

# MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Technical note on Newton Marsh SSSI and River Ribble Crossing



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**Prepared by:****Morgan Offshore Wind Limited,  
Morecambe Offshore Windfarm Ltd****Prepared for:****Morgan Offshore Wind Limited,  
Morecambe Offshore Windfarm Ltd**

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## Glossary

Term	Meaning
400 kV grid connection cables	Cables that will connect the proposed onshore substations to the existing National Grid Penwortham substation.
400 kV grid connection cable corridor	The corridor within which the 400 kV grid connection cables will be located.
Applicants	Morgan Offshore Wind Limited (Morgan OWL) and Morecambe Offshore Windfarm Ltd (Morecambe OWL).
Construction Traffic Management Plan	A document detailing the construction traffic routes for heavy goods vehicles and personnel travel, protocols for delivery of Abnormal Indivisible Loads to site, measures for road cleaning and sustainable site travel measures.
Direct pipe	A cable installation technique which involves the use of a mini (or micro) tunnel boring machine and a hydraulic (or other) thruster rig to directly install a steel pipe between two points.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Intertidal area	The area between Mean High Water Springs and Mean Low Water Springs.
Landfall	The area in which the offshore export cables make landfall (come on shore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area at Lytham St. Annes between Mean Low Water Springs and the transition joint bay inclusive of all construction works, including the offshore and onshore cable routes, intertidal working area and landfall compound(s).
Micro-tunnel / micro-tunnelling	A tunnelling technique involving the use of a hydraulic (or other) jacking rig and a mini (or micro) tunnel boring machine to install a concrete tunnel between two points.
Mitigation measures	This term is used interchangeably with Commitments. The purpose of such measures is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects.
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	<p>The offshore export cables, landfall, and onshore infrastructure for the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm. This includes the offshore export cables, landfall site, onshore export cables, onshore substations, 400 kV grid connection cables and associated grid connection infrastructure such as circuit breaker compounds.</p> <p>Also referred to in this report as the Transmission Assets, for ease of reading.</p>
National Grid Penwortham substation	The existing National Grid substation at Penwortham, Lancashire.
National Policy Statement(s)	The current national policy statements published by the Department for Energy and Net Zero in 2023 and adopted in 2024.

Term	Meaning
Offshore Order Limits	See Transmission Assets Order Limits: Offshore (below).
Onshore export cables	The cables which would bring electricity from the landfall to the onshore substations.
Onshore export cable corridor	The corridor within which the onshore export cables will be located.
Onshore substations	The onshore substations will include a substation for the Morgan Offshore Wind Project: Transmission Assets and a substation for the Morecambe Offshore Windfarm: Transmission Assets. These will each comprise a compound containing the electrical components for transforming the power supplied from the generation assets to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid.
Transmission Assets	See Morgan and Morecambe Offshore Wind Farms: Transmission Assets (above).

## Acronyms

Acronym	Meaning
SPA	Special Protection Area
SSSI	Sit of Special Scientific Interest

## Units

Unit	Description
m	Metres
m <sup>2</sup>	Metres squared

# 1 Technical note on Newton Marsh SSSI and River Ribble Crossing

## 1.1 Introduction

1.1.1.1 Natural England in its combined relevant and written representation RR-1601, Appendix H, point 34 (RR-1601.H.34) provided the following comment:

*‘Natural England notes that there is a definite impact for 24 months at this fixed point (400kV grid connection cable). We further note that there does not appear to be any identified mitigation for the risk of light and noise affecting the river corridor. Natural England advise the Applicant to review work approaches and clarify how risk from sound/light disturbance is to be mitigated for a period of up to 24 months. This should be updated in all necessary documents’.*

1.1.1.2 In addition, Natural England also raised the following matter in RR-1601.H.8 in relation to ornithological impacts associated with Newton Marsh SSSI:

*‘The potential impacts on Newton Marsh SSSI have not been adequately assessed. There is minimal information on what works will take place in close proximity to this site and how the work will be managed to not affect the site with respect to visual and noise disturbance. We acknowledge that the SSSI and onshore order limits are separated by a road, which is partly screened, which does lower the risk. However, the Applicant has not been clear why there is no risk to the site, as it is unclear if the breeding needs are self-contained in the site e.g. that the birds do not need to use adjacent areas for foraging.... Natural England advise that further consideration of Newton Marsh SSSI is included and updated within the assessment. Further justification should be provided on how the Applicant has concluded no risk to the site’.*

1.1.1.3 In light of these concerns, the Applicants met with Natural England on 28 April 2025 for site visits where both of these points were discussed. The outcome of the meeting was that the Applicants agreed to provide the following information, which is contained within this technical note:

- Information on the proposed works at the River Ribble crossing including a cross section to alleviate concerns regarding noise and visual impacts; and,
- Information on the proposed works in close proximity to Newton Marsh SSSI.

## 2 Summary of River Ribble Crossing Works

### 2.1 River Ribble Crossing

2.1.1.1 The River Ribble Crossing defines the area where up to four 400kV cable circuits from the proposed onshore substations will cross the River Ribble to connect to the existing National Grid Penwortham substation. The



Transmission Assets cables will cross the River Ribble to the east of the Preston Docks MX (motorcross circuit) (refer to Land Plan Onshore Figure 1.16 (APP-156)). The 400kV cables circuits will be installed via trenchless techniques, either via micro-tunnelling or direct pipe, in order to minimise potential impacts.

- 2.1.1.2 A full description of the 400 kV cable corridor, including further technical details of the Ribble Ribble Crossing and associated installation techniques can be found in Section 3.15.8 of Volume 1, Chapter 3: Project description (AS-024). However, an outline summary is provided in **Section 2.3** below.

## 2.2 River Ribble Crossing Working Areas

- 2.2.1.1 As presented in **Figure 1**, the River Ribble working area comprises of the area between Work Nos 26A/26B north of the River Ribble, and 30A/30B, 31A/31B south of the River Ribble (refer to the Onshore Works Plans (APP-154)).
- 2.2.1.2 The 400kV cable circuits will be installed underground within Work Nos. 26A/26B, 27A/27B, 28A/28B, 29A/29B, 30A/30B, 31A/31B. The 400kV cables will be buried via the trenchless installation technique between Work Nos 26A/26B north of the River Ribble, and 30A/30B, 31A/31B south of the River Ribble. Any surface construction activity between these two locations is only for access purposes, e.g., monitoring progress of works via access routes. No movement of plant will occur between Work Nos 26A/26B north of the River Ribble, and 30A/30B and 31A/31B south of the River Ribble.

## 2.3 Description of Proposed Works

- 2.3.1.1 To facilitate the installation of the 400kV cable circuits beneath the River Ribble, two trenchless installation techniques (micro-tunnelling and direct pipe), have been proposed. The final selection of technique will be informed by detailed ground investigation and design assessments conducted before construction.
- 2.3.1.2 Micro-tunnelling would require the establishment of compounds on both the north and south sides (work nos. 26A/26B, and 30A/30B, 31A/31B respectively) of the River Ribble (refer to **Figure 1**), consisting of a launch compound and a reception compound. Within each compound, pits or shafts will be excavated down to depths of up to 45m, with the walls and floors typically constructed of steel or concrete for structural stability. This is typically achieved through the construction of concrete rings, which are hydraulically pushed into the ground, with the material within the ring excavated. This process is repeated until desired depth is reached, after which the excavated stored material stored is used to backfill the shaft upon the completion of works.
- 2.3.1.3 Due to their depth, the shafts will likely require dewatering during excavation to manage groundwater ingress. Within the launch pit, a powerful hydraulic jacking rig will be used to push sections of pipe, typically made of reinforced concrete through to the ground towards the reception pit. A mini tunnel boring machine (MTBM) positioned at the front of the concrete pipe sections will excavate the soil. Excavated material is mixed with a bentonite slurry to



ease extraction and is pumped back to the surface via slurry lines within the pipe, with the bentonite separated out on the surface for re use. Once the MTBM reaches the reception pit, it will be removed via a crane along with the slurry lines, leaving the tunnel in place.

2.3.1.4 Direct pipe is a variation of micro-tunnelling, that uses a MTBM directly attached to the front of a continuous steel pipe, rather than using separate pipe sections. The steel pipe is pre-assembled and welded at the surface and is gradually pushed into the ground from the launch pit using a hydraulic thrust system. Upon reaching the reception pit, the MTBM and slurry lines are removed, leaving the continuous steel pipe permanently in place.

2.3.1.5 For both trenchless installation techniques, once the tunnel or pipe has been fully installed beneath the River Ribble, the 400kV cable circuits will be pulled through using a cable winch. Following successful installation, both the launch and reception pits will be backfilled with the excavated subsoil and topsoil, and the land reinstated.

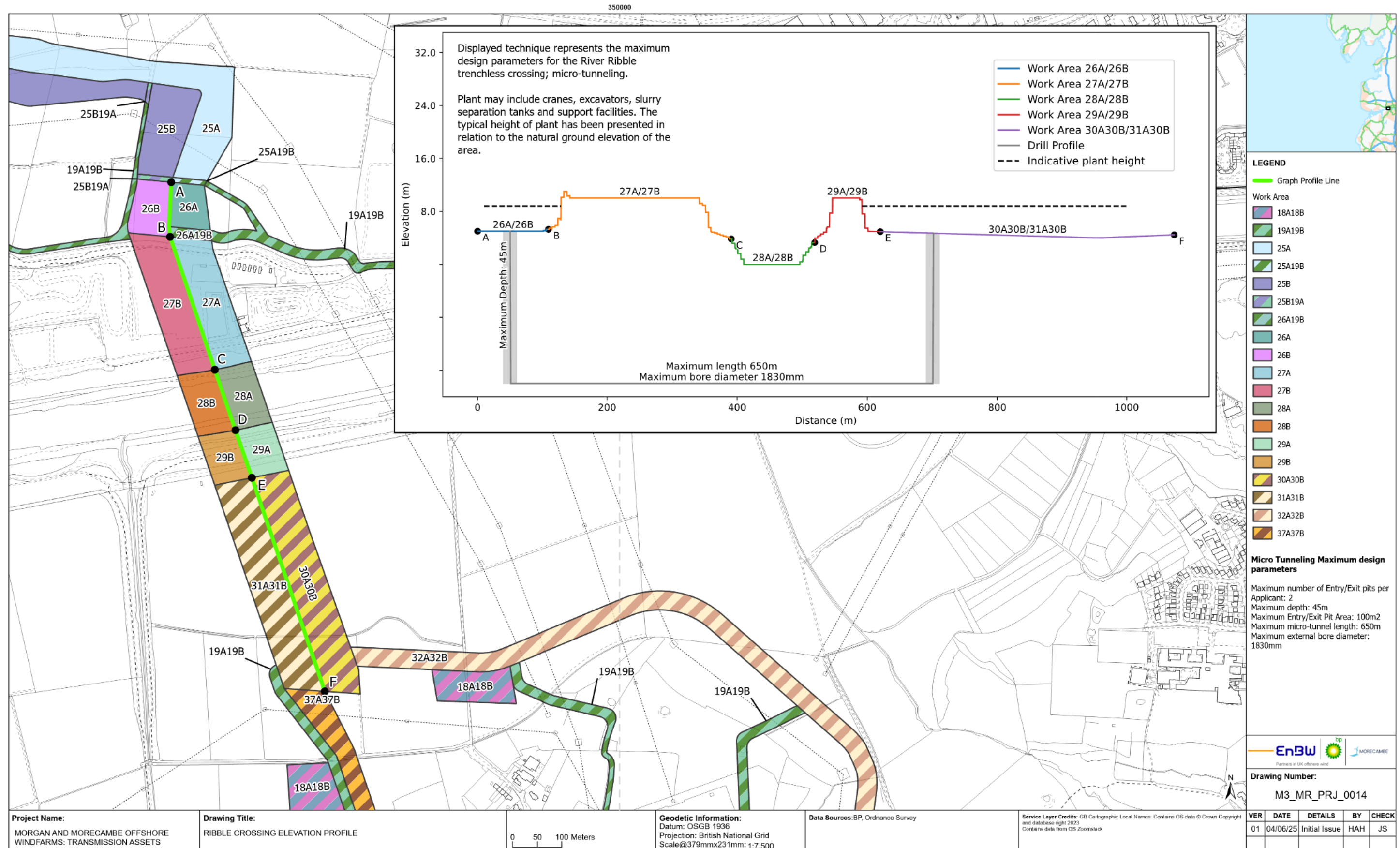


Figure 1 : Indicative Cross Section of the River Ribble Crossing (refer to the Onshore Works Plans (APP-154))

## 2.4 Potential impacts relating to ornithological receptors

### 2.4.1 Introduction

- 2.4.1.1 In light of the proposed works, Natural England require further information on the potential light and noise impacts affecting the river corridor.

### 2.4.2 Visual impacts

- 2.4.2.1 At the location where the 400kV grid connection cables cross the River Ribble, the river channel is in a well-defined corridor and is adjacent to the industrial outskirts of Preston. There are industrial units, an off-road motorbike racetrack and go karting centre approximately 50 metres (m) from north bank. These generate existing high levels of background lighting and noise disturbance in the area. The river channel contains intertidal habitats supporting grazing marsh and mudflats. The river is contained by built up flood embankments approximately 5 m high which support hedges on the top before dipping steeply away to farmland. Due to the extent of the embankment, it will provide natural screening to the works. Due to the entry and exit pit locations being located below the embankment height (see also **Section 2.4.3**), the activities associated with the trenchless construction techniques proposed at the River Ribble crossing will be out of the line of sight of birds using the River Ribble as shown on **Figure 1**.

### 2.4.3 Noise impacts

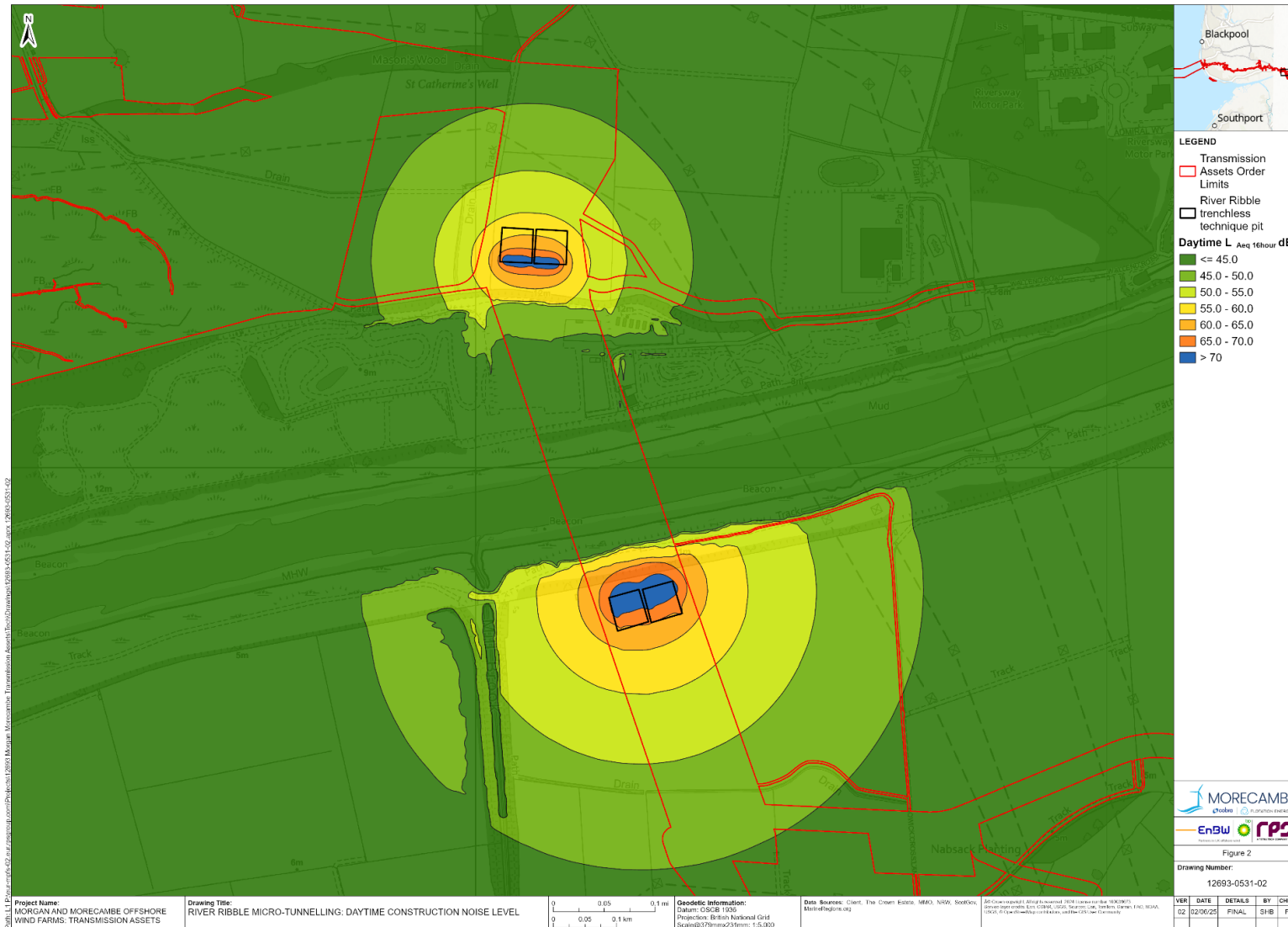
- 2.4.3.1 In addition to the lack of visual disturbance, noise disturbance is also predicted to be low due to the presence of the intervening embankments along the river. **Figure 2**, **Figure 3**, **Figure 4**, and **Figure 5** provide the results of noise modelling carried out for both trenchless installation options at the River Ribble crossing during both the day and nighttime. As shown on these Figures, the micro-tunnelling scenario produces the greatest noise impacts during the daytime, although is quieter at night, the direct pipe scenario produces more constant noise but at a lower level. Despite the differences, the modelling identifies that the predicted noise levels within the river corridor, where the birds are located, are well below the 60 dB level that would be assumed to cause a disturbance response in waterbirds from either percussive or constant noise (Cutts *et al.*, 2013).
- 2.4.3.2 It should also be noted that the modelling assumes as a worst-case scenario that all plant would be situated at ground level when in fact some will be located within entry and exit pits, further reducing the distance that the noise will travel. It can therefore be concluded that there will be no noise impacts to birds using the River Ribble caused by the trenchless construction techniques proposed at the River Ribble Crossing.

## 2.5 Conclusion

- 2.5.1.1 The proposed works will be visually screened by the high, artificial embankments that are topped with hedgerows and trees. In addition, the

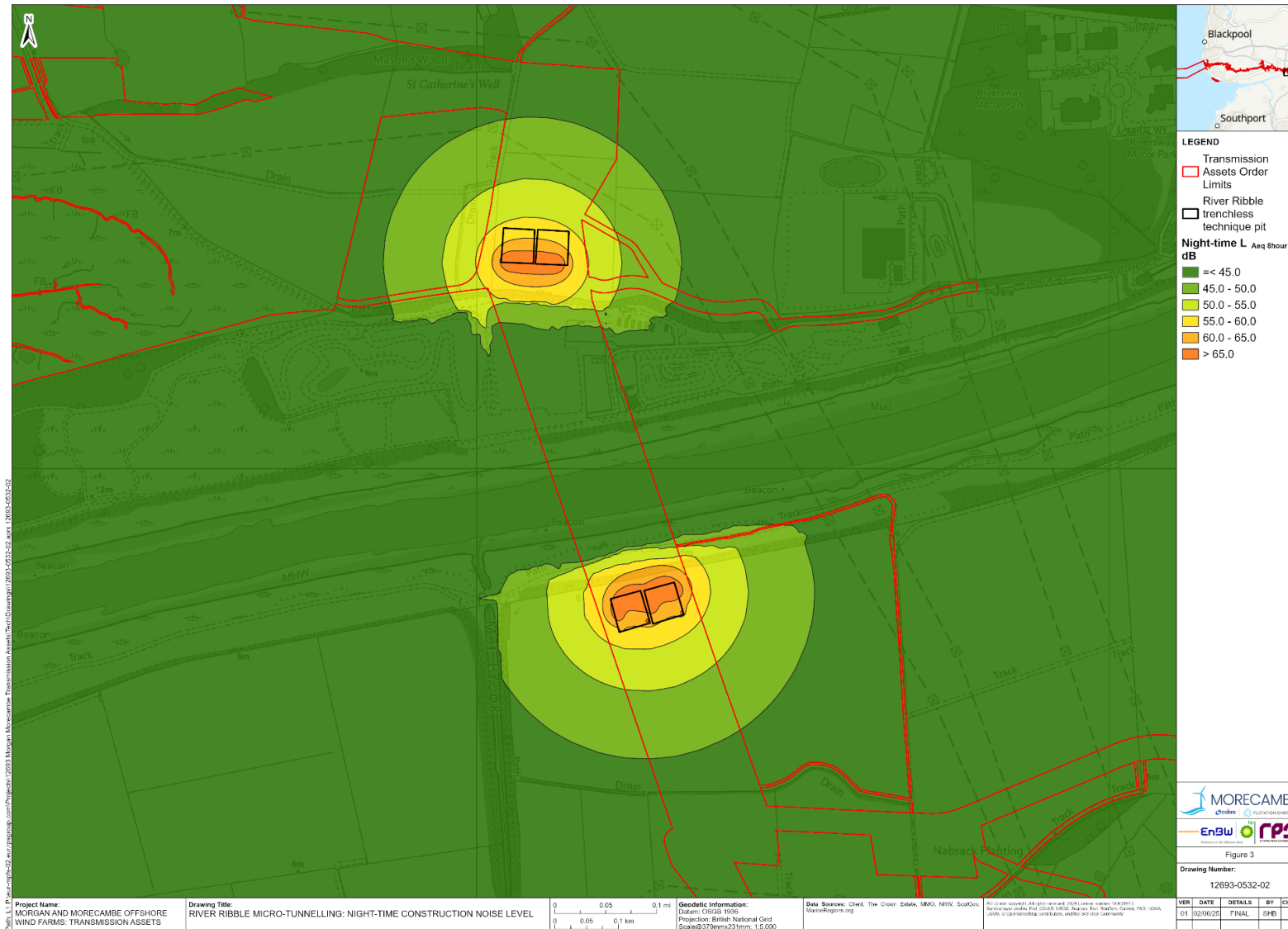
noise modelling shows that construction noise reduces to levels acceptable by waterbirds before reaching the river corridor.

- 2.5.1.2 It can therefore be concluded that the trenchless construction techniques that are proposed at the River Ribble crossing will have, as a worst-case scenario, negligible impacts upon birds.



**Figure 2: Noise modelling for the River Ribble micro-tunnelling method (daytime)**





**Figure 3: Noise modelling for the River Ribble micro-tunnelling method (night time)**





**Figure 4: Noise modelling for the River Ribble direct pipe method (daytime)**



**Figure 5: Noise modelling for the River Ribble direct pipe method (night time)**

## 3 Summary of works in close proximity to Newton Marsh SSSI

### 3.1 Overview of Newton Marsh SSSI

- 3.1.1.1 Newton Marsh SSSI is an area of 65.6 hectares of saltmarsh, ponds and ditches situated to the East of Warton Airport and North of the Ribble Estuary. Newton Marsh SSSI lies approximately 500 m away from the onshore export cable corridor, where construction activities would take place. However, at its closest point, there is an access track which is approximately 20 m away, beyond the dual carriageway (refer to Figure 4.1b (Onshore and Intertidal Ornithology Study Area) of Volume 3, Figures - Part 3 of 7 (APP-133)). Further information on the proposed works in proximity to Newton Marsh SSSI can be found in **Section 3.2**.
- 3.1.1.2 Ornithology site specific surveys were undertaken between 2022 and 2024 and covered part of Newton Marsh SSSI which was within the 500 m survey buffer included to account for disturbance (Volume 3, Annex 4.4: Onshore and intertidal ornithology survey methodologies (APP-095)).

### 3.2 Summary of bird usage of Newton Marsh SSSI

#### 3.2.1 Introduction

- 3.2.1.1 The saltmarsh habitats at Newton Marsh support large numbers of wintering waders and wildfowl and also support populations of rare breeding waders, including black-tailed godwit and avocet. In winter, many Ribble and Alt Estuaries SPA wildfowl and wader features are attracted to Newton Marsh and therefore the SSSI is seen as functionally linked to the SPA. The site provides protection and valuable foraging opportunities due to the matrix of marsh, creeks and ponds. Newton Marsh SSSI is an important site for breeding waders. The site is one of few sites across the UK where black-tailed godwit breed, making it a nationally important site for this species. In addition to black-tailed godwit, Newton Marsh SSSI is also important for breeding avocet, redshank and lapwing.

#### 3.2.2 Non-breeding bird survey data (2022/23 and 2023/24)

- 3.2.2.1 The annual peak count data for key SPA features at Newton Marsh SSSI are shown in **Table 1**. It should be noted that the Applicants' data does not apply to the entire of Newton Marsh SSSI, as much of the site is beyond the 500 m disturbance buffer used for surveys. Therefore, these peak counts are likely to underestimate the SSSI populations. Nonetheless, these data show that some species (e.g., black-tailed godwit, teal and wigeon) are present in important numbers. Other birds such as lapwing, golden plover, redshank, and shoveler were also regularly present, however these either aren't SPA features (e.g., lapwing and shoveler), or were present in low numbers (e.g., golden plover and redshank).

**Table 1: Annual peak counts at Newton Marsh for SPA and Ramsar features**

Species	2022/23	2023/24
Black-tailed godwit	18	406
Teal	261	214
Wigeon	980	819

### 3.2.3 Breeding bird survey data (2023)

- 3.2.3.1 Newton Marsh SSSI is of importance to a number of breeding waders and wildfowl over spring/summer.
- 3.2.3.2 **Table 2** shows the number of breeding territories that were recorded as present within both Newton Marsh SSSI and the 500 m survey buffer, again this is likely to underestimate the number of breeding waders present. In addition, lapwing, shoveler and teal were recorded as breeding at Newton Marsh SSSI.
- 3.2.3.3 During the 2023 breeding bird surveys, there was no indication that the breeding avocet, little ringed plover, redshank or black-tailed godwit were reliant upon the habitats outside of the SSSI with no records of these species anywhere else along the onshore survey area outside of Newton Marsh SSSI other than non-breeding birds.

**Table 2: Number of territories present within the survey area overlapping with the Newton Marsh SSSI**

Species	2023
Avocet	5
Little ringed plover	1
Redshank	4
Black-tailed godwit	1

### 3.2.4 Sensitivity to disturbance

- 3.2.4.1 **Table 3** shows the sensitivity of the features present at Newton Marsh SSSI. Redshank and black-tailed godwit are regarded as having medium sensitivity to disturbance. Teal and wigeon are regarded as having high sensitivity to disturbance as these features are more readily disturbed from a greater distance. The maximum recommended buffer for the breeding and non-breeding assemblage present at Newton Marsh SSSI is therefore 500 m.

**Table 3: The sensitivity of the wintering and passage features.**

Species	Sensitivity to disturbance*	Disturbance distance* (metres)
Redshank (breeding and non-breeding)	Medium	100-300
Black-tailed godwit (breeding and non-breeding)	Medium	100-200
Teal	High	200-500
Wigeon	High	200-500

\*Taken from Goodship and Furness (2022).

### 3.3 Summary of Proposed Works

#### 3.3.1 Introduction

3.3.1.1 There will be no works within Newton Marsh SSSI. However, the following construction activities would occur within 500 m of Newton Marsh SSSI, as detailed below and shown on **Figure 6**.

#### 3.3.2 Trenching and cable burial activities

3.3.2.1 Open-cut trenching and cable burial activities will occur approximately 500 m to the north of Newton Marsh SSSI. The works will be contained within a construction corridor width of 50 m, which includes two haul roads to facilitate safe movement of construction equipment and personnel. Installation activities in this area will occur within a 66 month window. However, construction activities will not be continuous throughout the entire period, as one Applicant may undertake works sequentially, with a gap between the completion of one project and the commencement of the other.

#### 3.3.3 Construction compounds

3.3.3.1 There will be one construction compound located approximately 250 m northwest from Newton Marsh SSSI. This compound will provide essential facilities, including offices, workers welfare units, storage areas and parking. It will be in place for up to 66 months, corresponding with the maximum duration of construction activities in this area.

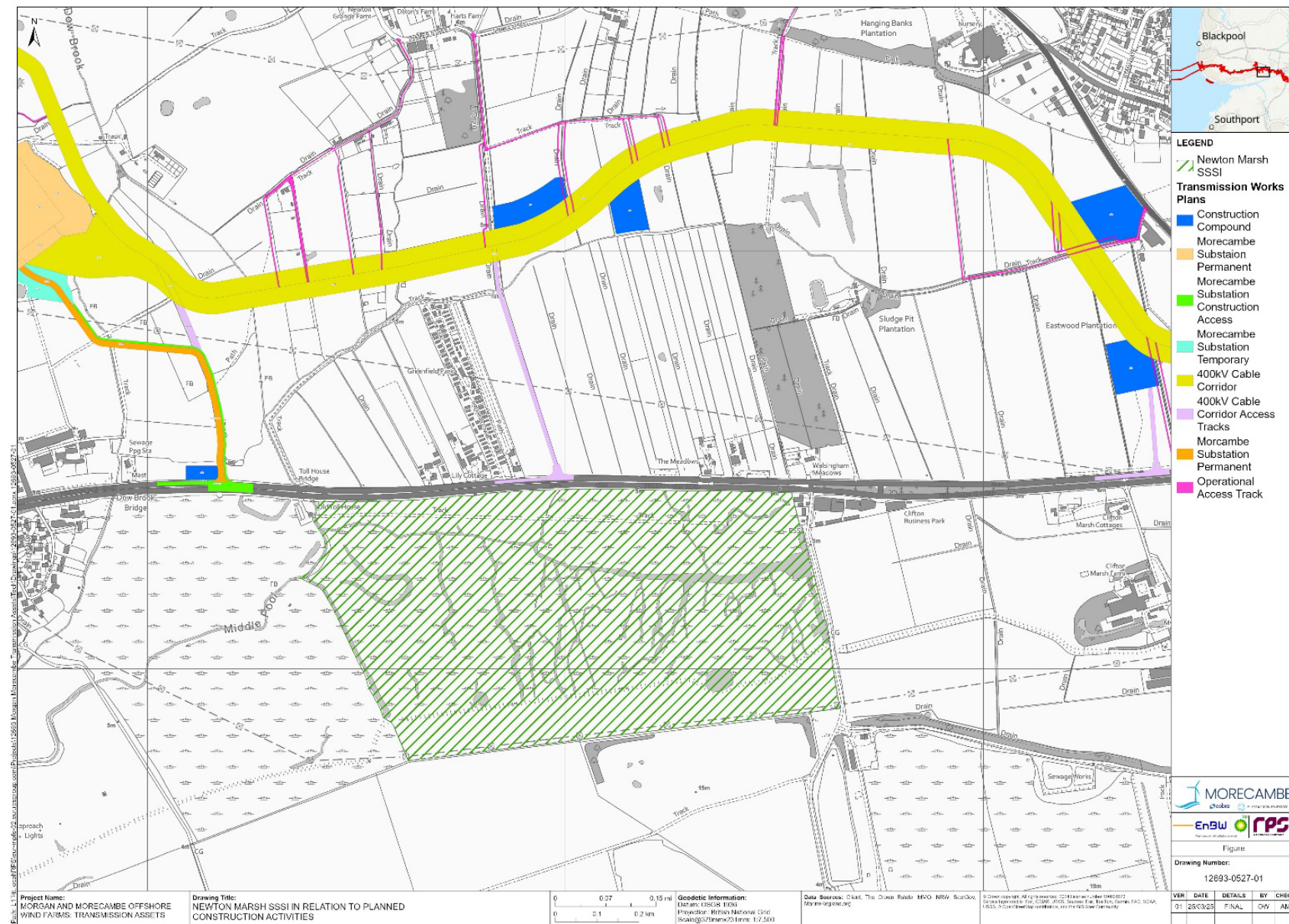
#### 3.3.4 Access tracks

3.3.4.1 There will be two access tracks situated on the northern edge of the A584. One will be temporary to facilitate the trenching and cable burial activities. The other, starting approximately 200 m northeast from Newton Marsh SSSI, will be combined for cable and substation works and will then be adopted long term for substation access.

3.3.4.2 Haul roads will typically be constructed by first removing the topsoil layer and setting it aside for reinstatement, then a permeable geotextile membrane is laid directly onto the exposed soil to stabilise the ground and reduce erosion. This membrane also helps evenly distribute loads from construction vehicles. Layers of crushed stone or aggregate are then spread onto the geotextile, with each layer compacted using heavy rollers to achieve a stable and even surface. Appropriate drainage including ditches and culverts may be installed alongside the haul road to manage surface water runoff.

3.3.4.3 Traffic movements will be carefully managed in line with the Applicants Outline Construction Traffic Management Plan submitted at Deadline 2 (J5/F02), the mitigation measures included within the plan will ensure minimal disruption and appropriate environmental protection measures are adhered to.





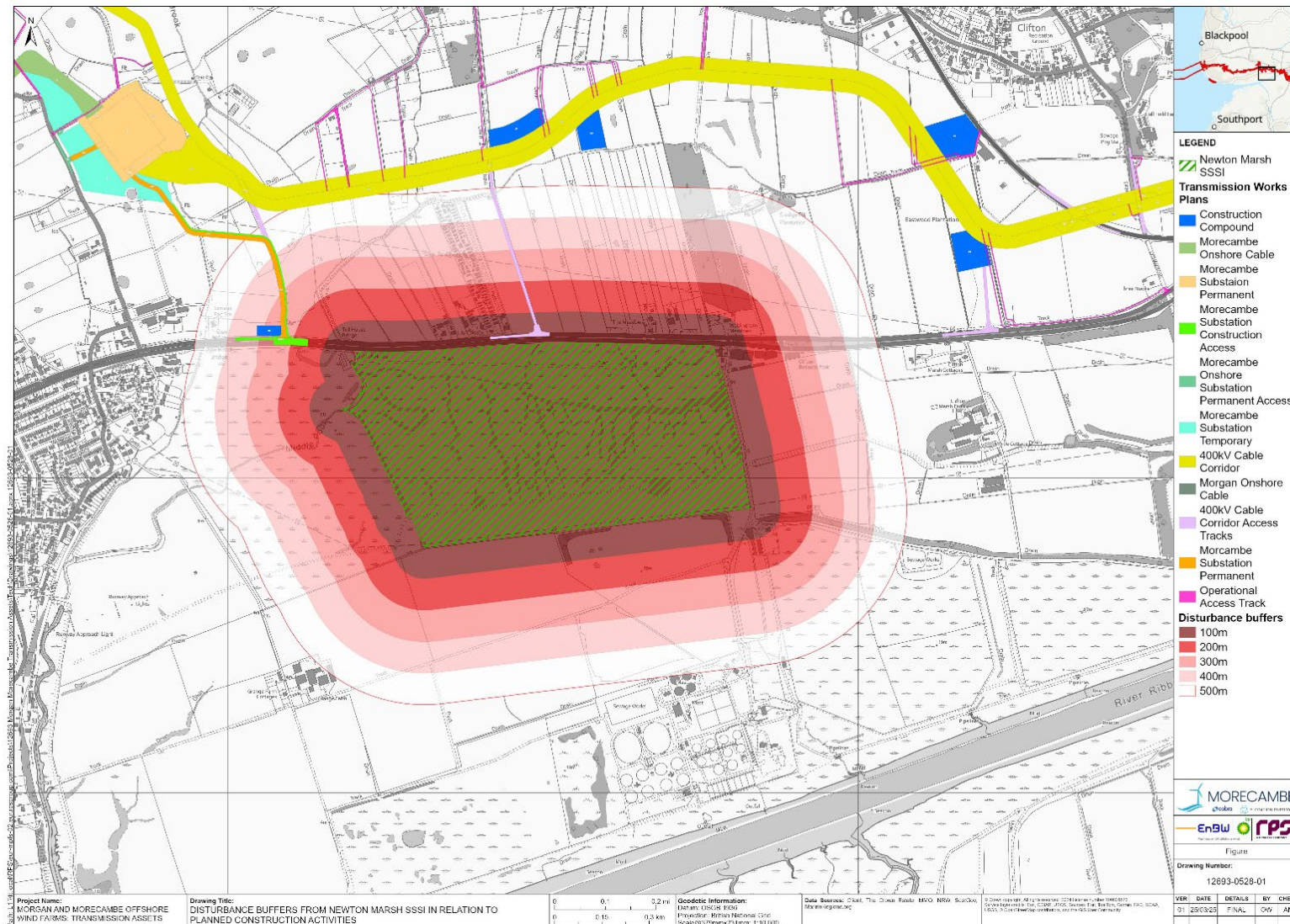
**Figure 6: Proposed Construction Works in relation to Newton Marsh SSSI**



### 3.4 Potential Ornithological Impacts on the receptors of Newton Marsh SSSI

#### 3.4.1 Introduction

- 3.4.1.1 The Applicants have provided further clarification below on the potential disturbance impacts on ornithological receptors at Newton Marsh SSSI. **Figure 7** illustrates the disturbance buffers from Newton Marsh SSSI in relation to planned construction activities.



**Figure 7: Disturbance buffers from Newton Marsh SSSI in relation to planned construction activities**



## 3.4.2 Visual disturbance

3.4.2.1 As seen in **Figure 8**, **Figure 9** and **Figure 10**, the area where trenching and cable burial is due to take place is shielded by the intervening dual carriageway and multiple hedgerows between Newton Marsh and the cable corridor. Due to the hedgerows, it is unlikely that the waterbirds that inhabit the ground and creeks at Newton Marsh can even see the dual carriageway, and the area where trenching and cable burial will be beyond the dual carriageway out of the sight line for the birds. This is due to at least four parallel hedges, some with mature trees, two carriageways (two-lane) separated by a wide central reservation, a series of pasture and arable fields, two farms, and a park home caravan park.



**Figure 8: Looking to the north from Newton Marsh SSSI**



**Figure 9: Looking south into Newton Marsh SSSI**





**Figure 10: The point from which Figure 8 and Figure 9 are located**

### 3.4.3 Noise

3.4.3.1 Newton Marsh SSSI is located to the south of the A584, a busy dual carriageway connecting Lytham St Anne's and Blackpool with Preston. The proposed construction area is located approximately 500 m to the north of the A584, at its closest point. Due to the visual and noise disturbance from this road, it is assumed that birds have become habituated to it. Warton Aerodrome is also located approximately 1,300 m to the southwest of Newton Marsh. During visits to the onshore study area, it has been observed that loud jet aircraft are frequently landing and taking off from this aerodrome. Background levels of disturbance are therefore already high.

### 3.5 Conclusion

3.5.1.1 Despite the year-round bird interests at Newton Marsh SSSI, there are not predicted to be any impact pathways from construction activities associated with the project because:

- There will be no works, and therefore no temporary or permanent habitat loss, within the Newton Marsh SSSI.
- Distance from works. At 500 m from the location of any proposed construction activities, the cable burial activities will be beyond the recommended disturbance buffers for the wetland bird assemblage present. There are two access roads that are closer, but these are on the opposite side of a busy dual carriageway (see below).
- Visual impacts and existing screening due habitat features. The busy dual carriageway A584 Preston New Road runs directly adjacent to the Northern edge of Newton Marsh SSSI, this has a wide central reservation with a tree lined hedge. In addition to the hedge on the central reservation, there are three more hedges also with mature trees, at least two farms, a series of arable and pasture fields, and a park home caravan park.
- Noise impact. There are existing high levels of disturbance from Warton Aerodrome and the A584, and any noise from construction would have had approx. 500 m to decay, therefore additional noise disturbance will not cause any additional impacts.
- Additional construction traffic will be on the dual carriageway from which the birds are already habituated to.