East Anglia ONE North Offshore Windfarm

Chapter 19

Air Quality

Environmental Statement
Volume 1

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Glossary of Acronyms

AADT	Annual Average Daily Traffic
ADMS	Atmospheric Dispersion Modelling System
AIS	Air Insulated Switchgear
APIS	Air Pollution Information System
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQMP	Air Quality Management Plan
AQS	Air Quality Strategy
CCS	Construction Consolidation Site
CEH	Centre for Ecology and Hydrology
CIA	Cumulative Impact Assessment
CL	Critical Load
CO	Carbon Monoxide
CoCP	Code of Construction Practice
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
Defra	Department for Environment Food and Rural Affairs
DETR	Department of the Environment, Transport and the Regions
DMRB	Design Manual for Roads and Bridges
DPF	Diesel Particulate Filter
EC	European Commission
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EPUK	Environmental Protection United Kingdom
ES	Environmental Statement
ESC	East Suffolk Council
ETG	Expert Topic Group
EU	European Union
GIS	Geographic Information System
HDD	Horizontal Directional Drilling
HGV	Heavy Goods Vehicle
HMSO	Her Majesty's Stationary Office
IAQM	Institute of Air Quality Management
IEMA	Institute of Environmental Management and Assessment
km	Kilometres
km/h	Kilometres per hour
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
$mg.m^{-3}$	Milligrams (of pollutant) per cubic metre (of air)
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NPS	National Policy Statement
NRMM	Non-Road Mobile Machinery
NSIP	Nationally Significant Infrastructure Project
OCoCP	Outline Code of Construction Practice

PEIR	Preliminary Environmental Information Report
PID	Public Information Days
PM_{10}	Particulate Matter with a mean aerodynamic diameter of less than 10 µm
$PM_{2.5}$	Particulate Matter with a mean aerodynamic diameter of less than 2.5 µm
RMSE	Root Mean Square Error
SAC	Special Area of Conservation
SCDC	Suffolk Coastal District Council
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TG	Technical Guidance
µg.m-3	Micrograms (of pollutant) per cubic meter (of air)
UK	United Kingdom

Glossary of Terminology

Applicant	East Anglia ONE North Limited.
Cable sealing end compound	A compound which allows the safe transition of cables between the overhead lines and underground cables which connect to the National Grid substation.
Cable sealing end (with circuit breaker) compound	A compound (which includes a circuit breaker) which allows the safe transition of cables between the overhead lines and underground cables which connect to the National Grid substation.
Construction consolidation sites	Compounds associated with the onshore works which may include elements such as hard standings, lay down and storage areas for construction materials and equipment, areas for vehicular parking, welfare facilities, wheel washing facilities, workshop facilities and temporary fencing or other means of enclosure.
Development area	The area comprising the onshore development area and the offshore development area (described as the 'order limits' within the Development Consent Order).
East Anglia ONE North project	The proposed project consisting of up to 67 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia ONE North windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive, as defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017 and regulation 18 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. These include candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Horizontal directional drilling (HDD)	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
HDD temporary working area	Temporary compounds which will contain laydown, storage and work areas for HDD drilling works.
Jointing Bay	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The area (from Mean Low Water Springs) where the offshore export cables would make contact with land, and connect to the onshore cables.
Link boxes	Underground chambers within the onshore cable route housing electrical earthing links.
Mitigation areas	Areas captured within the onshore development area specifically for mitigating expected or anticipated impacts.

National electricity grid	The high voltage electricity transmission network in England and Wales owned and maintained by National Grid Electricity Transmission
National Grid infrastructure	A National Grid substation, cable sealing end compounds, cable sealing end (with circuit breaker) compound, underground cabling and National Grid overhead line realignment works to facilitate connection to the national electricity grid, all of which will be consented as part of the proposed East Anglia ONE North project Development Consent Order but will be National Grid owned assets.
National Grid overhead line realignment works	Works required to upgrade the existing electricity pylons and overhead lines (including cable sealing end compounds and cable sealing end (with circuit breaker) compound) to transport electricity from the National Grid substation to the national electricity grid.
National Grid overhead line realignment works area	The proposed area for National Grid overhead line realignment works.
National Grid substation	The substation (including all of the electrical equipment within it) necessary to connect the electricity generated by the proposed East Anglia ONE North project to the national electricity grid which will be owned by National Grid but is being consented as part of the proposed East Anglia ONE North project Development Consent Order.
National Grid substation location	The proposed location of the National Grid substation.
Natura 2000 site	A site forming part of the network of sites made up of Special Areas of Conservation and Special Protection Areas designated respectively under the Habitats Directive and Birds Directive.
Onshore cable corridor	The corridor within which the onshore cable route will be located.
Onshore cable route	This is the construction swathe within the onshore cable corridor which would contain onshore cables as well as temporary ground required for construction which includes cable trenches, haul road and spoil storage areas.
Onshore cables	The cables which would bring electricity from landfall to the onshore substation. The onshore cable is comprised of up to six power cables (which may be laid directly within a trench, or laid in cable ducts or protective covers), up to two fibre optic cables and up to two distributed temperature sensing cables.
Onshore development area	The area in which the landfall, onshore cable corridor, onshore substation, landscaping and ecological mitigation areas, temporary construction facilities (such as access roads and construction consolidation sites), and the National Grid Infrastructure will be located.
Onshore infrastructure	The combined name for all of the onshore infrastructure associated with the proposed East Anglia ONE North project from landfall to the connection to the national electricity grid.
Onshore preparation works	Activities to be undertaken prior to formal commencement of onshore construction such as pre–planting of landscaping works, archaeological investigations, environmental and engineering surveys, diversion and laying of services, and highway alterations.

Onshore substation	The East Anglia ONE North substation and all of the electrical equipment within the onshore substation and connecting to the National Grid infrastructure.
Onshore substation location	The proposed location of the onshore substation for the proposed East Anglia ONE North project.
Transition Bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.

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19 Air Quality

19.1 Introduction

1. This chapter of the Environmental Statement (ES) considers the potential impacts of the proposed East Anglia ONE North project on air quality. This chapter was produced by Royal HaskoningDHV.

2. This ES chapter provides an overview of the existing baseline environment in respect to air quality, the findings of which have been used to inform an assessment of the potential impacts of the onshore infrastructure for the proposed East Anglia ONE North project. This assessment also considers cumulative impacts of other proposed projects in respect of air quality.

3. It should be noted that the East Anglia TWO offshore windfarm project (the proposed East Anglia TWO project) is also in the application stage. The proposed East Anglia TWO project has a separate Development Consent Order (DCO) process which has been submitted at the same time as the proposed East Anglia ONE North project. This assessment considers the cumulative impact of the proposed East Anglia ONE North project with the proposed East Anglia TWO project (***Appendix 19.2***) and subsequently with other proposed developments (***section 19.7***).

4. The potential air quality impacts arising from the construction, operation and decommissioning of the offshore elements of the proposed East Anglia ONE North project have been scoped out of this assessment. As a result, they are not considered further within this chapter. It should be noted that the proposed East Anglia ONE North project also has the potential to impact other environmental aspects with a link to air quality, which are discussed in other chapters within this ES. Therefore, this chapter refers to other onshore chapters where appropriate. The relevant chapters are:

   - ***Chapter 22 Onshore Ecology;***
   - ***Chapter 26 Traffic and Transport;*** and
   - ***Chapter 27 Human Health.***

5. The terminology and impact assessment methodologies used in this chapter differ from the generic impact assessment terminology presented within ***Chapter 5 EIA Methodology***, as air quality guidance documents include specific assessment criteria.

19.2 Consultation

6. Consultation is a key feature of the Environmental Impact Assessment (EIA) process, and continues throughout the lifecycle of a project, from its initial stages through to consent and post-consent.

7. To date, consultation with regards to air quality has been undertaken via Expert Topic Group (ETG) meetings, described within ***Chapter 5 EIA Methodology***, with meetings held in April 2018, January 2019 and May 2019, the East Anglia ONE North Scoping Report (SPR 2017) and the Preliminary Environmental Information Report (PEIR) (SPR 2019). Feedback received through this process has been considered in preparing the ES where appropriate and this chapter has been updated for the final assessment submitted with the DCO application.

8. The responses received from stakeholders with regards to the ETG process, Scoping Report and PEIR, are summarised in ***Appendix 19.1***, including details of how these have been taken account of within this chapter.

9. Ongoing public consultation has been conducted through a series of Public Information Days (PIDs) and Public Meetings. PIDs have been held throughout Suffolk in November 2017, March 2018, June / July 2018 and February / March 2019. A series of stakeholder engagement events were also undertaken in October 2018 as part of phase 3.5 consultation. Details of the consultation phases are discussed further in ***Chapter 5 EIA Methodology***.

10. ***Table 19.1*** shows public consultation feedback pertaining to air quality. Full details of the proposed East Anglia ONE North project consultation process are presented in the Consultation Report (document reference 5.1), which is provided as part of the DCO application.

Table 19.1 Public Consultation Responses Relevant to Air Quality

Topic	Response / where addressed in the ES
Phase 1	
• Dust and air pollution	Impacts of dust and air pollution are assessed in ***section 19.6***
Phase 2	
None	-
Phase 3	
• Concerns over air pollution from increased traffic and dust generation.	Impacts of dust and air pollution are assessed in ***section 19.6***

Topic	Response / where addressed in the ES
Phase 3.5	
• Concerns over diesel fumes on country roads affecting walkers • Impact of air pollution and dust generation from increased traffic • Concern over exceeding allowable NOx levels • Impact of air pollution on roadside vegetation and wildlife	Impacts of air pollution (on human and ecological receptors) caused by increased traffic are assessed in ***section 19.6.1.2***. Impacts linked with dust generation are assessed with ***section 19.6.1.1***.
Phase 4	
• Concern over impact of windblown dust from haul roads on sandy surfaces • Air pollution caused by increased traffic • Impact of fumes from construction vehicles and generators	Impacts linked with dust generation are assessed with ***section 19.6.1.1***. Impacts of air pollution (on human and ecological receptors) caused by increased traffic are assessed in ***section 19.6.1.2***.

19.3 Scope

19.3.1 Scope of the Assessment

11. The scope of the assessment presented in this chapter was determined based on the Planning Inspectorate's Scoping Opinion (Planning Inspectorate 2017). Section 42 responses from the Local Planning Authority (***Appendix 19.1***) indicated that more context should be provided within the chapter as to why certain phases or impacts were scoped out of the assessment.

12. The Planning Inspectorate agreed that offshore impacts could be scoped out of the assessment, as the principal source of emissions offshore would occur from the use of vessels, which were expected to have a negligible impact on air quality during all phases.

13. The onshore elements of the proposed East Anglia ONE North project may give rise to construction phase dust and road traffic emissions. These aspects were assessed as presented in this ES chapter.

14. During the operational phase, vehicle movements would be limited to occasional repair, maintenance and inspection visits at the onshore substation and National Grid substation and annual routine integrity tests of the onshore cable route. The Planning Inspectorate agreed that a significant change in traffic flows would not occur during the operational phase. Operational phase emissions from non-road mobile machinery were also considered by the Planning Inspectorate to be insignificant, and that this aspect could be scoped out. Operational phase traffic and non-road mobile machinery emissions were therefore not assessed and is not considered further within this chapter.

15. The Planning Inspectorate did not agree that operational phase dust emissions could be scoped out, as sufficient evidence had not been provided, at this point in time, that dusty activities would not occur during operation. Furthermore, there was reference in the archaeology and cultural heritage chapter to 'grubbing out' as a potentially dusty activity. It is not expected that operational activities associated with maintenance of the onshore cable route and onshore substation or National Grid infrastructure would lead to any significant generation of dust and fine particulate matter, as there would be no ground disturbance or earthworks carried out. It is therefore considered that an operational phase assessment is not required. Operational dust assessments were also scoped out upon agreement with stakeholders at ETG meetings in April 2018. The reference to 'grubbing out' was made as an example of potential decommissioning phase activities that may be required if building foundations are removed. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO, that will adhere to future relevant legislation and best practice, which will include measures to minimise dust and fine particulate matter emissions. An assessment of operational phase dust impacts was therefore not carried out and is not considered further within this chapter.

16. The Planning Inspectorate also stated that operational phase impacts which may result in significant cumulative effects should be included within the assessment of cumulative impacts. As it is not anticipated that any operational phase air quality impacts would occur, the assessment of cumulative operational phase impacts was not undertaken and is not considered further within this chapter.

19.3.2 Study Area

17. The study area for the air quality assessment was discussed and agreed at the Air Quality ETG, and the principles underlying its definition were additionally agreed with the Suffolk Coastal District Council (SCDC) (now East Suffolk Council (ESC[1])) Environmental Health Officers (EHOs) on 26th April 2018. The study area for the air quality assessment is defined as follows:

- Construction phase dust and fine particulate matter emissions:
  - Human receptors within 350m of the onshore cable corridor and within 50m of routes used by construction vehicles, up to 500m from the boundary of the onshore cable corridor; and
  - Ecological receptors within 50m of the onshore cable corridor and within 50m of routes used by construction vehicles, up to 500m from the boundary of the onshore cable corridor.

[1] SCDC merged with Waveney District Council (WDC) in 2019 to form ESC

- Construction phase road traffic emissions:
  - Human and ecological receptors within 200m of roads that are expected to experience increases in traffic movements as a result of the proposed East Anglia ONE North project.

18. The air quality study area is shown in ***Figure 19.1***.

19.3.2.1 Offsite Highway Improvements

19. Offsite highway improvements may take place at three locations; the A1094 / B1069 junction, the A12 / A1094 junction and Marlesford Bridge. These works are part of the onshore preparation works which may take place prior to the commencement of main construction. Therefore, detailed assessment of these works does not form part of the assessment of construction impacts presented in ***section 19.6.*** These works are to allow larger construction vehicles to access and navigate certain parts of the public road network. Any modifications to roads would be undertaken in consultation with and in accordance with the requirements of the local Highways Authority in accordance with the requirements of the draft DCO. Further details of the works required are presented in ***Chapter 6 Project Description.***

20. The offsite highway improvements at the A1094 / B1069 and A12 / A1094 junctions would involve the temporary moving of street furniture and temporary local widening of the highway (or creation of overrun areas). Offsite highway improvements at Marlesford Bridge would additionally require temporary laydown areas for structural works to accommodate abnormal indivisible loads.

21. The offsite highway improvements will not require a large quantity of plant and equipment and the works will have a small footprint, mostly within the existing highway boundary. Therefore, along with adherence to the best practice detailed in ***section 19.3.4,*** it is considered that these works will not have the potential to generate levels of construction dust that will have a potential impact on human or ecological receptors.

22. In addition, the offsite highway improvement locations fall within the assessed road network study area as shown on ***Figure 19.2.*** Therefore, impacts on receptors in proximity to the offsite highway improvement locations from the worst case construction vehicle movements are assessed and mitigated in ***section 19.6.1.2***. The offsite highway improvement works will not generate vehicle movements that have the potential to impact receptors along the assessed road network greater than that already assessed as the worst case during construction.

19.3.3 Worst Case Scenario

23. This section identifies the realistic worst case parameters associated with the proposed East Anglia ONE North project alone. This includes all onshore infrastructure for the proposed East Anglia ONE North project and the National Grid infrastructure that the proposed East Anglia ONE North project will require for ultimate connection to national electricity grid.

24. ***Table 19.2*** identifies those realistic worst case parameters of the onshore infrastructure that are relevant to potential impacts on air quality during construction and decommissioning phases of the proposed East Anglia ONE North project. Please refer to ***Chapter 6 Project Description*** for more detail regarding specific activities, and their durations, which fall within the construction phase. Areas provided for onshore infrastructure are maximum footprints with indicative dimensions provided in brackets.

25. As described in ***Chapter 5 EIA Methodology,*** there are two co-located onshore substation locations for either the proposed East Anglia ONE North project or the proposed East Anglia TWO project. It should be noted that the draft DCOs for both the proposed East Anglia ONE North and East Anglia TWO projects have the flexibility for either project to use either onshore substation location. There is no difference in the scoped in and assessed impacts between the two onshore substation locations, therefore the 'project alone' assessment in ***section 19.6,*** and associated chapter figures***,*** have been presented on the intended development strategy of the proposed East Anglia ONE North project using the western onshore substation location.

Table 19.2 Realistic Worst Case Scenario

Impact	Parameter	Notes
Construction		
Construction duration	The minimum realistic duration that the onshore works can be completed in, resulting in the highest traffic demand due to the intensity of activities, is 36 months (three years).	Vehicle movements have been calculated using this parameter and are detailed further in ***Chapter 26 Traffic and Transport***.
Construction date	Earliest start of construction is mid-2023.	Vehicle movements have been calculated using this parameter and are detailed further in ***Chapter 26 Traffic and Transport***.
Impacts related to the landfall	Horizontal Directional Drilling (HDD) temporary working area: 7,000m^2 (70m x 100m)	Construction footprints are provided as a proxy for construction dust emissions

Impact	Parameter	Notes
	Transition bay temporary working area (for 2 transition bays): 1,554m^2 (37m x 42m) Landfall Construction Consolidation Site (CCS) (x1): 7,040m^2 (88m x 80m)	
Impacts related to the onshore cable route	Onshore cable route: 290,912m^2 (9,091m x 32m) Jointing bay temporary working area: 570m^2 (30.6m x 18.6m). Total for 38 jointing bays: 21,660m^2 (570m^2 x 38) HDD (retained as an option to cross SPA / SSSI): Entrance pit temporary working area (x1): 6,300m^2 (90m x 70m) Exit pit temporary working area (x1): 2,700m^2 (90m x 30m) Onshore cable route large CCS (1): 16,500m^2 (165m x 100m). Onshore cable route medium CCS (2): 14,080m^2 total (88m x 80m per each medium CCS) Onshore cable route small CCS (2): 6,000m^2 total (60m x 50m per each small CCS) Total footprint of all onshore cable route CCS: 36,580m^2 Onshore cable route laydown area: 1,000m^2 Onshore cable route haul road between landfall and Snape Road (7,331m in length x 4.5m wide with additional 4m for passing places at approximately 90m intervals): 40,435m^2 Onshore cable route and substation access haul road (1,570m in length x 9m wide): 14,130m^2 Temporary access roads (957m in length x 4.5m wide with additional 4m for passing places at approximately 90m intervals): 5,231m^2	Construction footprints are provided as a proxy for construction dust emissions
Impacts related to the onshore substation	Onshore substation CCS: 17,100m^2 (190m x 90m) Permanent footprint (used as CCS during construction): 36,100m^2 (190m x 190m) Substation operational access road: 13,600m^2 (1,700m x 8m)	Construction footprints are provided as a proxy for construction dust emissions

Impact	Parameter	Notes
Impacts related to the National Grid Infrastructure	National Grid CCS: 23,350m^2 National Grid operational substation (Air Insulated Switchgear (AIS) technology) (used as a CCS during construction): 44,950m^2 (310m x 145m) Temporary pylon/mast temporary working area (x4): 10,000m^2 (2,500m^2 per each temporary pylon) Permanent pylon permanent footprint (x4): 1,600m^2 (400m^2 per each permanent pylon) Permanent pylon temporary working area (x4): 8,400m^2 (2,100m^2 per each permanent pylon) Overhead line realignment temporary working area: 5,000m^2 Cable sealing end/Cable sealing end (with circuit breaker) compounds permanent footprint: 10,000 m^2 (total for three compounds) Cable sealing end/Cable sealing end (with circuit breaker) compounds temporary working area: 30,000m^2 (for three compounds) Temporary access road (for pylon works): (1,100m in length x 4.5m wide with additional 4m for passing places at approximately 90m intervals): 5,629m^2 Permanent access road to sealing end compound: 1,850m^2 (500m x 3.7m)	Construction footprints are provided as a proxy for construction dust emissions AIS technology is assessed as the worst case due to a larger footprint. Further detail regarding Geographic Information System (GIS) technology is provided in ***Chapter 6 Project Description***.
Operation		
Operational phase air quality impacts have been scoped out as detailed in the Scoping Report (SPR 2017)		
Decommissioning		
No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.		

19.3.4 Embedded Mitigation and Best Practice

26. A range of different information sources has been considered as part of embedding mitigation into the design of the proposed East Anglia ONE North project (for further details see ***Chapter 6 Project Description*** and ***Chapter 4 Site Selection and Assessment of Alternatives***) including engineering requirements, feedback from community and landowners, ongoing discussions with stakeholders and regulators, commercial considerations and environmental best practice. Embedded mitigation measures relevant to air quality are detailed in ***Table 19.3.***

Table 19.3 Embedded Mitigation and Best Practice Measures for Air Quality

Parameter	Mitigation Measures Embedded into the proposed East Anglia ONE North Project Design
General	
Site selection	The proposed East Anglia ONE North project has undergone an extensive site selection process to date which has involved incorporating environmental considerations in collaboration with the engineering design requirements. Considerations include (but are not limited to) a preference for the shortest route length (where practical) and developing construction methodologies to minimise potential impacts. Key design principles, relevant to air quality, that have been adopted from the outset (wherever practical), include: • Avoid direct impacts with key internationally and nationally designated areas (Special Areas of Conservation (SACs), Special Protection Area (SPAs), Site of Special Scientific Interest (SSSIs), etc.).
Designated sites	The route of the onshore cable corridor was influenced from the onset of the proposed East Anglia ONE North project design process by the location of designated sites, specifically The Sandlings SPA and component Leiston-Aldeburgh SSSI. The proposed East Anglia ONE North project design minimises the overlap of the onshore cable corridor with these designated sites, choosing a crossing at the narrowest point, within habitat where no records of ornithological target species were found. For further detail please refer to ***Chapter 22 Onshore Ecology***. Where the onshore cable corridor crosses these designated sites, HDD or open cut crossing techniques may be employed. The HDD entry and exit pit temporary working areas would (where possible) be located away from these designated sites to avoid any potential impacts. When using an open cut methodology, the Applicant has committed to a reduced onshore cable route working width of 16.1m (reduced from 32m) with the Sandlings SPA. The onshore development area has also been designed to reduce interaction within a 200m buffer of the SPA where possible. This is in order to achieve a suitable distance between the designated site and construction works associated with the proposed East Anglia ONE North project to minimise disturbance to sensitive ornithological receptors.

Parameter	Mitigation Measures Embedded into the proposed East Anglia ONE North Project Design
HDD at landfall	The landfall location was influenced from the onset of the proposed East Anglia ONE North project design process by the presence of designated sites, specifically Leiston-Aldeburgh SSSI. The proposed East Anglia ONE North project has committed to the use of HDD (refer to ***Chapter 6 Project Description***) at the landfall to minimise potential impacts. Furthermore, the landfall HDD temporary working area is located inland from the SSSI boundary and the HDD exit pit will be at sea. . There will also be no requirement for access onto the beach at this location. Therefore, there will be no potential for any interaction with this site through the use of the HDD technique. The final landfall construction methodology will be detailed within the Landfall Construction Method Statement produced post-consent to discharge the requirements of the draft DCO
Access Strategy	The access strategy applies a hierarchical approach to selecting routes and where possible, seeks to reduce the impact of Heavy Goods Vehicle (HGV) traffic upon the most sensitive communities. This access strategy includes the following commitments: • All HGV traffic would be required to travel via the A1094 or B1122 from the A12, no traffic would be permitted to travel via alternative routes, such as the B1121 or B1119; • No HGV traffic would be permitted to travel though Leiston or Coldfair Green / Knodishall; and • No HGV traffic would be permitted to travel via B1121 past Friston or Sternfield.
Outline Code of Construction Practice (OCoCP)	A Code of Construction Practice (CoCP)) will be developed for the construction activities (and outline of which is submitted with this DCO application) and will adhere to construction industry good practice guidance for control measures and dust management. An Outline CoCP (OCoCP) has been submitted with this DCO application, as secured under the requirements of the draft DCO. The final CoCP which will be submitted post-consent, in consultation with the relevant regulators, will be further developed upon this OCoCP.
Air Quality Management Plan	An Air Quality Management Plan (AQMP) will be developed as part of the CoCP that will be produced post consent to discharge a requirement of the draft DCO. The AQMP will detail control measures to manage dust and emission during construction works.
Adoption of car sharing for construction employees	A target of an average of at least 1.5 employees per vehicle is proposed and would be secured through the Construction Traffic Management Plan (CTMP), as secured under the requirements of the draft DCO. An Outline CTMP (OCTMP) has been submitted with this DCO application
A haul road for the length of the onshore cable route	A haul road along the length of the onshore cable route has been designed to reduce the need for trips on the local highway network.

19.3.5 Monitoring

27. Post-consent, the final detailed design of the proposed East Anglia ONE North project will refine the worst-case parameters assessed in this ES. It is recognised that monitoring is an important element in the management and verification of the actual impacts based on the final detailed design. Where monitoring is proposed for air quality, this is described in the Outline Code of Construction Practice (OCoCP) submitted with this DCO application (document reference 8.1). Final details of monitoring will be agreed post-consent with the Local Planning Authority and relevant stakeholders.

19.4 Assessment Methodology

19.4.1 Guidance

19.4.1.1 Legislation

19.4.1.1.1 European Union Directives

28. European Union (EU) legislation forms the basis for United Kingdom (UK) air quality policy. The European Union Air Quality Framework Directive 96/62/EC on Ambient Air Quality Assessment and Management entered into force in 1996 (European Parliament 1996). Directive 96/62/EC and the first three Daughter Directives were combined to form the new European Union Directive 2008/50/EC (European Parliament 2008) on Ambient Air Quality and Cleaner Air for Europe, which came into force in June 2008.

19.4.1.1.2 United Kingdom Air Quality Strategy

29. The 1995 Environment Act required the preparation of a national Air Quality Strategy (AQS) which sets out the Government's approach to meeting air quality standards for specified pollutants. The Act also outlined measures to be taken by Local Planning Authorities in relation to meeting these standards and Objectives, which became the Local Air Quality Management (LAQM) system.

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

31. In 2019 the Government published its Clean Air Strategy (Defra 2019).

19.4.1.1.3 Local Air Quality Management

32. The standards and Objectives relevant to the LAQM framework have been prescribed through the Air Quality (England) Regulations (2000) (Her Majesty's Stationary Office (HMSO) 2000), and the Air Quality (England) (Amendment) Regulations (2002) (HMSO 2002). The European Union 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 (HMSO 2010).

33. The current air quality standards and Objectives of relevance to this assessment are presented in ***Table 19.4***. Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health. Pollutant Objectives, however, incorporate target dates and averaging periods which take into account economic considerations, practicability and technical feasibility.

34. Where an air quality Objective is not being met, Local Planning Authorities must designate those areas as Air Quality Management Areas (AQMAs) and take action to work towards meeting the Objectives. Following the designation of an AQMA, Local Planning Authorities are required to develop an Air Quality Action Plan (AQAP) to work towards meeting the Objectives and to improve air quality locally.

35. Possible exceedances of air quality Objectives are usually assessed in relation to those locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective.

Table 19.4 Air Quality Strategy Objectives (England) for the Purposes of LAQM

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

*The way the Objectives are to be measured is set out in the UK Air Quality (England) Regulations

19.4.1.2 Policy

36. The assessment of potential impacts upon air quality receptors 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 (NSIP). Those relevant to the proposed East Anglia ONE North project are:

- Overarching NPS for Energy (EN-1) (Department of Energy and Climate Change (DECC) 2011a);
- NPS for Renewable Energy Infrastructure (EN-3) (DECC 2011b); and
- NPS for Electricity Networks Infrastructure (EN-5) (DECC 2011c).

37. The specific assessment requirements for air quality, as detailed in the NPS, are summarised in ***Table 19.5***, together with an indication of the section of this chapter where each is addressed. Where any part of the NPS has not been followed within the assessment an explanation as to why the requirement was not deemed relevant, or has been met in another manner, is provided.

Table 19.5 NPS Assessment Requirements

NPS requirements	NPS reference	ES reference
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 assessment.
The ES should describe: • Any significant air emissions, their mitigation and any residual effects distinguishing between the proposed East Anglia ONE North project stages and taking account of any significant emissions from any road traffic generated by the proposed East Anglia ONE North project; • The predicted absolute emission levels of the proposed project, after mitigation methods have been applied; • Existing air quality levels and the relative change in air quality from existing levels; and • Any potential eutrophication impacts.	EN-1 paragraph 5.2.7	***Section 19.6***

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

19.4.1.3 Local Planning Policy

39. NPS EN-1, paragraph 4.1.5, states that:

"*Other matters that the IPC may consider important and relevant to its decision-making may include Development Plan Documents or other documents in the Local Development Framework. In the event of a conflict between these or any other documents and an NPS, the NPS prevails for the purposes of IPC decision making given the national significance of the infrastructure*."

40. The onshore development area is located within ESC's jurisdiction.

41. ESC published their Suffolk Coastal Final Draft Local Plan for a final stage of consultation in January 2019 (ESC 2019). This plan sets out strategic planning policies within East Suffolk and how the Local Planning Authority addresses the NPPF on a local basis. A review of the Final Draft Local Plan identified the following policies of relevance to the assessment:

"Policy SCLP9.1: Low Carbon and Renewable Energy
Council will support low carbon and renewable energy developments where they are within an area identified as suitable for renewable or low carbon energy or satisfy the following criteria:
[…]
d) Are complementary of the existing environment without causing any significant adverse impacts, particularly relating to the residential amenity…and air quality, unless those impacts can be appropriately mitigated.
[…]"

"Policy SCLP10.3: Environmental Quality
Development proposals will be expected to protect the quality of the environment and to minimise and, where possible, reduce all forms of pollution and contamination.
Development proposals will be considered in relation to impacts on;
a) Air quality, and the impact on receptors in Air Quality Management Areas;
[…]
Proposals should seek to secure improvements in relation to the above where possible.
The cumulative effect of development, in this regard, will be considered."

"Policy SCLP11.2: Residential Amenity
When considering the impact of development on residential amenity, the Council will have regard to the following:
[…]

g) Air quality and other forms of pollution; and […]
Development will not cause an unacceptable loss of amenity to neighbouring or future occupiers of development in the vicinity.”.”

42. Until the Local Plan is adopted, the existing Core Strategy remains in effect, which was published in 2013 (SCDC 2013). The following policies of relevance to air quality were identified:

“Development Management Policy DM23 – Residential Amenity
When considering the impact of new development on residential amenity, the Council will have regard to the following:
[…]
(f) light spillage, air quality and other forms of pollution;
[…]
Development will be acceptable where it would not cause an unacceptable loss of amenity to adjoining or future occupiers of the development.”

43. The requirements of these policies were considered in this assessment.

19.4.2 Data Sources

44. The data sources that were used to inform the air quality baseline are provided in ***Table 19.6***.

45. In addition to the data sources listed below, the air quality assessment utilised traffic data provided by the EIA proposed East Anglia ONE North project team’s transport specialists. Details of the derivation of the data and the assumptions used are provided in ***Chapter 26 Traffic and Transport***.

Table 19.6 Data Sources

Data	Year	Coverage	Confidence [2]	Notes
SCDC Air Quality Annual Status Report	2018	SCDC administrative region	High	Local monitoring data and baseline information
East Suffolk Council Diffusion Tube Monitoring Results 2018	2018	ESC administrative region	High	Local monitoring data and baseline information
Centre for Ecology and Hydrology (CEH)	2019	UK	High	Details of critical loads for ecological habitats
Department for Environment Food and Rural Affairs (Defra)	2016	UK	High	Assessment methodology

[2] Confidence level based upon the organisation responsible for collating data source (high = regulatory, low = non-regulatory)

Data	Year	Coverage	Confidence [2]	Notes
Local Air Quality Management Technical Guidance				
Defra's LAQM Support Portal	2019	Study area	High	1 x 1km grid pollutant background maps
Institute of Air Quality Management (IAQM) and Environmental Protection UK	2017	UK	High	Assessment methodology
IAQM	2014	UK	High	Guidance on the assessment of impacts from construction dust
Highways Agency (now Highways England)	2007	UK	High	Design Manual for Roads and Bridges assessment methodology

19.4.3 Impact Assessment Methodology

19.4.3.1 Construction Phase Dust and Fine Particulate Matter Emissions

46. Assessment of potential impacts associated with construction phase dust and fine particulate matter emissions was undertaken in accordance with the latest IAQM guidance (IAQM 2014). The terminology used within this guidance differs from the generic impact assessment terminology presented within ***Chapter 5 EIA Methodology***.

47. A summary of the assessment process is provided below:

Construction phase assessment steps:

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

48. It should be noted that trackout is defined as the transport of dust and dirt from the construction site onto the public road network. Full details of the assessment methodology are provided in ***Appendix 19.3***.

49. Defra technical guidance (Defra 2016) states that emissions from Non-Road Mobile Machinery (NRMM) used on construction sites are unlikely to have a significant impact on local air quality where relevant control and management measures are employed. Furthermore, the Planning Inspectorate agreed that emissions from these sources could be scoped out of the assessment. As such, emissions from NRMM were not considered quantitively, and the relevant control measures to be employed are detailed in ***section 19.6.1.1.5.6***.

19.4.3.1.1 Sensitivity

50. Definitions of the different sensitivity levels for human and ecological receptors to dust are given in ***Table 19.7.***

Table 19.7 Definitions of the Different Sensitivity Levels for Receptors to Construction Dust

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

19.4.3.1.2 Magnitude

51. The magnitude of construction phase dust emissions should be defined for each type of activity. These are broken down into four categories: demolition, earthworks, construction and trackout. The dust emission magnitudes can either be small, medium or large and are dependent on the methods of work undertaken and the scale of the activity. It was anticipated that there would be no demolition required as part of the proposed East Anglia ONE North project; therefore, this was not considered as part of the assessment.

52. The dust emission magnitudes for each activity are detailed in ***Table 19.8***.

Table 19.8 Definitions of the Different Magnitudes of Construction Phase Dust Emission

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

53. As detailed in ***Table 19.8***, 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.

19.4.3.1.3 Impact Significance

54. The dust emission magnitude should be combined with the sensitivity of the area to determine the risk of impacts prior to mitigation. This is shown in more detail in ***Appendix 19.3***. Once appropriate mitigation measures have been identified, the significance of construction phase impacts can be determined. The aim is to prevent significant effects at receptors due to the implementation of effective mitigation.

55. Impacts are unlikely to be significant where features of low sensitivity are subject to small scale or short-term impacts. If an impact is found not to be significant at the level at which the resource or feature has been valued, it may be significant at a more local level. Impacts are presented at different levels throughout the assessment where deemed applicable.

56. A matrix is not provided in the guidance to determine significance as it is considered that, with the implementation of effective mitigation measures, the residual impacts can be considered to be 'not significant' in accordance with guidance provided by the IAQM.

19.4.3.2 Construction Phase Road Traffic Emissions

57. The requirement for a detailed assessment of construction vehicle exhaust emissions at human and ecological receptors was considered using screening criteria provided by the IAQM and Environmental Protection UK (EPUK) (IAQM and EPUK 2017), and the Design Manual for Roads and Bridges (DMRB) (Highways Agency 2007). Only the DMRB guidance contains criteria relating to assessment of designated ecological sites.

58. The assessment criteria are detailed in ***Table 19.9***.

Table 19.9 IAQM and EPUK and DMRB Road Traffic Assessment Criteria

Guidance document	Criteria	
IAQM and EPUK	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
	HGVs	An increase in HGV movements of more than 25 per day within or adjacent to an AQMA, or more than 100 elsewhere
DMRB	Light Duty Vehicles (LDVs)	Increase of 1,000 AADT or more
	HGVs	An increase in HGV movements of more than 200 per day

59. The increases in traffic flows on the road network as a result of the construction phase of the proposed East Anglia ONE North project were screened using the criteria detailed in ***Table 19.9***. Road links which are anticipated to experience increases in traffic flows greater than the screening criteria were considered in the assessment. As such, sensitive receptor locations were identified on the affected road links only.

60. As shown in ***Table 19.10***, road links 4, 11 and 12 were not predicted to experience increases in HGVs above 100 per day; however, daily project-generated HGVs were approaching this figure (90 per day). As described in ***section 19.7.1***, the cumulative scenario with the proposed East Anglia TWO project would result in traffic flows in exceedance of the criteria on these road links (detailed further within ***Appendix 19.2***). As such, to provide a conservative assessment and consistency of receptor nomenclature, impacts were assessed at receptors along all road links detailed in ***Table 19.10*** for the proposed East Anglia ONE North project alone and cumulative assessment scenarios**.**

61. The road links are shown in ***Figure 26.1*** in ***Chapter 26 Traffic and Transport.***

Table 19.10 Road Links Considered in the Assessment

Link ID	Road	Number of vehicle movements generated by the construction phase of the proposed East Anglia ONE North project per day	
		Total vehicles	HGVs
1	A12 north of the B1122	274	165
2	A12 between the B1122 and A1094	224	165
3	A12 south of the A1094	280	165
4	B1122 from the A12 to Lover's Lane	217	90
6	A1094 from the A12 to the B1121/B1069	267	161
9	B1069 from the A1094 to Coldfair Green	412	167
11	Lover's Lane	213	90
12	Sizewell Gap	213	90

19.4.3.2.1 Dispersion Model

62. The potential impact of exhaust emissions from construction vehicles accessing the onshore infrastructure was assessed using the Atmospheric Dispersion Modelling System for Roads (Atmospheric Dispersion Modelling System (ADMS)-Roads) v4.1.1.0. The main pollutants of concern for human health as a result of vehicle emissions are annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$. Concentrations of these pollutants were therefore the focus of the ADMS-Roads assessment.

19.4.3.2.2 Assessment Scenarios

63. The worst-case scenario is that onshore construction works would occur over a three-year period (as detailed in ***Table 19.2***), from 2023 to 2026.To provide a conservative assessment, the maximum proposed East Anglia ONE North project-generated traffic across the three-year 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. The assessment has therefore considered the following scenarios:

- Verification / Base year (2018);
- Worst-Case Construction Year (2023) 'without project'; and
- Worst-Case Construction Year (2023) 'with project'.

64. A base year of 2018 was used as this was the most recent full calendar year for which monitoring and meteorological data were available.

19.4.3.2.3 Traffic Data

65. 24-hour AADT flows and HGV percentages were provided by proposed East Anglia ONE North project team's transport specialists, Royal HaskoningDHV. The traffic data used in the assessment is detailed in ***Appendix 19.3***.

66. Traffic speeds were included in the air dispersion modelling as follows:

- Queues were modelled at junctions at 20km/h; and
- Speed data for free-flowing traffic conditions were obtained from average speeds recorded during the traffic count surveys (discussed in ***Chapter 26 Traffic and Transport***) where applicable, or national speed limits. Where speeds vary across a road link, the lowest speed was used to provide a conservative assessment. For the purposes of model verification, the recorded road speed adjacent to the monitoring location was used to more adequately represent monitored conditions.

19.4.3.2.4 Emission Factors

67. Emission factors were obtained from the Emission Factor Toolkit v9.0 provided by Defra (Defra 2019a). Emission factors for 2023 were used in the 'without project' and 'with project' scenarios. There is some uncertainty regarding the rate of reduction in emissions from road vehicles in the future. Therefore, a sensitivity test was carried out, using emission factors for the 2018 base year in the 2023 'without project' and 'with project' assessment scenarios to provide a comparison. However, it is acknowledged that the use of 2018 base year emission data in scenarios this far into the future is likely to be overly conservative.

19.4.3.2.5 Meteorological Data

68. 2018 meteorological data from the Wattisham recording station was used in the ADMS-Roads model. This is the closest meteorological station to the study area.

19.4.3.2.6 Model Verification

69. 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 (Defra 2016) and IAQM and EPUK (IAQM and EPUK 2017) guidance.

70. Monitoring locations within the study area were reviewed to establish the suitability for use in model verification. Locations were considered where the

assessed road links provided sufficient representation of road traffic sources that would affect monitored concentrations at that point.

71. A review of the monitoring data identified eight NO_2 diffusion tubes located on the road network under consideration, which provided available data for 2018. The diffusion tubes are located in Little Glemham, Farnham and Stratford St Andrew and are all located along the A12. These eight diffusion tubes were therefore used in the derivation of the adjustment factor utilised in the assessment.

72. Stage one of the model verification process is detailed in ***Table 19.11***.

Table 19.11 Model Verification – Stage 1

Model verification	NO_2 diffusion tube monitoring location							
	FAR1	FAR2	STA1	STA2	STA6	STA7	STA8	LGM2
2018 Monitored Total NO_2 ($\mu g.m^{-3}$)	24	27	34	24	21	30	38	19
2018 Background NO_2 ($\mu g.m^{-3}$)	8.71	8.71	8.22	8.56	8.22	8.56	8.56	8.62
Monitored Road Contribution NOx (total - background) ($\mu g.m^{-3}$)	29.77	36.12	52.55	30.06	24.4	42.96	61.39	19.76
Modelled Road Contribution NOx (excludes background) ($\mu g.m^{-3}$)	17.65	12.93	15.03	14.38	12.74	15.76	16.33	11.03
Ratio of Monitored Road Contribution NOx / Modelled Road Contribution NOx	1.69	2.79	3.50	2.09	1.92	2.73	3.76	1.79
Adjustment Factor for Modelled Road Contribution								2.58578
Adjusted Modelled Road Contribution NOx ($\mu g.m^{-3}$)	45.65	33.44	38.86	37.18	32.93	40.76	42.22	28.53
Modelled Total NO_2 (based on empirical NOx / NO_2 relationship) ($\mu g.m^{-3}$)	31.65	26.06	28.10	27.66	25.34	29.30	29.97	23.62
Monitored Total NO_2 ($\mu g.m^{-3}$)	24.00	27.00	34.00	24.00	21.00	30.00	38.00	19.00
% Difference [(modelled - monitored) / monitored] x 100	31.88	-3.48	-17.35	15.25	20.67	-2.33	-21.13	24.32

73. As shown in ***Table 19.11***, the first stage of the verification process showed that model performance varied at the diffusion tube locations considered. The Root Mean Square Error (RMSE) of the model was 5µg.m^{-3}, which is slightly outside the ideal value of 4 µg.m^{-3} (10% of the Objective), but within the required 10µg.m^{-3} (25% of the Objective), as specified in Defra guidance (Defra 2016). However, at the two diffusion tubes within the Stratford St Andrew AQMA (STA1 and STA8), model performance was poorer and, as a consequence, the derived adjustment factor detailed in ***Table 19.11*** would underestimate pollutant concentrations within this sensitive area. The differences between monitored and modelled concentrations within the AQMA may be attributable to the effects of the diffusion tubes being located on a building façade where air flow around a diffusive sampler is reduced; these effects cannot be represented in the dispersion model.

74. To represent the model performance at receptors in the AQMA more adequately, the ratio of monitored to modelled NOx concentrations at diffusion tube STA8 (the location with the highest ratio within the AQMA (3.76)) was applied to modelled concentrations at receptors in the AQMA. A separate adjustment factor was derived and applied to receptors elsewhere in the study area, as detailed in ***Table 19.12***.

Table 19.12 Model Verification – Stage 2

Model verification	NO_2 diffusion tube monitoring location					
	FAR1	FAR2	STA2	STA6	STA7	LGM2
2018 Monitored Total NO_2 (µg.m^{-3})	24	27	24	21	30	19
2018 Background NO_2 (µg.m^{-3})	8.71	8.71	8.56	8.22	8.56	8.62
Monitored Road Contribution NOx (total - background) (µg.m^{-3})	29.77	36.12	30.06	24.4	42.96	19.76
Modelled Road Contribution NOx (excludes background) (µg.m^{-3})	17.65	12.93	14.38	12.74	15.76	11.03
Ratio of Monitored Road Contribution NOx / Modelled Road Contribution NOx	1.69	2.79	2.09	1.92	2.73	1.79
Adjustment Factor for Modelled Road Contribution						2.15990
Adjusted Modelled Road Contribution NOx (µg.m^{-3})	38.13	27.93	31.06	27.51	34.04	23.83
Modelled Total NO_2 (based on empirical NOx / NO_2 relationship) (µg.m^{-3})	27.93	23.12	24.48	22.44	25.89	21.03

Model verification	NO_2 diffusion tube monitoring location					
	FAR1	FAR2	STA2	STA6	STA7	LGM2
Monitored Total NO_2 ($\mu g.m^{-3}$)	24	27	24	21	30	19
% Difference [(modelled - monitored) / monitored] x 100	16.38	-14.37	2.00	6.86	-13.70	10.68

75. There is no PM_{10} or $PM_{2.5}$ monitoring carried out within the study area to carry out verification of the model outputs for these pollutants. Therefore, the derived NOx adjustment factors were applied to modelled PM_{10} and $PM_{2.5}$ concentrations to provide a conservative assessment, as recommended in Defra technical guidance (Defra 2016).

19.4.3.2.7 NOx to NO_2 Conversion

76. Oxides of nitrogen (NO_x) concentrations were predicted using the ADMS-Roads model. The modelled road contribution of NO_x at the identified receptor locations was then converted to NO_2 using the NO_x to NO_2 calculator (v7.1) (Defra 2019b), in accordance with Defra guidance (Defra 2016).

19.4.3.2.8 Background Pollutant Concentrations

77. The ADMS-Roads 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 were therefore obtained from Defra mapping (Defra 2019c) for the 1km x 1km grid squares covering the study area and receptor locations for 2018 and 2023.

19.4.3.2.9 Calculation of Short-Term Pollutant Concentrations

78. Defra guidance (Defra 2016) 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 calculation utilised in the prediction of short-term PM_{10} concentrations was:

    No. 24-hour mean exceedances = -18.5 + 0.00145 x annual mean^3 + (206/annual mean)

79. Research projects completed on behalf of Defra and the Devolved Administrations (Laxen and Marner 2003 and 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 $60\mu g.m^{-3}$. This value was therefore used as an annual mean equivalent threshold to evaluate likely exceedance of the hourly mean NO_2 Objective.

19.4.3.2.10 Sensitivity – Human Receptors

80. The sensitivity of an individual receptor is not considered in the assessment of air quality impacts; the air quality Objectives in ***Table 19.4***, which are health-based, only apply at locations where there is relevant public exposure as detailed in ***Table 19.13***.

Table 19.13 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. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-Hour Mean and 8-Hour Mean	All locations where the annual mean Objective would apply, together with hotels and gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-Hour Mean	All locations where the annual mean and 24 and 8-hour mean Objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

19.4.3.2.11 Magnitude and Significance – Human Receptors

81. Receptor locations where pollutant concentrations are close to, or in exceedance of the Objectives, are judged as receiving a larger impact magnitude with a relatively small change in pollutant concentrations, than those locations where there is a more adequate available headroom below the Objective. This is set out in more detail below.

82. 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. These criteria, as detailed below, were utilised in the assessment to provide consideration of the impacts associated with the proposed East Anglia ONE North project during the construction phase.

83. 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 19.14***.

Table 19.14 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".

84. 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 should take into account the following factors:

- The existing and future air quality in the absence of the development;
- 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.

85. 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 development on local air quality was undertaken by members of the IAQM and the Institute of Environmental Management and Assessment (IEMA).

19.4.3.2.12 Sensitivity – Ecological Receptors

86. Critical Loads (CLs) for habitat sites in the UK are published on the Air Pollution Information System (APIS) website (Centre for Ecology and Hydrology (CEH)

2019). 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.

19.4.3.2.13 Magnitude and Significance – Ecological Receptors

87. Guidance provided by the Environment Agency (Environment Agency 2017) states that where the contribution of a project leads to nutrient nitrogen deposition values below 1% of the Critical Load, impacts can be considered to be not significant. Whilst this guidance is intended for use with permitted industrial installations, the use of the 1% criterion is also considered by Natural England (Natural England 2018) to be a reasonable determination of the level at which impacts of a project or plan are not significant. A change of this magnitude could be within the natural range of fluctuations in deposition and is unlikely to be perceptible.

88. A project or plan in isolation may not lead to significant effects, but the Infrastructure Planning (EIA) Regulations 2017 (the EIA Regulations) require the consideration of impacts associated with a project or plan both in isolation, and in addition to other plans or projects which may affect the same designated site (an 'in-combination' assessment). The outcome of recent court judgements (notably the Wealden Judgement 2017) has led to the requirement for the 1% criterion to be applied to the in-combination impact to determine whether impacts remain insignificant, or whether further ecological investigation is required.

89. The Cumulative Impact Assessment (CIA) carried out for the proposed East Anglia ONE North project principally considered the effects associated with the Sizewell C New Nuclear Power Station, as this is the most significant future project within the study area. The cumulative effects of nutrient nitrogen deposition associated with road traffic from the construction of Sizewell C New Nuclear Power Station were considered and are presented in ***section 19.7.2***.

90. No other specific plans or projects were considered in the CIA, however the road link which passes alongside the designated sites will experience background traffic growth between the base year (2018) and the year of peak construction (2023), which will increase nutrient nitrogen deposition at the designated sites. The level of nutrient nitrogen deposition generated by this background traffic growth was therefore calculated and included in the 'in-combination' assessment to consider all future sources of nutrient nitrogen.

91. Any development-generated or in-combination nutrient nitrogen deposition values above 1% of the CL would require additional assessment by an ecologist to determine whether any significant impacts may be experienced at the affected

habitats. The determination of the significance of impacts associated with nutrient nitrogen deposition is detailed in ***Chapter 22 Onshore Ecology***.

19.4.4 Cumulative Impact Assessment

92. The proposed East Anglia ONE North project CIA will initially consider the cumulative impact with only the East Anglia TWO project against two different construction scenarios (i.e. construction of the two projects concurrently and sequentially). The worst case scenario of each impact is then carried through to the main body of the CIA which considers other developments which have been screened into the CIA.

93. For a description of the general methodology used for the CIA please refer to ***Chapter 5 EIA Methodology***. The cumulative impact assessment utilised the same methodology as detailed above in ***section 19.4.3***. The results of the CIA are presented in ***section 19.7***.

19.4.5 Transboundary Impact Assessment

94. There are no national transboundary implications with regard to local air quality.

19.5 Existing Environment

95. The characterisation of the existing environment was undertaken using data sources listed in ***Table 19.6*** plus other relevant literature.

96. The air quality study area is located wholly within ESC's jurisdiction. A review of the baseline air quality conditions indicates that there is a statutory designated AQMA at Stratford St Andrew, within the air quality study area. The AQMA was declared due to exceedances of the annual mean NO_2 Objective. The boundary of the AQMA is shown in ***Figure 19.2*****.**

19.5.1 Air Quality Monitoring Data

97. ESC undertakes monitoring within the air quality study area, along the A12, including within the Stratford St Andrew AQMA, as shown in ***Figure 19.2***. Recent monitoring within the air quality study area is detailed in ***Table 19.15*****.**

Table 19.15 NO_2 Monitoring Data Within the Air Quality Study Area

Site ID	Location	Site Type	Monitored annual mean NO_2 Concentration ($\mu g.m^{-3}$)				
			2014	2015	2016	2017	**2018**
LGM 2	Carlton Lodge, Main Road, Little Glemham	Roadside	27	24	25	19	19
FAR 1	Turret House, The Street, Farnham	Roadside	27	24	25	24	24

Site ID	Location	Site Type	Monitored annual mean NO_2 Concentration ($\mu g.m^{-3}$)				
			2014	2015	2016	2017	**2018**
FAR 2 a,b,c	Post Office Stores, The Street, Farnham	Roadside	29	30	29	28	27
STA 1 a,b,c	1 Long Row, Stratford St Andrew	Roadside	42	42	38	35	34
STA 2	Opposite Long Row, Stratford St Andrew	Roadside	25	28	25	26	24
STA 6	Jacobs Cottage, Main Road, Stratford St Andrew	Roadside	23	24	23	22	21
STA 7	30mph sign, Long Row, Stratford St Andrew	Roadside	30	34	34	31	30
STA 8 a,b,c	5 Long Row, Stratford St Andrew	Roadside	-	44	43	39	38

98. As detailed in ***Table 19.15***, annual mean NO_2 concentrations within Stratford St Andrew (STA1 and STA8) have been above the Objective in recent years, which is consistent with the AQMA designation. As acknowledged in the SCDC 2018 Annual Status Report (SCDC 2018), concentrations dropped below the annual mean Objective in 2017 for the first time since the AQMA was declared, which indicates that measures employed to improve air quality in the area have been successful. The 2018 monitoring results show that this improvement has continued.

19.5.2 Background Pollutant Concentrations

99. Background concentrations of NO_2, PM_{10} and $PM_{2.5}$ were obtained from the air pollutant concentration maps provided by Defra for the grid squares covering the air quality study area (Defra 2019). 2018 background concentrations were used for the base year assessment and sensitivity test (presented in ***Appendix 19.4***). Background concentrations for 2023 were used for the future year scenarios. The range of background concentrations across the air quality study area are detailed in ***Table 19.5***. The full table of background concentrations used in the assessment is provided in ***Appendix 19.3***.

Table 19.16 Background Pollutant Concentrations

Annual mean background concentration 2018 (µg.m^{-3})					
NO_2		**PM_{10}**		**$PM_{2.5}$**	
Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
7.73	8.83	13.96	15.93	8.78	9.42
Annual mean background concentration 2023 (µg.m^{-3})					
NO_2		**PM_{10}**		**$PM_{2.5}$**	
Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
6.54	7.28	13.12	15.10	8.08	8.71

100. As detailed in ***Table 19.5***, background pollutant concentrations are 'well below', i.e. less than 75% of, the relevant annual mean Objectives. This is to be expected in a predominantly rural area away from localised pollution sources such as roads.

19.5.3 Identification of Receptors

19.5.3.1 Construction Phase Dust and Fine Particulate Matter Assessment

101. The IAQM guidance (IAQM 2014) states that a Detailed Assessment is required where there are human receptors within 350m of the site boundary and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s). Ecological receptors within 50m of the site boundary or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s), are also identified at this stage.

102. Receptor locations were identified in the areas closest to the anticipated maximum construction dust impact within the air quality study area. In these areas, receptors were identified as follows:

- There are human receptors within 350m of the onshore infrastructure and within 50m of the planned construction vehicle route up to 500m from the boundary; and
- The onshore cable corridor will pass through a designated ecological site, and a planned construction vehicle route will run adjacent to the site.

103. A Detailed Assessment was therefore required to assess the impact of dust during the construction phase at human and ecological receptors.

104. The onshore cable corridor from landfall to the substation was assessed and the worst-case scenario was identified based on the number of receptors within 350m

from the site boundaries and 50m from the routes of construction traffic. Coldfair Green, south-west of Leiston, west of Aldringham, between Snape Road and Aldeburgh Road, was identified as the area with the most human receptors within 350m of the onshore works.

105. The worst-case area for ecological receptors was identified as the area where the onshore cable corridor passes through the Sandlings Special Protection Area (SPA) and Leiston-Aldeburgh Site of Special Scientific Interest (SSSI).

19.5.3.2 Construction Phase Road Traffic Emissions Assessment

19.5.3.2.1 Human Receptors

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

107. The sensitive receptor locations were selected based on their proximity to road links affected by the proposed East Anglia ONE North project, where the potential effect of development-generated traffic emissions on local air pollution would be most significant, including within the Stratford St Andrew AQMA. The sensitive receptor locations are detailed in ***Table 19.17*** and in ***Figure 19.3***.

Table 19.17 Sensitive Human Receptor Locations

Receptor ID	Location	OS grid reference (m)	
		X	Y
R1	Stratford St Andrew	635743	259992
R2	Little Glemham	634052	258315
R3	Stratford St Andrew	635768	260011
R4	Yoxford	639434	268346
R5	Yoxford	639592	268705
R6	Darsham	640437	269662
R7	Yoxford	640084	269152
R8	Saxmundham	637631	263177
R9	Yoxford	640151	268598
R10	Middleton Moor	641699	267682
R11	Leiston	646315	262373
R12	Leiston	645824	262575
R13	Church Common	639264	259364

Receptor ID	Location	OS grid reference (m)	
		X	Y
R14	Snape Watering	637793	260060
R15	Coldfair Green	643152	260593
R16	Coldfair Green	643263	260662

19.5.3.2.2 Designated Ecological Sites

108. The onshore cable corridor will pass through the Sandlings SPA and Leiston-Aldeburgh SSSI. The designated sites are located within 200m of roads which are anticipated to experience increases in traffic flows above those detailed in ***Table 19.9***. The Sizewell Marshes SSSI is also located within 200m of the same road link.

109. The APIS website (CEH 2019) was consulted to identify any habitats or features of these designated sites that are sensitive to nutrient nitrogen deposition. The habitats present within 200m of the road network were identified in consultation with the project ecologist, and the CLs for nutrient nitrogen deposition were obtained. The designated ecological sites considered in the assessment and associated Critical Load values are detailed in ***Table 19.18*** and shown in ***Figure 19.4***.

Table 19.18 Designated Ecological Sites and Critical Load Values

Designated ecological site	Most Sensitive Habitat or feature	Critical Load Range ($kgN.ha^{-1}.y^{-1}$)
Sandlings SPA, Leiston-Aldeburgh SSSI	Broadleaved woodland	10 – 20
	Dwarf shrub heath	10 – 20
Sizewell Marshes SSSI	Fen, marsh and swamp	15 – 25

110. In accordance with DMRB guidance (Highways Agency 2007), receptors were included in the model as transects through the designated sites, at 50m intervals back from the road up to 200m. The transect is shown in ***Figure 19.4*** and the locations are detailed in ***Table 19.19***.

Table 19.19 Ecological Receptor Transects

Designated Ecological Site	Transect ID	Distance from Road (m)	OS Grid Reference (m) X	Y
Sandlings SPA/Leiston-Aldeburgh SSSI	T1-1	0	646417	262373
	T1-2	50	646438	262325
	T1-3	100	646459	262280
	T1-4	150	646480	262234
	T1-5	200	646501	262189
Sizewell Marshes SSSI	T2-1	0	645414	263587
	T2-2	50	645453	263618
	T2-3	100	645493	263649
	T2-4	150	645532	263680
	`T2-5	200	645572	263710

19.5.4 Anticipated Trends in the Baseline Condition

111. Air quality within the study area is generally good, which is to be expected in an area which is largely rural in nature. However, air pollution is generally dominated by emissions from road vehicles, and in particular one part of the air quality study area along the A12 in Stratford St Andrew experiences poor air quality and has therefore been designated as a statutory AQMA. 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. It is expected that air quality in the AQMA will improve over time with the evolution of the vehicle fleet and the use of alternative fuel vehicles, combined with the measures implemented by ESC to improve air quality in this area. As such, it is anticipated that future pollutant concentrations will be reduced from baseline levels.

19.6 Potential Impacts

19.6.1 Potential Impacts during Construction

19.6.1.1 Impact 1: Construction Phase Dust and Fine Particulate Matter Emissions

112. A qualitative assessment of construction phase dust and fine particulate matter emissions was carried out in accordance with the latest IAQM guidance (IAQM 2014). Full details of the methodology and dust assessment undertaken are provided in ***Appendix 19.3***.

113. The construction works associated with the proposed East Anglia ONE North project have the potential to impact on local air quality conditions as described below:

- Dust emissions generated by excavation, construction and earthwork activities associated with the construction of the proposed East Anglia ONE North project have the potential to adversely impact sensitive receptors;
- Emissions of exhaust pollutants, especially NO2 and PM10 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 PM10 from NRMM operating within the onshore development area have the potential to impact local air quality at sensitive receptors in close proximity to the works.

114. As described previously, emissions from NRMM were not considered in the assessment, but the relevant control and management measures set out in ***section 19.6.1.1.5.6*** include good practice operations which will minimise releases from such vehicles and plant. these control measures are detailed further in the OCoCP, as secured under the requirements of the draft DCO and submitted with this DCO application.

19.6.1.1.1 Step 1: Screen the need for a Detailed Assessment

115. The IAQM guidance states that a Detailed Assessment is required if there are human receptors located within 350m and ecological receptors within 50m of the site boundary. Human receptors are present within 350m of the onshore cable corridor, which also passes through a designated ecological site (***Figure 19.4***). A Detailed Assessment was therefore required.

19.6.1.1.2 Step 2A: Define the Potential Dust Emission Magnitude

116. The IAQM guidance recommends that the dust emission magnitude is determined for demolition, earthworks, construction and trackout. As there is not expected to be any demolition undertaken as part of the proposed East Anglia ONE North project, it was not considered in the assessment.

117. The potential dust emission magnitude for the onshore development area was determined using the criteria detailed in ***Table A19.1*** of ***Appendix 19.3***. The dust emission magnitudes were determined from the worst-case scenarios identified in ***Table 19.2*** and detailed in ***Table 19.20***.

118. Coldfair Green, approximately 4km from the landfall was identified as the area with the most human receptors within 350m of the onshore development area.

The works closest to the designated ecological site are at a different location, closer to the landfall (1.7km north-west). The worst-case assessment was therefore undertaken based on the construction works undertaken in the vicinity of each type of receptor.

Table 19.20 Defined Dust Emission Magnitudes Associated for Each Onshore Construction Activity

Construction Activity	Dust Emission Magnitude Assessment – Human Receptors	Dust Emission Magnitude Assessment – Ecological Receptors
Earthworks	It was assumed that up to two CCSs will be built within 350m of human receptors, as the worst-case scenario area is near the junction of two sections of cable route, with each section having a CSS of 18,400m^2. It was assumed that up to 4 jointing bays will be built within 350m of human receptors, which have an area of up to 570m^2 each and a depth up to 1.2m. Earthworks within the onshore cable route will comprise removal and storage of topsoil, followed by excavation and reinstatement of 2 trenches. The soil type is potentially dusty and prone to wind whipping. Total earthworks area is greater than 10,000m^2. The dust emission magnitude is therefore Large.	It was assumed that up to two CCSs will be located within 50m of the ecological receptor, as the ecological receptor is at the junction of two sections of cable route, with each section having a CSS of 18,400m^2. It was assumed that up to 2 jointing bays will be built within 50m of ecological receptors, which have an area of up to 570m^2 each and a depth up to 1.2m. Earthworks within the onshore cable route will comprise removal and storage of topsoil, followed by excavation and reinstatement of 2 trenches. The soil type is potentially dusty and prone to wind whipping. Total earthworks area is therefore greater than 10,000m^2. The dust emission magnitude is therefore Large.
Construction	There are not anticipated to be any buildings constructed within the CCS, however it was assumed that cement-bound sand will be used to line the cable trench and pack around the ducts then backfilled using the stored subsoil and topsoil which is potentially dusty. The dust emission magnitude is therefore Medium.	There are not anticipated to be any buildings constructed within the CCS, however it was assumed that cement-bound sand will be used to line the cable trench and pack around the ducts then backfilled using the stored subsoil and topsoil which is potentially dusty. The dust emission magnitude is therefore Medium.
Trackout[3]	There are greater than 50 outward daily HGV movements from the CCS during the construction phase. The dust emission magnitude is therefore Large.	There are between 10 and 50 outward daily HGV movements from the CSS during the construction phase. The dust emission magnitude is therefore Medium.

[3] HGV movements are indicative and based on parameters used in the ***Chapter 26 Traffic and Transport*** impact assessment.

119. The dust magnitudes for earthworks, construction and trackout are summarised for each worst-case area in ***Table 19.21***.

Table 19.21 Dust Emission Magnitudes

Activity	Dust Emission Magnitude for Worst Case Scenario	
	Human Receptors	Ecological Receptors
Earthworks	Large	Large
Construction	Medium	Medium
Trackout	Large	Medium

19.6.1.1.3 Step 2B: Define the Sensitivity of the Area

120. The sensitivity of the area to dust soiling and impacts on human health was determined using the criteria in ***Table A19.3*** and ***Table A19.4*** of ***Appendix 19.3***. ***Figure 19.5*** details the distance bands from the site boundary used in determining the sensitivity of the area. The sensitivity of the area is defined as:

- Sensitivity of people to dust soiling
  - Earthworks and Construction: There are between 1 and 10 receptors within 50m of the onshore cable corridor. The sensitivity is therefore **Low**; and
  - Trackout: There are between 10 and 100 receptors within 50m of roads used by construction vehicles up to 500m from the site boundary. The sensitivity is therefore **Medium**.
- Sensitivity of people to health effects of PM_{10}
  - Earthworks and Construction: The highest annual mean background PM_{10} concentration across the study area is less than 24µg.m^{-3} and there are 1 - 10 receptors within 50m of the onshore cable corridor. The sensitivity is therefore **Low**; and
  - Trackout: There are between 10-100 receptors within 50m of roads used by construction vehicles, up to 500m from the site. The sensitivity is therefore **Low**.
- Sensitivity of the area to ecological impacts
  - Construction and Earthworks: the Leiston-Aldeburgh SSSI and Sandlings SPA is an internationally designated site and is thus a high sensitivity receptor, and is located within the site boundary. The sensitivity is therefore **High, whether HDD or open-cut trenching is used to cross the site**.
  - Trackout: the site access road is within 20m of the Leiston-Aldeburgh SSSI and Sandlings SPA, therefore the sensitivity is **High**.

121. The sensitivity of the area to dust soiling, human health and ecological impacts for each activity is summarised in ***Table 19.22***.

Table 19.22 Sensitivity of the Area to each Activity

Potential Impact	Sensitivity of the Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	Low	Low	Medium
Human Health	Low	Low	Low
Ecological impacts	High	High	High

19.6.1.1.4 Step 2C: Define the Risk of Impacts

122. The dust emission magnitude and sensitivity of the area are combined and the risk of impacts determined using ***Table A19.1 – Table A19.7*** in ***Appendix 19.3***. The risks for dust soiling, human health and ecological impacts are shown in ***Table 19.23***.

Table 19.23 Risk of Dust Impacts

Potential Impact	Dust Risk		
	Earthworks	Construction	Trackout
Dust Soiling	Low Risk	Low Risk	Medium Risk
Human Health	Low Risk	Low Risk	Low Risk
Ecological Impacts	High Risk	Medium Risk	Medium Risk

123. It should be noted that the proposed East Anglia ONE North project would employ embedded mitigation measures relating to construction dust, as noted in ***Table 19.3***. The IAQM construction dust assessment methodology does not include the consideration of embedded mitigation measures when determining the potential risk of dust impacts.

124. Implementation of embedded mitigation measures would ensure that the risk of dust impacts is lower than those identified in ***Table 19.23***.

19.6.1.1.5 Mitigation Measures

125. Step 3 of the IAQM guidance 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 impacts was ‘high risk’ resulting from construction activities without the implementation of mitigation measures.

126. The recommendations detailed below are taken from the IAQM guidance document, and are considered to be 'highly recommended' by the IAQM for sites with a high risk of dust impacts. The measures below would be undertaken in addition to those measures included as embedded mitigation within the proposed East Anglia ONE North project.

127. Section 42 responses highlighted that the soil within the study area is particularly light and prone to wind whipping. Topsoil stockpiles along the onshore cable route may therefore give rise to dust impacts due to the long-term nature of these stockpiles. The topsoil stockpiles will be controlled, as per the OCoCP (document reference 8.1) submitted with the DCO application and as secured under the requirements of the draft DCO, to preserve the integrity of the soil for reinstatement following construction of the proposed East Anglia ONE North project. The topsoil will be seeded following creation of the stockpile, which will significantly minimise the potential for windblown dust from this source. Revegetation is anticipated to reduce windblown particulate matter at an efficiency of 90% (National Pollutant Inventory 2012).

128. The measures below would be considered and where appropriate incorporated into the CoCP, to be agreed with the Local Planning Authority prior to construction commencing in order to discharge a requirement of the draft DCO.

19.6.1.1.5.1 Communications

129. Measures in relation to communications are detailed within the OCoCP submitted with this DCO application, and may include the following:

- Develop and implement a Stakeholder Communications Plan (as part of the CoCP, submitted to discharge a requirement of the draft DCO) that includes community engagement before work commences on site; and
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary and the head or regional office contact information. This may be the environment manager/engineer or the site manager.

19.6.1.1.5.2 Dust Management

130. Measures in relation to dust management are detailed within the OCoCP submitted with this DCO application, and may include the following:

- Develop and implement an AQMP, which may include measures to control other emissions, approved by ESC;
- 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 ESC when asked;
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book;
- Liaise with any other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes;
- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to note any dust deposition, record inspection results, and make the log available to ESC 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 the site layout so that machinery and dust causing activities are located away from receptors, as far as is practicable;
- Erect solid screens or barriers around dusty activities, or the site boundary, that are at least as high as any stockpiles on site;
- Take measures to control 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;
- Cover, seed or fence stockpiles to prevent wind whipping;
- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced, and 10 mph on unsurfaced, haul roads and work areas;
- Produce a CTMP, as secured under the requirements of the draft DCO, to manage the sustainable delivery of goods and materials (an OCTMP has been submitted with this DCO application);
- Implement the Outline Travel Plan (OTP) that has been submitted with the DCO application for the proposed East Anglia ONE North project, as secured under the requirements of the draft DCO, which supports and encourages sustainable travel for contractor operatives and staff (public transport, cycling, walking, and car-sharing);
- 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 conveyors, loading shovels, hoppers and other loading or 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; and
- Bonfires and burning of waste materials should not be permitted.

19.6.1.1.5.3 Measures Specific to Earthworks

131. Measures in relation to earthworks could include:

- Re-vegetate or cover earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable; and
- Only remove the cover in small areas during work and not all at once.

19.6.1.1.5.4 Measures Specific to Construction

132. Measures specific to construction could include:

- Ensure sand and other aggregates are stored in silos, bunded areas or in a controlled and well-managed manner;
- Avoid scabbling (roughening of concrete surfaces) if possible;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust release.

19.6.1.1.5.5 Measures Specific to Trackout

133. Measures specific to trackout could include:

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site;
- Ensure loaded 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 log book;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Install a wheel washing system (with rumble grids to dislodge accumulated dust and mud) prior to leaving the site where reasonably practicable;
- 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; and
- Locate site access gates at least 10m from receptors where possible.

19.6.1.1.5.6 Measures Specific to Non-Road Mobile Machinery (NRMM)

134. NRMM and plant would be well maintained. If any emissions of dark smoke occur, then the relevant machinery should stop immediately, and any problem rectified. In addition, the following controls would apply to NRMM:

- All NRMM should use fuel equivalent to ultralow sulphur diesel (fuel meeting the specification within EN590:2004);
- All NRMM will comply with regulation (EU) 2016/1628 of the European Parliament and of the European Council;
- All NRMM should 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
- Implementation of energy conservation measures including instructions to throttle down or switch off idle construction equipment; switch off the engines of trucks while they are waiting to access the site and while they are being loaded or unloaded, ensure equipment is properly maintained to ensure efficient energy consumption.

135. The implementation of the appropriate mitigation measures, in addition to embedded mitigation measures, will reduce the magnitude of dust emissions and the likelihood of their occurrence. The residual impacts from construction are considered to be **not significant**, in accordance with IAQM guidance.

19.6.1.2 Impact 2: Construction Phase Road Traffic Exhaust Emissions

19.6.1.2.1 Human Receptors

136. The 24-hour AADT flows and HGV percentages used in the air quality assessment scenarios are detailed in ***Appendix 19.3***.

137. Predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations for the 2023 year of peak construction are detailed in ***Table 19.24*** to ***Table 19.27***. Concentrations for

'without project' scenarios and the predicted change in NO_2, PM_{10} and $PM_{2.5}$ concentrations, as a result of the proposed East Anglia ONE North project, are also shown for comparison purposes.

Table 19.24 Annual Mean NO_2 results at Sensitive Human Receptor Locations (read in conjunction with *Figure 19.3*)

Receptor ID	Annual mean NO_2 concentrations ($\mu g.m^{-3}$)				
	Without the proposed East Anglia ONE North project	With the proposed East Anglia ONE North project	Change	Change as percentage of Objectives (%)	Impact descriptor
R1	28.68	29.08	0.40	1%	Negligible
R2	16.47	16.65	0.18	0%	Negligible
R3	15.46	15.63	0.17	0%	Negligible
R4	14.34	14.45	0.11	0%	Negligible
R5	13.10	13.19	0.09	0%	Negligible
R6	12.10	12.22	0.12	0%	Negligible
R7	12.28	12.40	0.12	0%	Negligible
R8	11.97	12.05	0.08	0%	Negligible
R9	8.55	8.71	0.16	0%	Negligible
R10	7.76	7.87	0.11	0%	Negligible
R11	8.03	8.13	0.10	0%	Negligible
R12	7.90	7.98	0.08	0%	Negligible
R13	10.89	11.08	0.19	0%	Negligible
R14	10.20	10.33	0.13	0%	Negligible
R15	8.84	9.09	0.25	1%	Negligible
R16	8.74	8.98	0.24	1%	Negligible

Table 19.25 Annual Mean PM_{10} results at Sensitive Human Receptor Locations (read in conjunction with *Figure 19.3*)

Receptor ID	Annual mean PM_{10} concentrations ($\mu g.m^{-3}$)				
	Without the proposed East Anglia ONE North project	With the proposed East Anglia ONE North project	Change	Change as percentage of Objectives (%)	Impact descriptor
R1	18.25	18.41	0.16	0%	Negligible
R2	16.61	16.68	0.07	0%	Negligible
R3	15.36	15.42	0.06	0%	Negligible
R4	14.95	15.01	0.06	0%	Negligible
R5	14.74	14.79	0.05	0%	Negligible
R6	16.22	16.27	0.06	0%	Negligible
R7	16.25	16.31	0.06	0%	Negligible
R8	15.07	15.11	0.04	0%	Negligible
R9	14.18	14.22	0.04	0%	Negligible
R10	14.77	14.80	0.03	0%	Negligible
R11	13.56	13.59	0.04	0%	Negligible
R12	13.90	13.93	0.03	0%	Negligible
R13	14.96	15.02	0.06	0%	Negligible
R14	15.54	15.58	0.04	0%	Negligible
R15	13.54	13.61	0.07	0%	Negligible
R16	13.52	13.59	0.07	0%	Negligible

Table 19.26 Short-term Exceedances of PM_{10} at Sensitive Human Receptor Locations (read in conjunction with *Figure 19.3*)

Receptor ID	Number of Exceedances of the short-term PM_{10} Objective (Days)		
	Without the proposed East Anglia ONE North project	With the proposed East Anglia ONE North project	Change
R1	2	2	0
R2	1	1	0
R3	0	0	0
R4	0	0	0
R5	0	0	0

Receptor ID	Number of Exceedances of the short-term PM_{10} Objective (Days)		
	Without the proposed East Anglia ONE North project	With the proposed East Anglia ONE North project	Change
R6	0	0	0
R7	0	0	0
R8	0	0	0
R9	0	0	0
R10	0	0	0
R11	0	0	0
R12	0	0	0
R13	0	0	0
R14	0	0	0
R15	0	0	0
R16	0	0	0

Table 19.27 Annual Mean $PM_{2.5}$ results at Sensitive Human Receptor Locations (read in conjunction with *Figure 19.3*)

Receptor ID	Annual mean $PM_{2.5}$ concentrations ($\mu g.m^{-3}$)				
	Without the proposed East Anglia ONE North project	With the proposed East Anglia ONE North project	Change	Change as percentage of Objectives (%)	Impact descriptor
R1	11.02	11.12	0.10	0%	Negligible
R2	9.78	9.82	0.04	0%	Negligible
R3	9.30	9.34	0.04	0%	Negligible
R4	9.07	9.11	0.04	0%	Negligible
R5	8.95	8.98	0.03	0%	Negligible
R6	9.25	9.28	0.03	0%	Negligible
R7	9.27	9.30	0.03	0%	Negligible
R8	9.05	9.07	0.02	0%	Negligible
R9	8.45	8.47	0.03	0%	Negligible
R10	8.54	8.56	0.02	0%	Negligible
R11	8.26	8.29	0.02	0%	Negligible

Receptor ID	Annual mean $PM_{2.5}$ concentrations ($\mu g.m^{-3}$)				
	Without the proposed East Anglia ONE North project	With the proposed East Anglia ONE North project	Change	Change as percentage of Objectives (%)	Impact descriptor
R12	8.46	8.48	0.02	0%	Negligible
R13	8.92	8.95	0.04	0%	Negligible
R14	9.01	9.04	0.02	0%	Negligible
R15	8.33	8.37	0.04	0%	Negligible
R16	8.32	8.36	0.04	0%	Negligible

138. The results of the construction phase road traffic emissions assessment indicate that annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ were predicted to be 'well below' (i.e. less than 75% of) the respective air quality Objectives in the year of peak construction at all receptors, including within the Stratford St Andrew AQMA, both 'without' and 'with' the proposed East Anglia ONE North project in place.

139. The change in NO_2 concentrations was no greater than 1% at all receptors; this corresponded to a 'negligible' impact in accordance with IAQM and EPUK guidance (IAQM and EPUK 2017).

140. A sensitivity test was carried out using base year emission factors and background concentrations, should emissions not reduce at the rate currently predicted. These results are presented in ***Appendix 19.4***.

141. All predicted NO_2 concentrations were well below $60\mu g.m^{-3}$ and therefore, in accordance with Defra guidance in LAQM.TG (16) (Defra 2016), the 1-hour mean Objective is unlikely to be exceeded (see ***Table 19.4***). Based on the calculation provided by Defra, as detailed in ***section 19.4.3.2.9***, the short-term PM_{10} objective was predicted to be met at all modelled locations with less than 35 exceedances of the daily mean objective of $50\mu g.m^{-3}$. Using the Defra calculation, there was no change in the number of days exceeding the daily mean Objective between the 'without' and 'with' development scenarios.

142. IAQM and EPUK Guidance states that professional judgement should be used to determine the overall significance of impact taking into account the impact at individual receptors. This assessment concludes that development-generated traffic impacts upon local air quality are not significant based upon:

- A predicted negligible impact at all receptor locations;

- Predicted pollutant concentrations were 'well below' the relevant air quality Objectives at all considered receptor locations;
- Development-generated traffic was not predicted to cause a breach of any of the air quality Objectives at any identified sensitive receptor location; and
- A conservative approach to the derivation of the traffic data was taken, as described in ***Table 19.2***.

19.6.1.2.1.1 Mitigation Measures

143. Although the proposed East Anglia ONE North project was predicted to have a negligible impact on local air quality, as good construction practice (developed through preparation of the final CoCP, submitted to discharge a requirement of the draft DCO) the proposed East Anglia ONE North project will further minimise construction-phase emissions so far as is practicable.

144. Given the nature of the proposed East Anglia ONE North project, there are limited ways in which a reduction in proposed East Anglia ONE North project impact could be achieved which are proportionate to the level of impact and the duration over which impacts would be experienced. As detailed in ***Table 19.3***, the proposed East Anglia ONE North project access strategy and design, including a haul road for the length of the onshore cable route, were developed to minimise vehicle movements insofar as possible, whilst providing a worst-case 'Rochdale Envelope' scenario for the purposes of EIA.

145. The Applicant will commit to requiring its contractors to use Euro VI-standard vehicles where possible. To provide an indication as to the improvement in air quality that may be experienced by using a full fleet of Euro VI vehicles, rather than the standard fleet split built into the Emission Factor Toolkit (Defra 2019a), a study was undertaken to consider the change in NO_2 concentrations that would occur. The reduction in emissions was considered at receptor R1 only, as this receptor is located within the statutory AQMA, declared for exceedances of the annual mean NO_2 Objective, and is considered to be the most sensitive to changes in air quality. Furthermore, this receptor is located on Link 3 (A12 south of the A1094) which is expected to experience the greatest proposed East Anglia ONE North project-generated traffic flows.

146. It is anticipated that the HGVs used during construction will comprise a mix of rigid-axle and articulated vehicles, split approximately 70% and 30% respectively. The input data and results are provided in ***Table 19.28*** and ***Table 19.29***.

Table 19.28 Default and 'With Mitigation' Vehicle Fleet Split for 2023

Vehicle Type	Euro Standard	Default Split (2023) Percentage of Fleet	With Mitigation (2023) Percentage of Fleet
Rigid HGV	Euro III	1%	0%
	Euro IV	1%	0%
	Euro V EGR*	2%	0%
	Euro V SCR**	5%	0%
	Euro VI	92%	100%
Artic HGV	Euro III	0%	0%
	Euro IV	0%	0%
	Euro V EGR*	1%	0%
	Euro V SCR**	2%	0%
	Euro VI	97%	100%

* Exhaust Gas Recirculation ** Selective Catalytic Reduction

Table 19.29 Expected Emission Reduction with Implementation of Mitigation

Receptor	Project-Generated NO_2 Concentration (Link 3)		Emission Reduction ($\mu g.m^{-3}$)
	Without Mitigation ($\mu g.m^{-3}$)	With Mitigation ($\mu g.m^{-3}$)	
R1	0.36	0.2	-0.16

147. As shown in ***Table 19.29***, using a vehicle fleet of 100% Euro VI-standard vehicles would lead to a small emission reduction in pollutant concentrations within the AQMA. The impact of the mitigation is reduced because, as detailed in ***Table 19.28***, the standard fleet split is anticipated to comprise a high percentage of Euro VI-standard HGVs by 2023. However, the implementation of this mitigation where possible would result in an improvement to local air quality.

19.6.1.2.2 Ecological Receptors

148. The results of the assessment of nutrient nitrogen deposition on designated ecological sites are detailed in ***Table 19.30*** and ***Table 19.31***.

Table 19.30 Nutrient Nitrogen Deposition Results

Designated ecological site	Transect ID	Habitat	Nutrient nitrogen deposition (kgN.ha.y^{-1})	
			Contribution from background traffic growth	Contribution from East Anglia ONE North
Sandlings SPA/Leiston-Aldeburgh SSSI	T1-1	Broadleaved woodland	0.03	0.04
	T1-2		0.00	0.01
	T1-3	Dwarf shrub heath	0.00	0.00
	T1-4		0.00	0.00
	T1-5		0.00	0.00
Sizewell Marshes SSSI	T2-1	Fen, marsh and swamp	0.02	0.03
	T2-2		0.00	0.00
	T2-3		0.00	0.00
	T2-4		0.00	0.00
	T2-5		0.00	0.00

Table 19.31 Nutrient Nitrogen Deposition as Percentage of Critical Load

Designated ecological site	Transect ID	Impact of East Anglia ONE North as Percentage of Critical Load			Impact of East Anglia ONE North In-Combination with Background Traffic Growth		
		% of lowest Critical Load	% of mid-range Critical Load	% of highest Critical Load	% of lowest Critical Load	% of mid-range Critical Load	% of highest Critical Load
Sandlings SPA/Leiston-Aldeburgh SSSI	T1-1	0.4%	0.2%	0.2%	0.7%	0.5%	0.3%
	T1-2	0.1%	0.1%	0.0%	0.1%	0.1%	0.1%
	T1-3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	T1-4	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	T1-5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sizewell Marshes SSSI	T2-1	0.2%	0.1%	0.1%	0.3%	0.2%	0.2%
	T2-2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	T2-3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	T2-4	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	T2-5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

149. As detailed in ***Table 19.31***, increases in nutrient nitrogen deposition as a result of the proposed East Anglia ONE North project were no greater than 1% of the Critical Load range at all transect locations, including those closest to the road network. The impact associated with the proposed East Anglia ONE North project in isolation is therefore considered to be **not significant**.

150. The 'in-combination' assessment showed that increases in nutrient nitrogen deposition were also below 1% of the most stringent Critical Load at all receptors. The in-combination impact is therefore considered to be **not significant**.

19.6.2 Potential Impacts during Decommissioning

151. No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.

152. Given the above, the potential for dust generation and vehicle movements is considered to be markedly less than during the construction phase, as no extensive earthworks would be carried out. Construction phase vehicle movements were considered to have an insignificant effect; therefore, the same conclusion can be drawn for the decommissioning phase. Over the assumed 25-year lifespan of the East Anglia ONE North project, vehicle fleet compositions are expected to be composed of a higher percentage of lower-emission vehicles which would further reduce any impacts.

19.7 Cumulative Impacts

19.7.1 Cumulative Impact with proposed East Anglia TWO Project

153. The East Anglia TWO offshore windfarm project (the proposed East Anglia TWO project) is also in the application phase. The proposed East Anglia TWO project has a separate DCO application which has been submitted at the same time as the proposed East Anglia ONE North project. The two projects share the same landfall location and onshore cable corridor and the two onshore substations are co-located, and connect into the same National Grid substation.

154. The proposed East Anglia ONE North project CIA will therefore initially consider the cumulative impact with only the proposed East Anglia TWO project.

155. The CIA considers the proposed East Anglia ONE North project and the proposed East Anglia TWO project under two construction scenarios:

- Scenario 1 - the proposed East Anglia ONE North project and proposed East Anglia TWO project are built simultaneously; and
- Scenario 2 - the proposed East Anglia ONE North project and the proposed East Anglia TWO project are constructed sequentially.

156. The worst case (based on the assessment of these two construction scenarios) for each impact is then carried through to the wider CIA which considers those developments which have been screened into the CIA (***section 19.7.2***). For a more detailed description of the assessment scenarios please refer to ***Chapter 5 EIA Methodology***.

157. Full assessment of scenario 1 and scenario 2 can be found in ***Appendix 19.2***. This assessment found that scenario 1 represented the worst case impacts for air quality. A summary of those impacts can be found in ***Table 19.32***. ***Table 19.32*** shows that no significant impacts with the proposed East Anglia TWO project have been identified for the proposed East Anglia ONE North project.

Table 19.32 Summary of Potential Impacts Identified for Air Quality under Construction Scenario 1

Potential Impact	Receptor	Sensitivity	Value	Magnitude	Significance	Mitigation Measures	Residual Impact
Cumulative Construction Impacts with the proposed East Anglia TWO project							
Impact 1: Construction phase dust and fine particulate matter	Human receptors	Dust soiling: medium Human health: low	-	Large	Assessment methodology does not assign significance before mitigation	Embedded mitigation with additional measures as recommended by the IAQM	Not significant
	Ecological receptors	High	-	Large			
Impact 2: Construction phase road traffic emissions	Human receptors	High	High	Negligible at all receptors	Not significant	Use of Euro VI HGVs during construction	Not significant
	Ecological receptors	High	High	-	Not significant		Not significant
Cumulative Operation Impacts with the proposed East Anglia TWO project							
Cumulative operational impacts were scoped out of the assessment, as detailed in ***section 19.4.4***							
Cumulative Decommissioning Impacts with the proposed East Anglia TWO project							
No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.							

19.7.2 Cumulative Impact Assessment with Other Developments

158. The assessment of cumulative impacts has been undertaken as a two stage process. Firstly, all impacts considered in ***section 19.6*** have been assessed for the potential to act cumulatively with other projects. Potential cumulative impacts are set out in ***Table 19.33***.

Table 19.33 Potential Cumulative Impacts

Impact	Potential for Cumulative Impact	Rationale
Construction		
Construction phase dust and fine particulate matter emissions	Yes	Dust impacts are only expected to occur where receptors are located within 350m of the dust-generating activities. Cumulative dust impacts may arise where two projects are located within 700m of each other and there are relevant receptors present.
Construction phase road traffic emissions	Yes	There is the potential for increases in development-generated traffic flows to lead to cumulative impacts at receptors where they occur on the same road links.
Operation		
Operational phase impacts have been scoped out of the air quality assessment, therefore there is no pathway for a significant cumulative impact to occur.		
Decommissioning		
No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.		

159. The second stage of the CIA is an assessment of whether there is spatial overlap between the extent of potential effects of the onshore infrastructure and the potential effects of other projects scoped into the CIA upon the same receptors. To identify whether this may occur, the potential nature and extent of effects arising from all projects scoped into the CIA have been identified and any overlaps between these and the effects identified in ***section 19.6***. Where there is an overlap, an assessment of the cumulative magnitude of effect is provided.

160. Following a review of projects which have the potential to overlap temporally or spatially with the proposed East Anglia ONE North project, two developments have been scoped into the CIA.

161. ***Table 19.34*** provides specific detail regarding the projects.

162. The full list of projects for consideration has been developed in consultation with the Local Planning Authority. The remainder of the section details the nature of the cumulative impacts against all those receptors scoped in for cumulative assessment.

Table 19.34Summary of Projects considered for the CIA in Relation to Air Quality

Project Name	Status	Development Period	[4]Distance from East Anglia ONE North Onshore Development Area	Project Definition	Level of Information Available	Included in CIA	Rationale
Sizewell C New Nuclear Power Station	PEIR formally submitted 04.01.19.	Application expected in 2020. Construction expected to commence in 2021.	1.4km	A new nuclear power station at Sizewell in Suffolk. Located to the north of the existing Sizewell B Power Station Complex, Sizewell C New Nuclear Power Station would have an expected electrical capacity of approximately 3,260 megawatts (MW). Full PEIR available: https://www.edfenergy.com/download-centre?keys=&tid=1380&year%5Bvalue%5D%5Byear%5D=	Tier 5[5]	Yes	Elements of the Sizewell C New Nuclear Power Station are within 700m of the proposed onshore development area. As there is a 350m impact buffer for sensitive receptors from the Sizewell C New Nuclear Power Station and the proposed East Anglia ONE North project, cumulative impacts are possible. Traffic associated with the construction of Sizewell C will travel on some of the same road links as East Anglia ONE North, therefore cumulative impacts at human and ecological receptors are possible.

[4] Shortest distance between the considered project and East Anglia ONE North– unless specified otherwise
[5] Based on criteria set out in ***section 5.7.2*** of ***Chapter 5 EIA Methodology***

Project Name	Status	Development Period	[4]Distance from East Anglia ONE North Onshore Development Area	Project Definition	Level of Information Available	Included in CIA	Rationale
Sizewell B Power Station Complex	Planning application formally submitted 18.04.19. Awaiting Decision.	Construction expected to commence in 2022. Expected construction timetable of 53 months. Peak construction is expected in 2022, completion of construction expected in 2027.	1.4km	The demolition and relocation of facilities at the Sizewell B Power Station Complex. In outline, demolition of various existing buildings (including the outage store, laydown area, operations training centre and technical training facility), and erection of new buildings, including a visitor centre, and the construction of new access road, footpath and amended junction at Sizewell Gap; and associated landscaping and earthworks/recontouring. Full planning application available: https://publicaccess.eastsuffolk.gov.uk/online-applications/applicationDetails.do?activeTab=summary&keyVal=PQ5NVGQXJJ100	Tier 4[6]	No	The most intensive period of construction is expected to occur in 2022, and therefore there will be no temporal overlap during this period with East Anglia ONE North, which will commence in Q3 2023. There are no data presented within the Sizewell B ES for subsequent construction years, and therefore the cumulative impact with East Anglia ONE North and Sizewell C could not be considered. However, it is anticipated that, as this project would form part of the enabling works for Sizewell C, that consideration of impacts associated with the peak construction period of Sizewell C would represent a worst-case scenario.

[6] Based on the definition of Tier 4 outlined in ***section 5.7.2*** of ***Chapter 5 EIA Methodology***

19.7.2.1 Construction Phase Dust and Fine Particulate Matter Emissions

163. Elements of the Sizewell C New Nuclear Power Station are within 700m of the onshore development area, and therefore there is the potential for cumulative construction dust impacts where the duration of the construction phases overlaps with the proposed East Anglia ONE North project alone and under cumulative Scenario 1 assessment detailed above.

164. The Sizewell C New Nuclear Power Station DCO application will include a construction dust impact assessment in accordance with IAQM guidance. In accordance with the guidance, the implementation of mitigation measures which are commensurate with the level of dust risk of the site will result in impacts that are **not significant**. Significant cumulative impacts are therefore highly unlikely.

19.7.2.2 Construction Phase Road Vehicle Exhaust Emissions

165. There are three different scenarios relating to different options for the development of Sizewell C, as follows:

- Sizewell C Early Years;
- Sizewell C Road Option; and
- Sizewell C Rail Option.

166. The Sizewell C Early Years scenario represents the initial construction stages of the project over a three-year period, before the implementation of proposed road bypass mitigation measures. This scenario is therefore considered to represent the worst-case with regard to air quality as project-generated traffic flows would be highest in this period.

167. The Sizewell C Road Option includes traffic for a road-based construction scenario, whereby the Two-Village Bypass and the Sizewell Link Road would be implemented, which form part of the project mitigation measures. These bypasses would be public roads which would divert traffic from the villages of Stratford St Andrew, Farnham and Theberton. There would also be a reduction in traffic movements in Yoxford and Middleton Moor.

168. The Sizewell C Rail Option would generate fewer vehicle movements as rail traffic would also be utilised. Under this scenario, the Two Village Bypass and a smaller bypass around Theberton would be constructed.

169. The Sizewell C Road Option is considered to be the most conservative of the two mitigation options, as it would result in higher road-based construction flows which would lead to a greater cumulative impact.

170. In both the road and rail scenarios for Sizewell C, Stratford St Andrew would be bypassed, and only local traffic would access the village. The PEIR for Sizewell C (EDF Energy 2019) states that it is expected that the AQMA revocation could be brought forward with the implementation of these mitigation measures.

171. It was agreed with highways stakeholders that the traffic-related impact of each Sizewell C scenario would be considered within the proposed East Anglia ONE North project cumulative assessment.

172. However, subsequent to the agreement of this approach, EDF Energy has submitted a Stage 4 consultation document prior to the submission of an ES in early 2020. EDF Energy have embarked upon a Stage 4 consultation exercise scheduled to run from 18 July to 27 September 2019. This Stage 4 consultation document does not contain sufficient information in terms of a freight management strategy to facilitate a quantitative assessment, therefore it is unable to be incorporated into the proposed East Anglia ONE North project cumulative assessment.

173. Recognising that Stage 3 information released by EDF Energy is out of date, a detailed quantitative CIA cannot be provided at this stage because a detailed CIA alone would potentially be based upon out of date and incorrect information.

174. Therefore, the CIA presented herein is qualitative, examining the potential for cumulative impacts with scenario 1.

19.7.2.2.1 Sizewell C Early Years

175. During the Early Years of Sizewell C construction, traffic generation would be at its most intensive and would be unmitigated. As such, there is the potential for a greater magnitude of impact within the Stratford St Andrew AQMA as a result of the cumulative interaction with scenario 1. However, it is not anticipated that additional traffic associated with Sizewell C New Nuclear Power Station would result in an exceedance of the air quality Objectives, given the magnitude of pollutant concentrations predicted for scenario 1, as detailed in ***Appendix 19.2*****.**

176. Impacts at other human receptors outside the AQMA are not anticipated to lead to a significant cumulative effect as, elsewhere in the study area, pollutant concentrations were predicted to be well below the relevant Objectives.

177. With regard to ecological receptors, EDF Energy has indicated that traffic generated by Sizewell C New Nuclear Power Station would not use Link 12 (Sizewell Gap) as a means of access to the nuclear power station. As such, there would be no potential for cumulative impacts at the Sandlings SPA/Leiston-Aldeburgh SSSI. The Sizewell Marshes SSSI would experience additional nutrient nitrogen deposition as a result of Sizewell C New Nuclear Power Station which may be above 1% of the Critical Load as an in-combination impact.

19.7.2.2.2 Scenario 1 and Sizewell C Road Option

178. Scenario 1 and Sizewell C Road Option. The Sizewell C Road Option includes the Two-Village Bypass and the Sizewell Link Road, as described above. As such, it is anticipated that the Stratford St Andrew AQMA, which would be bypassed, would experience a significant beneficial impact as the village would only be accessed by local traffic. A beneficial impact would also be experienced at other villages which would be bypassed (namely Farnham and Theberton).

179. Other human receptors outside of the bypassed villages would experience increases in pollutant concentrations, though these would be smaller in magnitude than those experienced in the more intensive Early Years scenario and are therefore not anticipated to be significant.

180. Cumulative impacts at the Sandlings SPA/Leiston-Aldeburgh SSSI would not be experienced, as described above. Increases in nutrient nitrogen deposition would occur at the Sizewell Marshes SSSI, though these would be lower in magnitude than those experienced in the Early Years scenario and may be greater than 1% of the Critical Load.

19.8 Inter-relationships

181. A summary of the likely inter-related effects arising from the proposed East Anglia ONE North development on air quality are presented in ***Table 19.35***.

Table 19.35 Inter-Relationships for Air Quality

Inter-relationship all Phases and Linked Chapter	Section where Addressed	Rationale
Chapter 22 Onshore Ecology	***Section 19.6.1.2.2***	Emissions from construction-generated traffic leads to increases in deposition of nutrient nitrogen at designated ecological sites
Chapter 26 Traffic and Transport	***Section 19.6.1.2*** ***Section 19.7.2.2***	Air quality is impacted by emissions from road traffic
Chapter 27 Human Health	***Section 19.6.1.2.2*** ***Section 19.6.1.2*** ***Section 19.7.2.1***	Human health is impacted by emissions from during construction works and from road traffic

19.9 Interactions

182. The impacts identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic impacts as a result of that interaction. The areas of interaction between impacts are presented in ***Table 19.36*** along with an indication as to whether the interaction may give rise to synergistic impacts. This provides a screening tool for which impacts have the

potential to interact. ***Table 19.37*** then provides an assessment for each receptor (or receptor group) related to these impacts in two ways. Firstly, the impacts are considered within a development phase (i.e. construction, operation or decommissioning) to see if, for example, multiple construction impacts could combine. Secondly, a lifetime assessment is undertaken which considers the potential for impacts to affect receptors across development phases. The significance of each individual impact is determined by the sensitivity of the receptor and the magnitude of effect; the sensitivity is constant whereas the magnitude may differ. Therefore, when considering the potential for impacts to be additive it is the magnitude of effect which is important – the magnitudes of the different effects are combined upon the same sensitivity receptor. If minor impact and minor impact were added this would effectively double count the sensitivity.

183. The receptors considered in the air quality assessment are:

- Human health (dust and traffic emissions); and
- Ecological (dust and traffic emissions).

Table 19.36 Interactions Between Impacts on Air Quality

Potential interactions between impacts		
Construction phase impacts		
	Impact 1: Construction dust and fine particulate matter	**Impact 2: Construction vehicle exhaust emissions**
Impact 1: Construction dust and fine particulate matter	-	Yes
Impact 2: Construction vehicle exhaust emissions	Yes	-
Operation phase impacts		
Operational impacts on air quality have been scoped out (SPR 2017)		
Decommissioning phase impacts		
No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.		

Table 19.37 Potential Interactions Between Impacts on Air Quality

Receptor	Construction	Operational	Decommissioning	Phase Assessment	Lifetime Assessment
Human Health (dust and traffic emissions)	Not significant	Scoped Out	Not significant	**No greater than individually assessed impact** For the two impacts (*Impact 1 dust emissions and Impact 2 traffic emissions*) there is potential for interaction, however both would be controlled and mitigated (***section 19.6.1.1, section 19.6.1.2***). Therefore, it is not considered that there is any greater impact than the impacts individually assessed.	**No greater than individually assessed impact** Given that there are no operational impacts, the time between the construction and decommissioning phases is too great for there to be a pathway of interaction between construction and decommissioning impacts.
Ecological (dust and traffic emissions)	Not significant	Scoped Out	Not significant	**No greater than individually assessed impact** For the two impacts (*Impact 1 dust emissions and Impact 2 traffic emissions*) there is potential for interaction, however both would be controlled and mitigated (***section 19.6.1.1, section 19.6.1.2***). Therefore, it is not considered that there is any greater impact than the impacts individually assessed.	**No greater than individually assessed impact** Given that there are no operational impacts, the time between the construction and decommissioning phases is too great for there to be a pathway of interaction between construction and decommissioning impacts.

19.10 Summary

184. A summary of the potential impacts identified in relation to air quality is provided in ***Table 19.38*** It was concluded that impacts on air quality associated with construction phase dust and road traffic emissions were not significant at both human and ecological receptors when considering the contribution of the proposed East Anglia ONE North project alone.

Table 19.38 Potential Impacts Identified for Air Quality

Potential Impact	Receptor	Sensitivity	Value	Magnitude	Significance	Mitigation Measures	Residual Impact
Construction							
Impact 1: Construction phase dust and fine particulate matter	Human receptors	Dust soiling: medium Human health: low	-	Large	Assessment methodology does not assign significance before mitigation	Embedded mitigation with additional measures as recommended by the IAQM Soil stockpile management measures e.g. seeding	Not significant
	Ecological receptors	High	-	Large			
Impact 2: Construction phase road traffic emissions	Human receptors	High	-	Negligible at all receptors	Not significant	Use of Euro VI HGVs during construction	Not significant
	Ecological receptors	High	-	Imperceptible at all receptors other than those closest to the road edge	Not significant		Not significant
Operation							
Operational phase air quality impacts have been scoped out (SPR 2017)							
Decommissioning							
No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.							

Potential Impact	Receptor	Sensitivity	Value	Magnitude	Significance	Mitigation Measures	Residual Impact
Cumulative Construction Impacts with Other Developments							
Impact 1: Construction phase dust and fine particulate matter	Human receptors	Dust soiling: medium Human health: low	-	Large	Assessment methodology does not assign significance before mitigation	Embedded mitigation with additional measures as recommended by the IAQM Soil stockpile management measures e.g. seeding	Not significant
	Ecological receptors	High	-	Large			
Impact 2: Construction phase road traffic emissions	The CIA has identified the potential for cumulative impacts with the Sizewell C New Nuclear Power Station. EDF Energy has advised that it is undertaking an additional phase of consultation (Stage 4). The proposed publication date of the EDF Stage 4 documentation mean it is unable to be incorporated into the proposed East Anglia ONE North project CIA. Therefore, the CIA presented in this ES examined the potential for cumulative impacts in a qualitative manner.						
Cumulative Operation Impacts with Other Developments							
Cumulative operational impacts were scoped out of the assessment, as detailed in ***section 19.4.4***							
Cumulative Decommissioning Impacts with Other Developments							
No decision has been made regarding the final decommissioning policy for the onshore infrastructure as it is recognised that industry best practice, rules and legislation change over time. An Onshore Decommissioning Plan will be provided, as secured under the requirements of the draft DCO. The onshore substation will likely be removed and be reused or recycled. It is anticipated that the onshore cable would be decommissioned (de-energised) and either the cables and jointing bays left *in situ* or removed depending on the requirements of the Onshore Decommissioning Plan approved by the Local Planning Authority. The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and agreed with the regulator. As such, for the purposes of a worst-case scenario, impacts no greater than those identified for the construction phase are expected for the decommissioning phase.							

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