East Anglia ONE North Offshore Windfarm

Appendix 6.4

Project Description East Anglia ONE North and East Anglia TWO Cumulative Project Descriptions

Applicant: East Anglia ONE North Limited
Document Reference: 6.3.6.4
SPR Reference: EA1N-DWF-ENV-REP-IBR-000343_004 Rev 021
Pursuant to APFP Regulation: 5(2)(a)

Author: Royal HaskoningDHV
Date: October 2019 15th December 2020
Revision: Version 021

Applicable to
East Anglia ONE North

Revision Summary				
Rev	**Date**	**Prepared by**	**Checked by**	**Approved by**
001	08/10/2019	Paolo Pizzolla	Ian Mackay	Helen Walker
002	15/12/2020	Paolo Pizzolla	Ian Mackay	Rich Morris

Description of Revisions			
Rev	**Page**	**Section**	**Description**
001	n/a	n/a	Final for Submission
002	n/a	n/a	Update for Deadline 3

Table of Contents

Appendix 6.3 is supported by the table listed below.

Table Number	Title
Table A6.1	Comparison between Scenarios for the proposed East Anglia ONE North and East Anglia TWO projects cumulative assessment

Glossary of Acronyms

CCS	Construction Consolidation Sites
CIA	Cumulative Impact Assessment
DCO	Development Consent Order
ES	Environmental Statement
HDD	Horizontal Directional Drilling
HE	Health England
LVIA	Landscape and Visual Impact Assessment
MW	Megawatt
NGET	National Grid Electricity Transmission
PEIR	Preliminary Environmental Information Report
ZTV	Zone of Theoretical Visibility

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.
Construction, operation and maintenance platform	A fixed offshore structure required for construction, operation, and maintenance personnel and activities.
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.
Inter-array cables	Offshore cables which link the wind turbines to each other and the offshore electrical platforms. These cables will include fibre optic cables.
Jointing bay	Underground structures constructed at 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.
Meteorological mast	An offshore structure which contains metrological instruments used for wind data acquisition.

Mitigation areas	Areas captured within the onshore development area specifically for mitigating expected or anticipated impacts.
Marking buoys	Buoys to delineate spatial features / restrictions within the offshore development area.
Monitoring buoys	Buoys to monitor *in situ* condition within the windfarm, for example wave and metocean conditions.
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.
Offshore cable corridor	This is the area which will contain the offshore export cables between offshore electrical platforms and landfall.
Offshore development area	The East Anglia ONE North windfarm site and offshore cable corridor (up to Mean High Water Springs).
Offshore electrical infrastructure	The transmission assets required to export generated electricity to shore. This includes inter-array cables from the wind turbines to the offshore electrical platforms, offshore electrical platforms, platform link cables and export cables from the offshore electrical platforms to the landfall.
Offshore electrical platform	A fixed structure located within the windfarm area, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore.
Offshore export cables	The cables which would bring electricity from the offshore electrical platforms to the landfall, these cables will include fibre optic cables.
Offshore infrastructure	All of the offshore infrastructure including wind turbines, platforms, and cables.
Offshore platform	A collective term for the construction, operation and maintenance platform and the offshore electrical platforms.
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.
Platform link cable	Electrical cable which links one or more offshore platforms. These cables will include fibre optic cables.
Safety zones	A marine area declared for the purposes of safety around a renewable energy installation or works / construction area under the Energy Act 2004.
Scour protection	Protective materials to avoid sediment being eroded away from the base of the foundations as a result of the flow of water.
Transition bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.

1 East Anglia ONE North and East Anglia TWO North Cumulative Project Descriptions

1.1 Changes to Previously Submitted Document

1. This Cumulative Project Description updates the previous version (APP-453) submitted with the Development Consent Order (DCO) application for the East Anglia ONE North project (the Project). The updates within this document take account of comments made by the Examining Authority in their first set of written questions and a commitment made by the Applicant at Deadline 2 (see ***Project Update Note*** (REP2-007) which confirms that should both the East Anglia ONE North project and the East Anglia TWO project be consented and then built sequentially, when the first project goes into construction, the ducting for the second project will be installed along the whole of the onshore cable route in parallel with the installation of the onshore cables for the first project. This will also include installing ducting using Horizontal Directional Drilling (HDD) at the landfall in parallel.

2. This updated document should be read in conjunction with the ***Onshore Cable Route Works Programme Clarification Note*** (document reference ExA.AS-10.D3.V1) submitted at Deadline 3 which provides supplementary information on the onshore cable route construction durations.

~~1.1~~1.2 Cumulative Project Descriptions

~~1.~~3. ~~The proposed East Anglia TWO project is also in the pre-application phase.~~ The proposed East Anglia TWO project ~~will have~~has submitted a separate DCO application ~~but is working to the same programme of submission as the proposed East Anglia ONE North project~~. The two projects will share the same landfall location, onshore cable route, National Grid infrastructure; and the two onshore substations will be co-located.

~~2.~~4. The proposed East Anglia ONE North project CIA will therefore initially consider the cumulative impact with the East Anglia TWO project and National Grid infrastructure 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 assessment which considers other developments which are in close proximity to the proposed East Anglia TWO project.

~~3.~~5. The two construction scenarios assessed are:

- 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 built sequentially (noting paragraph 1 above, that in this scenario the onshore cable ducting for the second project will be installed in parallel with the installation of the onshore cables for the first project).

6. 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 ONE North project being constructed first. However, in the eventuality that the proposed East Anglia TWO project is constructed first, the impacts presented would be the same.

7. As described in ***Chapter 5 EIA Methodology,*** there are two co-located onshore substation locations for either the proposed East Anglia TWO project or the proposed East Anglia ONE North project. The draft DCOs for both the proposed East Anglia TWO and East Anglia ONE North projects have the flexibility for either project to use either onshore substation location. The intended development strategy is for the proposed East Anglia TWO project to use the eastern location and the proposed East Anglia ONE North project to use the western location. Therefore, this is how the 'project alone' assessments in the onshore technical chapters (Chapters 18-30) are presented. There is no difference in the details provided below regardless of which onshore substation location is used by the proposed East Anglia ONE North project.

~~4.~~8. ***Table A6.1*** compares the East Anglia ONE North project in isolation with construction Scenario 1 and construction Scenario 2.

Table A1.1 Comparison between Scenarios for the proposed East Anglia ONE North and East Anglia TWO projects cumulative assessment

Parameter	East Anglia ONE North only	Scenario 1: East Anglia ONE North and East Anglia TWO constructed concurrently	Scenario 2: East Anglia ONE North and East Anglia TWO constructed sequentially
Landfall			
Number of cables	Up to 6 onshore cables, up to 2 fibre optic cables and up to 2 distributed temperature sensing (DTS) cables	Up to 12 onshore cables, up to 4 fibre optic cables and up to 4 DTS cables	
Number of transition bays	2	4	
Site description	Same site description (see ***Chapter 6 Project Description section 6.6.1***)		
Temporary roads assessment (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.6.2***)		
Horizontal Directional Drilling (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.6.3.1***)		
Transition bays (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.6.3.2***)		
Construction traffic and plant (not movements) (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.6.3.3***)		
Lighting (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.6.3.4***)		
Workforce (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.6.3.5***)		
Construction Programme	~~Same programme (see ***Chapter 6 Project Description section 6.9.1***)~~Up to 12 months	Up to 20 months	Up to 16 months for the first project Up to 4 months for the second project~~Up to 20 months for East Anglia ONE North and up to 20 months for East Anglia TWO later~~

Parameter	East Anglia ONE North only	Scenario 1: East Anglia ONE North and East Anglia TWO constructed concurrently	Scenario 2: East Anglia ONE North and East Anglia TWO constructed sequentially
Commissioning and Reinstatement ~~(methodology)~~Programme	~~Same methodology (see ***Chapter 6 Project Description section 6.6.3.6***)~~Up to 6 months	Up to 6 months	Up to 6 months for the first project. Up to 4 months for the second project
Operation and maintenance (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.6.4***)		
Decommissioning (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.6.5***)		
Onshore Cable Route			
Site description	Same description (see ***Chapter 6 Project Description section 6.7.1***)		
Cables and ducts	Same description (see ***Chapter 6 Project Description section 6.7.2.1***)		
Cable jointing and jointing pits	Two jointing bays per location, approximately 19 jointing bays locations.	~~Two~~ Four jointing bays per location, approximately 19 jointing bays locations.	
Preparation of the onshore cable route width	Construction activities would be undertaken within a temporarily fenced strip of land, known as the onshore cable route width, which would generally be no wider than 32m. Construction activities include the establishment of temporary infrastructure such as haul roads along the length of the onshore cable route, surface water management infrastructure; fencing and	Construction activities would be undertaken within a temporarily fenced strip of land, known as the onshore cable route ~~width~~, which would generally be no wider than 64m (total for both projects). Construction activities include the establishment of temporary infrastructure such as haul roads along the length of the onshore cable route, surface water management infrastructure; fencing and	~~Construction activities would be undertaken within a temporarily fenced strip of land, known as the onshore cable route width, which would generally be no wider than 32m.~~ Assuming that the proposed East Anglia ONE North project is constructed first~~, then the proposed East Anglia TWO project would also have a similar onshore cable route width (32m), with a cumulative width of 64m.~~: • Construction of East Anglia TWO onshore cables and East Anglia

Parameter	East Anglia ONE North only	Scenario 1: East Anglia ONE North and East Anglia TWO constructed concurrently	Scenario 2: East Anglia ONE North and East Anglia TWO constructed sequentially
	establishment of Construction Consolidation Sites (CCS).	establishment of Construction Consolidation Sites (CCS). Opportunities will be explored to share infrastructure between both projects (i.e. use of a common temporary haul road) to reduce the combined onshore cable route width.	ONE North onshore cable ducts would include those activities listed in Scenario 1 within the working widths specified for that scenario • Completion of the East Anglia TWO onshore cables will require temporary infrastructure such as haul roads to be installed (where required) to access the key work areas such as jointing bays and CCSs; and surface water management infrastructure would be established. Given the reduced infrastructure required for the East Anglia TWO project in this scenario, the Applicant would seek to reduce the onshore cable route width to 16.1m where practicable (i.e. in areas where only a haul road and associated surface water management is required).
Installation of onshore cables	The onshore cables for East Anglia ONE North would be installed in two parallel trenches (either laid directly within each trench or ducts would be laid for subsequent cable installation) with sand and originally excavated backfill, where suitable. In all there	The onshore cables for the proposed East Anglia ONE North project would be installed in two parallel trenches (either laid directly within each trench or ducts would be laid for subsequent cable installation) with sand and originally excavated backfill, where suitable. In all there would be six	Assuming that the proposed East Anglia ONE North project is constructed first: • The onshore cables for East Anglia ONE North would be installed in two parallel trenches (either laid directly within each trench or ducts would be laid for

Parameter	East Anglia ONE North only	Scenario 1: East Anglia ONE North and East Anglia TWO constructed concurrently	Scenario 2: East Anglia ONE North and East Anglia TWO constructed sequentially
	would be six power cables, two fibre-optic cables and two DTS cables. New joint bays will be constructed along the onshore cable route to allow for jointing of the onshore cables. Joint bays will subsequently be backfilled.	power cables, two fibre-optic cables and two DTS cables. In addition, two parallel trenches would be excavated, ~~or ducts installed~~ for the proposed East Anglia TWO project. ~~In total, four trenches would be excavated, each laid with two ducts, or cables laid directly. This would total six power cables, two fibre-optic cables and two DTS cables for the proposed East Anglia ONE North and six power cables, two fibre-optic cables and two DTS cables for the East Anglia TWO projects.~~in the same manner as for East Anglia ONE North, to accommodate six power cables, two fibre-optic cables and two DTS cables to serve the East Anglia TWO project. New joint bays will be constructed along the onshore cable route to allow for jointing of the onshore cables. Joint bays will subsequently be backfilled.	subsequent cable installation) with sand and originally excavated backfill, where suitable. In all there would be six power cables, two fibre-optic cables and two DTS cables. • New joint bays will be constructed along the onshore cable route to allow for jointing of the onshore cables. Joint bays will subsequently be backfilled. • In addition, two parallel trenches would be excavated for the proposed East Anglia TWO project in the same manner as for East Anglia ONE North to accommodate the onshore cable ducts for the future installation of six power cables, two fibre-optic cables and two DTS cables to serve the East Anglia TWO project. • Completion of the East Anglia TWO onshore cables at a later date will require duct integrity testing, repair and dewatering/cleaning (where required); new joint bays and the pulling of onshore cables through the pre-installed cable ducts.

Parameter	East Anglia ONE North only	Scenario 1: East Anglia ONE North and East Anglia TWO constructed concurrently	Scenario 2: East Anglia ONE North and East Anglia TWO constructed sequentially
			Joint bays will subsequently be backfilled.
Reduced working width	A reduced onshore cable route width of 16.1~~0~~m is proposed at woodland and important hedgerows identified within the draft DCO (classified as important due to ecological, cultural heritage or landscape criteria). This includes where the onshore cable route interacts with the woodland to the west of Aldeburgh Road and within the woodland to the east of Aldeburgh Road to within 40m of the Hundred River's western bank.	Where the East Anglia ONE North project is constructed in parallel with the East Anglia TWO project, the onshore cable route working width will be 27.1m within the woodland to the west of Aldeburgh Road and within the woodland to the east of Aldeburgh Road to within 40m of the Hundred River's western bank. A reduced combined onshore cable route width of 32.2m (as opposed to 64m) is proposed at important hedgerows identified within the draft DCO (classified as important due to ecological, cultural heritage or landscape criteria).~~A reduced onshore cable route width of 27.1m is proposed at the north of Fitches Lane woodland. A reduced onshore cable route width of 32.2m is proposed at hedgerows classified as important due to ecological, cultural heritage or landscape criteria, and for the potential open-cut trenching methodology if selected to cross the Leiston-Aldeburgh SSSI / Sandlings SPA.~~	Assuming that the proposed East Anglia ONE North project is constructed first: • Construction of the East Anglia ONE North onshore cable and the East Anglia TWO onshore cable ducts would be undertaken in line with the reduced working width described for scenario 1. • During completion of the East Anglia TWO onshore cables, the onshore cable route would reduce to 16.1m at woodland and important hedgerows identified within the draft DCO (classified as important due to ecological, cultural heritage or landscape criteria). This includes where the onshore cable route interacts with the woodland to the west of Aldeburgh Road and within the woodland to the east of Aldeburgh Road to within 40m of the Hundred River's western bank. ~~.A reduced onshore cable route width of 27.1m is proposed at the north of Fitches Lane woodland for both projects. A reduced onshore cable route~~

Parameter	East Anglia ONE North only	Scenario 1: East Anglia ONE North and East Anglia TWO constructed concurrently	Scenario 2: East Anglia ONE North and East Anglia TWO constructed sequentially
			~~width of 16.1m is proposed at hedgerows classified as important due to ecological, cultural heritage or landscape criteria, and for the potential open-cut trenching methodology if selected to cross the Leiston-Aldeburgh SSSI / Sandlings SPA, for each project. Assuming the proposed East Anglia ONE North project is constructed first, then the proposed East Anglia TWO project would also have a similar reduced onshore cable route width of 16.10m, with a cumulative reduced onshore cable route width of 32.2m.~~
~~Special crossings~~Leiston Aldeburgh SSSI / Sandlings SPA crossing	Where the Leiston Aldeburgh SSSI / Sandlings SPA crossing is undertaken using an open-cut trenching methodology, the maximum width of the onshore cable corridor will be restricted to 16.1m within the SSSI / SPA boundary. For the medium scale ~~HDD~~ trenchless technique crossing ~~(~~at the SSSI~~/ and~~ SPA~~AC~~ crossing point~~)~~, a typical working area of approximately 70m x 90m, or variations of these dimensions, would be required at the ~~HDD~~ rig site to accommodate the	Where the Leiston Aldeburgh SSSI / Sandlings SPA crossing for both the East Anglia ONE North and East Anglia TWO projects are undertaken simultaneously using an open-cut trenching methodology, the maximum width of the combined onshore cable corridor will be restricted to 32.2m (i.e. 16.1m per project) within the SSSI / SPA boundary. ~~Special crossings would match that as described in ***Chapter 6 Project Description section 6.7.3.10*** with~~	Assuming that the proposed East Anglia ONE North project is constructed first: • Construction of East Anglia ONE North onshore cable and East Anglia TWO onshore cable ducts would be undertaken as described for scenario 1. • During completion of the East Anglia TWO onshore cable route at a later date, the East Anglia TWO cables would be pulled through ducts, between either the footprint of the original trenchless

Parameter	East Anglia ONE North only	Scenario 1: East Anglia ONE North and East Anglia TWO constructed concurrently	Scenario 2: East Anglia ONE North and East Anglia TWO constructed sequentially
	drilling rig itself, as well as ancillary equipment, offices, working facilities and storage of bentonite (drilling fluid), water and drill pipes. At the exit side of each crossing an area of approximately 3~~7~~0m x 90m would be required to encompass the exit pit and the mud storage tanks.	~~the exception that f~~For the medium scale trenchless technique ~~HDD (~~at the SSSI/SPA ~~and Special Protection Area (SPA)~~ crossing ~~point)~~, a typical working area of approximately 70m x 175m, or variations of these dimensions, would be required at the ~~HDD~~ rig site to accommodate the drilling rig itself, as well as ancillary equipment, offices, working facilities and storage of bentonite (drilling fluid), water and drill pipes. At the exit side of each crossing an area of approximately 30m x 175m would be required to encompass the exit pit and the mud storage tanks.	technique entry/exit pits (located outside the SPA/SSSI), or between the project's jointing bays.~~Special crossings would match that as described in ***Chapter 6 Project Description section 6.7.3.10*** with the exception that for medium scale HDD (at the SSSI and SPA crossing point), a typical working area of approximately 70m x 90m, or variations of these dimensions, would be required at the HDD rig site to accommodate the drilling rig itself, as well as ancillary equipment, offices, working facilities and storage of bentonite (drilling fluid), water and drill pipes. At the exit side of each crossing an area of approximately 70m x 90m would be required to encompass the exit pit and the mud storage tanks. At a later date, the second project would use similar dimensions for special crossings.~~
Pre-construction works (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.3.2***)		
Topsoil stripping (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.3.5***)		
Temporary roads (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.3.6***)		

Parameter	East Anglia ONE North only	Scenario 1: East Anglia ONE North and East Anglia TWO constructed concurrently	Scenario 2: East Anglia ONE North and East Anglia TWO constructed sequentially
Cable delivery (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.3.8***)		
Cable pulling and installation (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.3.9***)		
Temporary works (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.3.11***)		
Construction traffic and plant	An initial assessment of the number of vehicle movements required (for the delivery of equipment, and personnel) associated with the construction of the cable route per separate construction sections has been estimated at approximately an average of 65 two-way movements per day for Section 1, 69 two-way movements per day for Section 2, 53 two-way movements per day for Section 3, and 105 two-way movements per day for Section 4.	For construction traffic and plant, an initial assessment of the number of vehicle movements required (for the delivery of equipment, and personnel) associated with the construction of the cable route per separate construction sections has been estimated at approximately an average of 78 two-way movements per day for Section 1, 80 two-way movements per day for Section 2, 64 two-way movements per day for Section 3, and 119 two-way movements per day for Section 4.	~~An initial assessment of the number of vehicle movements required (for the delivery of equipment, and personnel) associated with the construction of the cable route per separate construction sections has been estimated at approximately an average of 65 two-way movements per day for Section 1, 69 two-way movements per day for Section 2, 53 two-way movements per day for Section 3, and 105 two-way movements per day for Section 4.~~ ~~The proposed East Anglia ONE North project would have similar approximate movements per day.~~ Assuming East Anglia ONE North is constructed first: • East Anglia ONE North construction together with the installation of the East Anglia TWO onshore cable ducts would require fewer movements than scenario 1 (as jointing bays and

Parameter	East Anglia ONE North only	Scenario 1: East Anglia ONE North and East Anglia TWO constructed concurrently	Scenario 2: East Anglia ONE North and East Anglia TWO constructed sequentially
			cables for East Anglia TWO will not be installed at that time) • East Anglia TWO would require fewer movements than for the East Anglia ONE North only scenario, however until the location of jointing bays is known the extent of any reduction in haul road required cannot be ascertained and therefore the reduction of materials required (and associated reduction in movements) are not yet known. Notwithstanding, it is anticipated there will be a reduction in haul road length with an associated reduction in HGV movements (relative to -East Anglia ONE North only). Note that for East Anglia THREE the length of haul road required for cable installation (i.e. pulling cables through ducts installed by East Anglia ONE) will be approximately half of the total length of the offshore cable corridor • The cumulative assessment remains valid as the cumulative case was determined by the daily worst case peak construction traffic movements, derived from

Parameter	East Anglia ONE North only	Scenario 1: East Anglia ONE North and East Anglia TWO constructed concurrently	Scenario 2: East Anglia ONE North and East Anglia TWO constructed sequentially
			Scenario 1 Projects' parameters. This worst case traffic scenario is not changed by the introduction of a parallel duct installation scenario.
Lighting (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.3.13***)		
Workforce	The total number of construction employees required has been estimated at approximately an average of 22 construction personnel associated with Section 1 of the onshore cable route, 24 personnel per day for Section 2, 19 personnel per day for Section 3, and 40 personnel per day for Section 4.	Construction workforce would match that as described in *section 6.9.3.13* with the exception that the total number of construction employees required has been estimated at approximately an average of 26 construction personnel associated with Section 1 of the onshore cable route, 27 personnel per day for Section 2, 23 personnel per day for Section 3, and 43 personnel per day for Section 4. The estimated programme would remain as outlined in ***section 6.9.3.13***	Assuming East Anglia ONE North is constructed first: • The total number of construction employees required for East Anglia ONE North construction with installation of East Anglia TWO cable ducts would not exceed those required under scenario 1. • The total number of construction employees required for East Anglia TWO cable installation would not exceed those required for East Anglia ONE North only scenario. ~~The total number of construction employees required has been estimated at approximately an average of 22 construction personnel associated with Section 1 of the onshore cable route, 24 personnel per day for Section 2, 19 personnel~~

Parameter	East Anglia ONE North only	Scenario 1: East Anglia ONE North and East Anglia TWO constructed concurrently	Scenario 2: East Anglia ONE North and East Anglia TWO constructed sequentially
			~~per day for Section 3, and 40 personnel per day for Section 4.~~ ~~The proposed East Anglia TWO project would have similar personnel per day.~~
Construction Programme	Up to 24 months	Up to 24 months	Up to 24 months for the first project. Up to 12 months for the second project
Commissioning and Reinstatement ~~(methodology)~~Programme	Up to 6 months~~Same methodology (see ***Chapter 6 Project Description section 6.7.3.17***)~~	Up to 6 months	Up to 6 months for the first project. Up to 6 months for the second project
Operation and maintenance (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.6.4***)		
Decommissioning (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.6.5***)		
Substation(s)			
Onshore substation infrastructure	The proposed East Anglia ONE North project onshore substation would be located within a single compound, with up to maximum dimensions of ~~190m~~ 170m (width) x 190m (length) x up to 14~~18~~m (height) for external electrical equipment, or up to ~~15m~~ 14m (height) for the tallest building.	The proposed East Anglia TWO onshore substation is a duplication of the proposed East Anglia ONE North onshore substation~~ as outlined in ***Chapter 6 Project Description section 6.7.7*** and ***Table 6.28***,~~ that would be located immediately adjacent to the East Anglia ONE North onshore substation.	

Parameter	East Anglia ONE North only	Scenario 1: East Anglia ONE North and East Anglia TWO constructed concurrently	Scenario 2: East Anglia ONE North and East Anglia TWO constructed sequentially
National Grid substation infrastructure	The National Grid substation would be located within a single compound, with up to maximum dimensions of 145m (width) x 310m (length) x up to 6m (height) for the tallest Air Insulates Switchgear (AIS) building.	Only one National Grid substation is required for the proposed East Anglia TWO and East Anglia ONE North projects. The two SPR onshore substations would share the National Grid infrastructure and connection to the overhead lines (as per ***Chapter 6 Project Description section 6.7.9***). ~~The Applicant's preferred arrangement of all three substations is shown in ***Figure 6.5***.~~	
Site establishment and laydown	East Anglia ONE North: up to 17,100m^2 in area plus the 190m x ~~190m~~ 170m footprint of the onshore substation.	East Anglia TWO and East Anglia ONE North: up to maximum of 2 CCS of 17,100m^2 in area plus the 190m x ~~190m~~ 170m footprint of the onshore substations.	
Pre-construction activities (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.8.2***)		
Temporary fencing (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.8.4***)		
Grading and earthworks (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.8.6***)		
Surface water drainage (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.8.7***)		
Foul drainage (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.8.8***)		
Foundations (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.8.10***)		
Buildings (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.8.9***)		
Installation works (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.8.12***)		

Parameter	East Anglia ONE North only	Scenario 1: East Anglia ONE North and East Anglia TWO constructed concurrently	Scenario 2: East Anglia ONE North and East Anglia TWO constructed sequentially
Lighting (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.8.14***)		
Workforce (methodology)	Same methodology (see ***Chapter 6 Project Description section 6.7.8.15***)		
Construction Programme	For an outline programme for the construction of the onshore substation see ***Chapter 6 Project Description section 6.7.9.3***. For National Grid substation and overhead line see ***Chapter 6 Project Description section 6.9.4*** and ***section 6.9.5***.	For an outline programme for the construction of the onshore substation see ***Chapter 6 Project Description section 6.9.3***. For National Grid substation and overhead line see ***Chapter 6 Project Description section 6.9.4*** and ***section 6.9.5***.	The outline programme for the construction of the proposed East Anglia ONE North project onshore substation matches that as described in ***Chapter 6 Project Description section 6.9.3***. The outline programme for the construction of the proposed East Anglia TWO project onshore substation would be duplicated at a different date. The ES assessment assumes full reinstatement of the first project before construction of the second project begins. For National Grid substation and overhead line see ***Chapter 6 Project Description section 6.9.4*** and ***section 6.9.5***.
Operation	Same methodology (see ***Chapter 6 Project Description section 6.7.11***)		
Decommissioning	Same methodology (see ***Chapter 6 Project Description section 6.7.12***)		