

# Outer Dowsing Offshore Wind Preliminary Environmental Information Report Volume 2, Appendix 19.2: NRMM Emissions Assessment

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**OUTER DOWSING OFFSHORE WIND  
PRELIMINARY ENVIRONMENTAL  
INFORMATION REPORT**

**VOLUME 2, APPENDIX 19.2:  
NRMM EMISSIONS ASSESSMENT**

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## 1.0 NRMM Emissions Assessment

The scope of the assessment is to understand potential air quality effects associated with emissions generated by Non-Road Mobile Machinery (NRMM) during the construction phase of Outer Dowsing Offshore Wind ('the Project'). This is in response to comments from The Inspectorate contained within the Scoping Opinion (The Inspectorate, 2022).

### 1.1 Background

According to the Institute of Air Quality Management (IAQM) 'Guidance on the Assessment of Dust from Demolition and Construction' (IAQM, 2016), experience of assessing exhaust emissions from NRMM suggests that they are unlikely to have significant effects on local air quality. Furthermore, in accordance with the Department for Environment, Food and Rural Affairs (Defra) Local Air Quality Management Technical Guidance (TG22) (LAQM.TG22) (Defra, 2022), providing suitable controls are applied, emissions generated from NRMM are unlikely to contribute to a significant effect upon local air quality.

Consistent with advice provided by the IAQM and Defra, it was initially proposed to scope out effects associated with emissions generated from NRMM used during the construction phase of the Project on the basis that suitable controls will be applied. A series of example controls were included within the Scoping Report (ODOW, 2022).

In the Scoping Opinion (The Inspectorate, 2022), The Inspectorate stated that there was insufficient information on the type, quantity and use of NRMM during the construction phase to scope this matter out of the assessment. The Inspectorate therefore recommended to undertake an assessment of emissions generated from the operation of NRMM during construction.

A series of construction phase control measures will be included within the Code of Construction Practice (CoCP) to minimise NRMM emissions. These are outlined within the Outline Air Quality Management Plan (Document Reference: 8.1.2). Implementation of the CoCP will be secured as a requirement of the Development Consent Order (DCO).

In recognition of The Inspectorate's recommendations, a qualitative assessment of NRMM emissions has been undertaken to inform the likelihood of a significant effect arising during the construction phase. A qualitative approach to NRMM assessment is supported by both the IAQM and Defra, whereby their guidance documents (IAQM, 2016 and Defra, 2022) state that "*in the vast majority of cases they (NRMM) will not need to be quantitatively assessed*". Defra's LAQM.TG22 details a series of factors which can provide sufficient screening for a qualitative assessment.

### 1.2 Assessment Methodology

With reference to LAQM.TG22, the qualitative assessment will consider the following factors:

- Duration of construction works and associated phasing plans (where available);
- The number and type of NRMM to be used (including the emissions standards of the NRMM);
- Operating hours of NRMM;
- Proximity of sensitive receptors to NRMM working areas; and
- Existing air quality conditions in the area (e.g., Defra background pollutant concentrations).

Following a review of approaches adopted for other Nationally Significant Infrastructure Projects (NSIPs) where extensive onshore construction activities are proposed, a 50m distance screening threshold in relation to NRMM emissions has previously been accepted by statutory consultees and The Inspectorate. Following submission and with use of this distance screening threshold, the DCO for the Northampton Gateway Rail Freight Interchange was

awarded by the Secretary of State in 2019<sup>1</sup>. Use of 50m for screening impacts from NRMM emissions is considered appropriate. The basis for this distance screening threshold relates to guidance provided in LAQM.TG22, used for the purposes of establishing background monitoring stations to ensure there is no additional influence of local pollution sources:

*“For urban background or suburban sites there should be no major sources of pollution (for example a large multi-storey car park) within 50m. There should be no medium sized emission sources (for example, petrol stations, boiler vents, or ventilation outlets to catering establishments) within 20m.”*

As detailed, the 50m distance threshold relates to major sources of pollution. NRMM emissions generated by Project activity are not considered to be comparable to major sources of pollution (for example a large multi-storey car park). Furthermore, in consideration of likely construction activities, the extent of NRMM used during the construction phase of the Project is likely to be lower than that used to facilitate the construction of the Northampton Gateway Rail Freight Interchange. Construction activities for the Project will also occur in a temporary and mobile manner (e.g., across the spatial extent of the onshore Export Cable Corridor (ECC)). Exposure to emission contributions will therefore be transient. Whereas for the Northampton Gateway Rail Freight Interchange, construction activities will be confined to a smaller boundary where exposure to NRMM emissions is likely to be constant. In this context, use of 50m to screen impacts from NRMM is considered to be overly precautionary.

A 50m distance screening threshold in relation to NRMM emissions has been applied to the onshore PEIR boundary to inform the spatial extent of affected receptors (human and ecological). Use of the onshore PEIR boundary for the purposes of informing the extent of NRMM emissions is conservative, as the boundary represents the maximum design parameters/extents of any proposed construction area. In addition, it assumes that NRMM will be located concurrent with the boundary, which is highly unlikely to be the case; as NRMM locations will vary across the active construction area and will not typically be operated continuously at the boundary. The NRMM assessment will be repeated at Environmental Statement (ES) stage, following refinement of design parameters.

## 1.3 Baseline Environment

This section presents the baseline environment in relation to NRMM, including NRMM emissions regulation and background air quality.

### 1.3.1 NRMM Emissions Regulation

NRMM emissions are controlled through European Directives (e.g., Regulation EU 2016/1628) in terms of maximum operable emission limits. Emissions standards are applied to NRMM engines at the point of placing on the market and typically become stricter following the introduction and availability of cleaner technologies and fuels. The most recent stringent emission standards, Stage V, were effective from 2019 for engines below 56kW and above 130kW, and from 2020 for engines of 56-130kW.

### 1.3.2 Background Pollutant Concentrations

As discussed in Volume 1, Chapter 19: Onshore Air Quality, Defra maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution. The datasets include annual average concentration estimates for NO<sub>x</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> using a reference year of 2018 (the year in which comparisons between modelled and monitored concentrations are made).

Consideration has been given to pollutant concentrations reported for the first year of construction activities associated with the Project. Use of 2027 datasets to characterise baseline pollutant concentrations for the whole construction phase is conservative, in recognition of the forecast improvements to air quality (associated with the introduction of policy and cleaner emission technologies/restrictions). Baseline concentrations anticipated beyond

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<sup>1</sup> Statutory Instruments. 2019 No. 0000 Infrastructure Planning. The Northampton Gateway Rail Freight Interchange Order 2019. <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR050006/TR050006-001344-191009%20Northampton%20Gateway%20Rail%20Freight%20Interchange%20Order%20-%20PINS.pdf>

2027 are expected to be lower in comparison to those reported. The start of the construction phase (2027) also coincides with the greatest extent of potential NRMM activity and is therefore worst-case with respect to potential emission contributions and background pollutant levels. Pollutant concentrations for the assessment base year of 2019 have also been provided as a comparison and to inform the evolution of the baseline.

The maximum values from the grid squares covered by the onshore PEIR boundary are provided in Table 1-1. The corresponding annual mean Air Quality Assessment Levels (AQALs) and/or Critical Levels (where available) are provided for comparison.

**Table 1-1 – Maximum Defra Mapped Background Pollutant Concentrations**

Pollutant		Year	Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ )	
			Maximum Background	AQAL or Critical Level
Nitrogen Oxides	NO <sub>x</sub>	2019	12.1	30
		2027	9.6	
Nitrogen Dioxide	NO <sub>2</sub>	2019	9.2	40
		2027	7.4	
Particulate Matter	PM <sub>10</sub>	2019	16.8	40
		2027	15.8	
	PM <sub>2.5</sub>	2019	9.4	25
		2027	8.5	

The maximum annual mean background concentrations are well below the respective AQALs and Critical Levels in both 2019 and 2027. Therefore, a large headroom exists where NRMM activity is likely to interact with onshore sensitive receptors.

## 1.4 Affected Receptors

A review of onshore sensitive receptor locations (human and ecological) within 50m of potential NRMM activity has been undertaken (i.e. areas within proximity to the onshore PEIR boundary). Outcomes of this exercise will be used to identify whether receptors are present and further assessment is required. The areas affected by potential NRMM activity are presented in Volume 1, Chapter 19: Onshore Air Quality Figure 19.4.

### 1.4.1 Human Receptors

There are human receptors located within 50m of the onshore PEIR boundary, which could potentially be impacted by NRMM activity. In some areas, this is sporadic and amounts to singular properties or receptor exposure locations, however, is more concentrated in others. Key settlements in proximity include:

- Anderby Creek – coastal village near the landfall;
- Mumby – village located near the onshore ECC (Lincolnshire Node);
- Hogsthorpe – village located near the onshore ECC (Weston Marsh);
- Butterwick – village located near the onshore ECC (Weston Marsh);
- Fosdyke – village located near the onshore ECC (Weston Marsh);
- Wainfleet All Saints – town located near the onshore ECC (Weston Marsh);
- Wainfleet St Mary – village located near the onshore ECC (Weston Marsh); and
- Friskney – village located near the onshore ECC (Weston Marsh).

The receptor locations will be examined in further detail to consider the specific NRMM activities which have the potential to affect them and existing baseline conditions, to determine the likelihood of a significant effect arising. This is discussed in Section 1.5.5.

## 1.4.2 Ecological Receptors

Table 1-2 details the extent of designated ecological sites within 50m of potential NRMM activity, the applicable onshore ECC route segment and extent of the affected area (%) within each of the designations. These locations are illustrated in Volume 1, Chapter 19: Onshore Air Quality Figure 19.4.

The Air Pollution Information System (APIS)<sup>2</sup> was reviewed to provide an indication of the habitats present and their potential sensitivity to air pollution. This was undertaken for the Greater Wash Special Protection Area (SPA) and Sea Bank Clay Pits Site of Special Scientific Interest (SSSI) only, given the functionality and availability of data on APIS.

For the Greater Wash SPA, habitats/features listed on APIS potentially sensitive to air pollution include coastal stable dune grasslands – both acid and calcareous types, shifting coastal dunes, acid grassland, and calcareous grassland (using base cation).

For the Sea Bank Clay Pits SSSI, habitats/features listed on APIS potentially sensitive to air pollution is rich fens.

At PEIR stage, the presence or absence of the listed habitats/features has not been confirmed by habitat surveys. Therefore, for the present NRMM assessment it has been assumed that habitats sensitive to air pollution are present in the SPA and SSSI designations within 50m of potential NRMM activity.

To follow a similar approach, it has been assumed that habitats/features sensitive to air pollution are present in the Local Nature Reserve (LNR), Local Wildlife Site (LWS) and Lincolnshire Wildlife Trust reserves (LWT) within 50m of potential NRMM activity. This is considered conservative as it assumes sensitivity to air pollution, which may not necessarily be the case.

**Table 1-2 – Details of Affected Designated Ecological Sites**

Site Name	Designation	Route Segment	Extent of Affected Area (%) within Designation
Greater Wash	SPA	LN1 - Landfall to A52 – Mumby / WM1 - Landfall to A52 – Hogsthorpe	0.02
Sea Bank Clay Pits	SSSI		43.6
Havenside	LNR	WM10 - Church End Lane to The Haven	8.2
Risegate Eau	LWS / LWT	WM13 - Fosdyke Bridge to Weston Marsh Substation North	5.7
Moulton Marsh		WM14 - Fosdyke Bridge to Weston Marsh Substation South	19.7
Havenside		WM10 - Church End Lane to The Haven	9.8
Hobhole Bank			78.3
Hobhole Drain, Baker's Bridge South			12.8
Shore Road Drain		WM9 - Crowhall Lane to Church End Lane	18.7
Doves' Lane Drains		A5 - Ings Drove to Church End Lane	80.4
Hogsthorpe Pit		WM1 - Landfall to A52 – Hogsthorpe	44.1
Spendluffe Meadows		LN2 - A52 – Mumby to Lincolnshire Node	6.3

<sup>2</sup> APIS, <https://www.apis.ac.uk/src/> [accessed November 2022].



Site Name	Designation	Route Segment	Extent of Affected Area (%) within Designation
Wolla Bank Pit		LN1 - Landfall to A52 – Mumby / WM1 - Landfall to A52 – Hogsthorpe	98.7
Anderby Marsh			58.8
Anderby Creek Sand Dunes			81.9
Marsh Yard to Anderby Creek Dunes			12.5
Chapel Six Marshes			13.7
Wolla Bank South			99.4
Wolla Bank Reedbed			100
Friskney Decoy Wood		A2 - Steeping River to Fodder Dike Bank/Fen Bank	25.9

Sensitive ecological receptors are found within 50m of potential NRMM activity generated by the Project. These receptor locations will be examined in further detail to consider the specific NRMM activities which have the potential to affect them, the existing baseline conditions and potential sensitivities to air pollution (where available) – to determine the likelihood of a significant effect arising.

## 1.5 NRMM Construction Phase Assessment

### 1.5.1 Overview and Duration of Works

The construction phase of the Project is anticipated to commence in 2027, with onshore construction anticipated to last for a duration up to 36-months. The construction phase is therefore considered short-term.

Onshore construction activities will occur in a phased manner and will vary along the spatial extent of the PEIR boundary, according to specific works (e.g., construction of the Onshore Substation (OnSS)). Discrete construction activities will not occur concurrently in the same location (e.g., construction, use and reinstatement).

It is considered that required construction works can be split into three main elements:

- Landfall connection;
- Onshore cable route; and
- OnSS construction.

#### Landfall Connection

The landfall connection works are required to connect the offshore and onshore cable circuits, whereby these are jointed within Transition Joint Bays (TJB) located on the landward side of the sea defences/beach.

[The installation of the offshore export cables at landfall will be undertaken by HDD or other trenchless methods, with the punch out to be in the subtidal zone.](#) Given the location and nature of landfall operations are yet to be decided, a worst-case assessment is considered, with activities assumed intertidal nearer to potential onshore sensitive receptors.

The landfall beach works shall require temporary piling activities to facilitate the drilling and cable installation activities. The activities shall be required for the installation works only and may consist of localised driven beam, sheet pile wall and steel casing at the trenchless launch point and exit point.

Offshore cables will be connected onshore within TJBs, located landward side of the sea defences/beach. Specific TJB activities include transition bay excavation, wall and base construction, cable pulling and connection of cables in the bay, subsequent roof and backfill over the bays, and testing plant.

#### Onshore Cable Route

The onshore ECC is the cable corridor within which the final cable route will be located. For PEIR, grid connection points at Lincolnshire Node and Weston Marsh have been defined, with one OnSS search area at Lincolnshire Node and two at Weston Marsh. The onshore ECC extends approximately 11km in length to the Lincolnshire Node grid connection point, or approximately 80km in length to the Weston Marsh grid connection points. The onshore ECC to Weston Marsh includes an alternative route, which has been considered as a separate option. The indicative working width of the cable route is 80m within the 300m width PEIR boundary.

It is anticipated that most of the cable route will be constructed using an open cut method of construction, however, trenchless techniques will also be employed. The selection of trenchless techniques is subject to technical assessment and site-specific factors. Major roads, rivers and Internal Drainage Board managed drains will be crossed using trenchless techniques.

Prior to construction, the site will be prepared including fencing, temporary drainage, haul road construction and stripping of the topsoil.

Different areas/sections of the onshore cable route may be worked on independently at the same time and the route may not be worked sequentially from one end to the other. However, works on any location on the cable route are intermittent, as they are undertaken in a phased manner.

The specific construction processes and activities associated with the onshore ECC are as follows:

- Establish access and Temporary Construction Compound (TCC) and other compounds (such as, HDD);
- Site preparation – including fencing, haul road construction and topsoil strip;
- Cable route excavation, duct installation, backfill and reinstatement;
- Jointing bay excavation, base construction, pulling and connection of cables, backfill and reinstatement;
- Compound operations (e.g., TCC);
- Haul road and fencing removal and reinstatement; and
- TCC and other compounds (such as, HDD), and access road removal.

### OnSS Construction

At present, there are three discrete OnSS search areas under consideration; one for the Lincolnshire Node grid connection option and two within the Weston Marsh grid connection option. Only one of the three OnSS search areas will be taken forward –and therefore represents the Maximum Design Scenario (MDS) for that option. All three search areas are enclosed within the onshore PEIR boundary and have been considered for the PEIR.

Specific activities associated with the OnSS construction include ground works and formation of platform, building foundation works, access road and car parking works, building fabrication and plant installation.

#### 1.5.2 Working Hours

Construction working hours will be set by a requirement of the DCO, with necessary permit/authorisations required for the construction work to commence. Typically, construction activities will be in the daytime only; between 07:00 and 19:00, Monday to Saturday, with no work on Sundays, Bank Holidays or in the night-time. The typical construction period therefore equates to less than half of the calendar year.

Certain ‘time critical activities’ (e.g. use of HDD at major crossings, and cable pulling and testing at the TJB) may require continuous working outside the normal hours; which will require prior agreement from the relevant planning authority.

#### 1.5.3 Controls and Mitigation

In line with the emission standards discussed in Section 1.3.1 and the anticipated year of commencement of construction in 2027, it is likely that NRMM utilised by the Project will comply with the Stage V emission standard, however in some instances this will depend on whether specialist equipment (e.g. HDD rig) is commercially available.

Furthermore, a series of construction phase control measures will be included within the CoCP to minimise NRMM emissions. These are detailed in the Outline Air Quality Management Plan (document reference 8.1.2), which forms part of the CoCP. Implementation of the CoCP will be secured as a requirement of the DCO. The measures are replicated here:

- Plan site layout so that machinery is located away from receptors, as far as is possible;
- Ensure all vehicles switch off engines when stationary – no idling vehicles. This applies to idle construction equipment, and trucks waiting to access the site and being loaded/unloaded;
- NRMM equipment to be properly maintained to support efficient fuel consumption;
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable;
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials;
- Where feasible and commercially available, ensure all equipment complies with the latest (Stage V) emission standards;

- Where feasible, ensure further abatement plant is installed on NRMM equipment, e.g., Diesel Particulate Filters (DPFs) conforming to a defined and demonstrated filtration efficiency (load/duty cycle permitting); and
- Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).

As per Defra’s LAQM.TG22, following application of the above controls, effects associated with NRMM emissions on sensitive receptors are unlikely to be significant.

#### 1.5.4 Number, Type and Percentage Use of NRMM

Table 1-3 to Table 1-9 detail the number and type of plant to be used during the different construction activities. Construction activities have been grouped to represent the lifecycle of a set activity (e.g., grouping of transition bay excavation, transition bay wall and base construction, connection of cables within the transition bay, roof and backfill over transition bay) and the maximum number of plant that could impact upon a receptor at any one time is presented. The actual number of NRMM utilised for each activity at any point could be less than this.

For all activities presented in Table 1-3 to Table 1-8 (all activities except OnSS Construction), temporary lighting is the only item of NRMM where the maximum number exceeds 3. Temporary lighting itself is not expected to generate emissions, rather the mobile generators which are required for power.

The maximum estimated percentage use of the NRMM during each activity is presented in Table 1-3 to Table 1-9. As noted, some items of plant are required for the entirety of the activity’s duration (i.e., 100%) whereas other items are required for much less (e.g., 10% of the time). Whilst certain NRMM usage may be intense (100%), its use will be transient across the wider active construction area. Furthermore, the onshore ECC construction area is expected to shift in location throughout the construction phase, as construction progresses, minimising the duration of exposure at any one location.

#### Landfall Connection

**Table 1-3 – NRMM: Landfall Beach Operations and Piling**

Vehicle / Equipment	Maximum Indicative Number (No.) at any Point	Maximum Estimated Percentage (%) of Operation During any Activity
21T excavator	1	10
Cable winch	1	10
Pump	2	50
Temporary lighting	4	25

**Table 1-4 – NRMM: Transition Joint Bay**

Vehicle / Equipment	Maximum Indicative Number (No.) at any Point	Maximum Estimated Percentage (%) of Operation During any Activity
20T Dumper	2	100
21T excavator	1	100
30T excavator	1	100
5T Forward Tipping Dumper	1	100
Cable laying tracked crane	1	25
Cement mixer	1	25

Vehicle / Equipment	Maximum Indicative Number (No.) at any Point	Maximum Estimated Percentage (%) of Operation During any Activity
Crawler Crane	1	25
D6 Dozer	1	100
Loading shovel	1	100
Mobile concrete pump / concrete mixer truck	1	50
Mobile crane	1	25
Mobile generator	2	100
Mobile self-contained welfare unit	1	25
Piling Rig	1	10
Pre-cast concrete truck	1	5
Pump	2	100
Smooth Drum vibro roller	1	10
Telehandler	1	50
Temporary lighting	4	50
Tractor & Fuel bowser	1	10
Tractor & trailer	1	50
Tractor & Water bowser	1	25
Trench Roller	1	75

### Onshore Cable Route

**Table 1-5 – NRMM: Site Preparation, Establishment and Later Removal**

Vehicle / Equipment	Maximum Indicative Number (No.) at any Point	Maximum Estimated Percentage (%) of Operation During any Activity
20T Dumper	3	100
21T excavator	1	100
30T excavator	2	100
5T Forward Tipping Dumper	1	100
D6 Dozer	2	100
Grader	1	100
Loading shovel	2	100
Mobile generator	2	25
Mobile self-contained welfare unit	2	25
Road surface paver & roller	1	25
Smooth Drum vibro road roller	1	100
Smooth Drum vibro roller	1	50
Telehandler	1	70
Temporary lighting	12	50
Tractor & fencing kit	1	100
Tractor & Fuel bowser	1	10
Tractor & soil tiller, roller, seeder	1	25

Vehicle / Equipment	Maximum Indicative Number (No.) at any Point	Maximum Estimated Percentage (%) of Operation During any Activity
Tractor & trailer	1	70
Tractor & Water bowser	1	25

**Table 1-6 – NRMM: Cable Route**

Vehicle / Equipment	Maximum Indicative Number (No.) at any Point	Maximum Estimated Percentage (%) of Operation During any Activity
20T Dumper	2	100
21T excavator	2	100
30T excavator	2	100
5T Forward Tipping Dumper	2	100
Crawler Crane	1	10
D6 Dozer	2	100
Loading shovel	2	100
Mobile generator	2	25
Mobile self-contained welfare unit	1	25
Pump	2	100
Smooth Drum vibro roller	1	50
Telehandler	1	50
Temporary lighting	8	25
Tractor & Fuel bowser	1	10
Tractor & trailer	1	50
Tractor & Water bowser	1	25
Trench Roller	2	75

**Table 1-7 – NRMM: Jointing Bays**

Vehicle / Equipment	Maximum Indicative Number (No.) at any Point	Maximum Estimated Percentage (%) of Operation During any Activity
20T Dumper	2	100
21T excavator	1	100
30T excavator	2	100
5T Forward Tipping Dumper	1	100
Cable winch	1	50
D6 Dozer	2	100
Loading shovel	1	100
Mobile concrete pump / cement mixer truck	1	50
Mobile generator	2	50
Mobile self-contained welfare unit	1	25
Pump	2	100
Smooth drum vibro roller	1	10

Vehicle / Equipment	Maximum Indicative Number (No.) at any Point	Maximum Estimated Percentage (%) of Operation During any Activity
Telehandler	1	50
Temporary lighting	4	25
Tractor & cable drum trailer	1	50
Tractor & Fuel bowser (or self-propelled)	1	10
Tractor & trailer	1	50
Tractor & Water bowser (for dust suppression)	1	25
Trench Roller	1	75

**Table 1-8 – NRMM: TCC and Compound Operations**

Vehicle / Equipment	Maximum Indicative Number (No.) at any Point	Maximum Estimated Percentage (%) of Operation During any Activity
Cuttings / Recycling Tank	1	100
Directional Drill Generator	1	100
Generator	2	100
Mixing Tank	1	100
Mounting supports for directional drill	1	25
Mud Pump	1	100
Road Sweeper	1	10
Telehandler	2	75
Vibratory Piling Rig	1	10

## Onshore Substation

**Table 1-9 – NRMM: OnSS Construction**

Vehicle / Equipment	Activity Description	Indicative Number (No.) at any Point	Estimated Percentage (%) of Operation	
Excavator (earthworks)	Ground works/formation of platform	6	100	
Excavator (hydraulic breaker)		4	100	
Dozer		4	75	
Air compressor		4	100	
Dump truck		8	70	
Generator		2	100	
Crusher		2	80	
Percussive piling rig	Building foundation works	1	100	
Tracked drilling rig with hydraulic drifter		1	100	
Crane mounted auger		1	100	
Mini piling rig		2	100	
Compressor for mini piling		1	100	
Dump truck		4	50	
Truck mixer with pump		2	10	
Excavator (earthworks)		3	80	
Grinder		5	50	
Compressor		2	100	
Generator		2	100	
Excavator		Access road and car parking works road works	2	100
Dump truck			4	70
Asphalt spreader with support lorry	1		100	
Vibratory roller	2		70	
Grader	1		100	
Mobile crane	1		50	



Vehicle / Equipment	Activity Description	Indicative Number (No.) at any Point	Estimated Percentage (%) of Operation
Lorry	Building fabrication and HV Plant Installation	3	25
MEWP		2	75
Dump truck		4	10
Compressor		1	100
Forklift truck		2	50
Grinder		5	50
Pneumatic chipper/drill		3	50
Scaffolding		1	25

### 1.5.5 NRMM Activity in Relation to Sensitive Receptors

Where there is uncertainty and/or optionality regarding the extent of specific construction activities within 50m of a receptor, all possible construction activities have been considered for completeness. This is considered worst-case, as it is possible that the full extent of construction activities and NRMM identified may not occur within 50m of the receptor. However, this approach ensures all potential scenarios and associated impacts have been assessed for completeness.

#### Human Receptors

##### *Landfall Connection*

When considering activities associated with the landfall connection, i.e. landfall beach and TJB activities (NRMM outlined in Table 1-3 and Table 1-4), there are a few human receptor locations within 50m of potential NRMM activity. This includes approximately 10-20 residential receptors near the beachfront in Anderby Creek, and Bank Farm located off Anderby Road. Exposure to NRMM activity is therefore possible at these locations, however, this is expected to be intermittent throughout the construction period and will depend on the finalised locations of activities. Furthermore, a large proportion of the landfall construction activities are expected to be below ground level i.e., associated with trenchless techniques. This is likely to minimise any impacts from NRMM emissions on sensitive human receptors.

##### *Onshore ECC*

There are human receptors located within 50m of the onshore ECC which may potentially be exposed to NRMM activity associated with its construction, including jointing bays, and works associated with site preparation/reinstatement (NRMM outlined in Table 1-5, Table 1-6 and Table 1-7).

For the onshore ECC to the Lincolnshire Node grid connection point, this includes approximately 20 residential receptors. For the onshore ECC to the Weston Marsh grid connection point, this includes approximately 150-200 residential receptors along the ~80km route or 200-250 residential receptors along the alternative ~80km route, including some hotels/inns, caravan parks and farm properties. Assessment of the onshore ECC represents the MDS, as actual construction of the onshore cable route is anticipated to be 80m wide within this and it is therefore possible that NRMM activity may not interact with these receptor locations at all.

Furthermore, NRMM exposure from the construction activities identified within 50m is considered short term and temporary in nature, indicatively lasting up to 36-months, however likely to be far shorter at most locations given the cable construction works will be moving about the extent of the onshore ECC.

Potential NRMM exposure associated with the construction compounds (TCC and HDD NRMM outlined in Table 1-8) will occur in a more fixed location when compared to the cable construction works, with potential exposure from associated NRMM activity having the potential to last up to 36-months. This is still considered short-term, and NRMM activity within this period would be limited to the agreed working hours, and NRMM not necessarily utilised for 100% of the time.

##### *OnSS Construction*

From review of the three potential OnSS search areas, there are no high sensitivity human receptors (e.g., residential properties) located within 50m. As such, further consideration of NRMM activities associated with the OnSS construction is not required for human receptors. OnSS construction would have represented worst-case exposure to NRMM activity, given the fixed location of work, extent of NRMM activity (Table 1-9) and duration of construction (up to 36-months). The absence of high sensitivity human receptors in proximity is therefore considered positive in terms of minimising potential impacts from NRMM emissions.

#### Ecological Receptors

The ecological receptors in proximity to the potential onshore construction activities (i.e., within 50m) and the spatial extent of the affected area are presented in Table 1-2.

### *Landfall Connection*

There are several designations located near the coastline and therefore, there is potential to interact with NRMM activity associated with landfall beach operations, and cable connection at TJBs as well as wider cable construction operations that occur near the landfall (NRMM outlined in Table 1-3, Table 1-4, Table 1-5 and Table 1-6). However, it is unlikely that these independent construction activities will overlap at the same time at any location. The designations include the Greater Wash SPA, Sea Bank Clay Pits SSSI, and several non-statutory LWS/LWT.

Only 0.02% of the overall SPA designation is potentially exposed to NRMM activity associated with onshore construction works, therefore representing a very small area of the designation potentially exposed to impacts. APIS lists habitats/features of the SPA potentially sensitive to air pollution, however, the presence of these in proximity to potential NRMM activity has not yet been confirmed by ecological surveys, and therefore it is possible that sensitive habitats/features are not present in proximity to NRMM activity. The necessary ecological surveys will be carried out in preparation of the ES to inform this.

Near the landfall, less than half of the Sea Bank Clay Pits SSSI will be exposed to potential NRMM activity, and the extent of the LWS/LWT designations potentially exposed varies from 12.5% to 100%. However, a large proportion of the landfall construction activities are expected to be below ground level i.e., associated with trenchless techniques. This is likely to minimise any impacts from NRMM emissions on the designated ecological sites.

### *Onshore ECC*

There are several designations with the potential to be affected by cable construction operations (NRMM outlined in Table 1-5, Table 1-6 and Table 1-7).

For the Lincolnshire Node route option, this is the Spendluffe Meadows LWS/LWT only – whereby only 6.3% is within 50m of potential NRMM activity.

For the Weston Marsh route options, this includes Hogsthorpe Pit LWS, Doves' Lane Drains LWS, Shore Road Drain LWS, Hobhole Drain, Baker's Bridge South LWS, Hobhole Bank LWS, Havenside LNR, Havenside LWS, Friskney Decoy Wood LWS, and Moulton Marsh LWS/LWT. For most of these designations <20% of the area is potentially exposed to NRMM activity, apart from Hobhole Bank LWS (78.3%), Friskney Decoy Wood LWS (25.9%) and Hogsthorpe Pit LWS (44.1%).

### *OnSS Construction*

From review of the three potential OnSS search areas, there is one designated ecological site within 50m of one of the areas. This is Substation 11 within the Weston Marsh grid connection option and the Risegate Eau LWS. As displayed in Table 1-2, only 5.7% of the LWS is located within 50m of potential NRMM activity (presented in Table 1-9), representing a small area of the overall designation. Whilst NRMM activity associated with the OnSS construction is concentrated in one area, it is expected to be transient across the area.

## **1.5.6 Assessment of Significance of Effect**

This section summarises the discussed information to determine the likelihood of a significant effect arising from construction NRMM emissions. The following points are considered:

- The construction period is considered short-term (i.e., up to 36-months), and working hours within this are further limited (typically in the daytime, Monday to Saturday);
- Construction activities are carried out in a sequence and an overlap of multiple activities at the same time at any location is unlikely;
- NRMM is likely to comply with the Stage V emission standard;
- A series of construction phase control measures will be included within the CoCP and are outlined within Document 8.1.2: Outline Air Quality Management Plan. These will help control any potential NRMM emissions;

- Use of the onshore PEIR boundary in the assessment is considered conservative as it effectively assumes that NRMM use is concurrent with the boundary. This is unlikely to be the case as NRMM locations will vary across the active construction area and the spatial extent of NRMM activities is to be refined at the ES stage;
- Construction activities will be temporary/mobile, and plant will not be fixed for the full duration of works. By way of example, construction activities along the onshore ECC construction area will spatially vary as construction progresses. Exposure to NRMM emissions (in the majority of cases) will be transient;
- Whilst some NRMM is required for 100% of the activity duration, some is required for much less than this. Furthermore, the use of NRMM will be transient across the wider active construction area; and
- The number of NRMM and % use (presented in Table 1-3 to Table 1-9) represent maximum values associated with the activities across the construction lifecycle, and therefore the actual number of plant or its % use could be less than this at certain times or during certain activities.

### Human Receptors

Human receptors are present within 50m of potential NRMM activity associated with the landfall connection and onshore ECC elements. The following additional points are considered for human receptors:

- There are no human receptors within 50m of the OnSS search areas (which would have represented worst-case exposure in terms of construction and NRMM activity);
- There are 10-20 residential receptors located within 50m of potential NRMM activity associated with the landfall connection. However, exposure will be intermittent throughout the construction period and will depend on finalised locations of activities;
- Human receptor locations are intermittent along the onshore ECC. Activities associated with the construction of the onshore ECC (site preparation/reinstatement, cable route construction and jointing bays) are considered transient as construction will move about the extent of the onshore ECC; and
- The maximum annual mean background concentrations across the study area are well below the respective AQALs (Table 1-1). Concentrations across the full extent of the onshore PEIR boundary are expected to vary and be lower relative to the maximum reported. The likelihood of NRMM causing an exceedance (whilst considering the above points e.g. transient nature, type, quantum and emission standards) is therefore low.

### Ecological Receptors

Ecological receptors are present within 50m of potential NRMM activity associated with all three discussed elements – the landfall connection, onshore cable route, and OnSS construction. The following additional points are considered for ecological receptors:

- There is only one ecological receptor located near the OnSS search areas at Weston Marsh (Risegate Eau LWS), whereby only 5.7% of the designation is potentially exposed to NRMM activity;
- There are several designations located in proximity to the landfall connection activities. Of the statutory designations near the coastline, only 0.02% of the Greater Wash SPA potentially interacts with NRMM associated with the activities, and less than half (43.6%) of the Sea Bank Clay Pits SSSI. However, a large proportion of the landfall activities are expected to be below ground level i.e., associated with trenchless techniques. This is likely to minimise any impacts from NRMM emissions on the designated ecological sites;
- In terms of activities associated with the onshore cable route, the extent of designations potentially impacted varies, however for the majority, <20% of the area of each designation may be impacted. For the statutory Havenside LNR, this is 8.2%. Given the separation distance between activities, there is unlikely to be cumulative NRMM construction activities within 50m of any point within the designation; and
- The maximum annual mean background concentrations across the study area are well below the respective Critical Levels (Table 1-1). Concentrations across the full extent of the onshore PEIR boundary are expected

to vary and be lower relative to the maximum reported. The likelihood of NRMM causing an exceedance (whilst considering the above points e.g., transient nature, type, quantum and emission standards) is therefore low.

### Summary

Given the above, it is considered unlikely that significant effects on onshore sensitive human and ecological receptors will arise due to NRMM emissions generated during the construction phase of the Project. Potential impacts from NRMM emissions would therefore be considered negligible, direct and short-term/temporary, with the resultant effect 'not significant' in terms of the EIA regulations.

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