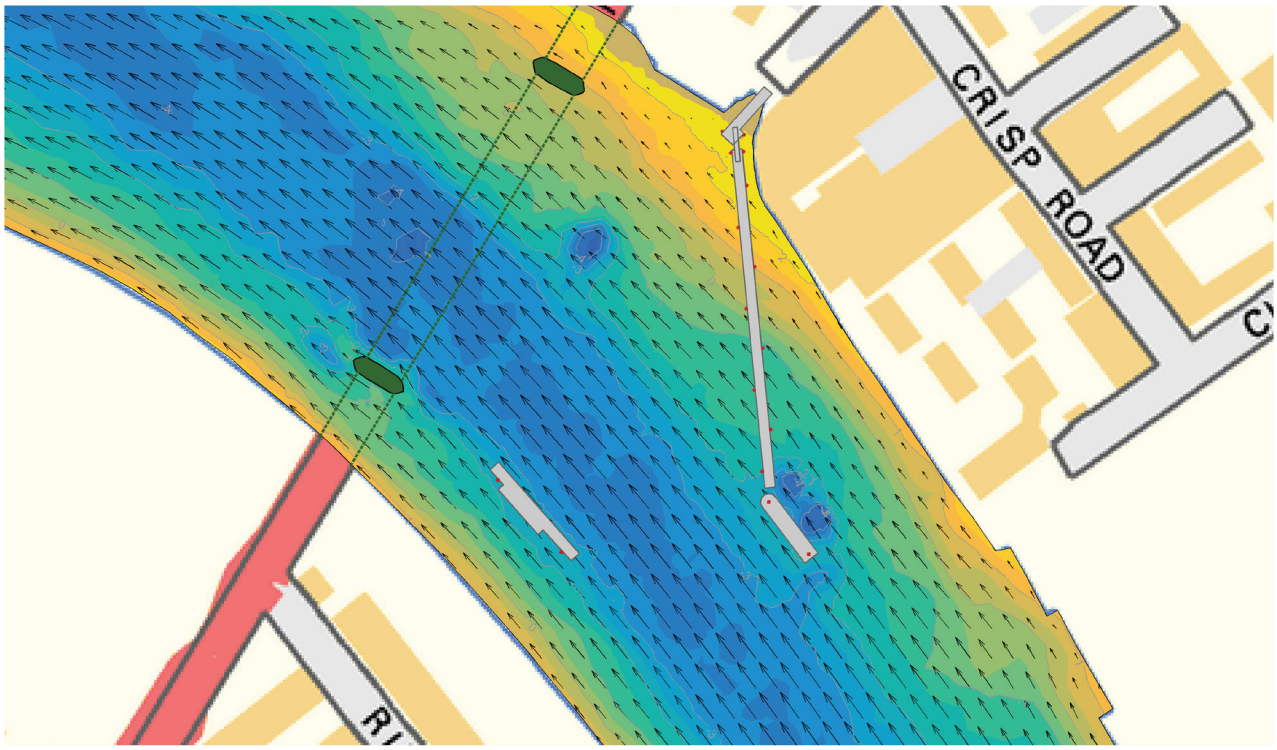
HR Wallingford
Working with water

Hammersmith Temporary Ferry

Aquatic Ecology Desk Assessment



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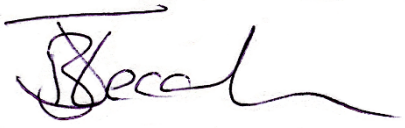

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1. Introduction

1.1. Background

An option for a temporary ferry crossing is being investigated by Transport for London (TfL) to run nearby to the existing Hammersmith Bridge during the bridge's refurbishment. Thames Clippers supported by Beckett Rankine recently won the tender to design and develop the ferry crossing and associated marine elements. HR Wallingford have been commissioned to support the consents process, including hydrodynamic, scour and ecological assessments.

This report presents the findings of a desk study on aquatic ecology in the vicinity of the proposed Temporary Hammersmith Ferry, adjacent and to the east of the Hammersmith Bridge. The work has been undertaken to identify ecological constraints that may affect the proposed Temporary Hammersmith Ferry project. The Hammersmith Bridge Refurbishment project is a separate development and is not considered within this report.

1.2. Report scope

The report sets out to:

- Provide baseline ecological information about the site and a surrounding study area with particular reference to whether legally protected and/or notable sites, species or habitats are present or likely to be present, which includes a high-level consideration of bird use of the foreshore;
- Provide recommendations to enable compliance with relevant nature conservation legislation and planning policy;
- Identification of potential pathways of effect, whereby ecological receptors are considered against the various activities of the project;
- Provide a high level assessment of potential significance of impact; and,
- Where required, to identify the need for avoidance or mitigation to reduce any potential impact.

This report is limited to the aquatic ecological constraints and considerations, and a high-level consideration of birds that may use the foreshore.

1.3. Project overview

To facilitate the refurbishment works and enable repairs for Hammersmith Bridge, a temporary ferry service is required to provide pedestrian and cycling access over the River Thames. The temporary ferry service, located to the east of Hammersmith Bridge, will provide temporary access for pedestrians and cyclists to cross the River Thames.

The Temporary Piers will be located on either side of the river, immediately downstream of Hammersmith Bridge. Hammersmith Pier on the north bank will land at the end of Queen Caroline Street, while Barnes Pier will land on the Thames towpath on the south bank.

Both the Hammersmith Pier and Barnes Pier which make up the Hammersmith Ferry service are to be temporary installations for an intended period of 3 years with a maximum of 5 years. The design of each structure has therefore been completed with ease of removal as a key criterion.

1.4. Location and description of the proposed development

The temporary crossing as proposed is shown in the general arrangement drawing in Figure 1.3. Two new temporary piers are proposed as ferry terminals, Hammersmith Temporary Pier (Figure 1.4 and Figure 1.5) on the north bank and Barnes Temporary Pier (Figure 1.6) on the south bank. In terms of structural marine elements this includes:

1.4.1. Hammersmith Temporary Pier

The proposed Hammersmith Temporary Pier is to land on the public slipway located at the end of Queen Caroline Street. The slipway is seldom used and is closed off with timber flood boards. Access to the pier is to be via a lightweight steel ramp that will span over the flood boards.

A modular floating walkway (using units by EZ Dock) will span between the flood defence wall and a second-hand barge, modified for use as a pier. The walkway will be restrained by temporary tubular piles of up to 0.5 m in diameter. The required piling is to be minimised to avoid major impacts and disturbance to the river environment.

The barge will be restrained by a pair of spud legs – these have been selected given their temporary nature and lesser impact when compared to piles. The pier is skewed downstream to facilitate passage of large vessels beneath Hammersmith Bridge (the bridge is open for occasional navigation when no works are in progress on the bridge).

Hammersmith Temporary Pier is shorter but with a similar arrangement of two restraining piles, a floating walkway and a transition platform with two piles. The floating walkway comprises 11 restraining temporary piles at 15 m intervals, and rests on the foreshore at low water.

1.4.2. Barnes Temporary Pier

The proposed Barnes Temporary Pier is formed from the old Savoy pier, itself a temporary structure, which will be repurposed for this development. The pier will be modified such that is restrained by a pair of spud legs rather than its current radial arms to minimise the impact on the foreshore.

Access to the pier is by an aluminium linkspan, connecting to the landside towpath. The towpath is located beneath Flood Defence Level and floods on some spring tides. As part of the works, a lightweight steel frame walkway will be installed to allow dry access to the pier.

Barnes Temporary Pier comprises two new temporary piles of around 1 m diameter restraining the pier of dimensions approximately 40 m long and 10 m wide.

1.4.3. Plough dredging

Approximately 120 m^3 of sediment is to be levelled by plough dredging in and around the area of the Hammersmith Temporary Pier (Figure 1.1), with an additional c.34 m^3 to be plough dredged at Barnes Temporary Pier (Figure 1.2), to allow vessels to come alongside at low tide.

The maximum height to be levelled at any location is circa 450 mm. The total c.154 m^3 of sediment will be plough dredged downstream.

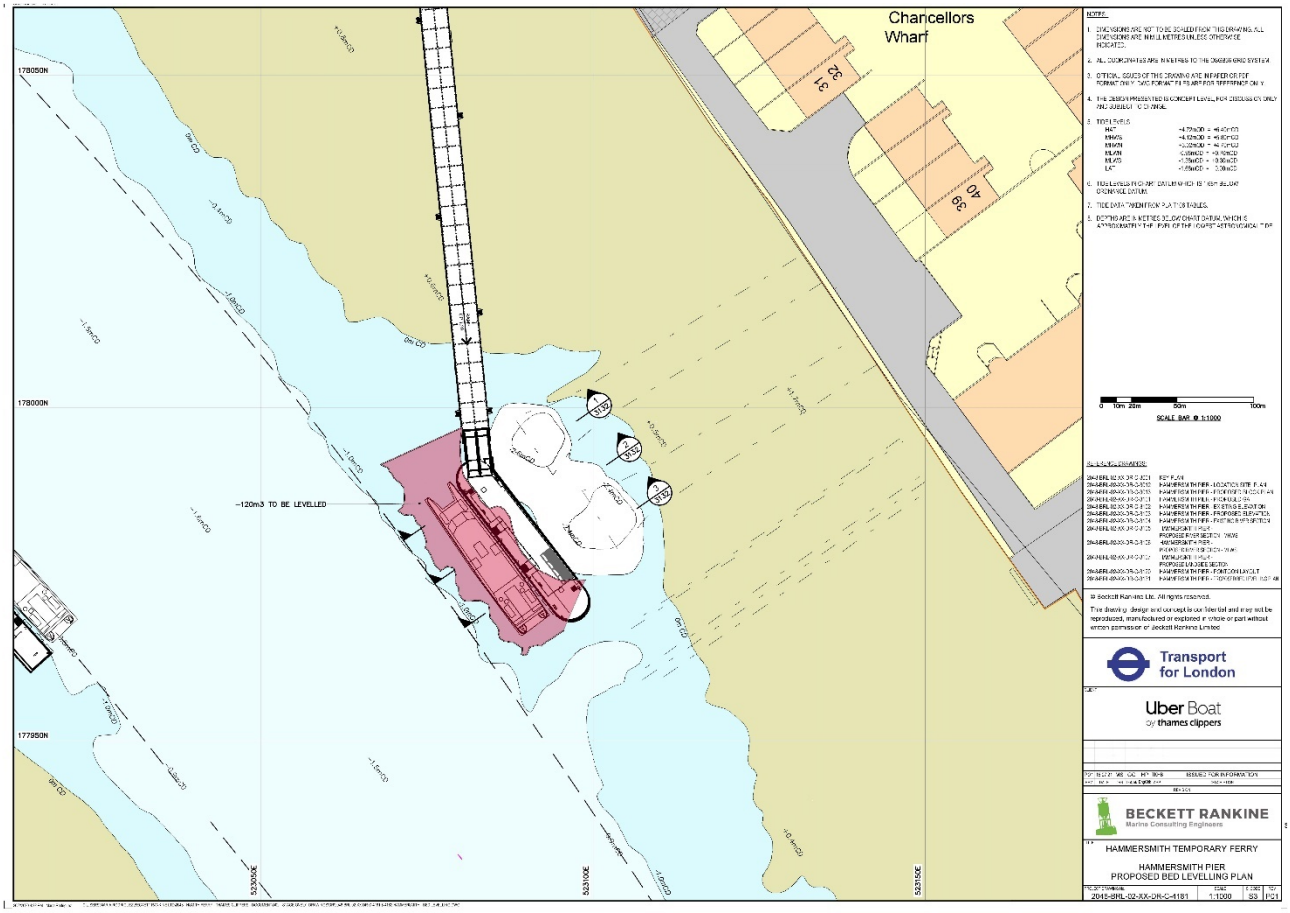

Figure 1.1: Location of sediment to be levelled via plough dredger at Hammersmith Temporary Pier

Source: Beckett Rankine, Drawing 2048-BRL-02-XX-DR-C-4181 HAMMERSMITH - BED LEVELLING PLAN

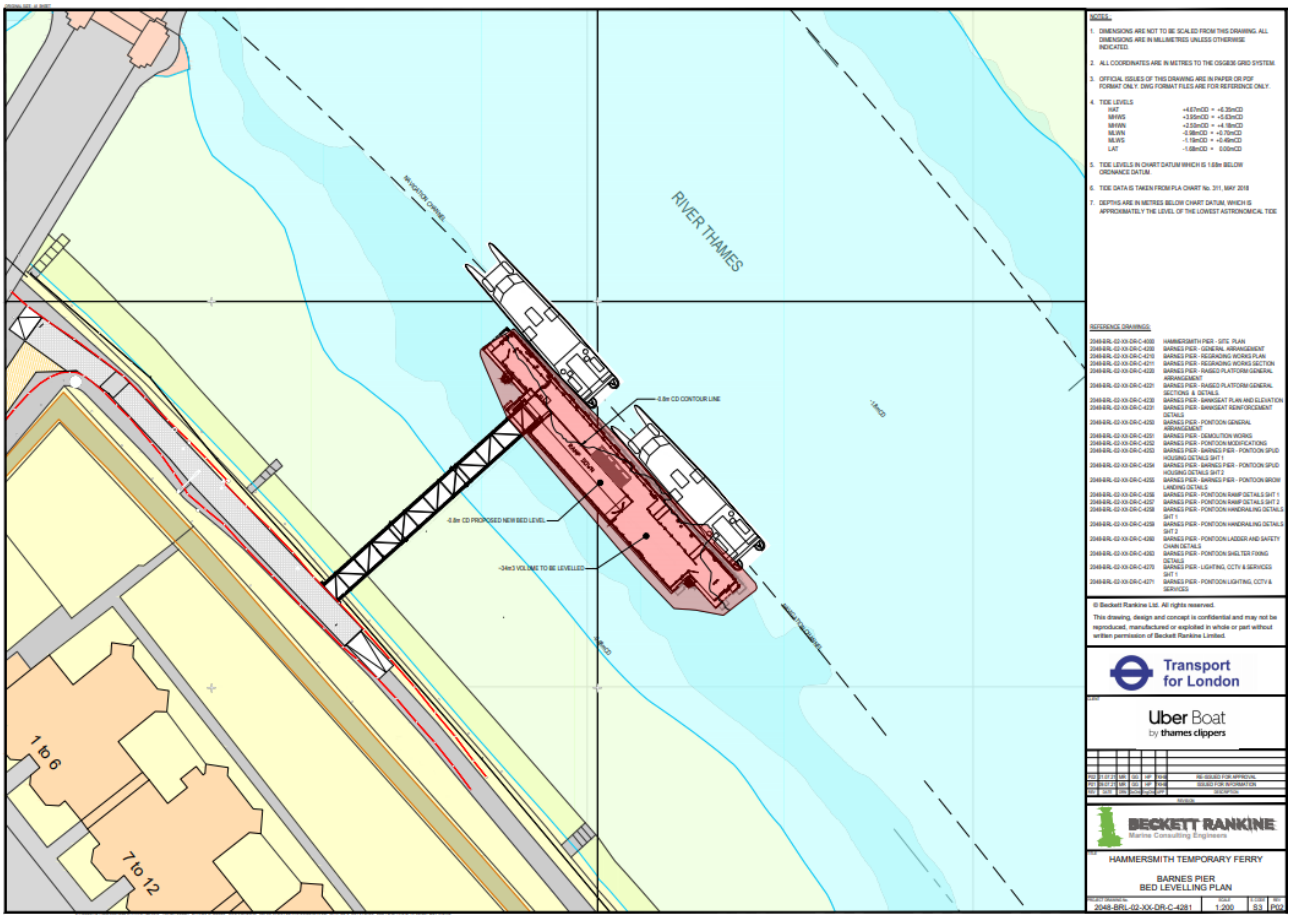

Figure 1.2: Location of sediment to be levelled via plough dredger at Barnes Temporary Pier

Source: Beckett Rankine, 2048-BRL-02-XX-DR-C-4281_P02 BARNES - BED LEVELLING PLAN

1.4.4. Programme

Offsite construction activities are underway. Works on site are due to start in early September and are to be completed by end of October. These dates continue to be subject to attaining the relevant licensing and consents for the works.

1.4.5. Construction

The first activity on site will be the bathymetric and UXO surveys. A proof dig at the pile line will also be carried out. Following this, the temporary piers will be installed following Red7 Marine's method statement. All piles will be driven by the crawler crane mounted on a jack-up barge. In the case of the 4 most northern piles, a landside excavator will act as the piling gate. For the remainder of the piles the excavator will be mounted on the jack-up barge where it will also act as a piling gate. A supply barge will operate adjacent to the jack-up barge to store the piles. Where necessary for the spud leg piles at Barnes Pier, the excavator will be mounted on the supply barge.

Non-percussive piling methods will be used to install the tubular piles. Soft-start vibratory piling methods (high-frequency, variable moment resonant free vibratory hammer) will be used instead to embed the piles

~4m into the riverbed, therefore, the noise and vibratory effects will be significantly reduced and less harmful to the surroundings. Piles will be driven dry where possible, and in the minimum water level possible where not possible. The plant requires a minimum water depth of 2 m to safely carry out the works. The methodology utilises low water piling techniques to reduce noise and vibration effects throughout the works.

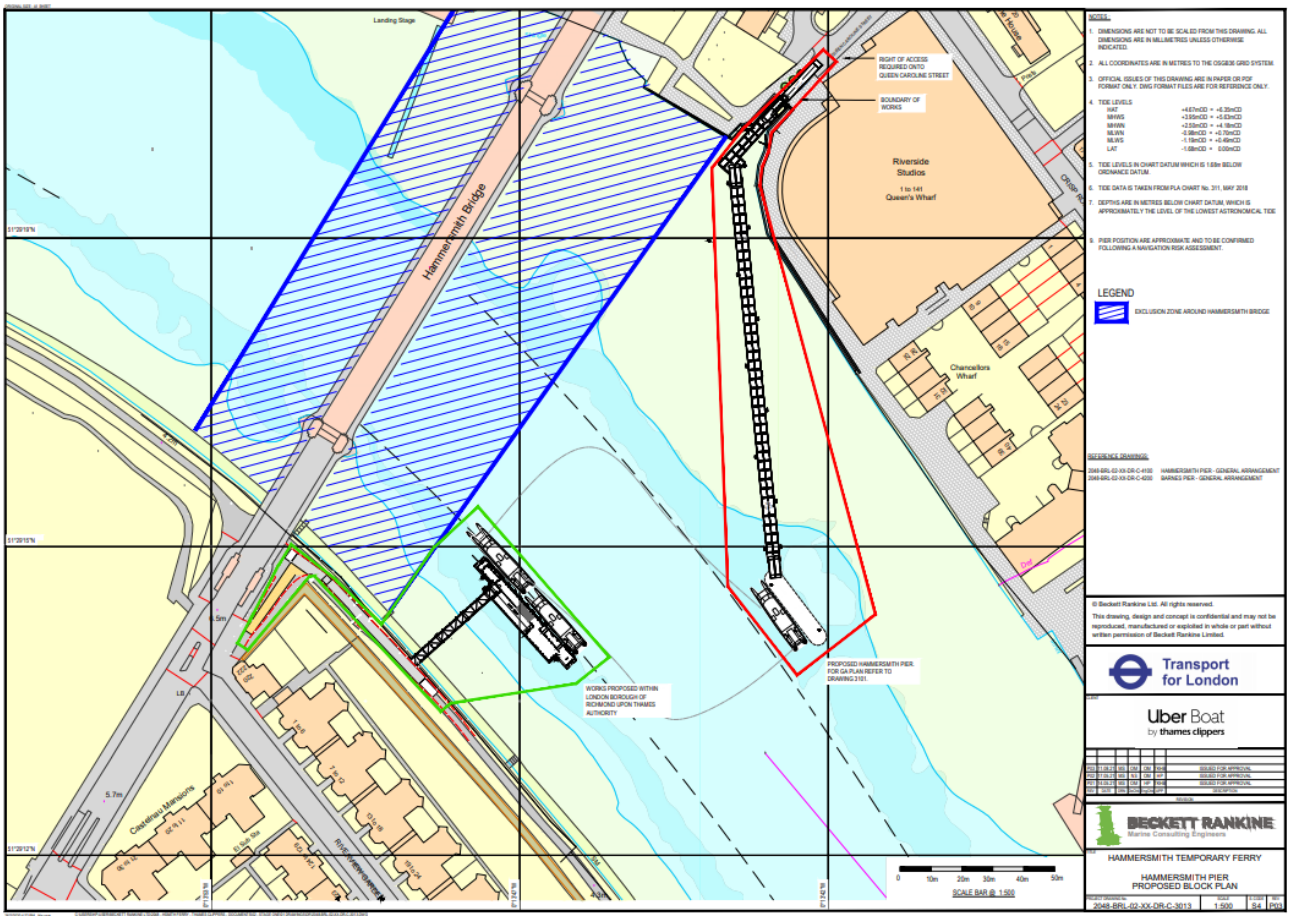

Figure 1.3: General arrangement of the temporary ferry project

Source: Beckett Rankine, Drawing 2048-BRL-02-XX-DR-C-3013_P03

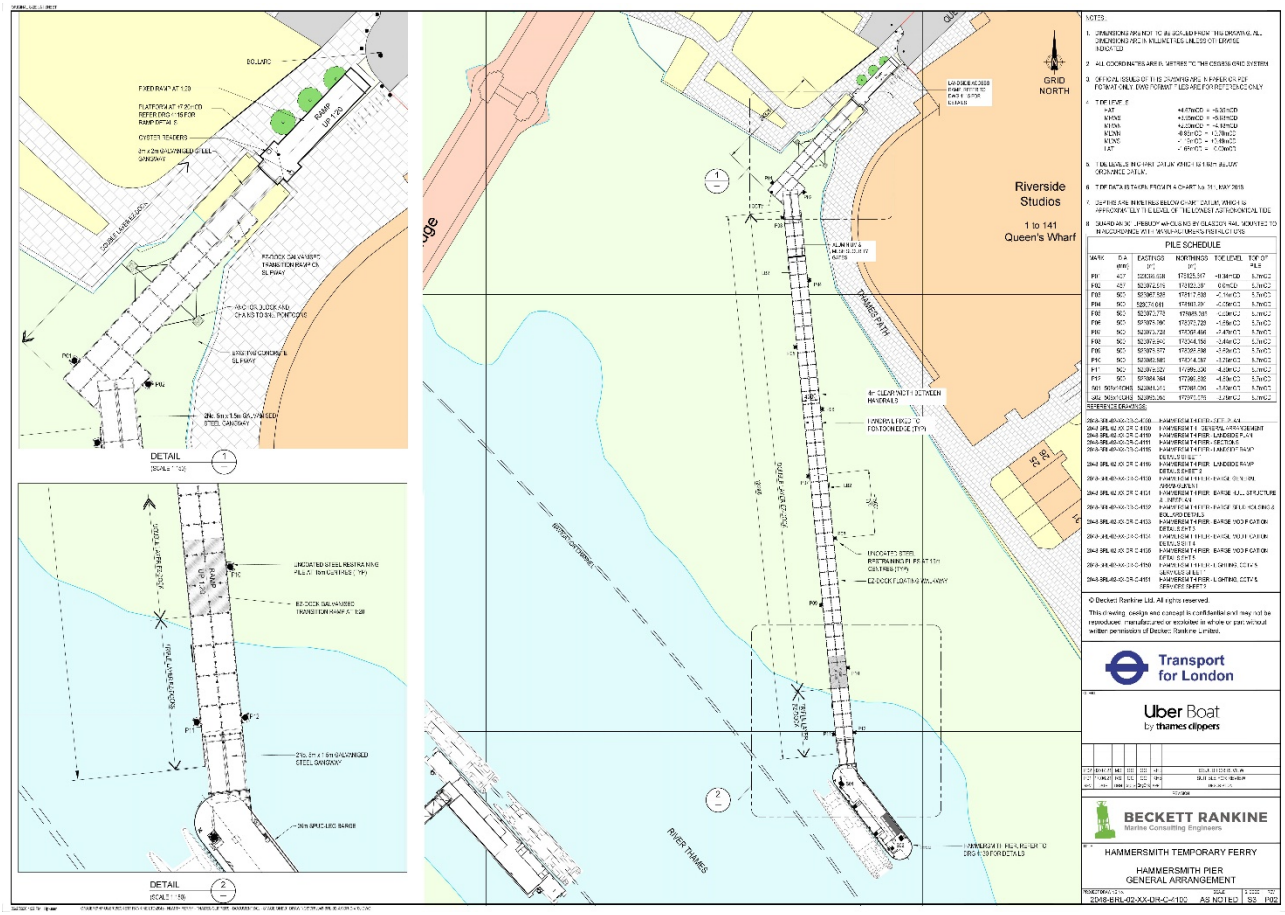

Figure 1.4: Hammersmith Temporary Pier general arrangement

Source: Beckett Rankine, Drawing 2048-BRL-02-XX-DR-C-4100_P02 HSMTH BRG-GA

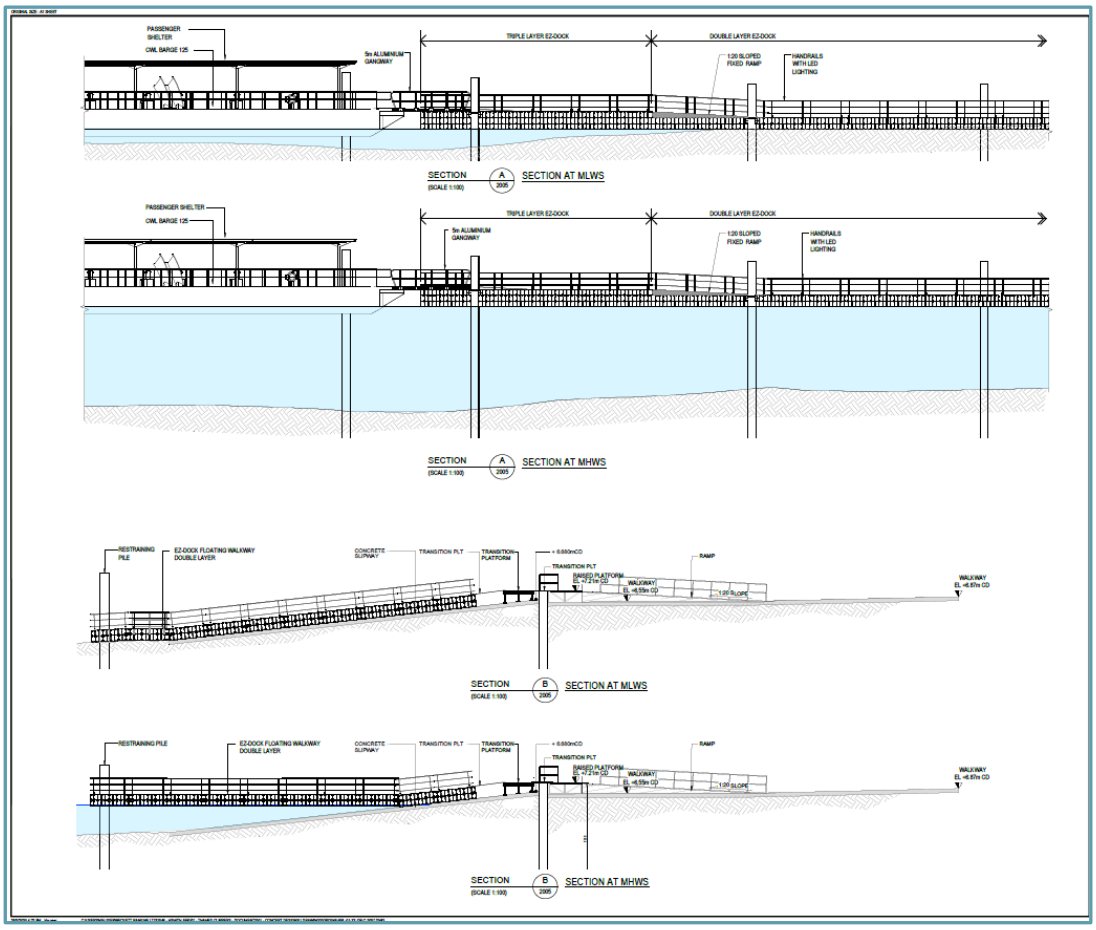

Figure 1.5: Cross-sections of the floating walkway proposed to access Hammersmith Temporary Pier

Source: Beckett Rankine, Drawing 2048-BRL-01-XX-DR-C-2007_T01

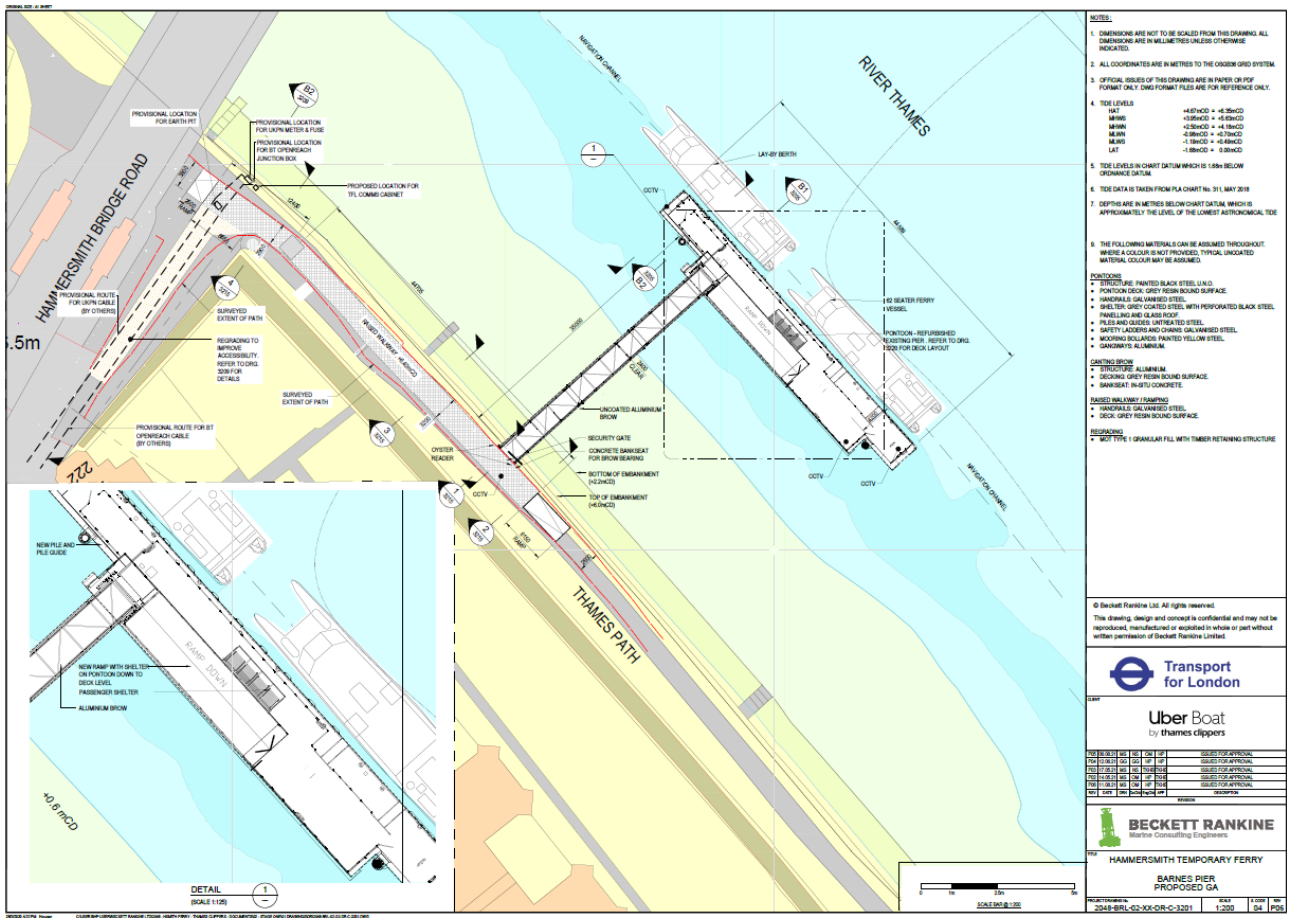

Figure 1.6: Barnes Temporary Pier general arrangement

Source: Beckett Rankine, Drawing 2048-BRL-02-XX-DR-C-3201 P06 BARNES PIER PROPOSED GA (002)

1.5. Policy and Legislation

1.5.1. Legislation

This aquatic ecology desktop study has been compiled with reference to the following relevant nature conservation legislation:

- The Wildlife and Countryside Act 1981 (HMSO, 1981), as amended by the Countryside and Rights of Way (CRoW) Act 2000 (HMSO, 2000); provides for the protection of wild birds and other wildlife and for the designation of Sites of Special Scientific Interest (SSSIs);
- The Conservation of Habitats and Species Regulations 2017, (Habitats Regulations, 2017) implement the EU Habitats Directive (Council Directive 92/43/EEC) (EU Council, 1992) on the conservation of natural habitats and of wild fauna and flora;
- European Directive 2009/147/EC on the conservation of wild birds (the Birds Directive, EU Council 2009) and 1971 Ramsar Convention on Wetlands of International Importance;
- Natural Environment and Rural Communities (NERC) Act 2006 (HMSO, 2006);
- The Water Framework Directive or WFD ('Directive 2000/60/EC of the European Parliament) establishing a framework for Community action in the field of water policy;
- The Marine and Coastal Access Act 2009 (MCAA) which established Marine Conservation Zones;
- Salmon and Freshwater Fisheries Act, 1975. This legislation protects wild fish, of particular relevance is Part II of the Act, which prohibits obstruction to passage of fish by either physical barriers (including potential water quality deterioration) or disturbance; and,
- The EU Eels Regulations, 2007 (Council Regulation EC) establishing measures for the recovery of the stock of European eel, transposed into UK law through The Eels (England & Wales) Regulations, 2009.

1.5.2. Planning Policy

The applicable national, regional and local planning policy framework associated with aquatic ecology and the proposed project is summarised below:

- National Planning Policy Framework (NPPF) (adopted March 2012);
- National Encroachment Policy for tidal rivers and estuaries (EA, 2006). The national encroachment policy for tidal rivers and estuaries states that the Environment Agency (EA) will consider every case on its merits, but it is generally opposed to works on tidal rivers that cause encroachment, which include: loss of, or damage to, the ecological integrity of tidal rivers and estuaries and inter-tidal habitats and reduced or altered river corridor space on tidal rivers and estuaries and damage to landscape character;
- The Tidal Thames Encroachment Policy for Tidal Rivers and Estuaries (EA, 2000). The Tidal Thames encroachment policy states that, except in exceptional circumstances, the Environment Agency will resist works on the Thames that cause encroachment where these may lead to loss or damage to river habitats and that the Agency welcome those aspects of development that lead to enhanced opportunities for fisheries and other ecology;
- The London Plan (March 2016). Outlines the London Mayor's strategies dealing with housing, transport, economic development and environment, and provides an overarching framework to guide local plans in the 33 London Boroughs. Chapter 7 of the London Plan relates to the Environment and includes specific policies relating to the Tidal Thames. The London Plan is being updated and the Consultation Draft of the New London Plan was published in December 2017. Policy SI 17 relates to protecting and

enhancing London's waterways includes biodiversity. The current 2016 Plan is still the adopted Development Plan, but the Draft London Plan is a material consideration in planning decisions;

- Hammersmith and Fulham Local Plan. The plan was adopted on 28 February 2018 and has replaced the Core Strategy 2011 and Development Management Local Plan 2013 documents as the basis for planning decisions and future development in the borough;
- Hammersmith and Fulham London Borough's Core Strategy (2011). To note this is superseded by the Hammersmith and Fulham Local Plan (see above); and,
- London Borough of Hammersmith and Fulham's Development Management Local Plan (adopted 2013). To note this is superseded by the Hammersmith and Fulham Local Plan (see above).

1.5.3. Other relevant guidance

Port of London Authority Environmental Guidance (July 2016): The Port of London Authority (PLA), as a statutory harbour authority, must comply with environmental legislation, government policy objectives and its own policy initiatives regarding the environment. The PLA also regulates work in, on or under the Tidal Thames through four consents/licenses: (1) River Works License, (2) Dredging License, (3) Estates Consent, and (4) Vessel License and must consider the environmental impact in all applications. The PLA's The Vision for the Tidal Thames was updated in July 2016 and states "The 20 year Vision will see the river the cleanest since the Industrial Revolution, with improved habitats and awareness of heritage".

Draft South East Marine Plan (submitted for consultation January 2020) (MMO, 2020): Marine plans are developed to inform and guide marine users and regulators across England, managing the sustainable development of marine industries alongside the need to conserve and protect marine species and habitats. The Marine Management Organisation (MMO) is responsible for preparing the ten marine plans in England . The Tidal Thames is encompassed within the South East Marine Plan, to be completed before 2021.

The Mayor's Biodiversity Strategy (Greater London Authority, 2015): The Mayor's Biodiversity Strategy was published in 2002, and partly updated in 2015, to provide the framework to protect and enhance London's natural environment. The Strategy closely links with the London Plan and focuses around four major areas: (1) Protection of Sites of Importance for Nature Conservation (SINCs), (2) increasing access to the natural environment, (3) greening of the urban environment and (4) protection of the Thames and London's other waterways. Part of the messages of the updated Biodiversity Strategy (March 2015) is also included in the London Environment Strategy (Greater London Authority, 2018).

1.5.4. Legislation to Protect Marine Mammals

There is a range of legislation to protect marine mammals in UK waters. The Grey Seal Protection Act (1914) established the first closed season for grey seals, making it unlawful to kill grey seals during their breeding season. The Conservation of Seals Act (1970) expanded this by detailing acceptable hunting methods and establishing closed seasons for grey and harbour seals.

Grey seals, harbour seals, bottlenose dolphins, harbour porpoises and otters are listed under Annex II of the European Commission's Habitats Directive (92/43/EEC), which requires EU member states to designate areas for the protection of habitats and species. The UK has 16 Special Areas for Conservation (SACs) designated specifically for seals, seven for grey seals and nine for harbour seals. Grey seals are qualifying features in thirteen SACs, and harbour seals are qualifying features in twelve. Two SACs have been designated specifically for bottlenose dolphins, and they are a qualifying feature in an additional SAC.

Harbour porpoises are qualifying features in one SAC and the JNCC are currently analysing species distribution data to identify possible dedicated SACs (JNCC 2015).

Marine mammals are also protected by the Wildlife and Countryside Act (1981) and the Conservation of Seals (England) Order 1999.

1.5.5. UK Post-2010 Biodiversity Framework

The UK Post-2010 Biodiversity Framework was published by the Joint Nature Conservation Committee (JNCC) and Department for the Environment, Food and Rural Affairs (Defra) in July 2012 on behalf of the Country specific Biodiversity Groups in the United Kingdom. The framework sets out broad enabling structures for actions to conserve and enhance biodiversity across the UK, underpinned by country-specific action plans which continue delivering priorities building upon work completed under the UK Biodiversity Action Plan (UKBAP) (although the UKBAP partnership no longer operates).

In England, the action plan which seeks to deliver within this framework is 'Biodiversity 2020: A strategy for England's wildlife and ecosystem services' published by Defra on 19th August 2011. The overall mission of the '2020 Strategy' is to 'halt overall biodiversity loss, support healthy well-functioning ecosystems, and establish coherent ecological networks with more and better places for nature for the benefit of wildlife and people'.

Although the UKBAP Partnership no longer exists, the London Biodiversity Partnership still lists a total of 214 Priority Species on the Greenspace Information for Greater London (GiGL) website, last updated in 2007. Of these, aquatic species relevant to the project area include:

- Atlantic salmon *Salmo salar;*
- European eel *Anguilla anguilla;*
- River lamprey *Lampetra fluviatilis;*
- Sea lamprey *Petromyzon marinus;*
- Smelt *Osmerus eperlanus;*
- Twaite shad *Allosa phallax; and*,
- Sea/Brown trout *Salmo trutta.*

The grey heron (*Ardea cinerea*) is also a listed London BAP species, which may use the intertidal area on the north Thames shore adjacent to the Hammersmith bridge, however this was not supported by the wintering bird survey conducted in February 2020 (Pell Frischmann, 2020).

The intertidal foreshore habitat is also protected under the London BAP.

2. Methodology

2.1. Desk Study

2.1.1. Introduction

For the purpose of this desk study exercise, records were collated within various radii around the project area. This approach is consistent with current good practice guidance published by CIEEM (2018). To provide the baseline data for the aquatic ecological desk study, the following information was obtained from the Multi-Agency Geographic Information for the Countryside (MAGIC); and Greenspace Information for Greater London (GiGL, 2021):

- Records of legally protected and notable species within 2 km of the project;
- Records of statutory sites designated for nature conservation value within 2 km of the project; and,
- Records of non-statutory sites designated for nature conservation value within 2 km of the project.

2.1.2. Sources of information

The desk-based search included obtaining readily available data from the following organisations and form various available projects in the vicinity of the Hammersmith Bridge planned works:

- Environment Agency – Migratory and freshwater fish monitoring surveys (EA, 2021);
- National Biodiversity Network (NBN) – Species atlas (https://nbn.org.uk/);
- Various Thames guidance documents produced by, or for the Zoological Society of London (ZSL) HR Wallingford 2016; ZSL, 2016 and ZSL, 2018);
- Fulham Football ground Environmental Statement (WSP, 2017); and,
- Half tide weir removal ecological survey (APEM, 2015).

2.2. High-level Impact Assessment

The results from the desk study have been used in conjunction with information on the Hammersmith Temporary Ferry project design to assess, at a high-level, the possible significant aquatic ecological effects that the project could have during both the construction, operational and decommissioning phases. Where possible a high-level impact assessment was undertaken in accordance with CIEEM guidelines (2018).

Only relevant ecological features, known as receptors, which are important and potentially affected by the project have been subject to this high-level assessment. Features that are sufficiently widespread, unthreatened and resilient to the project impacts are not assessed.

2.3. Identification and Characterisation of Potential Effects

Based on an understanding of the baseline conditions and of the proposed Hammersmith Temporary Ferry project, potential effects on important ecological features scoped into the assessment have been considered, taking into account construction (including site preparation) and operational phases. Effects have been assessed against baseline conditions and have been characterised with reference to ecological structure

and function of the feature in question, for instance the fragility/stability of an ecosystem and its connectivity to other features or resources.

Ecological effects are described in terms of relevant characteristics, including whether the effect is positive or negative, the extent (area) which may be affected, the magnitude (size, amount, intensity or volume) of the effect and the duration. Consideration is given to whether the effect is reversible (i.e. whether recovery from the effect is possible within a reasonable timescale) and the timing and frequency of change as a consequence of the Hammersmith Temporary Ferry project.

2.4. Mitigation and Description of Residual Effects

Potential mitigation and/or compensation measures are identified to address any identified potentially significant effects. If sites are present that support protected species, there may also be a legal obligation to provide such mitigation even where there is no significant effect.

2.5. Consultation

A number of consultations have been completed during the early stages of the Hammersmith Temporary Ferry project. With regard to aquatic ecological studies, this has included the following consultations:

- Environment Agency (08 April 2021) – First call with EA to discuss project, to outline the requirement for aquatic assessment and a Water Framework Directive (WFD) Assessment and noted the protected nature of the foreshore. Also notes requirement to consider scour.
- Marine Management Organisation – First call with MMO, to discuss project, to outline the requirement for aquatic assessment and a Water Framework Directive Assessment (WFDa) and to include consideration of scour and underwater noise.
- Environment Agency (22 April 2021) – Second meeting to discuss the projects. Within this meeting the EA confirmed the foreshore was not a protected mudflat as described under the WFD.

3. Description of Aquatic Ecology

3.1. Statutory sites

3.1.1. Marine Special Area of Conservation (SAC)

A search of 5 km radius has identified no estuarine or marine SACs. The closest marine site is Essex Estuary SAC, approximately 82 km downstream of the proposed Hammersmith Temporary Ferry project, at Maplin Sands.

Although not a designated feature, the whole of the tidal Thames is noted as being a qualifying Annex I complex habitat feature of: Estuary, (Marine, coastal and halophytic habitats, provided by the JNCC at: https://sac.jncc.gov.uk/habitat/).

3.1.2. Marine Special Protected Area (SPA)

A search of 5 km radius has identified no estuarine or marine SPAs. The closest marine site is the Thames Estuary and Marshes (SPA) which is approximately 56 km downstream of the proposed Hammersmith Temporary Ferry project.

Although not a designated feature, there is an area of foreshore on the northern bank of the Thames at the project site, which can offer habitat for loafing and/or foraging for marine and terrestrial bird species. The area of foreshore is not noted as a SPA or Ramsar supporting feature.

Consideration of the use, by birds, of this foreshore area is provided in Section 3.5 of this report.

3.1.3. Ramsar sites

A search of 5 km radius has identified no estuarine or marine Ramsar Convention sites. The closest marine site is the Thames Estuary and Marshes (Ramsar) which is approximately 56 km downstream of the proposed Hammersmith Temporary Ferry project.

3.1.4. Marine Conservation Zone (MCZ)

A search of 5 km radius has identified no estuarine or marine MCZ sites. The closest site is Swanscombe MCZ, approximately 46 km downstream of the proposed Hammersmith Ferry site.

The Swanscombe MZC is designated for the tentacled lagoon worm (*Alkmaria romijni*) as well as for intertidal mud habitat (Natural England, 2021). Although there are no records of the tentacle lagoon worm from 2 km of the project site, there is the potential that the species might occur at the proposed Hammersmith Temporary Ferry site. However, the conditions at the site are unlikely to be preferable for the tentacle lagoon worm.

The Marine Life Information Network (MarLIN) provides sensitivity reviews for marine habitats and species, including one for tentacled lagoon worm (https://www.marlin.ac.uk/species/detail/1200). The tentacled lagoon substrate and habitat preferences are noted as: Mud, Muddy gravel and Muddy sand. Tentacled lagoon worm has been recorded form salinities of 5 to 48 psu but its preferred range is thought to be 5 to 20 ppt since most records and the highest abundances are recorded in the latter range" (Gilliland & Sanderson, 2000).

The conditions at the site are unlikely to be suitable to support the tentacled lagoon worm and so is unlikely to affect this species outside of the designated site of Swanscombe MCZ.

3.1.5. Water Framework Directive

A search of 5 km radius of the project site has identified the whole of the River Thames is noted as a Transitional Waterbody. The stretch either side of the project is within the waterbody noted as: Thames Upper transitional water body (GB530603911403) (EA, 2021a).

Location of habitats protected under the WFD are indicated on Figure 3.1. The highlighted area on north bank, west of the Hammersmith Bridge is indicated as the protected habitat of intertidal soft sediment, which is either sand, mud or mixed (EUNIS A2.2, A2.3 or A2.4). The foreshore to the east of the Hammersmith Bridge where the structures for the Temporary Hammersmith Ferry are proposed, are not designated under the WFD. This is likely, in part, due to the more gravelly substrate present at that location.

Further details of the current WFD status and any potential impacts of the Hammersmith Temporary Ferry on the Themes Upper transitional water body, can be found in the accompanying WFD Assessment report (HR Wallingford, 2021c).

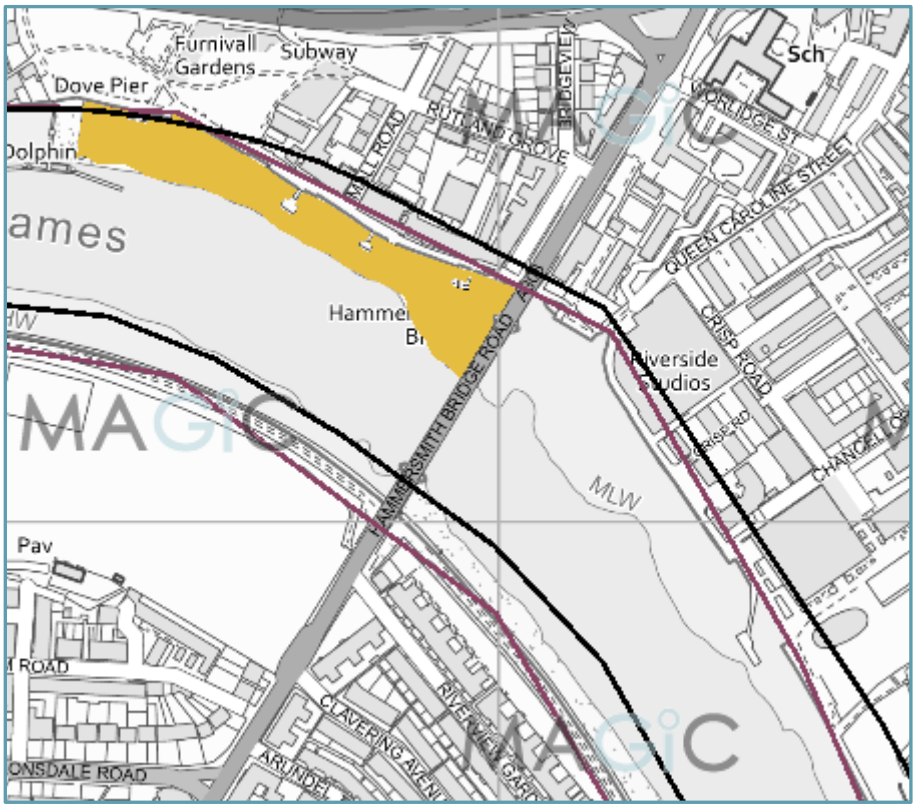

Figure 3.1: Location of WFD protected habitats. Highlighted area (north bank west of Hammersmith Bridge) is Intertidal Soft Sediment

Source: https://magic.defra.gov.uk/MagicMap.aspx

3.1.6. Sites of Special Scientific Interest (SSSI)

A search of 2 km (GiGL data search) identifies one SSSI that is immediately adjacent to the River Thames, approx. 1.5 km downstream of the proposed Hammersmith Temporary Ferry site on the southern bank. The site is Barn Elms Wetland Centre. The site is notified for bird species:

- Aggregations of non-breeding birds - Gadwall, *Anas strepera;*
- Aggregations of non-breeding birds - Shoveler, *Anas clypeata;*
- Assemblages of breeding birds - Lowland open waters and their margins.

The location of this SSSI site can be seen in Figure 3.2.

The species for which the Barn Elms Wetland Centre (SSSI) are notified may utilise the foreshore area on the north bank for loafing and or feeding.

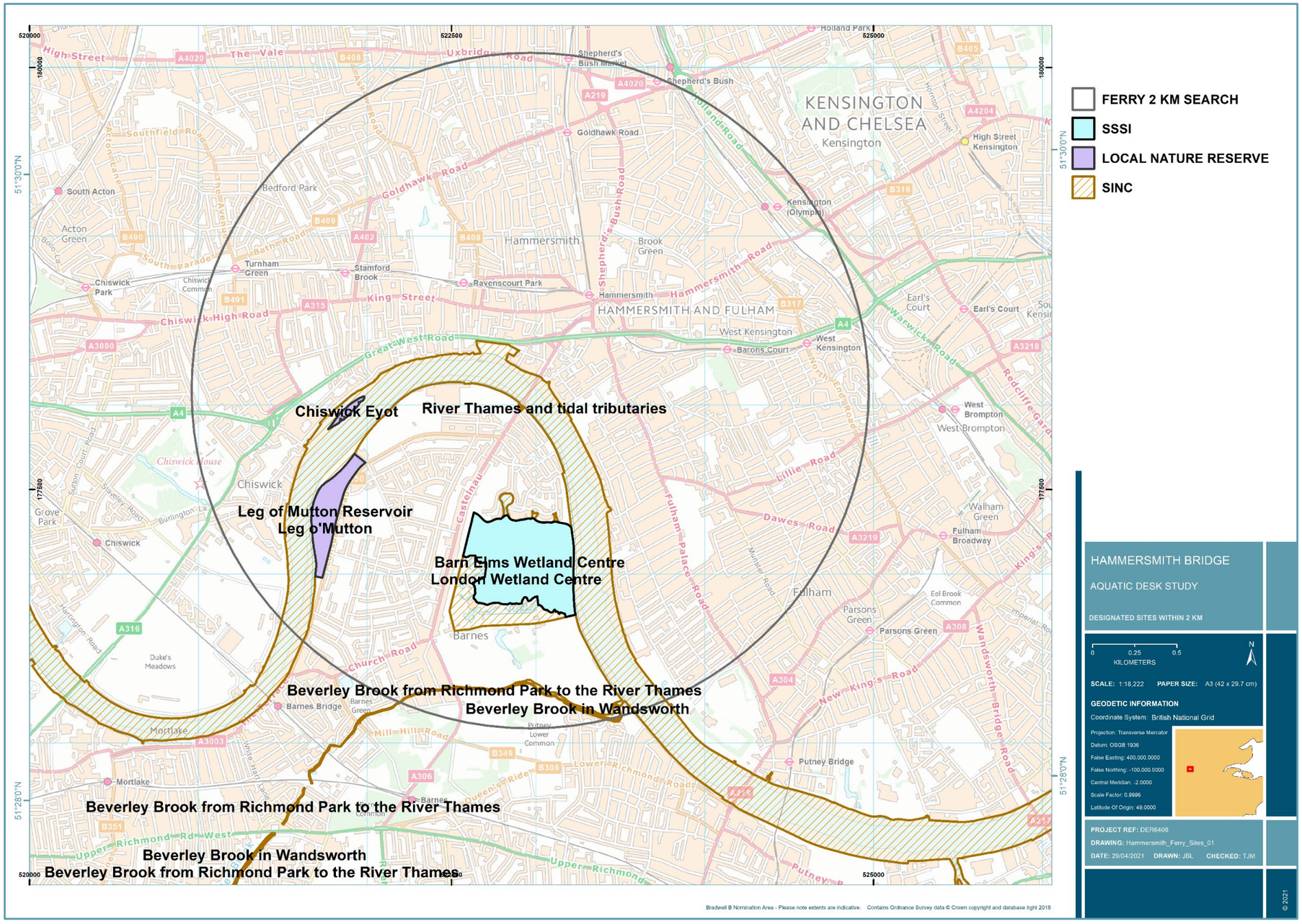

Figure 3.2: Designates sites within 2 km of the Hammersmith Temporary Ferry project

Source: Designated sites polygons from GiGL data search (GiGL, 2021) under licence to HR Wallingford [22 April 2021]. Copyright GiGL

3.1.7. Local Nature Reserve (LNR)

Local Nature Reserves (LNRs) are a statutory designation made under Section 21 of the National Parks and Access to the Countryside Act 1949 by principal local authorities.

Lonsdale Road Reservoir (Leg of Mutton Reservoir) LNR

A former reservoir where ducks and other water birds breed. Bird species are likely to be associated with the larger London Wetland Centre site. The site supports, amongst other species:

- teal (*Anas crecca*);
- tufted duck (*Aythya fuligula*);
- widgeon (*Anas penelope*); and,
- shovelers (*Anas clypeata*).

The site is also noted to supports herons and kestrels.

The location of Lonsdale Road Reservoir can be seen in Figure 3.2.

Chiswick Eyot LNR

One of several islands in the River Thames but it is unique in that it is the only one which still features traditional osier bed management. The site features a number of plant species of damp ground and a small reed bed, which is patricianly valuable. The island supports a breeding population of reed warbler and is visited regularly by herons, cormorants and occasional waders and waterfowl (GiGL, 2021).

The location of the LNR sites can be seen in Figure 3.2.

3.2. Non-statutory

3.2.1. Sites of Importance for Nature Conservation (SINCs)

Sites of Importance for Nature Conservation (SINCs) are non-statutory and are identified by the Greater London Authority on account of their flora and fauna. They are of Greater London and/or regional importance. The SINCs have been identified since 1986 using procedures that have now been adopted by the Mayor of London. They are recommended for protection in planning.

There are a number of SINCs that are within a 2 km search of the project area and have the potential to be affected by the proposed works. The code in brackets after the site name is the relevant SINC site code. These are:

- River Thames and tidal tributaries (M031);
- London Wetland Centre (M087), see also LNR above (Section 3.1.7);
- Leg o'Mutton (RiB102), see also LNR above (Section 3.1.7);
- Beverley Brook from Richmond to the River Thames (RiB1109); and,
- Beverley Brook in Wandsworth (WaB106).

The location of these SINCs can be seen in Figure 3.2. The proposed Hammersmith Temporary Ferry structures are within the River Thames and tidal tributaries (M031) SINC.

3.2.2. London BAP

There is intertidal mudflat on the southern shore of the Thames at the Hammersmith Temporary Ferry project site. This intertidal foreshore habitat on the south shore is protected under the London Biodiversity Action Plan (London BAP), however the larger foreshore on the northern side is not protected under the London BAP (See Figure 3.3), which is likely, in part, due to the more gravelly sediment present on the northern foreshore. The location of the Barnes pier is over this BAP habitat of 'River Thames', and includes half of the main channel and the intertidal areas on the southern bank.

The northern shore is larger than the southern shore, up to approximately 50 m in width at low tide in places. The southern shore is a few meters width of intertidal sediment.

3.2.3. Geological or geomorphological sites

There are no regionally important geological sites (RIGS) or locally important geological sites (LIGS) within 2 km of the Hammersmith Temporary Ferry project (GiGL, 2021).

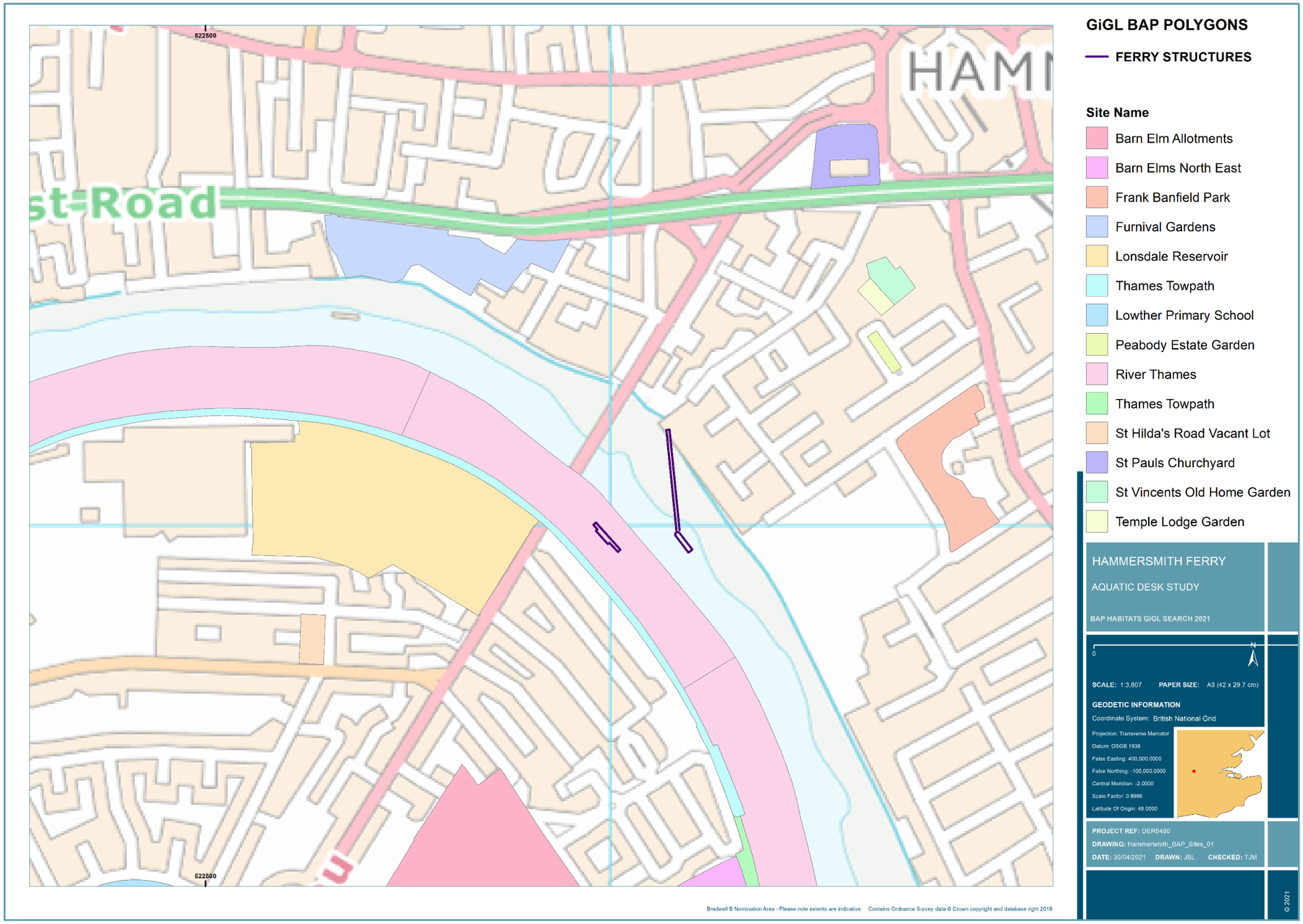

Figure 3.3: BAP habitats in the vicinity of the Hammersmith Temporary Ferry

Source: BAP polygons provided from GiGL data search (GiGL, 2021) under licence to HR Wallingford [22 April 2021]. Copyright GiGL.

3.3. Fish Species

3.3.1. General fish species

Fish species, both with protected status and those that are more common will use the river close to the proposed Hammersmith Temporary Ferry project.

Table 3.2 below provides further information on the fish species that are likely to be present in the Thames stretch which includes the project site. The table details the relevant legislation that is associated with each fish species.

Of the fish species that are present within this stretch of the Thames, European smelt and the European eel are of conservation importance. This is because the Thames smelt population are known to spawn close to the project area and eel are known to pass by the area on their upstream and downstream migration. Some of the most frequented eel locations are upstream of the project area. These two species are considered in more detail in the sections below.

Table 3.1: below shows the fish species that are most likely to be in the vicinity of the project. The table shows the current protected status of the fish (if applicable), its life strategy in relation to time spent in the Thames, and also the time of year they are within the Thames stretch that includes the project area. The ferry is located within the Thames stretch that is between Teddington Lock and Wandsworth Bridge.

Table 3.2 below provides further information on the fish species that are likely to be present in the Thames stretch which includes the project site. The table details the relevant legislation that is associated with each fish species.

Of the fish species that are present within this stretch of the Thames, European smelt and the European eel are of conservation importance. This is because the Thames smelt population are known to spawn close to the project area and eel are known to pass by the area on their upstream and downstream migration. Some of the most frequented eel locations are upstream of the project area. These two species are considered in more detail in the sections below.

Table 3.1: Common and protected species between Teddington Lock to Wandsworth Bridge (Table derived from ZSL Guidance document, 2016)

Common Name	Scientific Name	Type of fish	Time period near site	Spawning Event
Atlantic Salmon	*Salmo salar*	4	A,B,C,D	
Barbel	*Barbus barbus*	2	A,B,C,D	
Brown/Sea Trout	*Salmo trutta*	4	A,B,C,D	
Bullhead	*Cottus gobio*	2	A,B,C,D	
Common Dace	*Leuciscus leuciscus*	2	A,B,C,D	at L1* during B
Common Goby	*Pomatoschistus microps*	1	A,B,C,D	at L1* during A & B
European Eel	*Anguilla anguilla*	4	A,B,C,D	
European Seabass	*Dicentrarchus labrax*	3	B,C	
European Smelt	*Osmerus eperlanus*	4	B,C,D	at L1* during A & B
Flounder	*Platichthys flesus*	3	B,C,D	
River Lamprey	*Lampetra fluviatilis*	4	B,C,D	
Roach	*Rutilus rutilus*	2	B,C,D	at L1* during B

Type of fish: *(1) Spend entire life in Tidal Thames;*

(2) Mainly present in freshwater dominated Tidal Thames;

(3) Use the Tidal Thames to spawn or grow whilst juveniles;

(4) Migrate through the Tidal Thames to freshwater or saltwater.

Timing Key: *(A) Jan-March; (B) April-June; (C) July-Sept; (D) Oct-Dec.*

Status: *Protected sp; Common sp; Protected and common sp.*

*Spawning *:* *'at L1' is the section of the Thames between Teddington Lock to Wandsworth Bridge where the project is located.*

Table 3.2: Summary of regulation relevant to fish species that have been identified as present in the Tidal Thames since 1964

Common Name	Scientific Name	NERC Sp Principle Importance	Bern Convention Protected Fauna	Habitats Directive	MCZ FOCI	London BAP Species	UK BAP Priority Species
Atlantic Salmon	*Salmo salar*	Y	Annex III	Annex II, V		Y	Y
Barbel	*Barbus barbus*			Annex V			
Brown/Sea Trout	*Salmo trutta*	Y				Y	Y
Bullhead	*Cottus gobio*			Annex II			
Common Dace	*Leuciscus leuciscus*						
Common Goby	*Pomatoschistus microps*		Annex III				
European Eel	*Anguilla anguilla*	Y			Y	Y	Y
European Seabass	*Dicentrarchus labrax*						
European Smelt	*Osmerus eperlanus*	Y			Y	Y	Y
Flounder	*Platichthys flesus*						
River Lamprey	*Lampetra fluviatilis*	Y	Annex III	Annex II, V		Y	Y
Roach	*Rutilus rutilus*						

Source: Table derived from ZSL Guidance document 2016

3.3.2. European smelt (*Osmerus eperlanus*)

The European smelt (*Osmerus eperlanus*) is a small predatory fish that inhabits cold-water estuaries including the Tidal Thames. Once common in the UK, it has suffered significant declines since the early 19th century due to water pollution, over exploitation and destructive river engineering. Improvements to water quality in the latter half of the 20th century have allowed smelt to return to 36 water courses in England including the Tidal Thames.

The presence of smelt in an estuary can be used as an indicator of good water quality due to their sensitivity to pollution. They are listed as a London and UK Biodiversity Action Plan species, as a Feature of Conservation Importance (FOCI) species for the Marine Conservation Zone process and as a Natural Environment and Rural Communities (NERC) Species of Principal Importance.

A report, completed by HR Wallingford on behalf of ZSL, identified the likely spawning location of smelt within the Thames. The report noted the timing of smelt spawning within the two years of study was:

- 2015 analysis suggests a potential spawning date of 19 March 2015 and hatching date of 2 April 2015.

- 2016 analysis suggests that spawning occurred from 1 March to 2 April 2016 and hatching occurred from 22 March to 13 April 2016.

The data indicate that smelt spawn over an elongated period of five weeks during March and the beginning of April, with a one to three week peak spawning period within that window. The specific timing and length of the smelt spawning period each year is likely to be dependent on a range of environmental factors. Water temperature, tidal state, freshwater flow and salinity and lunar phase. Following spawning, juvenile smelt drift with the currents until they are large enough to swim independently. They remain in the Tidal Thames throughout the summer (ZSL, 2016).

During the ZSL ichthyoplankton surveys at Wandsworth Bridge, juvenile smelt estimated to be less than one day old were caught in 2015 and 2016. This suggested that the Wandsworth Bridge sampling site was in close proximity to where smelt spawned. HR Wallingford completed detailed numerical modelling of ZSL's ichthyoplankton survey dataset and their analysis showed a close match between the model results and the survey data when simulated smelt hatchlings were released at Wandsworth Bridge. The results suggest that smelt spawn in the area between Wandsworth Bridge and 600 m upstream of this point (see Figure 3.4). However, it cannot be ruled out that the spawning area could extend further West to Barnes Bridge (also shown in Figure 3.4). Full results can be found in the HR Wallingford 2016 report.

ZSL advise that no development affecting the subtidal habitat of the predicted spawning ground should be permitted during the months where smelt are likely to spawn: late February, March and April.

Figure 3.4: Location of predicted smelt spawning ground. Pink shows the most likely spawning ground and dark blue shows potential extension of this spawning ground upstream

Source: HR Wallingford, 2016

3.3.3. European Eel

The European eel, *Anguilla anguilla*, has been listed as 'Critically Endangered' on the IUCN Red List since 2008 due to dramatic declines in abundance recorded across all stages of its life cycle and much of its natural range (IUCN, 2014).

Eels are protected under the EU Eels Regulation, 2009, which sets out an escapement target (migration from inland waters to the sea) of 40 % for silver eels. The Thames river basin district (RBD) currently has an average of 20 % silver eel escapement and as such does not meet the 40 % compliance target for Eel Management Plans 2015 (Defra, 2015).

ZSL has conducted regular monitoring surveys of eel within the Thames tributaries. They record the annual mean catch per unit effort (CPUE) between 2011 and 2018. Each of the sites ZSL survey in are shown in Table 3.3 for each site is shown in Figure 3.5 below. CPUE fluctuates between years across most sites and shows high variance from the mean within a single season. Of sites monitored, those that are upstream of the project site are highlighted in blue. As eels migrate, the sites indicated in blue must have eels that have passed the site during upstream migration as adults and that pass downstream as juvenile eels. Of note Brent-Stoney Sluice has recorded the highest CPUE for five consecutive years. Brent-Stoney sluice is approximately 7 km upstream of the Hammersmith Bridge. Figure 3.5 shows the location of each of the monitoring sites.

Table 3.3: Annual CPUE for each of the monitoring sites

Site	2011	2012	2013	2014	2015	2016	2017	2018
Ash-Colne Off Take	-	-	-	0.27	0.1	0.1	-	-
Brent-Stoney Sluice	-	-	15.3	244.31	114.63	88.94	210.29	507.46
Crane-Crane Park Island	0	0	0	-	-	-	-	-
Crane-Mogden STW	-	-	-	-	5.96	6.35	3.87	0.93
Cray-Hall Place	0	0.01	0.04	-	-	-	-	0.11
Darent-Acacia Weir	-	0.16	0.02	1.21	0.08	0.09	-	-
Ember-Island Barn Sluice	-	-	-	-	-	-	6.81	-
Hogsmill-Middle Mill	-	0.01	0.04	0.08	0.08	0.18	0.21	0.12
Lea-Bow Locks	-	0.09	1.48	2.98	0.61	0.88	-	-
Lea-Lea Bridge	-	-	-	-	-	56.57	132.95	98.925
Longford-Home Park	-	-	0.62	2.82	2.53	2.31	-	-
Medway-Allington Lock	-	10.9	133.3	66.68	2.34	0.48	1.49	0.76
Mole-Zenith Weir	-	1.25	0.09	0.1	0.52	-	-	-
Roding-Redbridge	-	0.08	0.47	7.2	2.36	0.83	1.15	3.61
Thames-Molesey Weir	-	0.82	14.63	2.1	1.68	1.63	0.82	0.67
Thames-Teddington Lock	-	-	-	0.36	0.02	0.25	0.31	0.50
Wandle-Merton Abbey Mills	0	0.97	0.64	2.46	0.5	1.41	11.34	0.79
Wandle-Morden Hall	-	-	-	-	-	-	2.43	1.64
Annual CPUE	**0**	**1.59**	**15.14**	**27.55**	**10.11**	**12.31**	**33.79**	**49.78**

Source: Table from ZSL, 2018

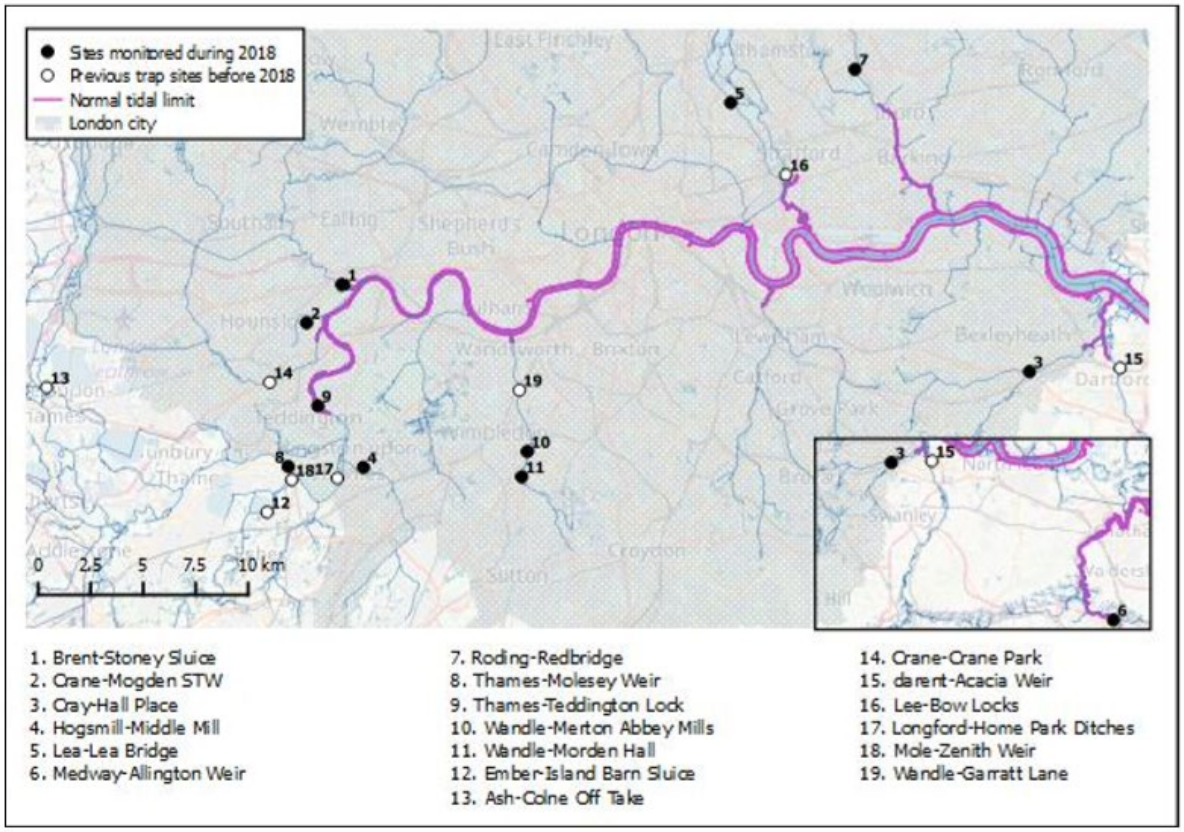

Figure 3.5: Location of the monitoring sites within the Thames catchment prior to 2018 and present

Source: QGIS ©. (ZSL, 2018)

3.3.4. Fish assemblage by seine netting

Fulham football club submitted an Environmental Statement for the proposed development of their ground - Fulham Stadium Limited applied to the Marine Management Organisation (MMO) under the Marine and Coastal Access Act 2009, Part 4, for a marine licence to undertake redevelopment of the riverside stand in 2017. The football ground is approximately 1.5 km downstream of the Hammersmith Bridge. Due to the proximity and recentness of the Fulham work, ecological details are also of relevance to this aquatic study.

Over the course of the two tides surveyed (WSP, 2017), a total of 24 seine nets were cast to survey the fish species close to the Fulham grounds. Approximately equal sampling effort distributed between the late ebb and early flooding tides. A total of 12 fyke net surveys were also carried out.

During this period a total number of 324 individual fish represented by 9 species were captured from the combined surveys. This included Common goby (*Pomatoschistus microps*) dominated the community structure (53%), with bass (*Dicentrarchus labrax*) accounting for 16%, flounder (*Platichthys flesus*)13% and European eel (*Anguilla anguilla*) 9%, with common bream (*Abramis brama*), three-spined stickleback (*Gasterosteus aculeatus*), smelt (*Osmerus eperlanus)*, dace (*Leuciscis leuciscus*) and roach (*Rutilus rutilus*) making up the remaining 7% (WSP, 2017).

3.3.5. Environment Agency (EA) freshwater monitoring

The EA undertake regular monitoring of the freshwater tributaries of the Thames. This includes recording migratory fish species. Records form a number of nearby tributaries of the tidal Themes (See Figure 3.6 for data site locations) are provided for the years 2015-2019 in Table 3.4.

Figure 3.6: Freshwater fish data locations in the vicinity of the Hammersmith Temporary Ferry

Source: https://environment.data.gov.uk/ecology/explorer/

Table 3.4: EA Freshwater fish monitoring records from locations indicated in Figure 3.6. Records from 2015-2019 (Data source: https://environment.data.gov.uk/ecology/explorer/)

Common Name	Species Name	Mapleton Road	Richmond Park SERT Reach B	Richmond Park SERT Reach C	Richmond Park SERT Reach D
3-spined stickleback	*Gasterosteus aculeatus*			4	9
Barbel	*Barbus barbus*	5			
Brown / sea trout	*Salmo trutta*	1			
Chub	*Leuciscus cephalus*	25	97	12	82
Dace	*Leuciscus leuciscus*	61	36	13	151
European eels > elvers	*Anguilla anguilla*	240	7	11	12
Gudgeon	*Gobio gobio*	6	31	1	38
Minnow	*Phoxinus phoxinus*	8	4		
Perch	*Perca fluviatilis*	6			
Roach	*Rutilus rutilus*	75			2
Stone loach	*Barbatula barbatula*	7		16	20

3.3.6. National Biodiversity (NBN) records

The NBN is a national Biological Records Centre, set up in 1964 to collate data, particularly from voluntary recording schemes, and make information available to conservation bodies and to publish the results. Records form a 2 km search of an aquatic nature are provided in Table 3.5 below. The table also includes 1 non-native species, please see Section 3.7.

Table 3.5: Species data form 2km data search. Data obtained from National Biodiversity Network (NBN) search online on 15th Jan 2020

Common name	Species name	Status	No. Occurrences	Earliest record	Latest record
European eel	*Anguilla anguilla*		11	1994	2006
Sea Bass	*Dicentrarchus labrax*		1		1996
Smelt	*Osmerus eperlanus*		6	1994	1997
Jenkins' Spire Snail	*Potamopyrgus antipodarum*	INNS	6		1991
Algae	No records		0		

Source: https://records.nbnatlas.org/explore/your-area#51.48829|-0.23037|13|ALL_SPECIES

3.3.7. Fish summary

For the purpose of the high-level assessment, it is considered that a number of protected and common fish species are likely to be present at the project site, at a variety of times throughout the year. This includes likely spawning areas for smelt, and the upstream migration of a number of species, including eels, and a typical fish assemblage for a river of this type.

3.4. Marine Mammals

Marine mammals are present throughout the Greater Thames Estuary during all months of the year (ZSL, 2015). Sightings of seals were reported as far upstream as Hampton Court Palace. Sightings of harbour porpoises and bottlenose dolphins were reported as far upstream as Teddington Lock and whales were reported as far upstream as Gravesend. As such whales are not considered likely to pass the project site.

Marine mammal disturbance should be considered in all planning applications which are related to the Thames or the Thames foreshore. Furthermore, all users of the Greater Thames Estuary should consider how their activity may affect marine mammals and mitigate appropriately (ZSL, 2015).

Figure 3.7 below shows the public sightings of pinnipeds and Cetaceans in the Greater Thames. Around the project site, pinnipeds are likely to be either grey seal (*Halichoerus grypus)* or harbour seals (*Phoca vitulina),* and cetaceans are likely to be restricted to harbour porpoise (*Phocoena phocoena*).

Figure 3.8 provides further detail on the species that have been recorded.

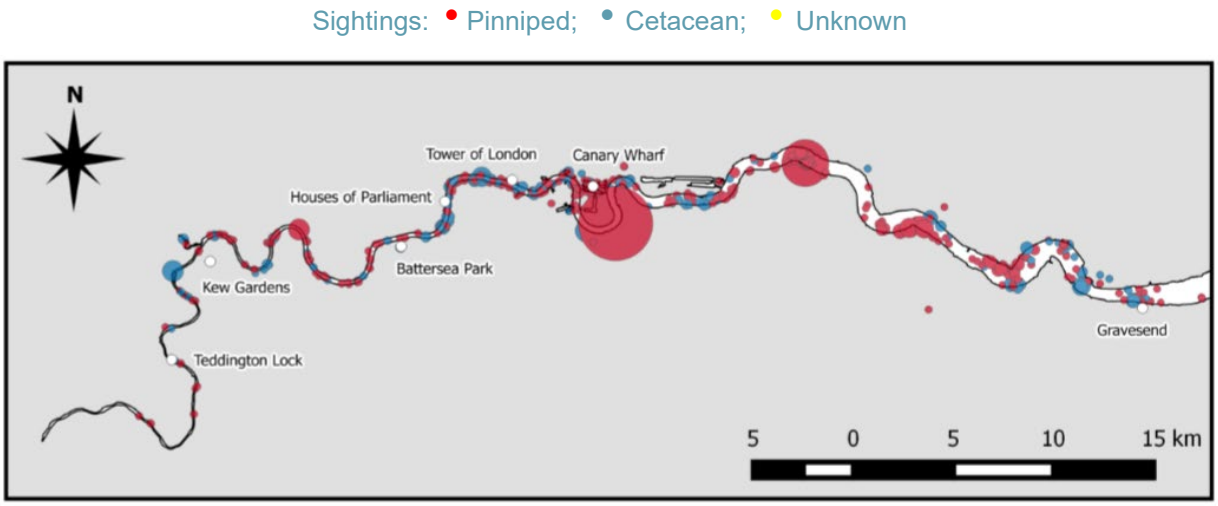

Figure 3.7: Public sightings of pinnipeds and cetaceans in the Greater Thames estuary (points scaled by number of animals per sighting) (ZSL, 2014)

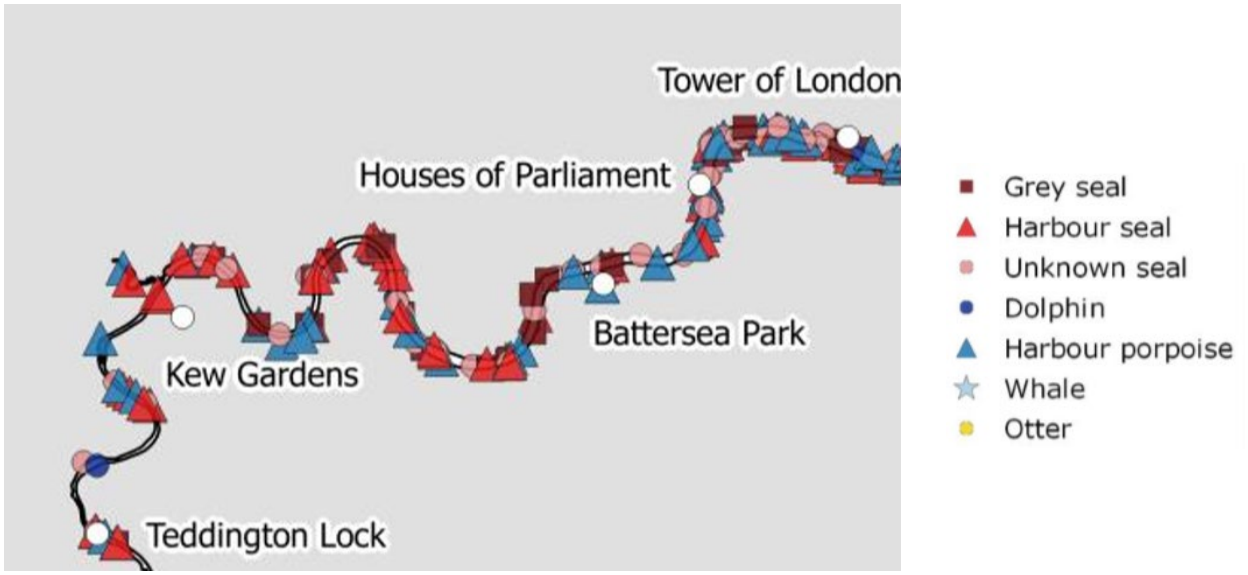

Figure 3.8: Marine mammal sightings reported in the Greater Thames estuary between 2004 – 2014 (ZSL, 2015)

Whilst the above two figures (Figure 3.7 and Figure 3.8) show the combined recordings of 10 years of data (2004-14), the figure below (Figure 3.9) shows the records of marine mammals that have been recorded during the first four months of 2021.

Figure 3.9: Marine mammal sightings reported in the vicinity of the Hammersmith Temporary Ferry in 2021 (ZSL on-line, available at: https://sites.zsl.org/inthethames/)

Note: Blue background = Harbour seal

Yellow background = Grey seal

Green background = Harbour porpoises

For the purpose of the high-level assessment, it is considered that grey and harbour seal and harbour porpoise may be occasionally present, in low or single numbers at the project site.

3.5. Ornithology

GiGL ornithological records

Records of birds of interest that have been obtained from the GiGL data search (GiGL, 2021) are provided in Table 3.6 below for the years 2010-2017. The GiGL ornithology data points can be seen on Figure 3.10.

Table 3.6: Birds of interest in the vicinity of the Hammersmith Temporary Ferry

Common Name	Species Name	2010	2013	2014	2015	2016	2017
Baltic Gull	*Larus fuscus fuscus*						3
Cetti's Warbler	*Cettia cetti*				3		
Common House Martin	*Delichon urbicum*			1	2		
Common Tern	*Sterna hirundo*			1			
European Herring Gull	*Larus argentatus*		2		2		3
Fieldfare	*Turdus pilaris*						1
Gadwall	*Mareca strepera*				2		
Goldcrest	*Regulus regulus*						1
Grey Heron	*Ardea cinerea*						1
Grey Wagtail	*Motacilla cinerea*			1	2		1
Hobby	*Falco subbuteo*	1					
House Sparrow	*Passer domesticus*		1	2	7		
Lesser Black-backed Gull	*Larus fuscus*		2		1		
Little Egret	*Egretta garzetta*			1			
Mute Swan	*Cygnus olor*	1					
Peregrine	*Falco peregrinus*				1		1
Red Kite	*Milvus milvus*				1		1
Stag Beetle	*Lucanus cervus*				4	1	
Starling	*Sturnus vulgaris*				1		
Swallow	*Hirundo rustica*		1		1		
Swift	*Apus apus*	2					
Teal	*Anas crecca*		2	3	5		2

Source: GiGL, 2021

Winter bird survey 2020

A winter bird survey was conducted in February 2020 for the previous potential temporary replacement to the Hammersmith Bridge whilst repair were conducted, which was a temporary cycle and footbridge (Pell Frischmann, 2020).

The survey methodology deployed was based on the Wetland Bird Survey (WeBS) (Gilbert et al. 1998) which is a standard methodology for wintering birds including non-breeding waterfowl. This method involved an extensive search of the Site by observing birds from vantage points on the Hammersmith Bridge, (Pell Frischmann, 2020). A summary table of birds recorded during that survey is provided below (Table 3.7).

Table 3.7: Bird data form 2020 winter bird survey

Common Name	Species name	IUCN Status	Abundance
Blackbird	*Turdus merula*	Green	1
Black-headed gull	*Chroicocephalus ridibundus*	Amber	250+
Blue tit	*Cyanistes caeruleus*	Green	3
Canada goose	*Branta canadensis*	Introduced	38
Carrion crow	*Corvus corone*	Green	54
Common gull	*Larus canus*	Amber	2
Coot	*Fulica atra*	Green	2
Cormorant	*Phalacrocorax carbo*	Green	21
Dunnock	*Prunella modularis*	Amber	1
Egyptian Goose	*Alopochen aegyptiaca*	Introduced	4
Feral pigeon	*Columba liva domestica*	None	120+
Goldfinch	*Carduelis carduelis*	Green	9
Great Tit	*Parus major*	Green	2
Great black-backed gull	*Larus marinus*	Amber	3
Grey heron	*Ardea cinerea*	Green	3
Grey wagtail	*Motacilla cinerea*	Red	2
Herring gull	*Larus argentatus*	Red	14
Lesser black-backed gull	*Larus fuscus*	Amber	4
Long tailed tit	*Aegithalos caudatus*	Green	2
Magpie	*Pica pica*	Green	1
Mallard	*Anas platyrhynchos*	Amber	75+
Moorhen	*Gallinula chloropus*	Green	5
Pied wagtail	*Motacilla alba yarrellii*	Green	6
Ring necked parakeet	*Psittacula krameri*	Not Listed -i	10
Robin	*Erithacus rubecula*	Green	2
Starling	*Sturnus vulgaris*	Red	28
Teal	*Anas crecca*	Amber	16
Woodpigeon	*Columba palumbus*	Green	1
Wren	*Troglodytes troglodytes*	Green	2

Source: Pell Frischmann, 2020

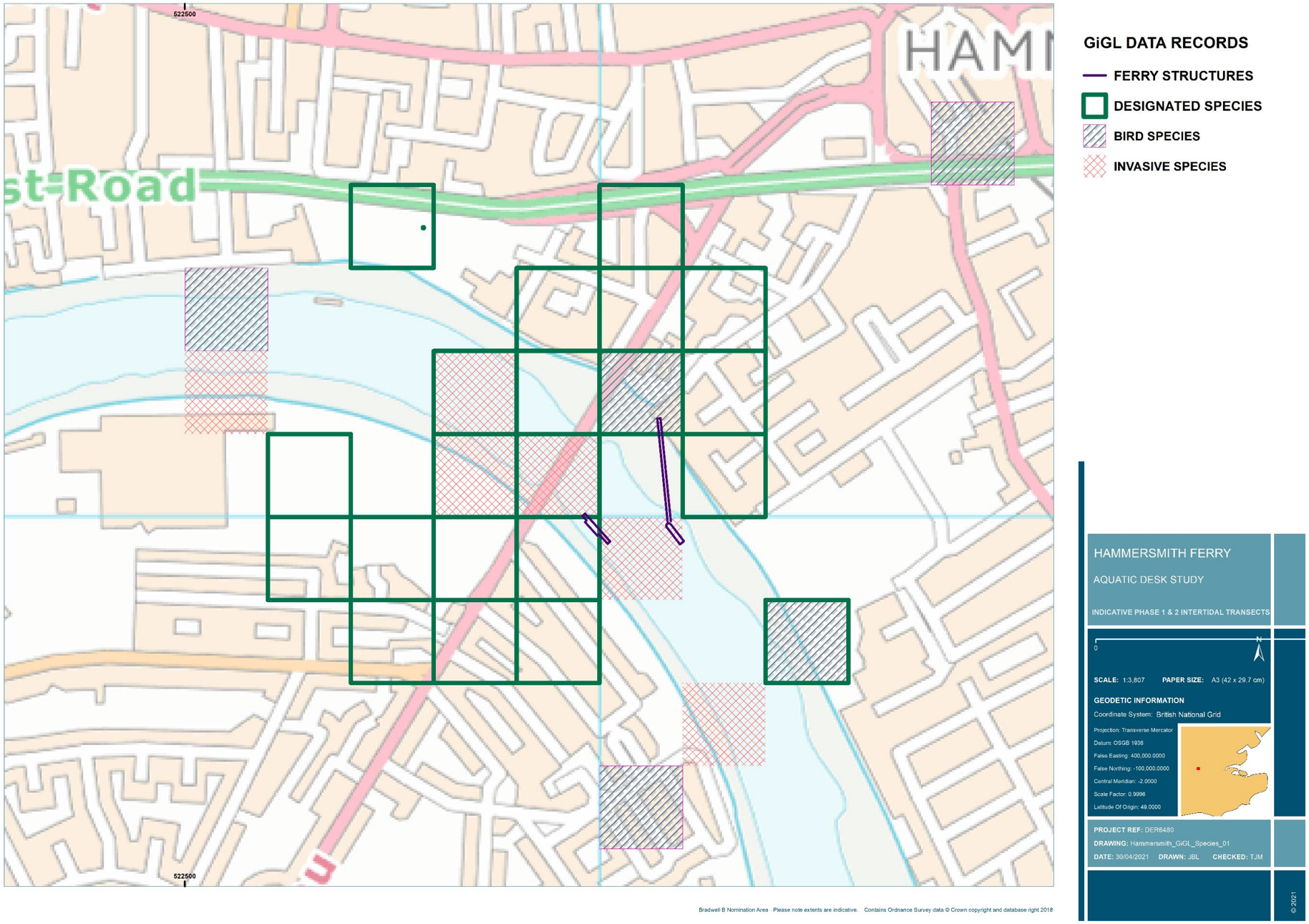

Figure 3.10: Locations of species records provided by GiGL data search

Source: Species data locations provided from GiGL data search (GiGL, 2021) under licence to HR Wallingford [22 April 2021]. Copyright GiGL.

3.6. Benthic Species (Benthos)

3.6.1. Data on benthic ecology

A number of invertebrate species were identified within the benthic surveys undertaken as part combined surveys for the Fulham football ground development (WSP, 2017) and for the removal of Wandall Half Tide Weir (APEM, 2015). It was concluded that there were no species or assemblages of conservation importance with only common species being recorded.

Fulham Football Club

The Fulham ES (WSP, 2017) did report that the swollen spire snail, (*Mercuria confuse*) has previously been recorded within the upper Tidal Thames and is currently listed as a red data list species. Additional IUCN red data list species include the duck mussel (*Anodonta anatine*), the swollen river mussel (*Unio tumidus*) and the nationally scarce crustacean shrimp (*Corophium lacustre*), which is thought to be locally common in the Thames. The tidal River Thames is also known to support populations of the tentacled lagoon worm (*Alkmaria romijni*), protected under the Wildlife and Countryside Act, 1981.

None of the above species were found to be present during surveys carried out at the proposed Fulham football ground development site.

Wandall Half Tide Weir

The site is a little further away than the Fulham example, at approximately 4 km downstream of the project site. A number of transects and core/grab samples were taken around the site. Of these, two were in the intertidal area to either side of the weir. These transects were less likely to have been impacted by the weir over the years.

The intertidal mixed substrata would fit within the LS.LMx (Littoral mixed sediments; EUNIS A2.4) habitat complex. The infralittoral communities within the Thames samples were Sublittoral mixed sediment in variable salinity (estuaries); EUNIS A5.42). Many of the benthic species are non-native or cryptogenic. Non-native species included, the New Zealand mud snail (*Potamopyrgus antipodarum*), and Asian clam (*Corbicula fluminea*) (APEM, 2015).

No species of conservation importance were recorded.

3.6.2. Benthic species summary

For the purpose of the high-level assessment, it is considered that some benthic species of local importance may be present at the project site.

3.7. Invasive Species

The London Invasive Species Initiative, part of the London Biodiversity partnership, encourages better co-ordination and partnership working to prevent, reduce and eliminate the impacts caused by invasive non-native species across the city.

A list was provided during the GiGL (2021) data search of a 2 km radius form the project. The one species noted of concern was the crustacean, the Chinese Mitten Crab (*Eriocheir sinensis*). This species was

recorded on 7 occurrences, between 09/09/11 and 10/10/16. These records are either from adjacent to Chiswick Eyot (LNR), or from the London Wetland Centre LNR site.

From Fulham Club ES Chapter (WSP, 2017), non-native species found in samples included the New Zealand mud snail (*Potamopyrgus antipodarum*), which has been widespread in British rivers for many years, and the Asian clam (Corbicula fluminea), which has become well established in the tidal Thames.

Other noted (non-aquatic) species present within the vicinity of the Hammersmith Temporary Ferry site from the GiGL search (2021) included:

- Ring-necked Parakeet (*Psittacula krameria*);
- Yellow Archangel (*Lamiastrum galeobdolon* subsp. *Argentatum*);
- Bluebell (*Hyacinthoides non-scripta* x *hispanica*);
- Orange Balsam (*Impatiens capensis*);
- Butterfly-bush (*Buddleja davidii*);
- Tree-of-heaven (*Ailanthus altissima*); and
- Three-cornered Garlic (*Allium triquetrum*).

For the purpose of the high-level assessment, it is considered that some invasive species are present at and around the project site.

4. Likely Impacts and Impact Assessment

4.1. Introduction

This section first considers the ecological sites, statutory and non-statutory, that have been identified above and provides a high-level screening to determine if there is likely to be a pathway of impact form any of the project activities and the site. If there is a potential pathway for aquatic receptors, they will be considered in greater detail in the following section.

4.2. Statutory sites

4.2.1. Barn Elms Wetland Centre SSSI

No direct impact upon aquatic habitats or species within Barn Elms Wetland Centre SSSI (also known as London Wetland Centre) is considered likely during any of the project works phases, as the site is adjacent to, but separated from the tidal Thames.

The bird populations of the site are also unlikely to be significantly impacted. This is due to a combination of the distance from the Site (0.75 km) and Barn Elms Wetland Centre SSSI's location within the urban area of London, which means species within the SSSI are likely to be accustomed to relatively high levels of background construction and other anthropogenic noise.

4.2.2. Lonsdale Road Reservoir LNR (Leg O'Mutton)

No direct impact upon aquatic habitats or species within Lonsdale Road Reservoir (LNR) is considered likely during any of the project works phases, as the site adjacent, but separated from the tidal Thames.

The bird populations of the site are also unlikely to be significantly impacted. This is due to a combination of the distance from the Site (1.0 km) and Lonsdale Road Reservoir's (LNR) location within the urban area of London, which means species within the LNR are likely to be accustomed to relatively high levels of background construction and other anthropogenic noise.

4.2.3. Chiswick Eyot LNR

No direct impact upon aquatic habitats or species within Chiswick Eyot (LNR) is considered likely during any of the project works phases, as the site is an island and does not have any designated aquatic features.

4.3. SINCs

Of the five identified SINCs, three have the potential to be impacted by the works. These are considered below:

4.3.1. River Thames and tidal tributaries

There is the potential pathway of effect for a number of features that are present within the tidal Thames, in the vicinity of the project. These features can be considered as three main groups:

- **fish** (including migratory and typical resident species);

- **marine mammals**;
- **benthos**; and
- **ornithology**.

The following sections examine the potential pathways and provides a high level assessment for these three receptor groups.

4.3.2. London Wetland Centre

No impact likely. This site is also an NNR, please see details in Section 4.2.1 above.

4.3.3. Leg o'Mutton

No impact likely. This site is also known as Lonsdale Road Reservoir LNR, see details in Section 4.2.2 above.

4.3.4. Beverley Brook from Richmond to the River Thames and Beverley Brook in Wandsworth

The Beverley Brook is located relatively close to the project site (within 2 km). The fish species that are present in the brook have the potential to come into close proximity to the project during some stages of the year or their lifecycles. As such there is the potential for fish impact due to the project.

As the fish that are present in the brook are very similar to those that are present in the Thames main river, consideration of impacts will be included with the assessment of **fish** receptor group from the Thames SINC (Section 4.3.1).

4.3.5. London BAP habitats

The southern pier (Barnes) is situated above a small section of intertidal foreshore that is noted as a London BAP habitat (See Figure 3.3). The project will come into contact with this area directly through the instillation of spud legs to maintain the position of the Bernes pier. The area will be subject to some increases in artificial lighting and increased shading once the walkway is in place.

As the benthos that are present in the BAP habitat are the same as those that are present in the Thames main river, consideration of impacts will be included with the assessment of **benthos** receptor group from the Thames SINC (Section 4.3.1).

4.4. Effect pathway screening

Following on from the collation of available aquatic data (Section 3), and consideration of the sites where there may be a potential pathway (Section 4.2 and 4.3), the potential pathway of effect upon aquatic ecological receptors within those sites are considered in more detail. These are considered as four aquatic ecological receptors groupings of **fish**, **marine mammal**, **benthos** and **ornithology**.

For each receptor group, consideration is given for the potential for a project activity, to have a possible pathway of effect. This process looks at the three stages of the project, construction (C), operation (O) and decommissioning (D) stages.

Screening of the effect pathways of the project upon the identified aquatic ecology receptors has been conducted, to identify where specific effects pathways associated with the project could potentially interact with aquatic ecology receptors. Table 4.1 below shows where there is there is unlikely to be a pathway (×), where there is a potential pathway (/) and where there is likely to be a pathway (✓).

Table 4.1: Effect pathway screening for project development stages

Effect pathway		Fish	Marine Mammal	Benthos	Ornithology
	Construction				
C1	Changes in water quality due to dredging, piling activity and scour	/	/	/	/
C2	Physical loss and disturbance of habitats or species due to dredging, piling activity and scour	/	×	/	×
C3	Underwater noise and vibration due to piling activity	✓	✓	/	×
C4	Use of artificial lighting	/	/	×	/
C5	Introduction or spread of invasive non-native species	×	×	/	×
C6	Accidental pollution events (e.g. oil spill)	/	/	/	/
	Operational				
O1	Change to water movement including scour due to structures being in the river	/	×	/	×
O2	Use of artificial lighting	/	/	×	/
O3	Increased shading and contact of Hammersmith walkway with the foreshore	/	×	✓	/
O4	Collision risk due to vessel movements (ferry)	×	/	×	×
O5	Accidental pollution events (e.g. oil spill)	/	/	/	/
	Decommissioning				
D1	Changes in water quality due to piling removal	/	/	/	/
D2	Change to water movement including scour, due to pile and structure removal	/	×	/	×
D3	Underwater noise and vibration due to pile removal activity	/	/	×	×
D4	Use of artificial lighting	/	/	×	/
D5	Introduction of invasive non-native species	×	×	/	×
D6	Accidental pollution events (e.g. oil spill)	/	/	/	/

Note: × No pathway; / Potential pathway; ✓ Likely pathway

4.5. Higher level assessment

At this stage, further consideration is given to the sensitivity of receptors to various effects, which is needed to provide an overall assessment process. Table 4.2 below provides further details on the potential for the effect pathways (detailed in Table 4.1 above) to have a significant effect on the features identified.

Where fish receptors are listed in the tables below, consideration is given to smelt and eel, as well as other typical fish species that may be present or migrating through the site.

Table 4.2: High level assessment for project development stages

Project effect pathway	Receptor group at risk from pathway				Consideration of effect significance
	Fish	Marine Mammal	Benthos	Bird	
Construction					
(C1) Changes in water quality due to dredging, piling activity and scour	/	/	/	/	Any piling activity into aquatic sediments is likely to disturb the sediment to some degree, depending on the nature of the piling activity and the nature of the sediments encountered. The piling method proposed for the temporary ferry structures: piles will be driven by the crawler crane mounted on a spud leg barge. A jack-up barge will act as a piling gate where accessible. In the case of the 4 most northern piles, a landside excavator will act as the piling gate. Piles will be driven dry where possible, and in the minimum water level possible where not possible. This is likely to cause some minor, localised disturbance to the sediment from the spud legs, the jack-up or by the land based excavator. This will be repeated each time the barge(s) is moved between each piling location. This is unlikely to significantly effect water quality as sediment disturbance will be minor. The assessment of scour due to the placement of the temporary piles and the walkway structure that will bottom out during low tide to some degree, shows only minor disturbance of sediments. As such this is unlikely to significantly impact water quality or cause secondary effects on aquatic receptors. The proposed plough dredging will likely move c.120 m^3 of sediment which will be ploughed downstream at the Hammersmith pier location, with an additional c.34 m^3 ploughed downstream on the Barnes side of the

Project effect pathway	Receptor group at risk from pathway				Consideration of effect significance
	Fish	Marine Mammal	Benthos	Bird	
					channel. Although there is typically some degree of chemical contamination in most tidal Thames sediments, it is unlikely that the disturbance of c.154 m^3 of sediment would lead to anything other than potentially very minor impacts to water quality, which would be localised and short term. The likelihood of indirectly effect on the aquatic receptors is likely to be very low. As such the likely impact on water quality is likely to be of **negligible** significance for all four receptor groups. See associated hydrodynamic and scour report (HR Wallingford, 2021a) and WFD Assessment report (HR Wallingford, 2021c).
(C2) Physical loss and disturbance of habitats or species due to dredging, piling activity and scour	/	×	/	×	Project activities will come into contact with the river bed at the point where piles are driven into the bed. Disturbance is also likely from contact from the crawler crane on spud legs and the jack up barge, plus land based excavator if required. There will also be some habitat alteration due to the c.154 m^3 of sediment that will be plough dredged further downstream. This will cause a temporary alteration in the benthic sediment from the location where the sediment is moved form, and where it is moved to. Habitat loss is only likely form the space that is occupied by the temporary piles and habitat disturbance at the dredge area and underneath the area where the Hammersmith Temporary Pier grounds al low water. The impact of disturbance associated with the jack-up barge is short term, and will only last during the construction of the piles. Recovery is likely from the low levels of disturbance. The benthos that is disturbed and area of habitat that is moved during the dredging required, will itself remove a small amount of benthic invertebrates from the river bed. This will in turn reduce the amount of food available for other species, although this is likely to be temporary in nature and is likely to recover quickly after the initial disturbance.

Project effect pathway	Receptor group at risk from pathway				Consideration of effect significance
	Fish	Marine Mammal	Benthos	Bird	
					The assessment of scour due to the placement of the temporary piles and the Hammersmith pier that will bottom out at low tide, shows only minor likelihood of disturbance of sediments and associated potential loss of benthos. As such scour is unlikely to significantly increase the loss of habitats and species from the project area. Due to the very small area of riverbed area likely to be physical disturbance due to the construction of the temporary ferry structures, and the large availability of similar habitat and associated species within the Thames, the likely impact of physical loss and disturbance of habitats and species is likely to be of **negligible** significance for all four receptor groups. Please see hydrodynamic and scour report for further information (HR Wallingford, 2020a)
(C3) Underwater noise and vibration due to piling activity	✓	✓	/	×	Underwater sound from anthropogenic activities has the potential to have adverse impacts on fish and marine mammals that may be in the vicinity of the Hammersmith Temporary Ferry. The potential impacts on these animals range from causing discomfort by changing the acoustic environment, causing the animals to retreat from an area (i.e. behavioural response), to causing physical injury. Generally physical injury is caused by either a large and sudden change in pressure causing barotrauma e.g. bursting of swim-bladder or blood vessels, or by the cumulative amount of sound that an animal is exposed to. For more detailed information, please see the project specific underwater noise assessment (HR Wallingford, 2021b). The methodology chosen to install the piles is already likely to reduce the amount of underwater noise to a minimum. The use of a soft-start for any piling activities would also allow for mobile species to swim away and avoid the areas of higher noise levels. **Marine mammals** – noise generated during the construction activity has the potential to cause behavioural impacts to marine mammals in the

Project effect pathway	Receptor group at risk from pathway				Consideration of effect significance
	Fish	Marine Mammal	Benthos	Bird	
					local area, and may mean that individuals are not able to pass the site. Given the low numbers of marine mammals in the vicinity of the works and the method of piling being adopted, including a soft-start, impacts on mammals are likely to be low. For more detailed information, please see the project specific underwater noise assessment (HR Wallingford, 2021b). **Fish** – Given most adult fish are able to swim away from noise, a soft-start would allow for mitigation of most of the minor impact, as adult and juvenile fish will be able to migrate away from the source of any construction noise.. However, fish embryos (such as those of smelt) in the immediate vicinity of the site may be susceptible to damage as they are immobile. Spawning fish are also less likely to move away from the area during spawning. Therefore the timing of such work should be planned to avoid the smelt spawning period and the incubation period of their eggs. Thames Estuary smelt spawning is reported to take place mainly at night (EA, 2010). All works, including piling should be restricted to daylight working which would likely minimise any potential effects on adult smelt spawning, however, developing eggs and juvenile fish may still be affected. The avoidance of piling during and immediately after the period of smelt spawning would help to further reduce any adverse effects. As smelt spawning has usually finished in April, the likely construction timing of June onward is unlikely to coincide with a sensitive time for smelt. Eel migration also generally occurs at night-time. As piling will be limited to daytime hours, the risk of noise impacts upon this migratory activity is also low. With these methods of piling adopted, a lack of night piling and unlikely to have piling during smelt spawning, the impact of noise and vibration during construction is likely to be of **negligible** significance for mammals and fish, and **no impact** for benthos and birds.

Project effect pathway	Receptor group at risk from pathway				Consideration of effect significance
	Fish	Marine Mammal	Benthos	Bird	
(C4) Use of artificial lighting	/	/	×	/	There is the potential for artificial light to be directed onto the water during some of the construction work. Some fish species avoid areas with increased artificial light; others can be attracted by the light. Both of these could alter fish migration or movement in the area. Where possible, construction light should use directional lights to minimise projection onto the water. If lighting is required into the river, break periods could be introduced during construction, where artificial lights are turned off, to allow any fish excluded from the area to migrate further upstream or downstream. Due to the short duration of the works and the likelihood that light on the water can be kept to a minimum, use of artificial lighting is likely to be of **negligible** significance for fish, marine mammals and bird receptors and **no impact** for benthos.
(C5) Introduction of invasive non-native species	×	×	/	×	With any construction activity that requires plant and vessels from another location, there is the potential for the spread of non-native species to the project area. After the works are complete there is also the potential for the spread of non-native species that are likely to be present at the project site to other locations. With any operations of this nature, best practice should be adopted (such as Cook *et al*, 2014) to prevent the spread of non-native species to and from the site. With the adoption of best practice, the impact of the introduction of non-native species is likely to be of **negligible** significance for benthos and **no impact** for fish, marine mammals and birds.
(C6) Accidental pollution events (e.g. oil spill)	/	/	/	/	During construction, a range of plant and machinery may be required on site. As is the case for most construction works that take place in and near the marine environment, there is the potential for accidental spillages or leakages of substances (e.g. fuels, oils, etc.) to occur from such machinery, which has the

Project effect pathway	Receptor group at risk from pathway				Consideration of effect significance
	Fish	Marine Mammal	Benthos	Bird	
					potential to adversely affect water and sediment quality through direct input to the estuary or via runoff. To minimise the risk of spillage or leakages from occurring, best practise techniques and due diligence should be implemented throughout all construction activities. All working practices will adhere to Guidance on Pollution Prevention (GPP) for works and maintenance in or near water (NetRegs, 2020) and all vessels would adhere to the requirements of the MARPOL Convention Regulations. It is not possible to assess the significance of a particular pollution incident as this is dependent on the nature of the incident (e.g. location, scale, type of pollutant). However, the risk associated with the impact of accidental pollution events is considered low.
Operational					
(O1) Change to water movement including scour due to structures being in the river	/	×	/	×	Fish movement depends on the flow of water. Any change to this may affect where fish are located in the Tidal Thames or provide a barrier to migration. The assessment of alterations to flow due to the placement of the temporary piles, the pier structures and the Hammersmith Temporary Pier that will bottom out at low tide indicate that there will be very minor and localised alterations to flow and a small likelihood of scour in isolated areas. As such this is unlikely to significantly impact aquatic receptors. The impact will also be temporary as the piles and structures will be in place for between 3 and 5 years. Change to water movement/scour due to structure being in the river is likely to be of **negligible** significance for fish, and **no impact** for marine mammals, benthos and birds. Please see hydrodynamic and scour assessment for further information (HR Wallingford, 2021a).

Project effect pathway	Receptor group at risk from pathway				Consideration of effect significance
	Fish	Marine Mammal	Benthos	Bird	
(O2) Use of artificial lighting	/	/	×	/	Some fish species avoid areas with increased artificial light; others can be attracted by the light. Both of these could alter fish migration or movement in the area. During operation there will be the need for artificial lighting at night for public health and safety. Lighting will be shaded wherever possible and installed to allow a minimal amount of light spill on to the river at night. Due to high levels of background lighting throughout this section of the River Thames, the effect of artificial lighting is likely to be of **negligible** significance for fish, marine mammal and bird receptors, and **no impact** on benthos.
(O3) Increased shading under Barnes walkway and pier and contact of Hammersmith walkway with the foreshore (including shading)	/	×	✓	/	Habitats within close proximity to the completed structure may be subject to increased levels of shading. Shading would be created by the new walkways over the river and over the foreshore. It is predicted that any effects would be restricted to very minor and localised change due to shading. Due to the naturally high levels of suspended sediment in the Thames estuary, existing levels of light penetration of the water column are limited, which in turn limits the ability of plants to grow within the water column. Part of the north bank foreshore will be impacted by the contact of the Hammersmith walkway which will ground at low tide. Although the level of contact will depend on state of the tidal, for the purpose of this assessment, it is considered that the full area is impacted for the full amount of time the ferry and associated structures are in operation (3 to 5 years). The area of impact is approximately 750 m^3. The foreshore that is directly in contact with the walkway at low tide is not designated under the WFD (Section 3.1.5 and Figure 3.1) which is limited to areas to the west of the Hammersmith Bridge. It is not part of the London BAP habitat (Section 3.2.2 and Figure 3.3) which is limited to the southern part of the Thames at the location of the Hammersmith bridge and

Project effect pathway	Receptor group at risk from pathway				Consideration of effect significance
	Fish	Marine Mammal	Benthos	Bird	
					proposed Hammersmith Temporary Ferry. The impact area is however designated as a SNIC (See Section 3.2.1 and Figure 3.1). There is likely to be a **minor significant** impact to the northern foreshore as a result of the presence of structures associated with the Hammersmith ferry. The impact is likely to be localised and temporary during the life-span of the ferry, which is expected to between 3 to 5 years. The habitats and species present at this impacted location are expected to fully recover following the removal of the temporary piles and structures and the decommissioning of the Hammersmith ferry. The exact time of recovery is unknown, however is likely to be fully recovered within a couple of years following the completion of the project. The impacted area is a SNIC feature (River Thames and tidal tributaries), however, due to the size and scale of that SNIC feature, the impact area is only a very small proportion of the feature present. As such the impact is likely to be of **negligible** significance to the SNIC feature. Due to the relatively small amount of shading and minor impact of the spud legs on the southern bank of the Thames during the time the temporary ferry will be in place (3 to 5 years) increased shading and direct impact is likely to be of **negligible** significance for benthos of the southern bank and fish, with **no impact** likely for mammals.
(C5) Introduction of invasive non-native species	×	×	/	×	With any activity that requires vessels that may be moved from another location, there is the potential for the spread of non-native species to the project area. After the works are complete there is also the potential for the spread of non-native species that are likely to be present at the project site to other locations. With any operations of this nature, best practice should be adopted (such as Cook *et al*, 2014) to prevent the spread of non-native species to and from the site.

Project effect pathway	Receptor group at risk from pathway				Consideration of effect significance
	Fish	Marine Mammal	Benthos	Bird	
					With the adoption of best practice, the impact of the introduction of non-native species is likely to be of **negligible** significance for benthos and no impact for fish and mammals.
(C6) Accidental pollution events (e.g. oil spill)	/	/	/	/	During operation, a number of ferries will be operating throughout the day. As is the case for most operations that take place in and near the marine environment, there is the potential for accidental spillages or leakages of substances (e.g. fuels, oils, etc.) to occur from vessels, which has the potential to adversely affect water and sediment quality through direct input to the estuary or via runoff. To minimise the risk of spillage or leakages from occurring, best practise techniques and due diligence should be implemented throughout all operational activities. Thames Clipper will have an emergency response protocol, which will include what actions to take following an expected leak or spillage. All working practices to adhere to the Guidance on Pollution Prevention (NetRegs, 2020) and all vessels would adhere to the requirements of the MARPOL Convention Regulations. It is not possible to assess the significance of a particular pollution incident as this is dependent on the nature of the incident (e.g. location, scale, type of pollutant). However, the risk associated with the impact of accidental pollution events is considered low.
Decommissioning					
(D1) Changes in water quality due to piling removal	/	/	/	/	The removal of the temporary piles and associated ferry structures after between 3 and 5 years will cause some disturbance to the sediment. Levels of disturbance are likely to be of a similar scale, nature and duration as during construction. The activity will also likely require some sort of jack-up barge to facilitate the removal, although the exact decommissioning method is not yet known. Although there are usually at least some level of contamination in most Thames sediments, it is

Project effect pathway	Receptor group at risk from pathway				Consideration of effect significance
	Fish	Marine Mammal	Benthos	Bird	
					unlikely that the minor levels of disturbance to the sediments would significantly affect water quality. The small additional scour due to the placement of piles in the Thames, will recover over time following their removal. During this time there is the potential for minor disturbance to the sediments. As such the impact on water quality is likely to be of **negligible** significance for all four receptor groups. See associated WFD Assessment Report (HR Wallingford, 2021c).
(D2) Change to water movement including scour, due to temporary pile and structure removal	/	×	/	×	The small alterations to flow due to the temporary piles and ferry structures being in place will be again altered due to their removal. Water movement will likely readjust to pre-project conditions after a short amount of time. As such the likely impact of a change to water movement/scour due to temporary pile and structure removal is likely to be of **negligible** significance for fish and benthos receptors and **no impact** for mammals and bird receptors.
(D3) Underwater noise and vibration due to pile removal activity	/	/	×	×	The activity to remove piles after between 3 and 5 years will be likely result in some low levels of noise and vibration that is of a lower magnitude than during the construction activity. However there is still the potential for noise generated to impact fish and marine mammal receptors. Once the removal method is chosen, a lack of night activity and restrictions on removal during smelt spawning, the impact of noise and vibration during decommissioning is likely to be of **negligible** significance for mammals and for fish, and **no impact** for benthos and birds.
(D4) Use of artificial lighting	/	/	×	/	There is the potential for artificial light to be directed onto the water during some of the decommissioning works. Some fish species avoid areas with increased artificial light; others can be attracted by the

Project effect pathway	Receptor group at risk from pathway				Consideration of effect significance
	Fish	Marine Mammal	Benthos	Bird	
					light. Both of these could alter fish migration or movement in the area. Where possible, decommissioning light will use directional lights to minimise projection onto the water. If lighting is required into the river, break periods could be introduced during decommissioning, where artificial lights are turned off, to allow any fish excluded from the area to migrate further upstream or downstream. Due to the short duration of the works and the likelihood that light on the water can be kept to a minimum, use of artificial lighting is likely to be of **negligible** significance for fish receptors, marine mammals and birds and **no impact** for benthos.
(D5) Introduction of invasive non-native species	×	×	/	×	With any decommissioning activity that requires plant and vessels from another location, there is the potential for the spread of non-native species to the project area. After the works are complete there is also the potential for the spread of non-native species that are likely to be present at the project site to other locations. With any operations of this nature, best practice should be adopted (such as Cook *et al*, 2014) to prevent the spread of non-native species to and from the site. With the adoption of best practice, the impact of the introduction of non-native species is likely to be of **negligible** significance for benthos and no impact for fish, marine mammals and birds.
(D7) Accidental pollution events (e.g. oil spill)	/	/	/	/	During decommissioning, a range of plant and machinery may be required on site. As is the case for most construction works that take place in and near the marine environment, there is the potential for accidental spillages or leakages of substances (e.g. fuels, oils, etc.) to occur from such machinery, which has the potential to adversely affect water and sediment quality through direct input to the estuary or via runoff. To minimise the risk of spillage or leakages from occurring, best practise techniques and

Project effect pathway	Receptor group at risk from pathway				Consideration of effect significance
	Fish	Marine Mammal	Benthos	Bird	
					due diligence should be implemented throughout all construction activities. All working practices to adhere to the Guidance on Pollution Prevention (NetRegs, 2020) and all vessels would adhere to the requirements of the MARPOL Convention Regulations. It is not possible to assess the significance of a particular pollution incident as this is dependent on the nature of the incident (e.g. location, scale, type of pollutant). However, the risk associated with the impact of accidental pollution events is considered low.

Note: ✗ No pathway; / Potential pathway; ✓ Likely pathway

5. Recommendations

Wherever possible, construction and decommissioning should be carefully planned to avoid key ecological events such as fish spawning, fish aggregation and fish migration.

5.1. During construction

Although negligible impacts upon fish are anticipated, a low-level construction lighting strategy will be implemented in order to minimise the risk of disturbance to fish. Lighting used for construction will be switched-off when not in use and positioned so as not to spill on to the water wherever possible.

The selection of low-noise/vibration piling techniques plus the avoidance of piling in the wet whenever possible. The works are envisaged to being conducted outside of the smelt spawning period (March to April inclusive).

Eel migration generally occurs at night-time. Mitigation will include limiting piling to during day-time hours, for example no activity between 19:00 and 06:00, the risk of noise impacts upon this activity will be further reduced.

In order to prevent significant pollution events and resulting adverse effect from occurring, a Construction Environmental Management Plan will be produced for the site which will incorporate working precautions and procedures in accordance with published Guidance on Pollution Prevention.

5.2. During operation

A low-level lighting strategy will be implemented in order to minimise the risk of disturbance to fish.

5.3. During decommissioning

As there are likely to be similar potential impacts during the decommissioning as during the construction, the same mitigation measures are recommended.

6. Conclusion

The report identifies a number of designated (statutory and non-statutory) sites that are in the vicinity of the proposed Hammersmith Temporary Ferry, adjacent to the Hammersmith Bridge. Sites within the vicinity have been assessed to determine if there is the potential of a pathway of impact from any of the projects proposed activities. Where a potential pathway exists, the features of those sites have been further assessed, at a high level, to assess the likely significance of effect.

Generally there is unlikely to be anything other than a negligible significant effect for most of the identified feature activity interactions. The piling method already proposed should reduce the severity of impact to a great degree, however some noise and vibration will still be caused. As such it is recommended that during construction and decommissioning of the piles avoids the smelt spawning period of April and March inclusive is avoided (which is currently envisages by the programme timetable), and the activity is restricted to daylight hours.

7. Report limitations and Assumptions

Only material that is readily available has been used for this aquatic study.

European water vole (*Arvicola amphibious*) noted form records but not considered.

Potential risk of spread of invasive plant species during other construction activities, that may be mobilised on the river. These are not aquatic and so no consideration was given.

No in-combination effects have been considered as this report has not looked at any other projects that are planned and/or approved within the local area.

8. References

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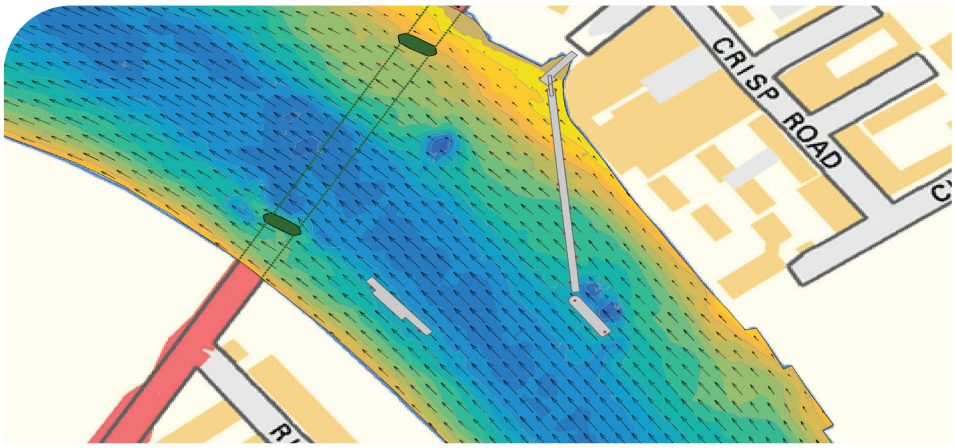

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