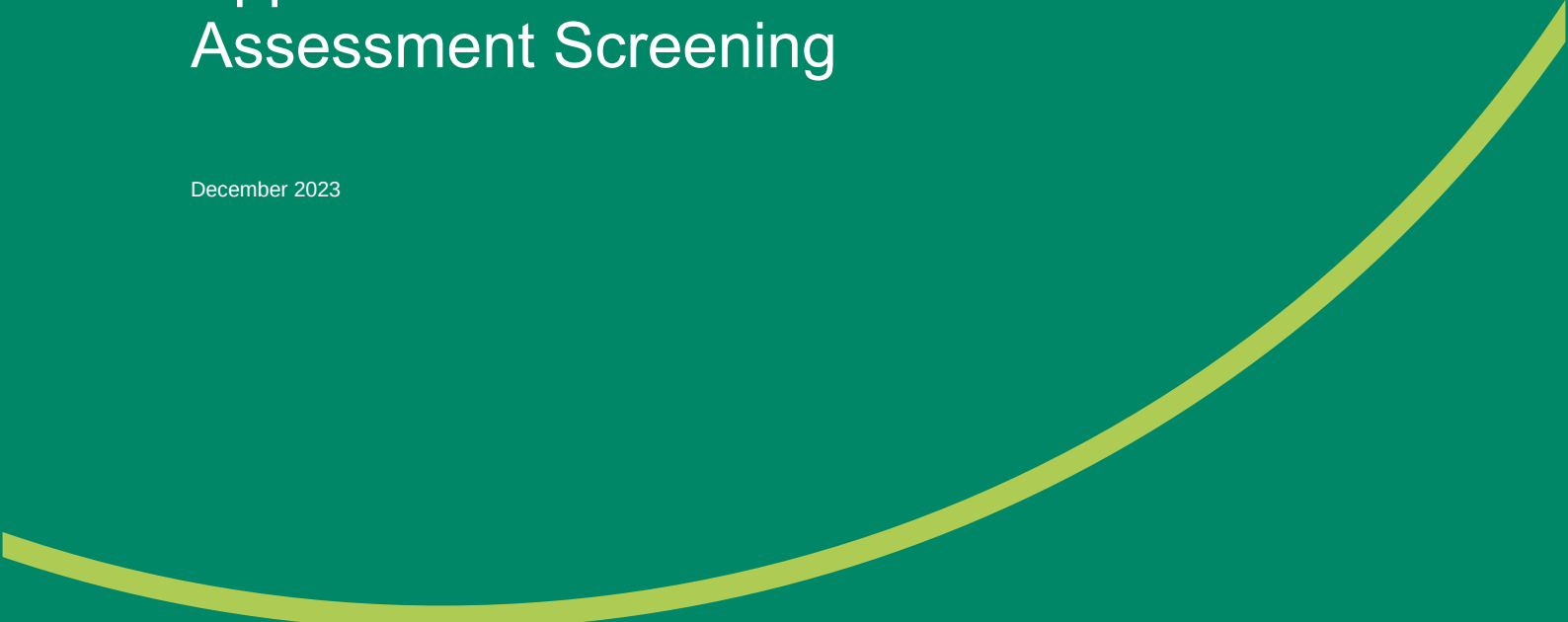


National Grid
Cable Tunnel Replacement
Project

Environmental Statement
Volume VI

Appendix 7.10 Marine
Assessment Screening

December 2023



Quality information

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Table of Contents

1	Marine Assessment Screening	1
1.1	Introduction	1
1.2	Project Description	1
1.3	Receptors.....	2
1.4	Impact Pathways	6
1.5	Conclusion	8

Plates

Plate 1: Habitats at the Site Location	2
Plate 2: Sightings of pinnipeds and cetaceans in the Greater Thames Estuary (points scaled by number of animals per sighting) ⁵	5
Plate 3: Designated sites near proposed activities	6

Tables

Table 1. Common and protected species, by life history stage, likely to be present in the Thames.....	3
Table 2. Total marine mammal sightings submitted to Thames Marine Mammal Sightings Survey between 2010 and 2014 ⁵	4

1 Marine Assessment Screening

1.1 Introduction

- 1.1.1 The Tilbury to Grain and Tilbury to Kingsnorth (TKRE) Cable Tunnel Replacement Project (hereafter the Proposed Development) includes the construction of a new cable tunnel stretching approximately 2.2 km under the Thames Estuary between a headhouse at Tilbury (51.457405, 0.39252189) to a headhouse at Gravesend (51.441663, 0.40807540).
- 1.1.2 The following Technical Note outlines the marine ecological receptors and the potential impact pathways associated with the Proposed Development. The terrestrial elements of the Proposed Development have been considered in the Environmental Statement (ES) Volume III Chapter 7: Biodiversity – Tilbury and ES Volume IV Chapter 15: Biodiversity – Gravesend.
- 1.1.3 An Outline Construction Environmental Management Plan (CEMP) (ES Volume VI Appendix 3.1) has been developed as an important measure to avoid significant environmental effects during design and construction.

1.2 Project Description

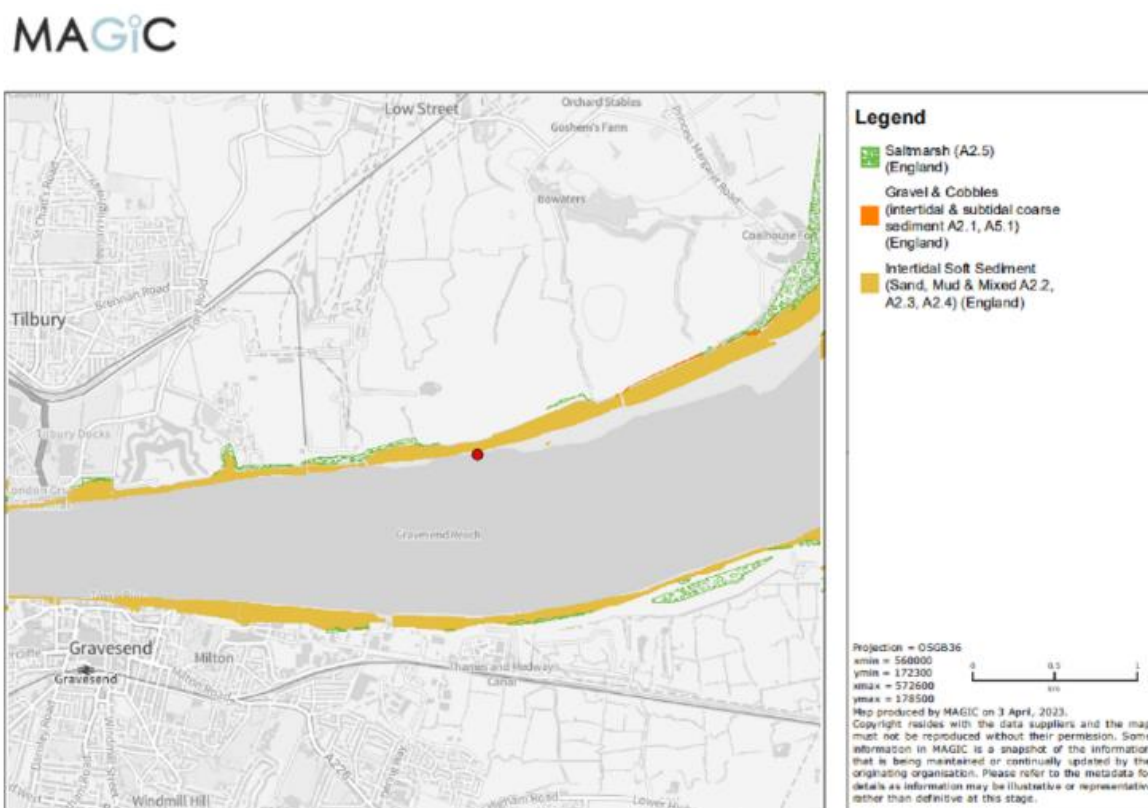
- 1.2.1 The new cable tunnel will stretch approximately 2.2 km between a headhouse at Tilbury to a headhouse at Gravesend, under the River Thames. This cable tunnel will be 4 m in internal diameter (4.5 m external diameter), and at a depth of approximately -34 to -32 m below the riverbed.
- 1.2.2 No works are required in the marine environment of the river itself. However, it is anticipated spoil from the tunnel will be to be disposed of via the River Thames. The excavated material from the construction of the Tilbury shaft will be approximately 13,000m³. This results in a total of approximately 85,700m³ of spoil which will need to be removed from the Tilbury site. It is understood that the tunnel drive will occur from the northern bank of the Thames. National Grid will seek to utilise either:
- the existing and working jetty to the south-east of the proposed Tilbury SEC, delivering the tunnel and Tilbury shaft spoil to the jetty via HGV and transferring to barge. There is an existing road extending to the jetty, however some upgrading of the existing road will be required. This route is depicted in the Planning Application – Red Line Boundary on Figure 1.1 (see ES Volume II Chapter 1: Introduction);
 - Berth 5 at the Port of Tilbury, delivering the tunnel spoil to the berth via HGV and transferring to barge. No road upgrading will be required for this option. This route is depicted in the Planning Application – Red Line Boundary on Figure 1.1 (see ES Volume II Chapter 1: Introduction).
- 1.2.3 Construction at the site will take place from 2024, when early mobilisation and further ground investigations take place. The main construction work will commence in 2025 and run until approximately 2028, with the tunnelling phase expected to take eight months. Approximately 80 barge movements are anticipated to be required for spoil disposal.
- 1.2.4 An Outline Construction Environmental Management Plan (CEMP) has been developed to include important measures to avoid significant environmental effects during design and construction. For more information regarding the Proposed Development description, see ES Volume II Chapter 3: Project Description.

1.3 Receptors

Habitats

- 1.3.1 The Thames Estuary is a highly dynamic environment subject to large freshwater inputs and a strong tidal regime. This results in a varied and changeable environment that supports a variety of habitats and species.
- 1.3.2 The Proposed Development is not located within any sites designated for marine habitats or species. The nearest protected site is the Thames Estuary and Marshes Special Protection Area (SPA), approximately 670 m to the east from the Gravesend headhouse. It is a water dependant designated site with a diversity of habitats, including grazing marsh, saltmarsh and mudflats, that support the internationally important bird populations. An assessment of the potential impact of the Proposed Development on European Sites can be found within the Report to inform Habitat Regulations Assessment Test of Likely Significant Effects.
- 1.3.3 Areas of saltmarsh and mudflats to the south of the Tilbury headhouse adjacent to the River Thames are habitats of principal importance listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act, 2006¹ shown on Plate 1: Habitats at the Site Location. Intertidal and subtidal habitats the Middle Thames WFD Waterbody (GB530603911402)² have been mapped as part of the Water Framework Directive (WFD) (Plate 1). The only habitat highlighted as being sensitive (based on their resistance to, and recovery rate) to human pressures, was saltmarsh; with the nearest saltmarsh habitat located approximately 380 m from the Proposed Development (Plate 1: Habitats at the Site Location). Other habitats such, such as gravel and cobbles, and intertidal soft sediment, are considered to have a lower sensitivity to human pressures.

Plate 1: Habitats at the Site Location



¹ HMSO (2006) Natural Environment and Rural Communities (NERC) Act 2006 (as amended):

<https://www.legislation.gov.uk/ukpga/2006/16/contents>

² Environment Agency. (2022). Thames Middle Water Body. <https://environment.data.gov.uk/catchment-planning/WaterBody/GB530603911402>

Fish

- 1.3.4 The Thames catchment is known to support several nationally and internationally protected diadromous³ or migratory fish species as well as those known to be dependent on the estuary at certain life stages or for their entire life cycle⁴.
- 1.3.5 The Thames Estuary supports a diverse range of fish fauna. A study carried out by the Zoological Society of London (ZSL) identified 24 protected and common species in the Tidal Thames. Of these, 17 are considered likely to be present in the Thames Middle water body within the vicinity of the proposed works (Table 1). Some of these species are protected nationally under Annex I of the Habitats Directive 2017 (e.g., Atlantic salmon). The Thames Estuary is also an important area for spawning or growth of many commercial species including Atlantic cod and herring.
- 1.3.6 Moreover, there have been fish survey undertaken by the Environment Agency (51.443518, 0.39653056), on the southern side of the River Thames, approximately 700 m west from the Gravesend headhouse. The most recent survey, completed in 2019, identified 15 species, including herring flounder and common goby.

Table 1: Common and protected species, by life history stage, likely to be present in the Thames

Common name	Latin name
Spend entire life cycle in the Tidal Thames	
Common goby	<i>Pomatoschistus microps</i>
Long-snouted seahorse	<i>Hippocampus guttulatus</i>
Nillsson's pipefish	<i>Syngnathus rostellatus</i>
Bib	<i>Trisopterus luscus</i>
Use the Tidal Thames to spawn or grow whilst juveniles	
Atlantic cod	<i>Gadus morhua</i>
Dover sole	<i>Solea solea</i>
European plaice	<i>Pleuronectes platessa</i>
European sea bass	<i>Dicentrarchus labrax</i>
European sprat	<i>Sprattus sprattus</i>
Flounder	<i>Platichthys flesus</i>
Herring	<i>Clupea harengus</i>
Short-snouted seahorse	<i>Hippocampus hippocampus</i>
Whiting	<i>Merlangus merlangius</i>
Migrate through the Tidal Thames to freshwater or saltwater	
Atlantic salmon	<i>Salmo salar</i>
Brown/sea trout	<i>Salmo trutta</i>
European eel	<i>Anguilla anguilla</i>

³ Species which spend a portion of their life cycle partially in fresh water and partially in salt water.

⁴ Zoological society of London. (2017). Guidance Document Conservation of Tidal Thames Fish.

Common name	Latin name
European smelt	<i>Osmerus eperlanus</i>

Marine Mammals

1.3.7 Cetaceans and pinnipeds are protected by a number of pieces of conservation legislation in the UK including:

- Habitats Directive 2017:
 - Annex II species are protected within designated Special Areas of Conservation (includes grey seal, harbour seal, harbour porpoise, and bottlenose dolphin);
 - Annex IV species are protected wherever they occur, and it is an offence to deliberately capture, kill, injure, or disturb animals (includes all cetaceans); and
 - Annex V are protected wherever they occur, and it is an offence to deliberately exploit or take animals from the wild (includes all pinnipeds).
- Schedule 5 of the Wildlife and Countryside Act 1981.

1.3.8 A range of marine mammals are known to utilise the Thames. The most recent report from ZSL reporting on recorded observations between 2004 and 2014⁵ concluded that on average, 113 sightings were reported each year, with 80 % of sightings being of pinnipeds.

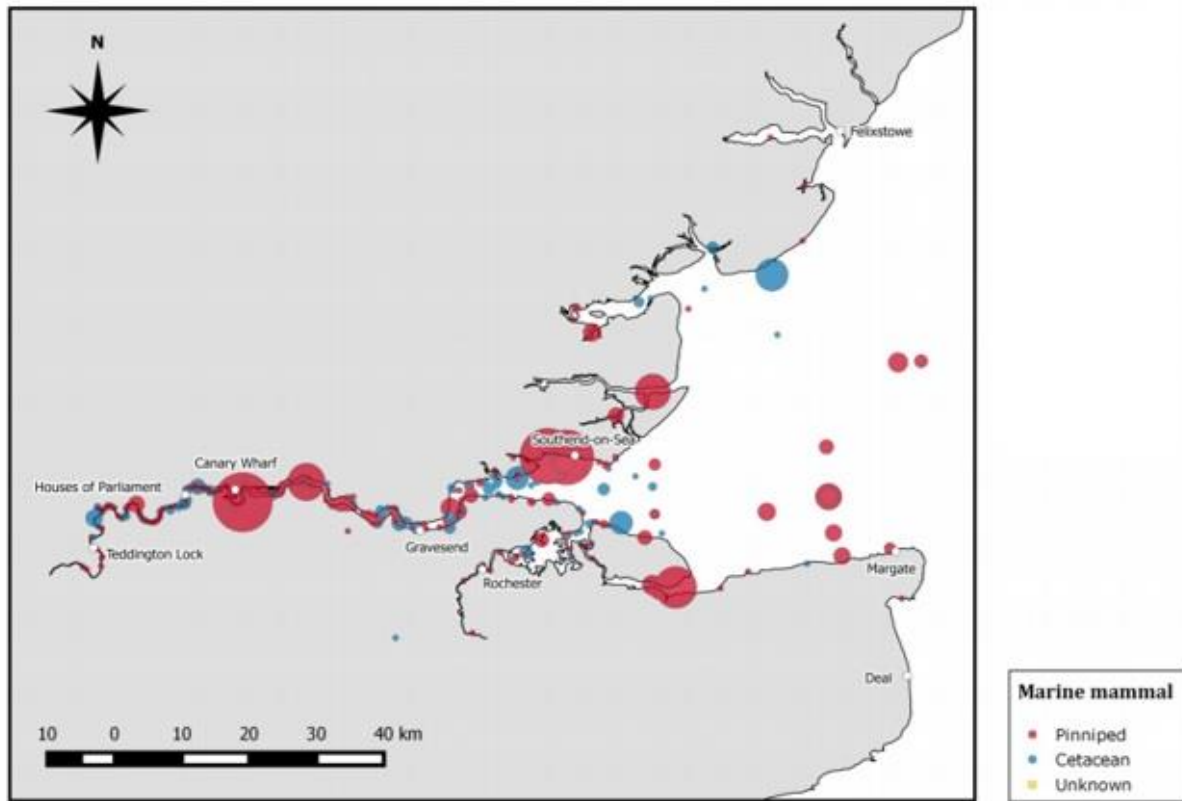
1.3.9 The greatest density of sightings was around Canary Wharf where 138 sightings per km² were recorded between 2004 and 2014 (although this hotspot could be due to increased observation effort in this area). The location of the Proposed Development had between 1 and 5 sightings per km² during the 10-year period between 2004 and 2014; the majority of which were of pinnipeds (Table 2; Plate 2).

Table 2. Total marine mammal sightings submitted to Thames Marine Mammal Sightings Survey between 2010 and 2014⁵

Marine mammal receptor	Species	Sightings	Total Sightings
Pinnipeds	Harbour seal	307	1,023
	Grey seal	250	
	Unknown seal	466	
Cetaceans	Harbour porpoise	226	1,281
	Dolphin	26	
	Whale	4	

⁵ Zoological society of London (2015). Thames Marine Mammal Sightings Survey Ten Year Report (2004-2014). [Online]. Available from: <https://www.zsl.org/sites/default/files/media/2015-08/Final%20TMMSS%20Report.pdf>

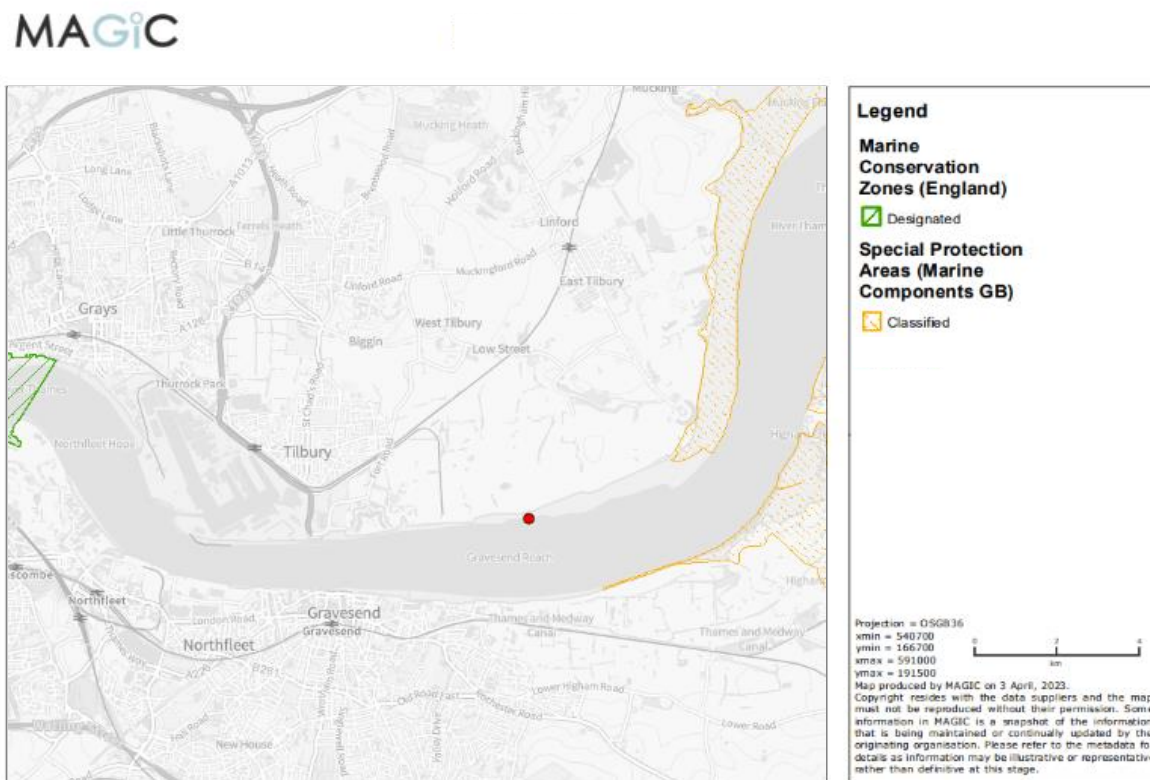
Plate 2: Sightings of pinnipeds and cetaceans in the Greater Thames Estuary (points scaled by number of animals per sighting)⁵



Relevant Designated Sites

- 1.3.10 The Proposed Development is not located within any sites designated for marine habitats or species. Nearby designated sites (Plate 3) include:
- Thames Estuary and Marshes SPA is approximately 670 m to the east from the Gravesend headhouse. The site is a water dependent site designated for a range of internationally important bird populations and their supporting habitats, including grazing marsh, saltmarsh and mudflats; and
 - Swanscombe MCZ is approximately 7 km upstream from the Proposed Development. The site is designated for the conservation of intertidal mud and tentacled lagoon worm (*Alkmaria romijni*).
- 1.3.11 The assessment of European Sites can be found within Report to inform Habitat Regulations Assessment Test of Likely Significant Effects.

Plate 3: Designated sites near proposed activities



1.4 Impact Pathways

Mobilisation of sediment from disturbance of the riverbed

- 1.4.1 Movement and placement of the barge associated with the movement of spoil has the potential to mobilise sediment and increase suspended sediment concentrations (SSC). Increased SSC results in elevated turbidity, which can affect rates of photosynthesis via a reduction in light availability and may also act as a barrier for any migratory fish. Suspended sediment may also settle out, resulting in increased deposition which can smother the seabed and sessile benthic organisms.
- 1.4.2 The largest sediment plumes, and highest levels of SSC, will be associated with disturbance of sediments with a high proportion of fine particulate material. The River Thames is dominated by soft sediment habitats which are characterised by a high proportion of fine sediments. The Proposed Development is located in an area of soft sediment (Plate 1). Tidal currents at this location are understood to be ebb-dominated, favouring the export of sediment⁶. Therefore, dispersion processes associated with the tidal currents will act to rapidly dilute the mobilised fine sediment to a point where the concentration of particulate matter and any deposition on the river bed would be negligible. Moreover, barge movements associated will be temporary and limited to a maximum of 80 movements. Therefore, any increase in SSC is also anticipated to be limited and temporary in nature.
- 1.4.3 Changes in SSC may alter the sediment supply to nearby saltmarsh communities. The closest area of saltmarsh habitat to the Proposed Development is located over 0.3 km away. Although saltmarsh is sedimentary habitat dependant on accretion and erosion of sediments, an increase in SSC could benefit saltmarsh, in particular pioneer species by providing additional sediment to colonise⁷. Tidal waters flooding saltmarshes are often naturally turbid and most communities have a high resilience

⁶ Thorn, M.F.C. and Burt, T.N. (1978). The silt regime of the Thames Estuary. Report No. IT175. Hydraulics Research Station, Wallingford.

⁷ Packham, J. R., & Willis, A. J. (1997). Ecology of Dunes, Salt Marsh and Shingle. Springer Science & Business Media.

and are likely to be adapted to some degree of sedimentation and occasional smothering, and thus will not be impacted by the mobilisation of sediments associated with the Proposed Development.

- 1.4.4 Increased SSC also has the potential to act a barrier to migratory fish present within the River Thames (Table 1). As previously stated, any increase in SSC is expected to be rapidly diluted by tidal currents and, as the River Thames is approximately 1.3 km wide at the point of the Proposed Development, it is not anticipated that any mobilised sediments will create a barrier across the width of the river. Therefore, based on the limited extent of any increased SSC, the temporary nature of the barge movements, and the mobile nature of fish, the mobilisation of sediment is not anticipated to act as a barrier to fish migration.
- 1.4.5 Therefore, the impact of any mobilised sediment associated with the Proposed Development on marine receptors is considered to negligible and is assessed as **not significant**.

Visual disturbance effects to marine mammals

- 1.4.6 Pinnipeds that have surfaced or have hauled-out could be affected by changes to visual stimuli from the proposed activities. Seals that are hauled out on land, either resting or breeding, may be particularly sensitive to visual disturbance⁸. However, there are no haul out sites within the vicinity of the proposed works. As such, there would be no visual disturbance to resting or breeding pinnipeds expected to occur from project activities.
- 1.4.7 The proposed activities are temporary in nature, and therefore the magnitude of change to visual stimuli is considered to negligible and thus, the impact of visual disturbance to seals is assessed as **not significant**.

Underwater sound and vibration disturbance effects to marine mammals and fish

- 1.4.8 No construction works are required within marine environment and the new cable tunnel will run at a depth of approximately -34 to -32 below the river bed. At this depth any underwater sound or vibration in the river will be negligible. However, there is potential for underwater sound to be produced by the movement of the barge associated with the movement of spoil which may impact marine mammals and fish that utilise the River Thames.
- 1.4.9 Cetaceans produce and receive sound over a great range of frequencies for use in communication, orientation, predator avoidance and foraging. As sound production in marine mammals is integral to so many important behaviours, any interference with these communicative functions has the potential for adverse effects. Pinnipeds also produce a diversity of sounds, though generally over a lower bandwidth. Their sounds are used primarily in critical social and reproductive interaction, both in water and air⁹. Sound from anthropogenic activities can negatively impact marine mammals as it influences their ability to echolocate, communicate and in extreme cases it can cause physical harm (directly via trauma to the auditory apparatus or indirectly through disorientation leading to beaching). Anthropogenic sound may have a diverse range of effects on marine receptors from injury to minor behavioural responses. Although, the wider Thames Estuary represents an important site for cetaceans and pinnipeds, the location of the Proposed Development, had between 1 and 5 sightings per km² during the 10-year period between 2004 and 2014. Although this may be due to low survey effort at this location, it is not anticipated that there will be extensive numbers of marine mammals within the vicinity of the Proposed Development.
- 1.4.10 Underwater noise and vibrations may also have an impact on fish species within the Thames Estuary. Sound plays a major role in the lives of fish including for communication, locating prey and avoiding predators¹⁰. Underwater noise and vibrations generated by the Proposed Development has the potential to disrupt normal fish behaviour and act as a barrier disrupting the movement of migratory fish through the water body.

⁸ Wilson, B., Batty, R. S., Daunt, F. and Carter, C. (2007). Collision risks between marine renewable energy devices and mammals, fish and diving birds. Report to the Scottish Executive. Scottish Association for Marine Science, Oban, Scotland.

⁹ Southall, B., Bowles, A., Ellison, W., Finneran, J., Gentry, R., Green, C., Kastak, C., Ketten, D. Miller, J., Nachtigall, P., Richardson, W., Thomas, J., Tyack, P. (2007). Marine mammal noise exposure criteria. Aquatic Management, 33. DOI 0.1121/AT.2021.17.2.52.

¹⁰ Fay, R. R., & Popper, A. N. (2000). Evolution of hearing in vertebrates: the inner ears and processing. Hearing Research, 149, 1-10.

However, the River Thames is a busy commercial waterway with significant levels of existing vessel traffic concentrated in a relatively narrow body of water. Baseline underwater sound monitoring at the Tilbury Docks were carried out in July 2017, in very close proximity to the proposed works, and found ambient underwater sound levels ranged between 85.4 and 161.5 dB re. 1µPa, with an average of 124.6 dB re. 1µPa¹¹. The number of barge movements will be limited to 80 movements which is not expected to significantly increase ambient sound levels caused by shipping traffic already present in the river. As such, sound emissions from the installation vessels will not constitute a substantive change from the baseline soundscape including existing vessel sound, and hence there is not potential for adverse effects on marine mammals nor fish. Therefore, the impact on marine receptors is considered to negligible and is assessed as **not significant**.

Introduction of Invasive Non-Native Species (INNS)

1.4.11 Vessels may inadvertently transport and introduce non-native species. Whilst most non-native species are unlikely to become invasive, those that do can out-compete native species and introduce diseases which could result in significant changes to community composition. INNS can spread rapidly, and the effects may not be constrained to the immediate project area. Therefore, to reduce any impacts of INNS introduction, the following good practice measures should be incorporated into the methods of the proposed activities:

- The installation vessel shall adhere to the International Maritime Organisation Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines)¹²;
- All equipment, materials, machinery, and PPE used will be in a clean condition prior to their arrival on site, and upon removal from site, to minimise risk of introducing INNS into the marine environment; and
- The development of a Construction Environmental Management Plan (CEMP) as an important measure to avoid significant environmental effects during design and construction.

1.4.12 If mitigation is properly defined and employed, and there will then be minimal risk of introducing or spreading INNS and this receptor will not need to be considered further.

1.5 Conclusion

1.5.1 As there is no construction occurring in the marine environment any impacts will be limited the barge activity associated with the movement of spoil. Based on the limited number of barge movements and temporary nature of the works, it has been concluded that there will be no significant impact on marine ecology from any potential impact pathways associated with the Proposed Development.

¹¹ Midforth, F., Mason, T. and East, S. (2017). Monitoring background noise and modelling of construction noise at Tilbury Docks. Subacoustech Environmental Report No. P203R0105.

¹² IMO. (2011). 2011 Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species. Annex 26. Resolution MEPC.207(62). Adopted 15 July 2011.

