBS East and DBS West Concurrent Construction

~~227.~~229. The potential dust emission magnitude for the Onshore Development Area under DBS East and DBS West Concurrent construction has been determined using the criteria detailed in **Volume 7, Appendix 26-2 (application ref: 7.26.26.2)**. The dust emission magnitudes have been determined from the worst case assumptions identified in **Table 26-1** and are detailed in **Table 26-33**.

Table 26-33 Defined Dust Emission Magnitudes Associated for Each Construction Activity for the Onshore Development Area - DBS East and DBS West Concurrent Construction

Construction Activity	Dust Emission Magnitude	Rationale
Human Receptors (Worst case)		
Earthworks (site area and earth works)	Small (<18,000m^2)	**Landfall Zone:** The proposed TJB Compound at the Landfall Zone is anticipated to be 190 x 75m (i.e., 14,250m^2) and topsoil will be stripped within this area. The proposed Satellite Temporary Construction Compound at the Landfall Zone is anticipated to be 75x75m and topsoil will be stripped within this area.

Construction Activity	Dust Emission Magnitude	Rationale
	Medium (18,000 - 110,000m^2)	**The north of Beverley (i.e., Onshore Export Cable Corridor and Temporary Construction Compounds):** The proposed Temporary Construction Compounds to the north of Beverley will have a combined footprint of up to 40,560m^2. Earthworks within the Onshore Export Cable Corridor 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. The trench would be excavated in sections along the Onshore Export Cable Corridor.
	Large (>110,000m^2)	**Onshore Converter Station:** The maximum operational area at the Onshore Converter Station will have a footprint of approximately 64,416~~129,000~~m^2, with a total substation construction area of 124,416~~189,000~~m^2 and soil will be stripped.
Construction (construction materials)	Medium	**All locations:** There are not anticipated to be any buildings constructed within the Temporary Construction Compounds (offices, etc. at the Onshore Converter Station 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 20 to 50 outward daily HGV movements*.
Ecological Receptors (worst case)		

Construction Activity	Dust Emission Magnitude	Rationale
Earthworks (site area and earthworks)	Large (> 110,000m²)	**Bentley Moor Wood AW within the Substation Zone:** The maximum operational area at the Onshore Converter Stations will have a footprint of approximately 64,416~~129,000~~m², with a total substation construction area of 124,416~~89,000~~m² and soil will be stripped.
Construction (construction materials)	Medium	**Bentley Moor Wood AW within the Substation Zone:** 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)	Large	**Bentley Moor Wood AW within the Substation Zone:** It is assumed as a worst case that there would be between > 50 outward daily HGV movements*
*HGV outward movements per day have been estimated from the HGV traffic flows presented in **Table 26-11** and **Volume 7, Appendix 26-3 (application ref: 7.26.26.3)**, where the number of outward HGV movements per day is half the HGV (per day) flow. While some construction routes (up to 250m from the Onshore Development Area) have more than 50 HDV outward movements per day, very few human receptors (<10) are located on these routes, therefore assessing fewer HGV movements on routes with >10 human receptors results in the same dust emission magnitude overall. Peak traffic flows reported are not expected to change as a result of **Project Change Request 2 (document reference 10.53).** As such, HGV movements reported in **Table 26-33** are unchanged.		

26.6.1.1.3 Step 2B: Define the Sensitivity of the Area

~~228.~~230. The sensitivity of receptors to dust soiling, impacts on human health and ecological effects has been determined using the criteria in **Volume 7, Appendix 26-2 (application ref: 7.26.26.2)**. **Volume 7, Figure 26-2 (application ref: 7.26.1)** details the distance bands from the Onshore Development Area used in determining the sensitivity of the area.

26.6.1.1.3.1 All Scenarios

~~229.~~231. The sensitivity of the area is defined as:

- Sensitivity of receptors to dust soiling on people and property:
  - Earthworks and construction:
  - There are between 1 to 10 high sensitivity residential receptors located within 250m of the indicative Landfall Temporary Construction Compound.
  - There are between 10 to 100 high sensitivity residential receptors within 100m of the Onshore Export Cable Corridor and Temporary Construction Compounds to the north of Beverley.
  - Butts Farm is located 20m from the Onshore Substation Zone at the closest point; therefore, it has been conservatively assessed that there are between 1 and 10 high sensitivity residential receptors within 20m of the Onshore Substation Zone boundary.
  - The sensitivity is therefore medium at the Onshore Substation Zone, and low at the Landfall Zone and to the north of Beverley along the Onshore Export Cable Corridor.
  - Trackout:
  - There are between 1 to 10 high sensitivity residential receptors within 20m of roads used by construction vehicles up to 250m from the indicative Landfall Temporary Construction Compound.
  - There are between 10 and 100 high sensitivity residential receptors within 50m of roads used to the north of Beverley.
  - There are between 1 to 10 high sensitivity residential receptors within 20m of roads used to access the Onshore Substation Zone
  - The sensitivity is medium at all locations.
- 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 24µg m^{-3}.
  - Earthworks and construction:
  - The number of sensitive residential receptors located in proximity to the indicative Landfall Temporary Construction Compound; the Onshore Export Cable Corridor and Temporary Construction Compounds to the north of Beverley; and Onshore Substation Zone results in a low sensitivity for all assessed locations.
  - Trackout:
  - The number of sensitive residential receptors located in proximity to the indicative Landfall Temporary Construction Compound; the

Onshore Export Cable Corridor and Temporary Construction Compounds to the north of Beverley; and Onshore Substation Zone results in a low sensitivity for all assessed locations.

- Sensitivity of receptors to ecological effects:
  - Earthworks and construction:
  - Bentley Moor Wood AW is located within the Substation Zone and is of medium sensitivity. The sensitivity is therefore medium.
  - Trackout:
  - Bentley Moor Wood AW is within 20m of routes used by construction vehicles, up to 250m from the Onshore Development Area. The sensitivity is therefore medium.

~~230.~~232. 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 26-34**.

Table 26-34 Sensitivity of the Area to Each Activity Under all Scenarios

Potential Impact	**Sensitivity Of The Surrounding Area**		
	Earthworks	**Construction**	**Trackout**
Dust soiling	Medium – Onshore Substation Zone Low – Landfall Zone and to the north of Beverley	Medium – Onshore Substation Zone Low – Landfall Zone and to the north of Beverley	Medium
Human health	Low	Low	Low
Ecological	Medium	Medium	Medium

26.6.1.1.4 Step 2C: Define the Risk of Impacts

26.6.1.1.4.1 All Scenarios

~~231.~~233. The dust and PM_{10} emission magnitude and sensitivity of the area(s) are combined, and the risk of effects determined using **Volume 7, Appendix 26-2 (application ref: 7.26.26.2).** The risks for dust soiling, human health and ecological effects are shown in **Table 26-35**.

Table 26-35 Risk of Dust Impacts – All Scenarios

Potential Impact	Dust Risk		
	Earthworks	**Construction**	**Trackout**
Dust soiling	Medium – Onshore Substation Zone Low - To the north of Beverley Negligible – Landfall Zone	Medium – Onshore Substation Zone Low – Landfall Zone and to the north of Beverley	Medium
Human health	Low - To the north of Beverley and Onshore Substation Zone Negligible – Landfall Zone	Low - To the north of Beverley and Onshore Substation Zone Negligible – Landfall Zone	Low
Ecological	Medium	Medium	Medium

~~232.~~234. It is anticipated that the risk of dust effects would be the same under all scenarios.

26.6.1.1.5 Further Mitigation – Step 3: Site Specific Mitigation (Under all Scenarios)

~~233.~~235. Step 3 of the IAQM guidance (2024) 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 'medium 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.

~~234.~~236. 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.

~~235.~~237. A list of mitigation measures that are recommended for a medium risk site, as determined by Step 2 of the dust assessment, by the IAQM guidance (IAQM, 2024) are provided below. These measures are be outlined within the Project's **Outline CoCP (Volume 8, application ref: 8.9)** submitted with the application and form part of the embedded mitigation for Air Quality impacts.

- 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 Outline 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
  - 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
- 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.
- 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.

26.6.1.1.6 Residual Impacts – Step 4: Determine Significant Effects (Under all Scenarios)

~~236.~~238. With the implementation of the above mitigation measures, which are detailed in the **Outline CoCP (Volume 8, application ref: 8.9)** and the secured within the final CoCP (as secured by DCO Requirement), the residual impacts from either DBS East or DBS West In Isolation or Concurrent construction of DBS East and DBS West are considered to be not significant, in accordance with IAQM guidance (2024).

26.6.1.2 Impact 2 NRMM Emissions

~~237.~~239. DBS East and DBS West constructed Concurrently may result in a higher magnitude of impacts due to more NRMM plant (including HDD rigs) running Concurrently at the Landfall Zone than a single Project being constructed at any one time (In Isolation and Sequential construction). Therefore, Concurrent construction has been the focus of the NRMM emissions assessment, as it will require the highest number of NRMM plant operational at any one time.

~~238.~~240. As discussed in section 26.4.3.2, NRMM control measures will be implemented as embedded mitigation and therefore a qualitative assessment of DBS East and DBS West-generated NRMM used during construction at the Landfall Zone, the Onshore Substation Zone and along the Onshore Export Cable Corridor has been undertaken where effects on receptors may occur. 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 26-1**); and
- Distances from NRMM to the nearest receptors.

~~239.~~241. The greatest anticipated number of plant working at one location at the same time is anticipated to be for the Onshore Converter Station construction works. Elsewhere within the Onshore Development Area the construction works would be less intensive.

~~240.~~242. The anticipated working hours for construction of the Projects 7am-7pm Monday to Saturday (i.e., 72 hours per week), subject to any essential activities that are required to be undertaken outside of these times.

~~241.~~243. The Onshore Development Area is largely rural in nature and, as shown in **Table 26-30**, the future 2026 background concentrations of NO_2, PM_{10} and $PM_{2.5}$ at the Landfall Zone, along the Onshore Export Cable Corridor 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.

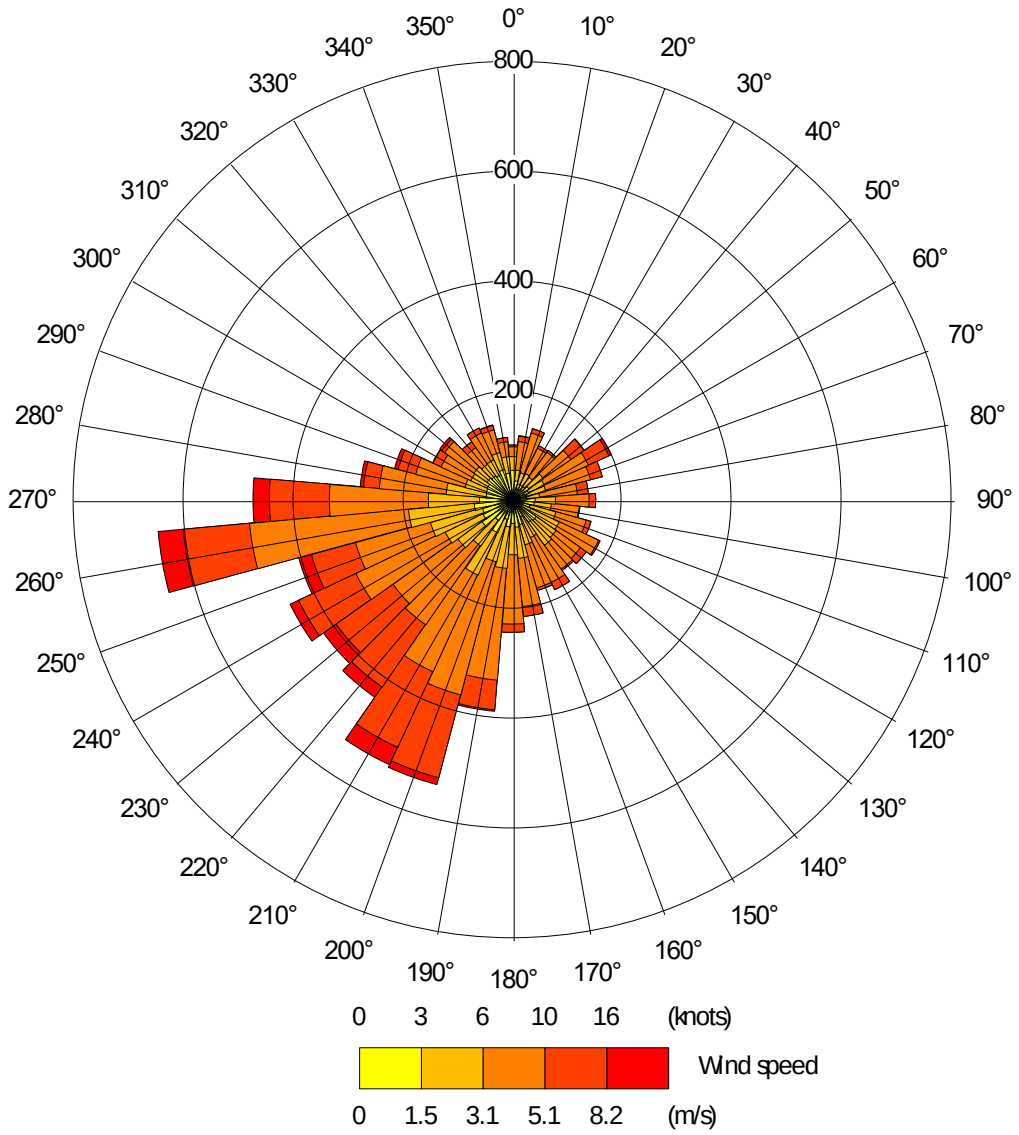

Plate 26-1 Leconfield Meteorological Station Wind Rose (2022)

~~242.~~244. The potential impacts associated with NRMM used at the indicative Landfall Zone TJB compound, the Onshore Export Cable Corridor and the Onshore Substation Zone are set out below.

26.6.1.2.1 NRMM at the Landfall Zone

~~243.~~245. The closest downwind human receptors are the residential properties off Green Lane to the north approximately 290m north of the TJB compound.

~~244.~~246. Trenchless crossing e.g., 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). The total duration of all works at the Landfall Zone is expected to be up to 18 months for an In Isolation and Concurrent Scenario and 48 months, not continuous, for a Sequential Scenario. Within the construction period, activities including the TJB construction, trenchless crossing and cable pull would lag/overlap. Emissions would not be expected over the duration of a full year as a result.

~~245.~~247. As shown in the wind rose in **Plate 26-1,** the prevailing winds at Leconfield are consistently from the west and south-west. Therefore, emissions from the HDD would be dispersed away from the residential receptors to the north during westerly wind conditions. As such, in consideration of annual mean pollutant concentrations, the impact would be reduced.

~~246.~~248. 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 with the employment of control and management measures (as detailed in **Table 26-3**).

~~247.~~249. As detailed in section 26.5.3.1.2, none of the ecological receptors in proximity to the Landfall Zone (Greater Wash SPA is more than 200m of the Landfall Zone Temporary Construction Compound), which may be susceptible to adverse effects from NRMM emissions.

~~248.~~250. NRMM emissions associated with the construction compound and transition joint bays would be more intermittent in nature and would only occur during working hours. Once construction of the Landfall Zone elements has been completed (including demobilisation) no pollution sources would be present (i.e., there are no operational phase impacts on local air quality) as a result of the Projects. As the works at Landfall Zone would be short-term and temporary, and with the employment of relevant control and management measures detailed in **Table 26-3**, it is unlikely significant impacts would occur as a result of emissions from NRMM.

~~249.~~251. The effect of emissions from NRMM used at the Landfall Zone is therefore considered to be not significant.

26.6.1.2.2 NRMM along the Onshore Export Cable Corridor

~~250.~~252. The primary activities that would occur along the Onshore Export Cable Corridor are temporary haul road construction, cable laying and removal/excavation/backfilling works associated with the trench. There will also be construction activities associated with the construction of Temporary Construction Compounds and trenchless crossings e.g. HDDs for crossing of existing infrastructure and natural features.

~~251.~~253. As construction works on the Onshore Export Cable would be undertaken in sections in a linear nature, NRMM plant would be operational in the vicinity of a receptor for only a relatively short duration, and not for the full duration of the Onshore Export Cable Corridor construction programme (33 months).

~~252.~~254. As noted in **Table 26-30**, background pollutant concentrations are less than 50% of the relevant air quality Objectives. Therefore, it is unlikely that NRMM along the Onshore Export Cable Corridor would have a significant impact on local air quality with control and management measures employed (as detailed in **Table 26-3**).

~~253.~~255. With regard to ecological receptors, there is only one receptor, Burton Bushes SSSI and AW, in the vicinity of the Onshore Export Cable Corridor. Burton Bushes SSSI and AW is located approximately 120m from the Onshore Export Cable Corridor at its closest point. The intermittent and short-term nature of the plant usage during the construction of the Onshore Export Cable Corridor in the vicinity of this ecological receptor would also reduce the potential for significant impacts at this location. As mentioned in section 26.5.3.2, there are no ecological receptors within 200m of a Temporary Construction Compound. It is therefore expected that the employment of management and control measures, particularly siting plant and other emission sources as far from the Burton Bushes SSSI and AW as is practicable (see **Table 26-3**), will mean that effects would be not significant.

26.6.1.2.3 NRMM at the Onshore Substation Zone

~~254.~~256. The Onshore Substation Zone for DBS East and DBS West is located in arable land south-west of Beverley. Construction activities in the Onshore Substation Zone include site preparation and earthworks, and construction of the Onshore Converter Station and permanent access routes.

~~255.~~257. The nearest human receptors to the Onshore Substation Zone are residential receptors located in Bentley to the south. The nearest ecological receptor is a Bentley Moor Wood AW, located within the boundary of the Onshore Substation Zone.

~~256.~~258. The duration of construction works at the Onshore Substation Zone during Concurrent build of DBS East and DBS West would occur for up to four years. However, emissions would only occur during working hours, and plant usage would be intermittent and variable throughout the working day rather than used continuously. In addition, given that the prevailing wind direction (see **Plate 26-1**) is from the west and south-west, NRMM emissions would be dispersed away from any nearby human receptors for the majority of the time.

~~257.~~259. The nearest Substation Zone Temporary Construction Compound to Bentley Moor Wood AW is located at a distance of approximately 280m west of the woodland. It is considered that this distance would provide sufficient dilution and dispersion of pollutant emissions from NRMM within the Substation Zone Temporary Construction Compound.

~~258.~~260. Given the low background pollutant concentrations in the area, and the fact that the source of NRMM emissions would be temporary during construction only, it is unlikely NRMM at the Onshore Substation Zone would have a significant impact on local air quality with the employment of control and management measures (as detailed in **Table 26-3**).

26.6.1.2.4 NRMM Significance

~~259.~~261. Defra technical guidance (Defra, 2022b) 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, and a qualitative assessment of effects is sufficient for consideration of effects. The results of the qualitative assessment above demonstrates that intensive construction activities are unlikely to have a significant impact on local air quality with the implementation of the mitigation measures detailed in **Table 26-3.**

26.6.1.2.5 Mitigation Measures Specific to NRMM (Under all Scenarios)

~~260.~~262. Effects were found to be not significant, taking into account the employment of embedded mitigation measures detailed in **Table 26-3**. As such, no further mitigation measures are required.

26.6.1.3 Impact 3 Construction Road Vehicle Exhaust Emissions

~~261.~~263. The Projects' construction-generated road traffic flows have been determined for the worst case scenario which is DBS East and DBS West Concurrently (see **Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)**). Construction generated traffic impacts for the scenario where DBS East or DBS West are built In Isolation have also been considered.

26.6.1.3.1 DBS East or DBS West In Isolation

26.6.1.3.1.1 Human Receptors

~~262.~~264. The 24-hour AADT flows and HGV percentages used in the air quality assessment for DBS East or DBS West In Isolation are detailed in **Volume 7, Appendix 26-3 (application ref: 7.26.26.3)**. These are unchanged as a result of **Project Change Request 2 (document reference 10.53)**.

~~263.~~265. Predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations for the earliest year of construction (2026) 'with DBS East or DBS West' In Isolation Scenario are detailed in **Table 26-36** to **Table 26-39**. Concentrations for the 'without DBS East and DBS West' assessment are also shown for comparison purposes. All concentrations are inclusive of the background concentration at each receptor.

~~264.~~266. The predicted annual mean concentration at each specified receptor has been compared to the 2022 monitored concentration at the most representative monitoring site, where available (**Table 26-40**) as required by the Hull City Council EHO (stated in the consultation responses in **Volume 7, Appendix 6-1 (application ref: 7.6.6.1)**). It should be noted that the majority of monitoring sites operated by Hull City Council are Kerbside sites (located within 1m of the road) which experience elevated levels of road emissions compared to relevant exposure (as captured within the assessment). Monitored concentrations are therefore expected to be elevated compared to that experienced by the majority of residential exposure within the study area.

Table 26-36 Annual Mean NO_2 Results for 2026 at Sensitive Human Receptor Locations for DBS East or DBS West In Isolation

Receptor ID	**DBS East or DBS West In Isolation**				
	2026 Annual Mean NO_2 Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	**With DBS East or DBS West**	**Change**	**Change as% of the Objective**	**Impact Descriptor**
Hull City Council					
R1	26.0	26.2	0.2	0%	Negligible
R2	21.9	22.0	0.1	0%	Negligible

Receptor ID	DBS East or DBS West In Isolation				
	2026 Annual Mean NO_2 Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East or DBS West	Change	Change as% of the Objective	Impact Descriptor
R30	18.4	18.5	0.1	0%	Negligible
R31	16.5	16.6	0.1	0%	Negligible
R32	17.0	17.2	0.2	0%	Negligible
R33	22.1	22.2	0.1	0%	Negligible
R34	17.0	17.1	0.1	0%	Negligible
R35	16.3	16.4	0.1	0%	Negligible
R36	20.5	20.7	0.2	1%	Negligible
R37	17.9	18.1	0.2	0%	Negligible
R38	19.2	19.4	0.3	1%	Negligible
R39	22.6	23.0	0.4	1%	Negligible
R40	20.1	20.3	0.2	0%	Negligible
R41	14.6	14.9	0.2	1%	Negligible
R42	12.8	12.9	0.1	0%	Negligible
R45	12.8	12.9	0.2	0%	Negligible
ES R67	12.8	12.8	0.0	0%	Negligible
ES R68	15.0	15.1	0.2	0%	Negligible
ES R69	17.6	17.9	0.3	1%	Negligible
ES R70	15.8	16.1	0.3	1%	Negligible

Receptor ID	DBS East or DBS West In Isolation				
	2026 Annual Mean NO_2 Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East or DBS West	Change	Change as% of the Objective	Impact Descriptor
ES R71	17.4	17.6	0.2	1%	Negligible
ES R72	17.5	17.7	0.2	0%	Negligible
East Riding of Yorkshire					
R6	18.9	19.0	0.1	0%	Negligible
R7	13.7	14.1	0.4	1%	Negligible
R8	12.7	13.0	0.2	1%	Negligible
R9	15.3	15.6	0.3	1%	Negligible
R10	14.8	15.0	0.2	1%	Negligible
R11	17.4	17.7	0.3	1%	Negligible
R12	19.9	20.4	0.5	1%	Negligible
R13	9.0	9.1	0.1	0%	Negligible
R14	10.9	11.2	0.2	1%	Negligible
R15	12.9	13.1	0.3	1%	Negligible
R16	16.1	16.6	0.4	1%	Negligible
R17	11.1	11.3	0.2	0%	Negligible
R18	16.9	17.5	0.5	1%	Negligible
R19	15.4	15.9	0.5	1%	Negligible
R20	19.2	19.7	0.5	1%	Negligible

Receptor ID	DBS East or DBS West In Isolation				
	2026 Annual Mean NO_2 Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East or DBS West	Change	Change as% of the Objective	Impact Descriptor
R24	12.0	12.1	0.1	0%	Negligible
R25	14.5	14.7	0.2	1%	Negligible
R26	13.9	14.0	0.2	0%	Negligible
R27	10.6	10.6	0.1	0%	Negligible
R46	13.9	14.2	0.4	1%	Negligible
R55	12.5	12.7	0.2	1%	Negligible
ES R64	6.7	6.8	0.0	0%	Negligible
ES R65	10.5	10.6	0.1	0%	Negligible
ES R66	7.4	7.4	0.0	0%	Negligible

Table 26-37 Annual Mean PM_{10} Results at Sensitive Human Receptor Locations for DBS East or DBS West In Isolation

Receptor ID	DBS East or DBS West In Isolation				
	2026 Annual Mean PM_{10} Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East or DBS West	Change	Change as% of the Objective	Impact Descriptor
Hull City Council					

Receptor ID	DBS East or DBS West In Isolation				
	2026 Annual Mean PM_{10} Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East or DBS West	Change	Change as% of the Objective	Impact Descriptor
R1	29.2	29.5	0.3	1%	Negligible
R2	22.3	22.5	0.2	0%	Negligible
R30	17.9	18.0	0.1	0%	Negligible
R31	16.9	17.1	0.2	0%	Negligible
R32	17.4	17.6	0.2	1%	Negligible
R33	16.2	16.4	0.2	1%	Negligible
R34	18.2	18.3	0.1	0%	Negligible
R35	17.1	17.2	0.1	0%	Negligible
R36	22.7	23.0	0.3	1%	Negligible
R37	18.6	18.8	0.2	0%	Negligible
R38	19.9	20.1	0.2	1%	Negligible
R39	23.6	23.9	0.3	1%	Negligible
R40	18.1	18.3	0.2	0%	Negligible
R41	18.5	18.7	0.2	1%	Negligible
R42	16.5	16.6	0.1	0%	Negligible
R45	15.1	15.2	0.1	0%	Negligible
ES R67	14.3	14.4	0.0	0%	Negligible
ES R68	17.0	17.2	0.2	0%	Negligible

Receptor ID	DBS East or DBS West In Isolation				
	2026 Annual Mean PM_{10} Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East or DBS West	Change	Change as% of the Objective	Impact Descriptor
ES R69	17.9	18.1	0.2	1%	Negligible
ES R70	17.6	18.1	0.5	1%	Negligible
ES R71	16.2	16.4	0.2	0%	Negligible
ES R72	16.2	16.4	0.2	0%	Negligible
East Riding of Yorkshire					
R6	21.3	21.5	0.1	0%	Negligible
R7	16.1	16.2	0.1	0%	Negligible
R8	15.6	15.7	0.1	0%	Negligible
R9	15.0	15.1	0.1	0%	Negligible
R10	16.0	16.1	0.1	0%	Negligible
R11	17.3	17.4	0.1	0%	Negligible
R12	18.2	18.3	0.2	0%	Negligible
R13	14.2	14.2	0.0	0%	Negligible
R14	14.8	14.9	0.1	0%	Negligible
R15	14.7	14.8	0.1	0%	Negligible
R16	16.1	16.3	0.2	0%	Negligible
R17	13.5	13.6	0.1	0%	Negligible
R18	17.4	17.6	0.2	1%	Negligible

Receptor ID	DBS East or DBS West In Isolation				
	2026 Annual Mean PM_{10} Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East or DBS West	Change	Change as% of the Objective	Impact Descriptor
R19	16.9	17.1	0.2	0%	Negligible
R20	18.2	18.4	0.2	1%	Negligible
R24	15.2	15.3	0.1	0%	Negligible
R25	15.9	16.0	0.1	0%	Negligible
R26	15.8	15.8	0.0	0%	Negligible
R27	15.2	15.2	0.0	0%	Negligible
R46	17.1	17.3	0.2	0%	Negligible
R55	13.7	13.8	0.1	0%	Negligible
ES R64	12.3	12.3	0.0	0%	Negligible
ES R65	15.6	15.6	0.1	0%	Negligible
ES R66	14.4	14.4	0.0	0%	Negligible

Table 26-38 Short Term Mean PM_{10} Results at Sensitive Human Receptor Locations for DBS East or DBS West In Isolation

Receptor ID	DBS East or DBS West In Isolation		
	2026 Number of Days >50µg m^{-3} (Objective being less than 35 exceedances per year)		
	Without DBS East or DBS West	With DBS East or DBS West	Change
Hull City Council			
R1	25	26	1
R2	7	7	0
R30	1	1	0
R31	1	1	0
R32	1	1	0
R33	0	0	0
R34	2	2	0
R35	1	1	0
R36	8	8	1
R37	2	2	0
R38	3	4	0
R39	9	10	1
R40	2	2	0
R41	2	2	0
R42	0	1	0
R45	0	0	0
ES R67	0	0	0

Receptor ID	DBS East or DBS West In Isolation		
	2026 Number of Days >50µg m^{-3} (Objective being less than 35 exceedances per year)		
	Without DBS East or DBS West	With DBS East or DBS West	Change
ES R68	1	1	0
ES R69	1	1	0
ES R70	1	1	0
ES R71	0	0	0
ES R72	0	0	0
East Riding of Yorkshire			
R6	5	5	0
R7	0	0	0
R8	0	0	0
R9	0	0	0
R10	0	0	0
R11	1	1	0
R12	2	2	0
R13	0	0	0
R14	0	0	0
R15	0	0	0
R16	0	0	0
R17	0	0	0
R18	1	1	0

Receptor ID	DBS East or DBS West In Isolation		
	2026 Number of Days >50µg m^{-3} (Objective being less than 35 exceedances per year)		
	Without DBS East or DBS West	With DBS East or DBS West	Change
R19	1	1	0
R20	2	2	0
R24	0	0	0
R25	0	0	0
R26	0	0	0
R27	0	0	0
R46	1	1	0
R55	0	0	0
ES R64	0	0	0
ES R65	0	0	0
ES R66	0	0	0
Values have been rounded to the nearest whole number therefore the change observed between without and with DBS East or DBS West does not always equate to an overall change of the same magnitude.			

Table 26-39 Annual Mean $PM_{2.5}$ Results at Sensitive Human Receptor Locations for DBS East or DBS West In Isolation

Receptor ID	DBS East or DBS West In Isolation				
	2026 Annual Mean $PM_{2.5}$ Concentrations (µg m^{-3}) Objective = 20 µg m^{-3}				
	Without DBS East or DBS West	With DBS East or DBS West	Change	Change as% of the Objective	Impact Descriptor
Hull City Council					
R1	17.1	17.2	0.2	1%	Negligible
R2	13.3	13.4	0.1	0%	Negligible
R30	10.9	11.0	0.0	0%	Negligible
R31	10.2	10.3	0.1	1%	Negligible
R32	10.4	10.6	0.1	1%	Negligible
R33	10.0	10.1	0.1	1%	Negligible
R34	11.4	11.5	0.1	0%	Negligible
R35	10.8	10.9	0.0	0%	Negligible
R36	13.9	14.1	0.2	1%	Negligible
R37	11.5	11.6	0.1	0%	Negligible
R38	12.2	12.3	0.1	1%	Negligible
R39	14.1	14.3	0.2	1%	Negligible
R40	11.2	11.3	0.1	0%	Negligible
R41	10.9	11.1	0.1	1%	Negligible
R42	9.9	9.9	0.1	0%	Negligible
R45	8.9	8.9	0.0	0%	Negligible

Receptor ID	DBS East or DBS West In Isolation				
	2026 Annual Mean $PM_{2.5}$ Concentrations (µg m^{-3}) Objective = 20 µg m^{-3}				
	Without DBS East or DBS West	With DBS East or DBS West	Change	Change as% of the Objective	Impact Descriptor
ES R67	9.2	9.2	0.0	0%	Negligible
ES R68	10.6	10.7	0.1	0%	Negligible
ES R69	10.7	10.8	0.1	1%	Negligible
ES R70	10.5	10.8	0.3	1%	Negligible
ES R71	10.0	10.1	0.1	1%	Negligible
ES R72	10.0	10.1	0.1	0%	Negligible
East Riding of Yorkshire					
R6	12.4	12.5	0.1	0%	Negligible
R7	8.7	8.8	0.1	0%	Negligible
R8	8.5	8.5	0.0	0%	Negligible
R9	8.5	8.6	0.1	0%	Negligible
R10	8.8	8.8	0.0	0%	Negligible
R11	9.4	9.4	0.1	0%	Negligible
R12	10.0	10.1	0.1	1%	Negligible
R13	7.8	7.9	0.0	0%	Negligible
R14	8.2	8.2	0.0	0%	Negligible
R15	8.7	8.8	0.1	0%	Negligible
R16	9.4	9.5	0.1	1%	Negligible

Receptor ID	DBS East or DBS West In Isolation				
	2026 Annual Mean $PM_{2.5}$ Concentrations (µg m^{-3}) Objective = 20 µg m^{-3}				
	Without DBS East or DBS West	With DBS East or DBS West	Change	Change as% of the Objective	Impact Descriptor
R17	8.0	8.0	0.0	0%	Negligible
R18	9.4	9.6	0.1	1%	Negligible
R19	9.1	9.2	0.1	1%	Negligible
R20	9.6	9.8	0.1	1%	Negligible
R24	8.3	8.3	0.0	0%	Negligible
R25	8.6	8.6	0.0	0%	Negligible
R26	8.4	8.4	0.0	0%	Negligible
R27	8.1	8.1	0.0	0%	Negligible
R46	9.2	9.3	0.1	1%	Negligible
R55	8.1	8.1	0.0	0%	Negligible
ES R64	7.0	7.0	0.0	0%	Negligible
ES R65	8.5	8.5	0.0	0%	Negligible
ES R66	7.6	7.6	0.0	0%	Negligible

Table 26-40 Comparison of Annual Mean NO_2 Results at Sensitive Human Receptor Locations in Hull City Council for DBS East or DBS West In Isolation Against Monitored Concentrations at Sites Operated by Hull City Council

DBS East or DBS West In Isolation							
Comparison of 2026 Annual Mean NO_2 Concentrations against 2022 monitored concentrations within Hull City Council (µg m^{-3})							
Receptor ID	**Without DBS East or DBS West (µg m^{-3})**	**With DBS East or DBS West (µg m^{-3})**	**Nearest representative Monitoring Site ID Operated By Hull City Council**	**2022 Monitored Concentration (µg m^{-3})**	**Change (µg m^{-3})**	**Change as% of the Objective**	**Impact Descriptor**
R1	26.0	26.2	DT13	26.2	-0.01	0%	Negligible
R2	21.9	22.0	DT13	26.2	-4.2	-11%	Negligible
R30	18.4	18.5	DT1	18.5	0.0	0%	Negligible
R31	16.5	16.6	DT50	35.8	-19.2	-48%	Negligible
R32	17.0	17.2	DT50	35.8	-18.6	-46%	Negligible
R33	22.1	22.2	DT50	35.8	-13.6	-34%	Negligible
R34	17.0	17.1	-	-	-	-	-

DBS East or DBS West In Isolation							
Comparison of 2026 Annual Mean NO_2 Concentrations against 2022 monitored concentrations within Hull City Council (µg m^{-3})							
Receptor ID	**Without DBS East or DBS West (µg m^{-3})**	**With DBS East or DBS West (µg m^{-3})**	**Nearest representative Monitoring Site ID Operated By Hull City Council**	**2022 Monitored Concentration (µg m^{-3})**	**Change (µg m^{-3})**	**Change as% of the Objective**	**Impact Descriptor**
R35	16.3	16.4	-	-	-	-	-
R36	20.5	20.7	-	-	-	-	-
R37	17.9	18.1	DT56	30.9	-12.8	-32%	Negligible
R38	19.2	19.4	-	-	-	-	-
R39	22.6	23.0	DT54	33.6	-10.6	-27%	Negligible
R40	20.1	20.3	-	-	-	-	-
R41	14.6	14.9	-	-	-	-	-
R42	12.8	12.9	-	-	-	-	-

DBS East or DBS West In Isolation							
Comparison of 2026 Annual Mean NO_2 Concentrations against 2022 monitored concentrations within Hull City Council (µg m^{-3})							
Receptor ID	**Without DBS East or DBS West (µg m^{-3})**	**With DBS East or DBS West (µg m^{-3})**	**Nearest representative Monitoring Site ID Operated By Hull City Council**	**2022 Monitored Concentration (µg m^{-3})**	**Change (µg m^{-3})**	**Change as% of the Objective**	**Impact Descriptor**
R45	12.8	12.9	-	-	-	-	-
ES R67	15.0	15.1	-	-	-	-	-
ES R68	17.6	17.9	-	-	-	-	-
ES R69	26.0	26.2	DT50	35.8	-17.8-	-45%	Negligible
ES R70	15.8	16.1	-	-	-	-	-
ES R71	17.4	17.6	-	-	-	-	-
ES R72	17.5	17.7	-	-	-	-	-
- No representative monitoring site available. It should be noted that most of the diffusion tubes are not directly comparable with modelled receptor locations							

~~265.~~267. The results of the construction phase road traffic emissions assessment show that annual mean concentrations of NO_2 (see **Table 26-36)**, PM_{10} (see **Table 26-37**) and $PM_{2.5}$ (see **Table 26-39**) are predicted to be well below (i.e., less than 75% of) the respective air quality Objectives in the construction (2026) DBS East or DBS West In Isolation at all receptors (including the receptors R1, R2, ES R70, ES R71 and ES R72 within the Hull AQMA), both 'with' and 'without' DBS East or DBS West in place.

~~266.~~268. The changes in NO_2, PM_{10} and $PM_{2.5}$ concentrations are 1% or less at all receptors; this corresponded to a 'negligible' impact, in accordance with IAQM and EPUK guidance (IAQM & EPUK, 2017). **Table 26-40** shows the predicted 2026 NO_2 concentrations at specified residential receptors within Hull City Council under DBS East or DBS West In Isolation compared to the monitored concentrations undertaken in 2022 by Hull City Council, as requested by the EHO in Hull City Council ((pers. Comm., 9 January 2023).

~~267.~~269. As detailed in **Table 26-40**, the predicted annual mean concentration at all modelled receptors under DBS East or DBS West In Isolation are lower or the same as the comparative concentrations recorded in 2022 within Hull City Council. The impact of the DBS East or DBS West is therefore considered negligible in accordance with the Hull City Council supplementary planning guidance 'Air Quality Guidance for Planners and Developers' (Hull City Council, 2018).

~~268.~~270. All predicted NO_2 concentrations are well below 60µg m^{-3} and therefore, in accordance with Defra guidance (Defra, 2021a), the 1-hour mean Objective is unlikely to be exceeded (see **Table 26-6**). Based on the calculation provided by Defra, as detailed in section 26.4.3.3**,** the short-term PM_{10} Objective was predicted to be met at all modelled locations (the Objective being less than 35 exceedances of 50µg m^{-3} as a daily mean). As shown in **Table 26-38**, there was no change in the number of days exceeding the daily mean Objective between the 'without' and 'with' DBS East or DBS West In Isolation assessments, using the Defra (2022) calculation.

~~269.~~271. The assessment therefore concludes that impacts generated by DBS East or DBS West construction-generated road traffic upon local air quality are not significant.

26.6.1.3.1.2 Ecological Receptors

~~270.~~272. **Table 26-41** presents the contribution of DBS East or DBS West In Isolation and the in-combination contribution (i.e., Project traffic, 2022 to 2026 traffic growth plus cumulative projects traffic) (see section 26.4.3.3.7). 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.

~~271.~~273. Predicted total pollutant concentrations (including the relevant background pollutant concentrations) at the ecological receptor locations as a result of Project alone traffic and in-combination traffic are detailed in **Table 26-42**. Values in exceedance of 100% of the Critical Level or Load are shown in in bold text.

*Table 26-41 DBS East or DBS West In Isolation – Maximum Contribution of Project-generated/In-combination NOx, NH_3, N-dep and Acid Deposition from Traffic on Feature(s) Under Designated Ecological Sites (Figures Highlighted in **bold** are Those Which Cannot be Considered Insignificant)*

Link	Designated Ecological Site			'DBS East or DBS West In Isolation'										
				Concentration or Flux				% of Critical Level or Critical Load						
	Site Type	Name	Feature Name or Critical Load Class	NOx	NH_3	N-Dep	Acid-Dep	NOx	NH_3		N-Dep		Acid-Dep	
				µg.m^{-3}	µg.m^{-3}	kgN.ha^{-1}.yr^{-1}	keq.ha^{-1}.yr^{-1}	-	% of lower CL	% of upper CL	% of lower CL	% of upper CL	% of lower CL	% of upper CL
Project-Alone (i.e., DBS East or West In Isolation) Contribution														
24	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	0.09	0.002	NC	NS	0.3%	0.2%	0.1%	NC	NC	NS	NS
29	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	0.07	0.002	NC	NS	0.2%	0.2%	0.1%	NC	NC	NS	NS
29	LNR	Humber Bridge	Broadleaved deciduous woodland	0.06	**	-	-	0.2%	**	**	-	-	-	-
63	AW	Bentley Moor Wood	Broadleaved deciduous woodland	**	**	0.04	0.003	**	**	**	0.4%	0.3%	0.02%	0.02%
In-combination (i.e., Project-generated traffic, 2022-2026 traffic growth and cumulative projects traffic) Contribution														
24	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	0.66	0.02	NC	NS	**2.2%**	**1.8%**	0.6%	NC	NC	NS	NS
29	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	0.69	0.02	NC	NS	**2.3%**	**1.8%**	0.6%	NC	NC	NS	NS
29	LNR	Humber Bridge	Broadleaved deciduous woodland	0.63	**	-	-	**2.1%**	**	**	-	-	-	-

Link	Designated Ecological Site			'DBS East or DBS West In Isolation'										
				Concentration or Flux				% of Critical Level or Critical Load						
	Site Type	Name	Feature Name or Critical Load Class	NOx	NH_3	N-Dep	Acid-Dep	NOx	NH_3		N-Dep		Acid-Dep	
				µg.m^{-3}	µg.m^{-3}	kgN.ha^{-1}.yr^{-1}	keq.ha^{-1}.yr^{-1}	-	% of lower CL	% of upper CL	% of lower CL	% of upper CL	% of lower CL	% of upper CL
63	AW	Bentley Moor Wood	Broadleaved deciduous woodland	**	**	0.17	0.01	**	**	**	**1.7%**	**1.1%**	0.1%	0.1%

Notes: Figures in **bold** represents exceedance of 1% of the Critical Level or Load.
*Designated feature of the Humber Estuary SAC only.
The Project alone/ in-combination increase in AADT did not exceed the distance based screening criteria detailed in the JNCC guidance (see **Table 26-20) and therefore was not screened in for further assessment
NS: Not sensitive. NC: No comparable habitat with established critical load estimate available.

*Table 26-42 DBS East or DBS West In Isolation – Total Concentration of NOx, NH_3, N-dep and Acid Deposition from Traffic on Feature(s) under Designation Ecological Sites (Including Background Concentrations) Values in Exceedance of 1% of the Critical Level or Load, are Shown in **bold**.*

Link	Designated Ecological Site			'DBS East or DBS West In Isolation' - Total pollutant concentration/deposition										
				NOx		NH_3			N-Dep			Acid-Dep		
	Site Type	Name	Feature Name or Critical Load Class	Total concentration µgm^{-3}	% of CL	Total concentration µg m^{-3}	% of Lower CL	% of Upper CL	Total kg N ha^{-1} yr^{-1}	% of Lower CL	% of Upper CL	Total keq N ha^{-1} yr^{-1}	% of Lower CL	% of upper CL
Project-Alone (i.e., DBS East or West In Isolation) Contribution														
24	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	22.0	73%	1.7	**170%**	57%	NC	NC	NC	NS	NS	NS
29	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	14.2	47%	1.8	**180%**	60%	NC	NC	NC	NS	NS	NS

Link	Designated Ecological Site			'DBS East or DBS West In Isolation' - Total pollutant concentration/deposition											
				NOx		NH_3			N-Dep			Acid-Dep			
	Site Type	Name	Feature Name or Critical Load Class	Total concentration μgm^{-3}	% of CL	Total concentration $\mu g\ m^{-3}$	% of Lower CL	% of Upper CL	Total kg N $ha^{-1}\ yr^{-1}$	% of Lower CL	% of Upper CL	Total keq N $ha^{-1}\ yr^{-1}$	% of Lower CL	% of upper CL
29	LNR	Humber Bridge	Broadleaved deciduous woodland	14.2	47%	**	**	**	-	-	-	-	-	-
63	AW	Bentley Moor Wood	Broadleaved deciduous woodland	**	**	**	**	**	30.3	**303%**	**202%**	2.1	19%	19%
In-combination (i.e., Project-generated traffic, 2022-2026 traffic growth and cumulative projects traffic) Contribution															
24	SAC	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	22.6	75%	1.7	**172%**	57%	NC	NC	NC	NS	NS	NS
29	SAC	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	14.8	49%	1.9	**182%**	61%	NC	NC	NC	NS	NS	NS
29	LNR	Humber Bridge	Broadleaved deciduous woodland	14.8	49%	**	**	**	-	-	-	-	-	-
63	AW	Bentley Moor Wood	Broadleaved deciduous woodland	**	**	**	**	**	30.4	**304%**	**203%**	2.1	19%	19%

Notes: Figures in **bold** represents exceedance of the Critical Level or Load.
*Designated feature of the Humber Estuary SAC only.
The Project alone/ in-combination increase in AADT did not exceed the distance based screening criteria detailed in the JNCC guidance (see **Table 26-20) and therefore was not screened in for further assessment
NS: Not Sensitive. NC: No comparable habitat with established critical load estimate available.

~~272.~~274. As shown in **Table 26-41**, there are sites which are predicted to experience in-combination impacts in excess of 1% of the CLe or CL. However, comparison with the project alone impacts**,** shows that only a small percentage of impacts at all sites is due to the contribution from DBS East or DBS West In Isolation. Furthermore, the contribution from DBS East or DBS West In Isolation does not result in impacts in excess of 1% of any of the CLe or CL for all European and nationally designated sites. The contribution from in-combination traffic (i.e. traffic growth and cumulative projects) alone results in an increase of greater than 1% at all sites for the pollutants considered.

~~273.~~275. As previously discussed, the impact of DBS East or DBS West In Isolation 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.

~~274.~~276. As shown in **Table 26-42**, due to elevated background NH_3 concentrations and N-dep fluxes in exceedance of the Critical Levels and Loads, respectively, total pollutant concentrations of NH_3 exceed the lower NH_3 Critical Level and total N-dep exceed the lower and upper and N-dep Critical Load, respectively. NOx concentrations do not exceed the Critical Level of 30 $\mu g.m^{-3}$ at the sites assessed. It is also worth noting the following:

- In-combination NH_3 and N-dep impacts do not result in any additional exceedances of the upper Critical Loads.
- Results are presented for both the lower and upper NH_3 Critical Levels.
- The worst case impacts are presented in **Table 26-41** and **Table 26-42** as the closest boundary of ecological sites to affected road links. Road traffic pollutant concentrations would decrease rapidly with distance back from the road's edge.
- Finally, it should be noted that these results are based on the average vehicle fleet mix in 2019 for NOx and 2015 for NH_3 and N-dep; as such, changes in emissions of these pollutants into the future is not accounted for.

~~275.~~277. Acid-dep as a result of in-combination traffic does not exceed 1% of the relevant Critical Load values, therefore, acid-dep impacts on the Bentley Moor Wood AW are considered to be not significant. Total NOx concentrations do not exceed the Critical Level and therefore, despite an impact on sites greater than 1% of the Critical Level, these impacts are considered to be not significant.

~~276.~~278. The effect of NOx concentrations and acid deposition fluxes as a result of Projects on identified designated sites is considered to be not significant. The significance of NH_3 and N-dep impacts are discussed in **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18)** and **Report to Inform Appropriate Assessment (RIAA) - Habitats Regulations Assessment (Volume 6, application ref: 6.1)**.

26.6.1.3.2 DBS East and DBS West Concurrent Construction

26.6.1.3.2.1 Human Receptors

~~277.~~279. The 24-hour AADT flows and HGV percentages used in the air quality assessment for DBS East and DBS West Concurrent construction are detailed in **Volume 7, Appendix 26-3 (application ref: 7.26.26.3).** These are unchanged as a result of **Project Change Request 2 (document reference 10.53)**.

~~278.~~280. Predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations for the 2026 year of construction (2026) 'with DBS East and DBS West Concurrent construction' scenario are detailed in **Table 26-43** to **Table 26-46**.

~~279.~~281. The predicted annual mean concentration at each specified receptor has been compared to the 2022 monitored concentration at the most representative monitoring site, where available (**Table 26-47**) as required by the Hull City Council EHO (stated in the consultant responses in **Volume 7, Appendix 26-1 (application ref: 7.26.26.1).**

Table 26-43 Annual Mean NO_2 Results at Sensitive Human Receptor Locations for DBS East and DBS West Concurrent Construction

Receptor ID	DBS East and DBS West Concurrent Construction				
	2026 Annual Mean NO_2 Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East and DBS West	Change	Change as% of the Objective	Impact Descriptor
Hull City Council					
R1	26.0	26.3	0.2	1%	Negligible
R2	21.9	22.0	0.2	0%	Negligible

Receptor ID	DBS East and DBS West Concurrent Construction				
	2026 Annual Mean NO_2 Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East and DBS West	Change	Change as% of the Objective	Impact Descriptor
R30	18.4	18.5	0.1	0%	Negligible
R31	16.5	16.7	0.2	0%	Negligible
R32	17.0	17.3	0.3	1%	Negligible
R33	22.1	22.2	0.2	0%	Negligible
R34	17.0	17.1	0.1	0%	Negligible
R35	16.3	16.4	0.1	0%	Negligible
R36	20.5	20.8	0.3	1%	Negligible
R37	17.9	18.1	0.2	1%	Negligible
R38	19.2	19.5	0.3	1%	Negligible
R39	22.6	23.2	0.6	1%	Negligible
R40	20.1	20.4	0.3	1%	Negligible
R41	14.6	15.0	0.3	1%	Negligible
R42	12.8	12.9	0.1	0%	Negligible
R45	12.8	13.0	0.2	1%	Negligible
ES R67	12.8	12.8	0.0	0%	Negligible
ES R68	15.0	15.2	0.2	1%	Negligible
ES R69	17.6	18.0	0.4	1%	Negligible
ES R70	15.8	16.2	0.4	1%	Negligible

Receptor ID	DBS East and DBS West Concurrent Construction				
	2026 Annual Mean NO_2 Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East and DBS West	Change	Change as% of the Objective	Impact Descriptor
ES R71	17.4	17.7	0.3	1%	Negligible
ES R72	17.5	17.7	0.3	1%	Negligible
East Riding of Yorkshire					
R6	18.9	19.1	0.2	1%	Negligible
R7	13.7	14.2	0.5	1%	Negligible
R8	12.7	13.0	0.3	1%	Negligible
R9	15.3	15.7	0.4	1%	Negligible
R10	14.8	15.1	0.3	1%	Negligible
R11	17.4	17.8	0.4	1%	Negligible
R12	19.9	20.5	0.6	2%	Negligible
R13	9.0	9.1	0.1	0%	Negligible
R14	10.9	11.2	0.3	1%	Negligible
R15	12.9	13.2	0.3	1%	Negligible
R16	16.1	16.7	0.6	1%	Negligible
R17	11.1	11.3	0.2	1%	Negligible
R18	16.9	17.6	0.6	2%	Negligible
R19	15.4	16.0	0.6	1%	Negligible
R20	19.2	19.9	0.6	2%	Negligible

Receptor ID	DBS East and DBS West Concurrent Construction				
	2026 Annual Mean NO_2 Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East and DBS West	Change	Change as% of the Objective	Impact Descriptor
R24	12.0	12.2	0.2	0%	Negligible
R25	14.5	14.7	0.3	1%	Negligible
R26	13.9	14.1	0.2	0%	Negligible
R27	10.6	10.7	0.1	0%	Negligible
R46	13.9	14.4	0.5	1%	Negligible
R55	12.5	12.8	0.3	1%	Negligible
ES R64	6.7	6.8	0.0	0%	Negligible
ES R65	10.5	10.7	0.2	0%	Negligible
ES R66	7.4	7.4	0.1	0%	Negligible

Table 26-44 Annual Mean PM_{10} Results at Sensitive Human Receptor Locations for DBS East and DBS West Concurrent Construction

Receptor ID	DBS East and DBS West Concurrent Construction				
	2026 Annual Mean PM_{10} Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East and DBS West	Change	Change as% of the Objective	Impact Descriptor
Hull City Council					

Receptor ID	DBS East and DBS West Concurrent Construction				
	2026 Annual Mean PM_{10} Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East and DBS West	Change	Change as% of the Objective	Impact Descriptor
R1	29.2	29.6	0.4	1%	Negligible
R2	22.3	22.6	0.2	1%	Negligible
R30	17.9	18.0	0.1	0%	Negligible
R31	16.9	17.1	0.3	1%	Negligible
R32	17.4	17.7	0.3	1%	Negligible
R33	16.2	16.5	0.3	1%	Negligible
R34	18.2	18.3	0.2	0%	Negligible
R35	17.1	17.2	0.1	0%	Negligible
R36	22.7	23.1	0.4	1%	Negligible
R37	18.6	18.8	0.2	1%	Negligible
R38	19.9	20.2	0.3	1%	Negligible
R39	23.6	24.1	0.5	1%	Negligible
R40	18.1	18.4	0.2	1%	Negligible
R41	18.5	18.8	0.3	1%	Negligible
R42	16.5	16.6	0.2	0%	Negligible
R45	15.1	15.2	0.1	0%	Negligible
ES R67	14.3	14.4	0.0	0%	Negligible
ES R68	17.0	17.3	0.2	1%	Negligible

Receptor ID	DBS East and DBS West Concurrent Construction				
	2026 Annual Mean PM_{10} Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East and DBS West	Change	Change as% of the Objective	Impact Descriptor
ES R69	17.9	18.2	0.3	1%	Negligible
ES R70	17.6	18.3	0.7	2%	Negligible
ES R71	16.2	16.5	0.3	1%	Negligible
ES R72	16.2	16.5	0.2	1%	Negligible
East Riding of Yorkshire					
R6	21.3	21.5	0.2	0%	Negligible
R7	16.1	16.3	0.1	0%	Negligible
R8	15.6	15.7	0.1	0%	Negligible
R9	15.0	15.1	0.2	0%	Negligible
R10	16.0	16.1	0.1	0%	Negligible
R11	17.3	17.5	0.2	0%	Negligible
R12	18.2	18.4	0.2	1%	Negligible
R13	14.2	14.2	0.0	0%	Negligible
R14	14.8	14.9	0.1	0%	Negligible
R15	14.7	14.8	0.1	0%	Negligible
R16	16.1	16.3	0.2	1%	Negligible
R17	13.5	13.6	0.1	0%	Negligible
R18	17.4	17.6	0.3	1%	Negligible

Receptor ID	DBS East and DBS West Concurrent Construction				
	2026 Annual Mean PM_{10} Concentrations (µg m^{-3}) Objective = 40 µg m^{-3}				
	Without DBS East or DBS West	With DBS East and DBS West	Change	Change as% of the Objective	Impact Descriptor
R19	16.9	17.1	0.2	1%	Negligible
R20	18.2	18.4	0.3	1%	Negligible
R24	15.2	15.3	0.1	0%	Negligible
R25	15.9	16.0	0.1	0%	Negligible
R26	15.8	15.8	0.1	0%	Negligible
R27	15.2	15.2	0.0	0%	Negligible
R46	17.1	17.4	0.3	1%	Negligible
R55	13.7	13.8	0.1	0%	Negligible
ES R64	12.3	12.3	0.0	0%	Negligible
ES R65	15.6	15.7	0.1	0%	Negligible
ES R66	14.4	14.4	0.0	0%	Negligible

Table 26-45 Short Term Mean PM_{10} Results at Sensitive Human Receptor Locations for DBS East and DBS West Concurrent Construction

Receptor ID	DBS East and DBS West Concurrent Construction		
	2026 Number of Days >50 µg m^{-3} (Objective being less than 35 exceedances per year)		
	Without DBS East or DBS West	With DBS East and DBS West	Change
Hull City Council			
R1	25	26	1
R2	7	7	0
R30	1	1	0
R31	1	1	0
R32	1	1	0
R33	0	0	0
R34	2	2	0
R35	1	1	0
R36	8	8	1
R37	2	2	0
R38	3	4	0
R39	9	10	1
R40	2	2	0
R41	2	2	0
R42	0	1	0
R45	0	0	0

Receptor ID	DBS East and DBS West Concurrent Construction		
	2026 Number of Days >50 µg m^{-3} (Objective being less than 35 exceedances per year)		
	Without DBS East or DBS West	With DBS East and DBS West	Change
ES R67	0	0	0
ES R68	1	1	0
ES R69	1	2	0
ES R70	1	2	1
ES R71	0	0	0
ES R72	0	0	0
East Riding of Yorkshire			
R6	5	6	0
R7	0	0	0
R8	0	0	0
R9	0	0	0
R10	0	0	0
R11	1	1	0
R12	2	2	0
R13	0	0	0
R14	0	0	0
R15	0	0	0
R16	0	0	0
R17	0	0	0

Receptor ID	DBS East and DBS West Concurrent Construction		
	2026 Number of Days >50 µg m^{-3} (Objective being less than 35 exceedances per year)		
	Without DBS East or DBS West	With DBS East and DBS West	Change
R18	1	1	0
R19	1	1	0
R20	2	2	0
R24	0	0	0
R25	0	0	0
R26	0	0	0
R27	0	0	0
R46	1	1	0
R55	0	0	0
ES R64	0	0	0
ES R65	0	0	0
ES R66	0	0	0
Values have been rounded to the nearest whole number therefore the change observed between without and with DBS East and DBS West does not always equate to an overall change of the same magnitude.			

Table 26-46 Annual Mean $PM_{2.5}$ Results at Sensitive Human Receptor Locations for DBS East or DBS West Concurrent Construction

Receptor ID	DBS East and DBS West Concurrent Construction				
	2026 Annual Mean $PM_{2.5}$ Concentrations (µg m^{-3}) Objective = 20 µg m^{-3}				
	Without DBS East or DBS West	With DBS East and DBS West	Change	Change as% of the Objective	Impact Descriptor
Hull City Council					
R1	17.1	17.3	0.2	1%	Negligible
R2	13.3	13.4	0.1	1%	Negligible
R30	10.9	11.0	0.1	0%	Negligible
R31	10.2	10.3	0.2	1%	Negligible
R32	10.4	10.6	0.2	1%	Negligible
R33	10.0	10.1	0.2	1%	Negligible
R34	11.4	11.5	0.1	0%	Negligible
R35	10.8	10.9	0.1	0%	Negligible
R36	13.9	14.2	0.2	1%	Negligible
R37	11.5	11.6	0.1	1%	Negligible
R38	12.2	12.3	0.2	1%	Negligible
R39	14.1	14.4	0.3	1%	Negligible
R40	11.2	11.4	0.1	1%	Negligible
R41	10.9	11.1	0.2	1%	Negligible
R42	9.9	10.0	0.1	0%	Negligible
R45	8.9	8.9	0.1	0%	Negligible

Receptor ID	DBS East and DBS West Concurrent Construction				
	2026 Annual Mean $PM_{2.5}$ Concentrations (µg m^{-3}) Objective = 20 µg m^{-3}				
	Without DBS East or DBS West	With DBS East and DBS West	Change	Change as% of the Objective	Impact Descriptor
ES R67	9.2	9.2	0.0	0%	Negligible
ES R68	10.6	10.7	0.1	1%	Negligible
ES R69	10.7	10.8	0.2	1%	Negligible
ES R70	10.5	10.9	0.4	2%	Negligible
ES R71	10.0	10.1	0.1	1%	Negligible
ES R72	10.0	10.1	0.1	1%	Negligible
East Riding of Yorkshire					
R6	12.4	12.6	0.1	1%	Negligible
R7	8.7	8.8	0.1	0%	Negligible
R8	8.5	8.5	0.1	0%	Negligible
R9	8.5	8.6	0.1	0%	Negligible
R10	8.8	8.8	0.1	0%	Negligible
R11	9.4	9.5	0.1	1%	Negligible
R12	10.0	10.1	0.1	1%	Negligible
R13	7.8	7.9	0.0	0%	Negligible
R14	8.2	8.2	0.0	0%	Negligible
R15	8.7	8.8	0.1	0%	Negligible
R16	9.4	9.6	0.1	1%	Negligible

Receptor ID	DBS East and DBS West Concurrent Construction				
	2026 Annual Mean $PM_{2.5}$ Concentrations (µg m^{-3}) Objective = 20 µg m^{-3}				
	Without DBS East or DBS West	With DBS East and DBS West	Change	Change as% of the Objective	Impact Descriptor
R17	8.0	8.0	0.0	0%	Negligible
R18	9.4	9.6	0.2	1%	Negligible
R19	9.1	9.2	0.1	1%	Negligible
R20	9.6	9.8	0.2	1%	Negligible
R24	8.3	8.4	0.0	0%	Negligible
R25	8.6	8.6	0.0	0%	Negligible
R26	8.4	8.4	0.0	0%	Negligible
R27	8.1	8.1	0.0	0%	Negligible
R46	9.2	9.3	0.1	1%	Negligible
R55	8.1	8.1	0.0	0%	Negligible
ES R64	7.0	7.0	0.0	0%	Negligible
ES R65	8.5	8.5	0.0	0%	Negligible
ES R66	7.6	7.6	0.0	0%	Negligible

Table 26-47 Comparison of Annual Mean NO_2 Results at Sensitive Human Receptor Locations in Hull City Council for DBS East and DBS West Concurrent Construction Against Monitored Concentrations at Sites Operated by Hull City Council

DBS East and DBS West Concurrent Construction							
Comparison of 2026 Annual Mean NO_2 Concentrations against 2022 monitored concentrations within Hull City Council (µg m^{-3})							
Receptor ID	**Without DBS East or DBS West (µg.m^{-3})**	**With DBS East or DBS West (µg.m^{-3})**	**Nearest representative Monitoring Site ID Operated By Hull City Council**	**2022 Monitored Conc. (µg m^{-3})**	**Change (µg m^{-3})**	**Change as% of the Objective**	**Impact Descriptor**
R1	26.0	26.3	DT13	26.2	0.06	0%	Negligible
R2	21.9	22.0	DT13	26.2	-4.2	-10%	Negligible
R30	18.4	18.5	DT1	18.5	0.02	0%	Negligible
R31	16.5	16.7	DT50	35.8	-19.1	-48%	Negligible
R32	17.0	17.3	DT50	35.8	-18.5	-46%	Negligible
R33	22.1	22.2	DT50	35.8	-13.6	-34%	Negligible
R34	17.0	17.1	-	-	-	-	-
R35	16.3	16.4	-	-	-	-	-
R36	20.5	20.8	-	-	-	-	-
R37	17.9	18.1	DT56	30.9	-12.8	-32%	Negligible
R38	19.2	19.5	-	-	-	-	-
R39	22.6	23.2	DT54	33.6	-10.44	-26%	Negligible
R40	20.1	20.4	-	-	-	-	-
R41	14.6	15.0	-	-	-	-	-
R42	12.8	12.9	-	-	-	-	-
R45	12.8	13.0	-	-	-	-	-
ES R67	12.8	12.8	-	-	-	-	-

DBS East and DBS West Concurrent Construction							
Comparison of 2026 Annual Mean NO_2 Concentrations against 2022 monitored concentrations within Hull City Council (µg m^{-3})							
Receptor ID	**Without DBS East or DBS West (µg.m^{-3})**	**With DBS East or DBS West (µg.m^{-3})**	**Nearest representative Monitoring Site ID Operated By Hull City Council**	**2022 Monitored Conc. (µg m^{-3})**	**Change (µg m^{-3})**	**Change as% of the Objective**	**Impact Descriptor**
ES R68	15.0	15.2	-	-	-	-	-
ES R69	17.6	18.0	DT50	35.8	-17.9	-45%	Negligible
ES R70	15.8	16.2	-	-	-	-	-
ES R71	17.4	17.7	-	-	-	-	-
ES R72	17.5	17.7	-	-	-	-	-
- No representative monitoring site available. It should be noted that most of the diffusion tubes are not directly comparable with modelled receptor locations however they have been included for comparison purposes.							

~~280.~~282. The results of the construction phase road traffic emissions assessment show that annual mean concentrations of NO2 (**Table 26-43**), PM10 (**Table 26-44**) and PM2.5 (Table 26-46) are predicted to be well below (i.e. less than 75% of) the respective air quality Objectives in the construction (2026) DBS East and DBS West Concurrent construction at all receptors (including the receptors R1, R2, ES R70, ES R71 and ES R72 within the Hull AQMA), both 'with' and 'without' DBS East and DBS West in place.

~~281.~~283. The impact of DBS East and DBS West Concurrent construction is 'negligible' at all receptors, in accordance with IAQM and EPUK guidance (IAQM & EPUK, 2017).

~~282.~~284. As detailed in **Table 26-47**, the predicted annual mean concentration at all modelled receptors under DBS East and DBS West Concurrent construction are lower or the same than the comparative concentrations recorded in 2022 within Hull City Council. The impact of the DBS East and DBS West is therefore considered negligible in accordance with the Hull City Council supplementary planning guidance 'Air Quality Guidance for Planners and Developers' (Hull City Council, 2018).

~~283.~~285. All predicted NO2 concentrations are well below 60µg m-3 and therefore, in accordance with Defra guidance (Defra, 2021a), the 1-hour mean Objective is unlikely to be exceeded (see **Table 26-6**). Based on the calculation provided by Defra, as detailed in section 26.4.3.3, the short-term PM10 Objective was predicted to be met at all modelled locations (the Objective being less than 35 exceedances of 50µg m-3 as a daily mean).

~~284.~~286. As shown in **Table 26-45**, there was no change in the number of days exceeding the daily mean Objective between the 'without' and 'with' DBS East and DBS West Concurrent construction assessments, using the Defra (2022) calculation.

~~285.~~287. The assessment therefore concludes that impacts generated by road traffic upon local air quality are not significant in the DBS East and DBS West Concurrent construction scenario.

26.6.1.3.2.2 Ecological Receptors

~~286.~~288. **Table 26-48** present the potential contribution of the Projects' contribution (i.e. DBS East and DBS West Concurrent construction) and the in-combination contribution (i.e. Project traffic, 2022 to 2026 traffic growth plus cumulative projects traffic) (see section 26.4.3.3.7), respectively, on the sensitive features under each designation. 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.

~~287.~~289. Predicted total pollutant concentrations (including the relevant background pollutant concentrations) at the ecological receptor locations alone and in-combination are detailed in **Table 26-49**. Values in exceedance of 100% of the Critical Level or Load are shown in in bold text.

*Table 26-48 DBS East and DBS West Concurrent Construction – Maximum Contribution of Projects-generated/In-Combination NOx, NH_3, N-dep and Acid Deposition from Traffic on Feature(s) Under Designated Ecological Sites (Figures Highlighted in **bold** are those Which Cannot be Considered Insignificant)*

Link	Designated Ecological Site			'DBS East or DBS West in Concurrent'										
				Concentration or Flux				% of Critical Level or Critical Load						
	Site Type	Name	Feature Name or Critical Load Class	NOx	NH_3	N-Dep	Acid-Dep	NOx	NH_3		N-Dep		Acid-Dep	
				µg.m^{-3}	µg.m^{-3}	kgN.ha^{-1}.yr^{-1}	keq.ha^{-1}.yr^{-1}	-	% of lower CL	% of upper CL	% of lower CL	% of upper CL	% of lower CL	% of upper CL
Projects-Alone (i.e., Concurrent Scenario) Contribution														
24	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	0.13	0.003	NC	NS	0.4%	0.3%	0.1%	NC	NC	NS	NS
28	LNR	Humber Bridge	Broadleaved deciduous woodland	0.08	**	-	-	0.3%	**	**	-	-	-	-
29	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	0.08	0.002	NC	NS	0.3%	0.2%	0.1%	NC	NC	NS	NS
29	LNR	Humber Bridge	Broadleaved deciduous woodland	0.08	**	-	-	0.3%	**	**	-	-	-	-
63	AW	Bentley Moor Wood	Broadleaved deciduous woodland	**	**	0.05	0.003	**	**	**	0.5%	0.3%	0.03%	0.03%
In-combination (i.e., Projects-generated traffic, 2022-2026 traffic growth and cumulative projects traffic) Contribution														
24	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	0.69	0.02	NC	NS	**2.3%**	**1.9%**	0.6%	NC	NC	NS	NS
28	LNR	Humber Bridge	Broadleaved deciduous woodland	0.30	**	-	-	**1.0%**	**	**	-	-	-	-

Link	Designated Ecological Site			'DBS East or DBS West in Concurrent'										
				Concentration or Flux				% of Critical Level or Critical Load						
	Site Type	Name	Feature Name or Critical Load Class	NOx	NH_3	N-Dep	Acid-Dep	NOx	NH_3		N-Dep		Acid-Dep	
				µg.m^{-3}	µg.m^{-3}	kgN.ha^{-1}.yr^{-1}	keq.ha^{-1}.yr^{-1}	-	% of lower CL	% of upper CL	% of lower CL	% of upper CL	% of lower CL	% of upper CL
29	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	0.70	0.02	NC	NS	**2.3%**	**1.8%**	0.6%	NC	NC	NS	NS
29	LNR	Humber Bridge	Broadleaved deciduous woodland	0.64	**	-	-	**2.1%**	**	**	-	-	-	-
63	AW	Bentley Moor Wood	Broadleaved deciduous woodland	**	**	0.18	0.012	**	**	**	**1.8%**	**1.2%**	0.1%	0.1%

Notes: Figures in **bold** represents exceedance of the Critical Level or Load.
*Designated feature of the Humber Estuary SAC only.
The Project alone/ in-combination increase in AADT did not exceed the distance based screening criteria detailed in the JNCC guidance (see **Table 26-20) and therefore was not screened in for further assessment
NS: Not sensitive. NC: No comparable habitat with established critical load estimate available.

Table 26-49 DBS East and DBS West Concurrent Construction – Total Concentration of NOx, NH_3, N-dep and Acid Deposition from Traffic on Feature(s) under Designation Ecological Sites (including background concentrations). Values in exceedance of 100% of the Critical Level or Load, are shown in in ***bold****.*

Link	Designated Ecological Site			DBS East and DBS West Concurrently - Total pollutant concentration/deposition											
				NOx		NH_3			N-Dep			Acid-Dep			
	Site Type	Name	Feature Name or Critical Load Class	Total concentration μgm^{-3}	% of CL	Total concentration $\mu g\ m^{-3}$	% of Lower CL	% of Upper CL	Total kg N $ha^{-1}\ yr^{-1}$	% of Lower CL	% of Upper CL	Total keq N $ha^{-1}yr^{-1}$	% of Lower CL	% of upper CL
Projects-Alone (i.e., Concurrent Scenario) Contribution															
24	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	22.1	74%	1.70	**170%**	57%	NC	NC	NC	NS	NS	NS
28	LNR	Humber Bridge	Broadleaved deciduous woodland	13.8	46%	**	**	**	-	-	-	-	-	-
29	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	14.2	47%	1.80	**180%**	60%	NC	NC	NC	NS	NS	NS
29	LNR	Humber Bridge	Broadleaved deciduous woodland	14.2	47%	**	**	**	-	-	-	-	-	-
63	AW	Bentley Moor Wood	Broadleaved deciduous woodland	**	**	**	**	**	30.3	**303%**	**202%**	2.13	19%	19%
In-combination (i.e., Project-generated traffic, 2022-2026 traffic growth and cumulative projects traffic) Contribution															
24	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	22.6	75%	1.72	**172%**	57%	NC	NC	NC	NS	NS	NS

Link	Designated Ecological Site			DBS East and DBS West Concurrently - Total pollutant concentration/deposition											
				NOx		NH_3			N-Dep			Acid-Dep			
	Site Type	Name	Feature Name or Critical Load Class	Total concentration μgm^{-3}	% of CL	Total concentration $\mu g\ m^{-3}$	% of Lower CL	% of Upper CL	Total kg N $ha^{-1}\ yr^{-1}$	% of Lower CL	% of Upper CL	Total keq N $ha^{-1}yr^{-1}$	% of Lower CL	% of upper CL
28	LNR	Humber Bridge	Broadleaved deciduous woodland	14.0	47%	**	**	**	-	-	-	-	-	-
29	SAC, SPA, SSSI	Humber Estuary	Mudflats and sandflats not covered by seawater at low tide*	14.8	49%	1.82	**182%**	61%	NC	NC	NC	NS	NS	NS
29	LNR	Humber Bridge	Broadleaved deciduous woodland	14.8	49%	**	**	**	-	-	-	-	-	-
63	AW	Bentley Moor Wood	Broadleaved deciduous woodland	**	**	**	**	**	30.4	**304%**	**203%**	2.14	19%	19%

Notes: Figures in bold represents exceedance of the Critical Level or Load.
* Designated feature of the Humber Estuary SAC only.
The Project alone/ in-combination increase in AADT did not exceed the distance based screening criteria detailed in the JNCC guidance (see **Table 26-20) and therefore was not screened in for further assessment
NS: Not Sensitive. NC: No comparable habitat with established critical load estimate available.

~~288.~~290. Table 26-49 similar to DBS East or DBS West In Isolation, **Table 26-48** shows there are sites which are predicted to experience in-combination impacts in excess of 1% of the CLe or CL. However, again similarly to the In Isolation Scenario, comparison with the Projects alone impacts, shows that only a small percentage of impacts at sites is due to the contribution from DBS East and DBS West together Concurrently. Further to this, the contribution from DBS East and DBS West Concurrently does not result in impacts in excess of 1% of any of the CLe or CL for European and nationally designated sites. The contribution from in-combination traffic (i.e. traffic growth and cumulative projects) alone results in an increase of greater than 1% at all sites for the pollutants considered.

~~289.~~291. As previously discussed, the impact of DBS East and DBS West would be experienced only during the construction period. 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.

~~290.~~292. As shown in **Table 26-49**, due to elevated background NH3 concentrations and N-dep fluxes in exceedance of the Critical Levels and Loads, respectively, total pollutant concentrations of NH3 exceed the lower Critical Load and total N-dep exceed the lower and upper N-dep Critical Load, respectively. NOx concentrations do not exceed the Critical Level of 30 µg m-3 at the sites assessed. It is also worth noting the following:

- In-combination NH3 and N-dep impacts do not result in any additional exceedances of the upper Critical Loads.
- Results are presented for both the lower and upper NH3 Critical Levels.
- The worst case impacts are presented in **Table 26-48** and **Table 26-49** as the closest boundary of ecological sites to affected road links was assessed. Road traffic pollutant concentrations would decrease rapidly with distance back from the road's edge.
- Finally, it should be noted that these results are based on average vehicle fleet mix in 2019 for NOx and 2015 for NH_3 and N-dep; as such, changes in emissions of these pollutants into the future is not accounted for.

~~291.~~293. Acid-dep as a result of in-combination traffic does not exceed 1% of the relevant Critical Load values, therefore, acid-dep impacts on the Bentley Moor Wood AW are considered to be not significant. Total NOx concentrations do not exceed the Critical Level and therefore, despite an impact on sites greater than 1% of the Critical Level, these impacts are considered to be not significant.

~~292.~~294. The effect of NOx concentrations and acid deposition fluxes as a result of the Projects on identified designated sites is considered to be not significant. The significance of NH_3 and N-dep impacts are discussed in **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18)** and **Report to Inform Appropriate Assessment (RIAA) - Habitats Regulations Assessment (Volume 6, application ref: 6.1)**.

26.6.2 Potential Effects During Operation

~~293.~~295. Operational phase impacts have been scoped out of the assessment and therefore have not been considered within this assessment.

26.6.3 Potential Effects During Decommissioning

~~294.~~296. No decision has been made regarding the final decommissioning plan for the Projects, 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.

~~295.~~297. The anticipated decommissioning activities are outlined in section 26.3.3. The potential impacts of the decommissioning of the Onshore Project have been assessed for air quality on the assumption that decommissioning methods will be similar or of a lesser scale than those deployed for construction. The types of impact would be comparable to those identified for the construction phase:

- Impact 1: Construction Dust and Fine Particulate Matter
- Impact 2: NRMM Emissions
- Impact 3: Construction Road Vehicle Exhaust Emissions.

~~296.~~298. The magnitude of impacts would be comparable to or less than those identified for the construction phase. Accordingly, it is anticipated that the effects determined in section 26.6 would be valid for the decommissioning phase regardless of the final decommissioning methodologies.

~~297.~~299. The programme for decommissioning is expected to be similar in duration to the construction phase. The detailed activities and methodology would be determined later within the project lifetime. Any such methodology and associated mitigation would be agreed with the relevant authorities and statutory consultees through a decommissioning plan in accordance with requirement 27 of the **Draft DCO (Volume 3, application ref: 3.1)** once received.

26.7 Cumulative Effects Assessment

~~298.~~300. Cumulative effects can be defined as incremental effects on that same receptor from other proposed and reasonably foreseeable schemes and developments in combination with the Projects. This includes all schemes that result in a comparative effect that is not intrinsically considered as part of the existing environment and is not limited to offshore wind projects.

~~299.~~301. The overarching method followed in identifying and assessing potential cumulative effects is set out **in Volume 7, Chapter 6 EIA Methodology (application ref: 7.6)** and **Volume 7, Appendix 6-1 Onshore Cumulative Effects Assessment Methodology (application ref: 7.6.6.1)**. The approach is based upon the Planning Inspectorate Advice Note Seventeen: Cumulative Effects Assessment (CEA) (PINS 2017). The approach to the CEA is intended to be specific to the Projects and takes account of the available knowledge or the environment and other activities around the Onshore Development Area.

~~300.~~302. The CEA has followed a four-stage approach developed from the Planning Inspectorate Advice Note Seventeen. These stages are set out in **Table 6-1-2** of **Volume 7, Appendix 6-1 Onshore Cumulative Effects Assessment Methodology (application ref: 7.6.6.1)**. Stage four of this process, the CEA assessment is undertaken in two stages.

~~301.~~303. The first step in the CEA is the identification of which residual impacts assessed for the Projects on their own have the potential for a cumulative impact with other schemes, plans, projects and activities. This information is set out in **Table 26-50** which sets out the potential impacts assessed in this chapter and identifies the potential for cumulative effects to arise, providing a rationale for such determinations. Only potential impacts assessed as negligible or above are included in the CEA. Those assessed as 'no impact' are not taken forward as there is no potential for them to contribute to a cumulative impact.

Table 26-50 Potential Cumulative Impacts

Potential Impact	Potential for Cumulative Effect	Justification
Construction		
Impact 1: Construction Dust and Fine Particulate Matter	Yes	There is potential for cumulative construction dust impacts where projects occur within 500m of each other as dust impacts are considered within a 250m buffer from each project, as detailed in section 26.4.3.1. Therefore, two projects would need to be within 500m of each other for cumulative dust impacts to occur.
Impact 2: NRMM Emissions	Yes	There is potential for cumulative NRMM emission impacts where projects overlap.
Impact 3: Construction Phase Road Traffic Emissions	Yes	Where the construction phase of the Projects overlaps with other projects, there is the potential for cumulative impacts associated with Projects-generated traffic emissions on the local road network.
Operation & Maintenance		
Operational impacts were scoped out of the assessment, as detailed in section 26.3.1, therefore there would be no potential for 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 phase are assumed to be the same as those identified during the construction phase.		

~~302.~~304. In-combination increase in NOx and NH_3 concentrations and nutrient nitrogen and acid deposition may also cumulatively affect designated ecological sites (see section 26.4.3.3.7.1 for further details). Due to the requirement to apply the 1% threshold to in-combination impacts (see section 26.4.3.3.7), the ecological assessment is inherently cumulative. As detailed in section 26.4.3.3.7.1, no consented agricultural or industrial projects in the vicinity of designated sites which may be affected by traffic generated by DBS East and/or DBS West were identified for inclusion.

~~303.~~305. The second stage of the CEA is a project specific assessment of the potential for any significant cumulative effects to arise due to the construction of the Projects. To do this, a short list of schemes for CEA has been produced relevant to air quality following the approach outlined in **Volume 7, Appendix 6-1 (application ref: 7.6.6.1).** The second stage of this assessment is only undertaken if the first stage identifies that cumulative effects are possible.

~~304.~~306. The CEA has been based on information available on each potential scheme (e.g. as set out on the East Riding of Yorkshire Council and Hull City Council planning portals and the Planning Inspectorate website) as of January 2024. It is noted that the other scheme details available may change in the period up to construction or may not be available in detail at all. The assessment presented here is therefore considered to be conservative, with the level of impacts expected to be reduced compared to those presented here.

~~305.~~307. A total of ten schemes have been identified for inclusion on the short list of projects to be assessed cumulatively for air quality. Schemes that have not been considered as resulting in likely cumulative significant effects for air quality are as a result of the scheme having either already concluded construction or will have by the time construction of DBS East and/or DBS West commence, 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 construction, operation, or decommissioning periods.

~~306.~~308. Furthermore, sub-regional growth in housing and employment, as adopted by the region's Local Plans, has been captured within the future year traffic growth factors applied (further detail is provided in **Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)**) and used within the air quality assessment. The cumulative effect of housing and employment projects is therefore inherent in the air quality assessment, and these projects have not been included in **Table 26-51**.

~~307.~~309. Summary information on the short list schemes progressing through this exercise (i.e. the short list of other schemes) for assessment on air quality is provided below in **Table 26-51** which presents the scenarios whereby the Projects and the other schemes/developments that have been identified on the short list of schemes screened for air quality, could potentially result in cumulative effects for onshore air quality.

Table 26-51 Short List of Schemes Considered Within the Air Quality Cumulative Effects Assessment

Scheme Name	Tier	Discussion	Likelihood and Significance of Cumulative Effects
Proposed Birkhill Wood National Grid Substation	2	Birkhill Wood substation works (data was sent by National Grid)	The schemes are within 500m of the Projects therefore there would be the potential for cumulative dust impacts and NRMM emission impacts. Furthermore, the study areas overlap with the Traffic and Transport Study Area for the Projects and therefore traffic movements for both schemes could use the same road links. It is therefore reasoned that there is the potential for
A63 Castle Street Improvement	1	The A63 Castle Street improvement scheme in Hull involves lowering the A63 at Mytongate junction, creating a split-level junction where Ferensway and Commercial Road cross the A63. Additionally, the eastbound carriageway will be widened to three lanes between Princes Dock Street and Market Place. Two new bridges are planned over the A63: one at	

Scheme Name	Tier	Discussion	Likelihood and Significance of Cumulative Effects
		Porter Street and another in front of Princes Quay Shopping Centre	cumulative effects to occur. These schemes have therefore been considered in the air quality CEA.
Creyke Beck Solar Farm	1	Solar Farm	
Hornsea Four Offshore Wind Farm	1	Wind Farm	
A164 And Jocks Lodge Improvement Scheme	1	Construction of road improvements between Cottingham and Beverley (ref: 20/01073/STPLF)	
Tickton Bridge Solar	1	Erection of 1 POC Mast, control room and connection to an existing 132kV Suspension Tower and construction of 2 vehicular accesses in relation to approved application 22/00824/STPLF	The schemes are within 500m of the Projects therefore there would be potential for cumulative dust impacts and NRMM emission impacts. Despite the study areas overlapping with the Traffic and Transport Study Area for the Projects, a thorough assessment indicates that the traffic movements
Strawberry Fields	3	Change of use of land to accommodate reorganisation and expansion of existing holiday park consisting of 32no touring caravan pitches, 18no static caravan	

Scheme Name	Tier	Discussion	Likelihood and Significance of Cumulative Effects
		pitches and erection of an amenity building	associated with these schemes would have negligible effects on human and ecological receptors. Consequently, it is firmly reasoned that there is no likelihood of cumulative road traffic effects on human and ecological receptors occurring. This comprehensive evaluation underscores the assurance that the proximity to DBS East and/or DBS West, combined with the specific nature of the traffic movements, leads to any significant impacts on both human and ecological receptors. These schemes have therefore been considered in the air quality CEA for only dust and NRMM effects.
Carr Lane Tickton	3	Construction of 49.9MW Solar Farm comprising of ground mounted solar panels, underground cabling, a temporary construction compound, access tracks, perimeter fencing with CCTV cameras, access gates and associated ancillary grid infrastructure and work	
Croxby Hall Farm	3	Construction of Solar Farm comprising of ground mounted solar panels, underground cabling, a temporary construction compound, site access and access gates, substations, maintenance and perimeter fencing with CCTV cameras and associated infrastructure	

Scheme Name	Tier	Discussion	Likelihood and Significance of Cumulative Effects
Snuff Mill Lane Solar	3	Construction of Solar Farm comprising of ground mounted solar panels, underground cabling, site access and access gates, substations, maintenance and perimeter fencing with CCTV cameras and associated infrastructure	
JBM Peartree Hill Solar	2	Construction of a Solar Farm and collated Battery Energy Storage System (BESS) that would allow for the generation, export and storage of electricity exceeding 50MW.	
Barnes Way Land	1	Erection of 157 dwellings, open space and associated work 2) Change of use of the ground floor of an office E(g)(i) to a flexible E(g)(i), public worship F1(f) and community facility F2 Use- Kingswood House. (Revised Description)	The schemes are greater than 2km from DBS East and/or DBS West therefore there would be no potential for cumulative dust impacts. The schemes are also sufficiently distant to preclude cumulative NRMM emission impacts. Furthermore, the study areas do not overlap therefore there would be no potential for cumulative road traffic impacts on human and ecological receptors. As such, there are not anticipated to be cumulative effects on onshore air quality.
Land South Of Connaught	1	Formation of a new 103 space car park including access, infrastructure, landscaping and associated works.	
Danepark Road	3	Erection of 99 dwellings and associated provision of public open space, infrastructure and landscaping	

Scheme Name	Tier	Discussion	Likelihood and Significance of Cumulative Effects
			Therefore, these schemes have been scoped out of the CEA.

26.7.1 Assessment of Cumulative Impacts

26.7.1.1 Cumulative Impact 1: Construction Phase Dust and Particulate Matter

~~308.~~310. There is the potential for cumulative dust impacts associated with the following schemes and the Projects as they are located within 500m of the Onshore Development Area:

- Creyke Beck Substation Extension
- The Proposed Birkhill Wood National Grid Substation
- Hornsea Project Four Offshore Wind Farm (ref: EN010098)
- Tickton Bridge POC Mast (ref:23/01743/STPLF)
- Strawberry Fields (ref:23/01927/PLF)
- Carr Lane (ref:22/03648/STPLF).

26.7.1.1.1 Significance of effect

~~309.~~311. A construction dust assessment has been undertaken as part of the air quality assessment to accompany the Hornsea Project Four Offshore Wind Farm. The assessment has been undertaken in accordance with the IAQM dust guidance on the assessment of dust from demolition and construction (IAQM, 2024).

~~310.~~312. The Hornsea Project Four Offshore Wind Farm assessment concludes that the construction effects would be temporary and effects in relation to dust are not predicted to be significant. The assessments include reference to specific mitigation measures to be implemented from IAQM guidance (IAQM, 2024); stating that, with the implementation of the recommended mitigation, impacts would be **not significant**.

~~311.~~313. It is anticipated that a construction dust assessment would be undertaken and/or best practice mitigation methods will be recommended for the cumulative schemes with insufficient information available, where required. As it is anticipated that cumulative schemes will implement recommended mitigation measures (likely in accordance with the guidance provided by the IAQM (2024)), it is not anticipated that the residual effects from construction phase dust emissions, when combined with those of DBS East and/or DBS West, will be significant.

~~312.~~314. It is therefore anticipated that there would be **not significant** cumulative impacts associated with construction phase dust emissions from the schemes combined with DBS East and/or DBS West.

26.7.1.1.2 Further Mitigation

~~313.~~315. No further mitigation is recommended.

26.7.1.2 Cumulative Impact 2: NRMM Emissions

26.7.1.2.1 Significance of Effect

~~314.~~316. Due to the potential for overlapping construction programmes and the proximity of the same schemes listed in section 26.7.1.1.1, there is the potential (albeit unlikely) for NRMM associated with DBS East and/or DBS West to be located and operating at the same time, and in the same area as NRMM associated with the aforementioned schemes identified in **Table 26-53**.

~~315.~~317. However, pollutant concentrations at all human receptors considered in this assessment were well below the relevant Objectives. It is anticipated that each project 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 DBS East and/or DBS West. Therefore, it is unlikely that there would be a significant cumulative impact associated with construction phase NRMM. Inter-project engagement will seek to avoid temporal overlap.

26.7.1.2.2 Further Mitigation

~~316.~~318. No further mitigation is recommended.

26.7.1.3 Cumulative Impact 3: Construction Road Vehicle Exhaust Emissions

26.7.1.3.1 Human Receptors

~~317.~~319. There is the potential for cumulative traffic emissions impacts at human receptors associated with the following schemes and the Projects as their traffic study area overlaps with the Traffic and Transport Study Area for the Projects:

- A164 and Jocks Lodge Improvement Scheme (ref: 20/01073/STPLF)
- Creyke Beck Substation Extension
- The Proposed Birkhill Wood National Grid Substation
- Hornsea Project Four Offshore Wind Farm

26.7.1.3.1.1 Significance of Effect

~~318.~~320. The Transport Consultant for the Projects provided traffic flows and distribution associated with the schemes screened into the CEA, as shown in **Volume 7, Appendix 26-3 Air Quality Assessment Traffic Data (application ref: 7.26.26.3)**.

~~319.~~321. The in-combination increase in traffic flows associated with DBS East and/or DBS West and the other schemes detailed above cumulatively exceed the IAQM and EPUK screening criteria (IAQM and EPUK, 2017) on road links. However, traffic associated with DBS East and/or DBS West accounts for only a small proportion of the total traffic generated. Therefore, DBS East and/or DBS West is responsible for a small proportion of the potential change in air pollutants and therefore the ability for DBS East and/or DBS West to mitigate any potential cumulative effects is limited. In addition, the effects of DBS East and/or DBS West would be experienced only on a temporary basis, during construction. As such, there is considered to be no potential for a long-term cumulative air quality effect.

~~320.~~322. Further to the above, baseline air quality conditions in proximity to the affected road network are good and therefore there are no areas of significant air quality concern (i.e. locations where the ambient concentrations exceed or approach the relevant Objectives), as detailed in section 26.5. As such, the risk of exceedance of the air quality Objectives, even with potential change in cumulative traffic, is **low**.

~~321.~~323. Therefore, it is unlikely that there would be a significant cumulative effect associated with traffic emissions at human receptors and the cumulative impact is considered to be **not significant**.

26.7.1.3.1.2 Further Mitigation

~~322.~~324. Effects of road traffic emissions at human receptors were found to not be significant, as such, no mitigation measures are required.

26.7.1.3.2 Ecological Receptors

~~323.~~325. As detailed in section 26.6.1.3.1.2 and section 26.6.1.3.2.2 and also discussed section 26.7.1.3.2 as part of the road traffic emissions ecological assessment, in-combination impacts have been considered in the impact assessment, and therefore the assessment is inherently cumulative. This includes background traffic growth (from 2022 to 2026, which represents regional growth due to residential and employment developments), and cumulative developments.

26.7.1.3.2.1 Significance of Effect

~~324.~~326. Details of the significance of air quality impacts on ecological receptors as a result of traffic emissions is provided in **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18)** and **Report to Inform Appropriate Assessment (RIAA) - Habitats Regulations Assessment (Volume 6, application ref: 6.1)**. As concluded in this chapter and in referenced in section 26.6.1.3.1.2 and section 26.6.1.3.2.2, the effects upon the qualifying / interest features of designated sites for nature conservation arising from changes to NOx, NH_3, N-Dep and acid deposition from road traffic emissions considered in this assessment are **not significant.**

26.7.1.3.2.2 Further Mitigation

~~325.~~327. No further mitigation measures are identified in **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18)** or **Report to Inform Appropriate Assessment (RIAA) - Habitats Regulations Assessment (Volume 6, application ref: 6.1)**.

26.8 Potential Monitoring Requirements

~~326.~~328. No air quality monitoring is proposed as no significant effects were predicted. Visual dust inspections will be undertaken as part of the dust management measures as detailed in section 26.6.1.1.5.

26.9 Transboundary Effects

~~327.~~329. There are no transboundary effects with regard to air quality as the Onshore Development Area would not be sited in proximity to any international boundaries. Transboundary effects are therefore scoped out of this assessment and not considered further.

26.10 Interactions

~~328.~~330. The effects identified and assessed in this chapter have the potential to interact with each other. The areas of potential interaction between effects are presented in **Table 26-52**. This provides a screening tool for which effects have the potential to interact. **Table 26-53** provides an assessment for each receptor group (i.e., human or ecological) as related to these impacts.

~~329.~~331. Within **Table 26-53** the effects 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 construction effects could increase the significance of the effect upon a receptor. Following this a lifetime assessment is undertaken which considers the potential for effect to affect receptors across all development phases.

~~330.~~332. The worst case impacts assessed within the chapter take these interactions into account and for the impact assessments are considered conservative and robust.

Table 26-52 Interactions Between Impacts During Construction

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.			

Table 26-53 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 26.6.1.1.5. Impact 2: not significant with the implementation of good practice mitigation measures detailed in section 26.6.1.2.5. 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 the Projects. Very few human receptors have the potential to be affected by all three construction impacts. Notwithstanding this, background pollutant concentrations in the study area are low (see **Table 26-28**) 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 interactions will not exacerbate the potential impacts associated with these activities during construction.

Receptor	Highest Significance Level During Construction	Construction Phase Assessment
Ecological receptors	Impact 1: not significant with the implementation of mitigation measures detailed in section 26.6.1.1.5. Impact 2: not significant with the implementation of good practice mitigation measures detailed in section 26.6.1.2.5. Impact 3: see **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18)**.	**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 DBS East or DBS West Very few ecological receptors (i.e. Burton Bushes SSSI and AW and the Bentley Moor Wood AW within the Substation Zone) have the potential to be affected by all three construction phase impacts. It is therefore considered that interactions will not exacerbate the potential impacts associated with these activities during construction.

26.11 Inter-relationships

~~331.~~333. For air quality there are potential inter-relationships between other topics assessed within this ES chapter including Terrestrial Ecology, Benthic Ecology, Transport, Human Health and Climate Change. A summary of the potential inter-relationships between Onshore Archaeology, Transport, Human Health and Climate Change is provided in **Table 26-54**.

Table 26-54 Air Quality Inter-relationships

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
Construction			
Impact 1: Construction dust and fine particulate matter	**Volume 7, Chapter 27 Human Health (application ref: 7.27)**	Section 26.6.1.1	There could be the potential for human health impacts associated with increases in pollutant concentrations at sensitive receptors.
	Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18)	Section 26.6.1.3.1.2.	Ecological receptors may be impacted by changes to air quality.
Impact 2: NRMM emissions	**Volume 7, Chapter 27 Human Health (application ref: 7.27)**	Section 26.6.1.2	There could be the potential for human health impacts associated with NRMM emissions.
	Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18)	Section 26.6.1.2	Ecological receptors may be impacted by changes to air quality resulting from NRMM emissions.

Topic and Description	Related Chapter	Where Addressed in this Chapter	Rationale
Impact 3: Construction road vehicle exhaust emissions	**Volume 7, Chapter 24 Traffic and Transport (application ref: 7.24)**	Section 26.6.1.3	Pollutant emissions from traffic movements associated with DBS East and/or DBS West have the potential to impact on air quality.
	Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18)	Section 26.6.1.3.1.2	Ecological receptors may be impacted by changes to air quality resulting from construction road vehicle exhaust emissions. Impacts and the significance of effects are discussed in **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18).**
	Volume 7, Chapter 27 Human Health (application ref: 7.27)	Section 26.6.1.2	There could be the potential for human health impacts associated with increases in pollutant concentrations at sensitive receptors.

26.12 Summary

~~332.~~334. This chapter has provided a characterisation of the existing air quality conditions and an assessment of the onshore air quality impacts and potential for significant effects due to the construction and decommission phases of the Projects. Onshore operation and maintenance and offshore air quality impacts have been scoped out.

~~333.~~335. The assessment has been undertaken with reference to relevant legislation, policy and guidance and the assessment methodology agreed with the relevant councils.

~~334.~~336. The effect of construction dust and fine particulate matter from the Projects on human and ecological receptors is considered not significant with the implementation of site specific mitigation measures.

~~335.~~337. The effect of NRMM emissions on human and ecological receptors is considered not significant with the implementation of relevant embedded control and management measures.

~~336.~~338. The effect of Projects generated road traffic emissions on existing human receptors was predicted to be not significant. The impact on designated ecological sites of increases in traffic were also considered and compared to the appropriate Critical Loads and Levels. Whilst some impacts were predicted to be below the threshold of insignificance, the impacts of certain pollutants require specific ecological consideration to determine the significance of effect (which is addressed in **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18)**.

~~337.~~339. A summary of the potential impacts identified with relation to air quality is provided in **Table 26-55**.

Table 26-55 Summary of Potential Likely Significant Effects on Air Quality

Potential Impact	Project	Receptor	Sensitivity	Magnitude of Impact	Pre-mitigation Effect	Mitigation Measures Proposed	Residual Effect
Construction							
Impact 1: Construction dust and fine particulate matter	DBS East or DBS West	Human receptors within 250m of the Onshore Development Area (and/or within 50m of HGV routes up to 250m from the Onshore Development Area site entrance	Dust soiling: low to medium	Low to medium risk	As per the IAQM guidance (IAQM, 2024) significance of effect should not be determined prior to implementation of mitigation.	Measures as recommended by the IAQM (see section 26.6.1.1.5).	**Not significant**
			Human health: low	Low risk			
		Ecological receptors within 200m of the Onshore Development Area (and/or within 50m of HGV routes up to 250m from the Onshore Development Area)	Ecological effects: high	Medium to high risk			
	DBS East and DBS West	Human receptors within 250m of the Onshore Development Area (and/or within 50m of HGV routes up to 250m from the Onshore Development Area	Dust soiling: low to medium	Low to medium risk			
			Human health: low	Low risk			
		Ecological receptors within 200m of the Onshore Development Area (and/or within 50m of HGV routes up to 250m from the Onshore Development Area)	Ecological effects: high	Medium to high risk			

Potential Impact	Project	Receptor	Sensitivity	Magnitude of Impact	Pre-mitigation Effect	Mitigation Measures Proposed	Residual Effect
Impact 2: NRMM emissions	DBS East and/or DBS West	Human and ecological receptors within close proximity to NRMM works within the Onshore Development Area	High	Magnitude of impact is not defined.	Defra technical guidance (Defra, 2022b) 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.	No additional mitigation measures required.	**Not significant**
Impact 3: Construction road vehicle exhaust emissions	DBS East or DBS West	Residential properties, schools, hospitals and care homes within 200m of roads	High	The predicted impact of DBS East or DBS West at all receptors for all pollutants was 'negligible'.	**Not significant** negligible impact at all receptors.	No additional mitigation measures required.	**Not significant**
		Designated ecological sites within 200m of affected roads		See **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18).**			
	DBS East and DBS West	Residential properties, schools, hospitals and care homes within 200m of roads	High	The predicted impact of DBS East and DBS West at all receptors for all pollutants was 'negligible'.	**Not significant** negligible impact at all receptors.	No additional mitigation measures required.	**Not significant**
		Designated ecological sites within 200m of affected roads		See **Volume 7, Chapter 18 Terrestrial Ecology and Ornithology (application ref: 7.18).**			
Operation							
Operational impacts on air quality have been scoped out.							
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 prior to any decommissioning commencing onshore.							

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