East Anglia TWO Offshore Windfarm

Appendix 19.2

Air Quality Cumulative Impact Assessment with the Proposed East Anglia ONE North Project

Environmental Statement
Volume 3

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Glossary of Acronyms

AADT	Annual Average Daily Traffic
CCS	Construction Consolidation Sites
CIA	Cumulative Impact Assessment
DCO	Development Consent Order
ES	Environmental Statement
HDD	Horizontal Directional Drilling
HGV	Heavy Goods Vehicle
IAQM	The Institute of Air Quality Management
LAQM	Local Air Quality Management
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
TG	Technical Guidance
µg.m-3	Micrograms (of pollutant) per cubic meter (of air)

Glossary of Terminology

Applicant	East Anglia TWO 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 TWO project	The proposed project consisting of up to 75 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 TWO 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 TWO 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 TWO project to the national electricity grid which will be owned by National Grid but is being consented as part of the proposed East Anglia TWO 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 TWO 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 TWO 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 TWO project.
Transition Bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.

19.2 Cumulative Impact Assessment with the proposed East Anglia ONE North Project

19.1 Introduction

1. This appendix to ***Chapter 19 Air Quality*** covers the cumulative impact assessment of the proposed East Anglia TWO project with the proposed East Anglia ONE North project in relation to air quality.

2. The East Anglia ONE North offshore windfarm project (the proposed East Anglia ONE North project) is also in the application phase. The proposed East Anglia ONE North project has a separate Development Consent Order (DCO) which has been submitted at the same time as the proposed East Anglia TWO 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.

3. The proposed East Anglia TWO project Cumulative Impact Assessment (CIA) for air quality will therefore initially consider the cumulative impact with only the East Anglia ONE North project against two different construction scenarios (i.e. construction of the two projects simultaneously and sequentially). The realistic 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.

4. For a more detailed description of the CIA please refer to ***Chapter 5 EIA Methodology***.

19.2 Construction Scenarios Realistic Worst Case Parameters

5. This appendix considers the proposed East Anglia TWO project and the proposed East Anglia ONE North project under two construction scenarios:

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

6. As discussed in ***section 19.1***, the realistic worst case (based on the assessment of these two construction scenarios) for each impact is then carried through to

the wider CIA which considers other developments, projects or plans which have been screened into the CIA for the proposed East Anglia TWO project.

7. It should be noted that the operational phase impacts on air quality will be the same irrespective of the construction scenario. Therefore, operational impacts identified in scenario 1 will be the same as those for scenario 2.

8. Embedded and additional mitigation measures for the proposed East Anglia TWO project and proposed East Anglia ONE North project will be the same. These are detailed in ***Chapter 19 Air Quality***

19.2.1 Scenario 1

9. ***Table A19.1*** presents the realistic worst case parameters of scenario 1. In this instance, the proposed East Anglia TWO project and proposed East Anglia ONE North project are built simultaneously. Areas provided for onshore infrastructure are maximum footprints with indicative dimensions provided in brackets.

Table A19.1 Scenario 1 Realistic Worst Case

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	HDD temporary working area: 13,300m^2 (70m x 190m) Transition bay temporary working area (for 4 transition bays): 3,108m^2 (37m x 42m) Landfall Construction Consolidation Site (CCS) (x1): 14,080m^2 (88m x 160m)	Construction footprints are provided as a proxy for construction dust emissions
Impacts related to the onshore cable route	Onshore cable route: 581,824m^2 (9,091m x 64m) Jointing bay temporary working area: 570m^2 (30.6m x 18.6m). Total for 76 jointing bays: 43,320m^2 (570m^2 x 76) HDD (retained as an option to cross SPA / SSSI):	Construction footprints are provided as a proxy for construction dust emissions

Impact	Parameter	Notes
	Entrance pit temporary working area (x1): 12,250m^2 (175m x 70m) Exit pit temporary working area (x1): 5,250m^2 (175m x 30m) Onshore cable route large CCS (1): 33,000m^2 (165m x 200m). Onshore cable route medium CCS (2): 28,160m^2 total (88m x 160m per each medium CCS) Onshore cable route small CCS (2): 12,000m^2 total (120m x 50m per each small CCS) Total footprint of all onshore cable route CCS: 73,160m^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	
Impacts related to the onshore substations	Onshore substation CCS (x2): 34,200m^2 (190m x 90m per each onshore substation) Permanent footprint (used as CCS during construction) (x2): 72,200m^2 (190m x 190m per each onshore substation) Substation operational access road: 13,600m^2 (1,700m x 8m) Onshore substation approximate quantity of spoil material: 38,102m^3	Construction footprints are provided as a proxy for construction dust emissions
Impacts related to the National Grid Infrastructure	National Grid CCS: 23,350m^2 National Grid operational substation (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)	Construction footprints are provided as a proxy for construction dust emissions. AIS technology is assessed as the worst case due to a larger footprint. Futher detail regarding GIS tehcnology is provided in ***Chapter 6 Project Description***.

Impact	Parameter	Notes
	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)	
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.		

19.2.2 Scenario 2

10. ***Table A19.2*** presents the realistic worst case parameters of scenario 2. Scenario 2 represents the realistic worst-case in the eventuality that the proposed East Anglia TWO project and proposed East Anglia ONE North project are constructed sequentially. Areas provided for onshore infrastructure are maximum footprints with indicative dimensions provided in brackets.

11. Under scenario 2, either the proposed East Anglia TWO project or the proposed East Anglia ONE North project could be constructed first. However, there will be no difference in impact regardless of which project is constructed first. The CIA

presented in this ES is presented using the intended development strategy of the proposed East Anglia TWO project being constructed first. However, in the eventuality that the proposed East Anglia ONE North project is constructed first, the impacts presented would be the same. Further detail regarding the sequential construction is provided in ***Chapter 5 EIA Methodology***.

Table A19.2 Scenario 2 Realistic Worst Case

Impact	Proposed East Anglia TWO Project Parameters	Proposed East Anglia ONE North Project Parameters (on the assumption that the proposed East Anglia TWO project is post-construction)	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).	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.	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	HDD temporary working area: 7,000m^2 (70m x 100m) 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) Landfall transition bays approximate quantity of spoil material (for 2 transition bays): 454m^3	HDD temporary working area: 7,000m^2 (70m x 100m) 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) Landfall transition bays approximate quantity of spoil material (for 2 transition bays): 454m^3	Construction footprints are provided as a proxy for construction dust emissions
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)	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)	Construction footprints are provided as a proxy for construction dust emissions

Impact	Proposed East Anglia TWO Project Parameters	Proposed East Anglia ONE North Project Parameters (on the assumption that the proposed East Anglia TWO project is post-construction)	Notes
	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 Onshore cable trench approximate quantity of spoil material: 14,325m^3	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 Onshore cable trench approximate quantity of spoil material: 14,325m^3	

Impact	Proposed East Anglia TWO Project Parameters	Proposed East Anglia ONE North Project Parameters (on the assumption that the proposed East Anglia TWO project is post-construction)	Notes
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) Onshore substation approximate quantity of spoil material: 24,486m^3	Onshore substation CCS: 17,100m^2 (190m x 90m) Permanent footprint (used as CCS during construction): 36,100m^2 (190m x 190m) Onshore substation approximate quantity of spoil material: 24,486m^3	Construction footprints are provided as a proxy for construction dust emissions
Impacts related to the National Grid Infrastructure	National Grid CCS: 23,350m^2 National Grid operational substation (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	National Grid infrastructure will be constructed as part of the proposed East Anglia TWO project	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 GIS technology is provided in ***Chapter 6 Project Description***.

Impact	Proposed East Anglia TWO Project Parameters	Proposed East Anglia ONE North Project Parameters (on the assumption that the proposed East Anglia TWO project is post-construction)	Notes
	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)		
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 Cumulative Impact Assessment during Construction

12. The following sections discuss which of the two construction scenarios detailed in ***section 19.2*** will be the realistic worst case in terms of impacts to air quality.

19.3.1 Cumulative Impact 1: Construction Phase Dust and Fine Particulate Matter Emissions

13. Under scenario 2 each project is constructed individually, whereby any works are completed for the proposed East Anglia TWO project (full reinstatement), and then the proposed East Anglia ONE North project construction would follow at a later date. Therefore, the impact significance during construction of the proposed East Anglia TWO project alone will then be the same for construction of the proposed East Anglia ONE North project alone at the landfall, onshore cable route and substation sites. Therefore, under scenario 2, whilst acknowledging the repeated 3-year construction period and thereby the duration of impact is extended, the cumulative impact with the proposed East Anglia ONE North project under scenario 2 will be **not significant** as presented for the proposed East Anglia TWO project alone in ***Chapter 19 Air Quality*****.**

14. The following assessment was therefore carried out for scenario 1.

19.3.1.1 Step 1: Screen the need for a Detailed Assessment

15. The same receptors were identified and are considered to represent the worst-case for scenario 1 as for the proposed East Anglia TWO project alone assessment as detailed in ***section 19.6.1.1*** of ***Chapter 19 Air Quality***. A detailed assessment is therefore required.

19.3.1.2 Step 2A: Define the Potential Dust Emission Magnitude

16. The dust emission magnitude calculated for scenario 1 is presented in ***Table A19.3.***

Table A19.3 Defined Dust Emission Magnitudes Associated for each Construction Activity for Scenario 1

Construction Activity	Dust Emission Magnitude Assessment – Human Receptors	Dust Emission Magnitude Assessment – Ecological Receptors
Earthworks	• It was assumed that up to two CCS areas will be built within 350m of human receptors, as the worst case scenario is near the junction of two sections within the onshore development area each CCS having an area of 40,950m^2. • Earthworks within the onshore cable route will comprise removal and storage of topsoil, followed by excavation and reinstatement of 4 trenches • Total earthworks area is greater than 10,000m^2. • The dust emission magnitude is therefore Large.	• It was assumed that an HDD entrance and exit pit CCS are both located within 50m of the ecological receptor, with a combined footprint of 19,500m^2. • Total earthworks area is greater than 10,000m^2. • The dust emission magnitude is therefore Large.
Construction	• There are not anticipated to be any buildings constructed within the mobilisation areas, 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. • 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.

Construction Activity	Dust Emission Magnitude Assessment – Human Receptors	Dust Emission Magnitude Assessment – Ecological Receptors
Trackout	• There are greater than 50 outward daily Heavy Goods Vehicle (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.

17. The dust magnitudes for earthworks, construction and trackout associated with scenario 1 are summarised for each worst case area in ***Table A19.4.***

Table A19.4 Dust Emission Magnitudes for the onshore works - Scenario 1

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

19.3.1.3 Step 2B: Define the Sensitivity of the Area

18. The sensitivity of the area to dust soiling, human health impacts and ecological impacts remains as per the proposed East Anglia TWO project alone assessment, and is restated in ***Table A19.5***.

Table A19.5 Sensitivity of the Area to each activity - Scenario 1

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

19.3.1.4 Step 2C: Define the Risks of Impacts

19. The dust emission magnitude and sensitivity of the area are combined and the risk of impacts determined using ***TableA19.1*** – ***TableA19.7*** in ***Appendix 19.3***. The risks for dust soiling and human health are shown in ***Table A19.6.***

Table A19.6 Risk of Dust Impacts - Scenario 1

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

20. As described in ***section 19.6.1.1.4*** of ***Chapter 19 Air Quality***, the proposed East Anglia TWO project would employ embedded mitigation measures relating to construction dust. The Institute of Air Quality Management (IAQM) construction dust assessment methodology does not include the consideration of embedded mitigation measures when determining the potential risk of dust impacts.

21. Implementation of embedded mitigation measures would ensure that the risk of dust impacts is lower than those in ***Table A19.6.***

22. 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 earthworks, construction and trackout without the implementation of mitigation measures.

23. The identified level of dust risk for scenario 1 is the same as for the proposed East Anglia TWO project alone. Therefore, the mitigation measures detailed in ***section 19.6.1.1.5*** of ***Chapter 19 Air Quality*** remain applicable to scenario 1.

24. 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.

19.3.2 Cumulative Impact 2: Construction Phase Road Traffic Emissions

19.3.2.1 Human Receptors

25. The worst-case cumulative impact scenario for road traffic emissions was determined based on the change in traffic flows associated with scenario 1 and scenario 2. Traffic flows are expected to increase year on year, therefore the assessment of the years of project construction in 2030, under scenario 2, is the most conservative scenario with regard to total traffic movements. However, this far into the future, vehicle emissions would be lower than in preceding years due to the expected evolution of the vehicle fleet and the use of lower emission vehicles. Furthermore, there would be more construction works undertaken

under scenario 1 as both projects would be constructed simultaneously; therefore, there would be a higher project impact at receptors due to a greater number of vehicle movements. It is therefore considered that this higher magnitude of change represents the worst-case scenario, and therefore the cumulative assessment was carried out for scenario 1, commencing in 2023.

26. The 24-hour Annual Average Daily Traffic (AADT) flows and Heavy Goods Vehicle (HGV) percentages used in the cumulative scenario 1 assessment are detailed in ***Appendix 19.3***. It should be noted that traffic flows associated with both the proposed East Anglia TWO and East Anglia ONE North projects being constructed concurrently would not result in a simple doubling of traffic flows, as elements of the onshore infrastructure would be shared between the two projects. This is detailed further in ***Chapter 26 Traffic and Transport***.

27. Predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations for the 2023 year of peak construction 'with scenario 1' are detailed in ***Table A19.7*** to ***Table A19.910.*** Concentrations for 'without scenario 1' and the predicted change in NO_2, PM_{10} and $PM_{2.5}$ concentrations, as a result of Scenario 1, are also shown for comparison purposes.

Table A19.7 Annual Mean NO_2 results at Sensitive Human Receptor Locations – Scenario 1

Receptor ID	Annual mean NO_2 concentrations ($\mu g.m^{-3}$)				
	Without Scenario 1	With Scenario 1	Change	Change as % of Objective	Impact descriptor
R1	28.68	29.21	0.53	1%	Negligible
R2	16.47	16.71	0.24	1%	Negligible
R3	15.46	15.69	0.23	1%	Negligible
R4	14.34	14.46	0.12	0%	Negligible
R5	13.10	13.21	0.11	0%	Negligible
R6	12.10	12.25	0.15	0%	Negligible
R7	12.28	12.43	0.15	0%	Negligible
R8	11.97	12.06	0.09	0%	Negligible
R9	8.55	8.76	0.21	1%	Negligible
R10	7.76	7.91	0.15	0%	Negligible
R11	8.03	8.16	0.13	0%	Negligible
R12	7.90	8.00	0.10	0%	Negligible
R13	10.89	11.12	0.23	1%	Negligible

Receptor ID	Annual mean NO_2 concentrations ($\mu g.m^{-3}$)				
	Without Scenario 1	With Scenario 1	Change	Change as % of Objective	Impact descriptor
R14	10.20	10.36	0.16	0%	Negligible
R15	8.84	9.15	0.31	1%	Negligible
R16	8.74	9.04	0.30	1%	Negligible

Table A19.8 Annual Mean PM_{10} results at Sensitive Human Receptor Locations – Scenario 1

Receptor ID	Annual mean PM_{10} concentrations ($\mu g.m^{-3}$)				
	Without Scenario 1	With Scenario 1	Change	Change as % of Objective	Impact descriptor
R1	18.25	18.45	0.21	1%	Negligible
R2	16.61	16.70	0.09	0%	Negligible
R3	15.36	15.43	0.08	0%	Negligible
R4	14.95	15.03	0.08	0%	Negligible
R5	14.74	14.81	0.07	0%	Negligible
R6	16.22	16.29	0.07	0%	Negligible
R7	16.25	16.32	0.07	0%	Negligible
R8	15.07	15.12	0.05	0%	Negligible
R9	14.18	14.24	0.06	0%	Negligible
R10	14.77	14.81	0.04	0%	Negligible
R11	13.56	13.61	0.05	0%	Negligible
R12	13.90	13.94	0.04	0%	Negligible
R13	14.96	15.04	0.08	0%	Negligible
R14	15.54	15.59	0.06	0%	Negligible
R15	13.54	13.62	0.09	0%	Negligible
R16	13.52	13.60	0.08	0%	Negligible

Table A19.9 Short-Term PM_{10} Results at Sensitive Human Receptor Locations – Scenario 1

Receptor ID	Number of Exceedences of the Short-Term PM_{10} Objective (Days)		
	Without Scenario 1	With Scenario 1	Change
R1	2	2	0
R2	1	1	0
R3	0	0	0
R4	0	0	0
R5	0	0	0
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 A19.10 Annual Mean $PM_{2.5}$ results at Sensitive Human Receptor Locations - Scenario 1

Receptor ID	Annual mean $PM_{2.5}$ concentrations ($\mu g.m^{-3}$)				
	Without Scenario 1	With Scenario 1	Change	Change as % of Objective	Impact descriptor
R1	11.02	11.15	0.13	1%	Negligible
R2	9.78	9.83	0.05	0%	Negligible
R3	9.30	9.35	0.05	0%	Negligible
R4	9.07	9.12	0.05	0%	Negligible
R5	8.95	8.99	0.04	0%	Negligible
R6	9.25	9.29	0.04	0%	Negligible
R7	9.27	9.31	0.04	0%	Negligible
R8	9.05	9.08	0.03	0%	Negligible

Receptor ID	Annual mean $PM_{2.5}$ concentrations ($\mu g.m^{-3}$)				
	Without Scenario 1	With Scenario 1	Change	Change as % of Objective	Impact descriptor
R9	8.45	8.48	0.04	0%	Negligible
R10	8.54	8.57	0.03	0%	Negligible
R11	8.26	8.29	0.03	0%	Negligible
R12	8.46	8.49	0.02	0%	Negligible
R13	8.92	8.96	0.04	0%	Negligible
R14	9.01	9.04	0.03	0%	Negligible
R15	8.33	8.38	0.05	0%	Negligible
R16	8.32	8.36	0.05	0%	Negligible

28. The results of the scenario 1 road traffic emissions assessment show a similar pattern to those predicted for the proposed East Anglia TWO project alone assessment. 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 at all receptors, including within the Stratford St Andrew Air Quality Management Area (AQMA), both with and without scenario 1.

29. The change in pollutant concentrations was no greater than 1% at all receptors; this corresponded to a 'negligible' impact at all receptors, in accordance with IAQM and Environmental Protection UK (EPUK) guidance (IAQM and EPUK 2017).

30. As for the proposed East Anglia TWO project alone assessment, a sensitivity test was carried out to consider a scenario in which emissions would not improve from the base year (2018). The results of this sensitivity test are shown in ***Appendix 19.4.***

31. All predicted annual mean NO_2 concentrations were well below $60\mu g.m^{-3}$ and therefore, in accordance with Defra guidance in Local Air Quality Management Technical Guidance (LAQM.TG) (16) (Defra 2016), the 1-hour mean Objective is unlikely to be exceeded (see ***Table A19.11***). Based on the calculation provided by Defra, as detailed in ***section 19.4.3.2.9*** of ***Chapter 19 Air Quality***, the short-term PM_{10} objective was predicted to be met at all modelled locations, with fewer 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.

Table A19.11 Air Quality Strategy Objectives (England) for the Purposes of LAQM

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

32. The mitigation measures detailed in ***Chapter 19 Air Quality*** will also be applied to scenario 1, and therefore a reduction in pollutant concentrations would be experienced of a similar magnitude.

33. This assessment concludes that traffic impacts associated with scenario 1 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 selected receptor locations; and
- Scenario 1 traffic flows were not predicted to cause a breach of any of the air quality Objectives at any identified sensitive receptor location.

19.3.3 Ecological Receptors

34. The results of the cumulative assessment of nutrient nitrogen deposition on designated ecological sites are detailed in ***Table A19.12.***

Table A19.12 Nutrient Nitrogen Deposition Results

Designated ecological site	Transect ID	Habitat	Nutrient nitrogen deposition (kgN.ha.y^{-1})	
			Contribution from background traffic growth	Contribution from Scenario 1
Sandlings SPA/Leiston-Aldeburgh SSSI	T1-1	Broadleaved woodland	0.03	0.05
	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	0.01
	T2-3		0.00	0.00
	T2-4		0.00	0.00
	T2-5		0.00	0.00

Table A19.13 Nutrient Nitrogen Deposition as Percentage of Critical Load

Designated ecological site	Transect ID	Impact of Scenario 1 as Percentage of Critical Load			Impact of Scenario 1 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	0.5%	0.3%	0.2%	0.8%	0.5%	0.4%
	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%	0.2%	0.1%	0.3%	0.3%	0.2%
	T2-2	0.0%	0.0%	0.0%	0.1%	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%

35. As detailed in ***Table A19.13***, increases in nutrient nitrogen deposition as a result of scenario 1 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 scenario 1 in isolation is therefore considered to be not significant.

36. The 'in-combination' assessment showed that increases in nutrient nitrogen deposition were also below 1% of the Critical Loads. Impacts are therefore considered to be insignificant.

19.4 Summary

37. ***Table A19.14*** gives an overarching summary of which of the two construction scenarios, detailed above, will be the realistic worst case in terms of impacts relating to air quality.

Table A19.14 Summary of Scenario 1 and Scenario 2 Realistic Worst-Case Assumptions

Impact	Worst Case	Notes
Impact 1: Construction phase dust and fine particulate matter – Human and Ecological receptors	Scenario 1	Identified as worst case, but with mitigation measures is predicted not to be significant.
Impact 2: Construction phase road traffic emissions – Human receptors	Scenario 1	Identified as worst case, but with mitigation measures is predicted not to be significant.
Impact 2: Construction phase road traffic emissions – Ecological receptors	Scenario 1	Not significant

38. Overall, construction scenario 1 creates a realistic worst case in terms of impacts to air quality. Therefore, scenario 1 was carried through into the wider CIA with other developments.

19.5 References

Department for the Environment Food and Rural Affairs (Defra) (2016) Local Air Quality Management Technical Guidance Document Local Air Quality Management.TG (16) London: Defra

Environment Agency (2017) Air Emissions Risk Assessment for your Environmental Permit. [Online]. Available at: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) (2017). Land-Use Planning & Development Control: Planning for Air Quality.

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