Llywodraeth Cymru / Welsh Government

A494 RIVER DEE BRIDGE REPLACEMENT

Statement to Inform Appropriate Assessment (SIAA)

395318-RML-00-XX-RP-L-0006| Rev 2

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Abbreviations

AA	Appropriate Assessment
AOD	Above Ordnance Datum
AEOI	Adverse Effect on Integrity
BNGR	British National Grid Reference
BSI	British Standards Institute
BT	British Telecom
BTO	British Trust for Ornithology
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
cSAC	Candidate Special Area of Conservation
Defra	Department for Environment, Food and Rural Affairs
DLL	District Level Licence
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
ELG	Environmental Liaison Group
ELIA	Environmental Lighting Impact Assessment
EMMP	Environmental Mitigation and Management Plan
EPS	European Protected Species
ES	Environmental Statement
EU	European Union
FCC	Flintshire County Council
FRAP	Flood Risk Activity Permit
GCN	Great Crested Newt
HRA	Habitats Regulations Assessment
HSI	Habitat Suitability Index
ILP	Institution of Lighting Professionals
INNS	Invasive Non-Native Species
IROPI	Imperative Reasons of Overriding Public Interest
IRZ	Impact Risk Zone
JNCC	Joint Nature Conservation Committee
kV	Kilovolt

LILO	Left In, Left Out
LNR	Local Nature Reserve
LSE	Likely Significant Effect
MAGIC	Multi-Agency Geographic Information for the Countryside
MHWS	Mean High-Water Spring
Mph	Miles per hour
NMWTRA	North and Mid Wales Trunk Road Agent
NNR	National Nature Reserve
NRW	National Resources Wales
NSN	National Site Network
NVC	National Vegetation Classification
PEA	Preliminary Ecological Appraisal
PMA	Private Means of Access
PPV	Peak Particle Velocity
PRoW	Public Right of Way
pSAC	Proposed Special Area of Conservation
pSPA	Proposed Special Protection Area
REAC	Register of Actions and Commitments
SAC	Special Area of Conservation
SOP	Standard Operating Procedure
SoS	Secretary of State
SPA	Special Protection Area
SNCB	Statutory Nature Conservation Body
SPEN	Scottish Power Energy Networks
SSSI	Site of Special Scientific Interest
t	Tonne
TWG	Technical Working Group
UK	United Kingdom
WFD	Water Framework Directive

1. Introduction

1.1. Background

1.1.1 The North and Mid Wales Trunk Road Agent (NMWTRA) has appointed Mott MacDonald as the lead consultant to provide multidisciplinary consultancy services for the A494 River Dee Bridge Replacement Scheme, covering Welsh Government's Key Stage Approval Stages 3 and 4.

1.1.2 The River Dee Bridge is a strategic part of the A494 road corridor where it crosses the River Dee in North Wales. The bridge was originally constructed in 1960, along with this section of the A494 which opened in 1962.

1.1.3 Since 1962, the settlements of Queensferry and Garden City have expanded along with other forms of urban and industrial development, resulting in encroachment on both sides of the A494 road corridor, causing it to become increasingly constrained over time. An exception is the land to the southeast of the bridge that remains as agricultural land. This has heavily influenced the design of the new bridge, meaning that there was no real alternative but for a replacement bridge to be considered to the southeast, where there were few space constraints and where connections to the existing A494 road corridor on both sides of the river could be made.

1.1.4 The new bridge and connections to the existing A494 road corridor is hereafter referred to as the "Scheme" and consists of the following key features:

a) A 1.2km long offline[1] re-alignment to the south of the existing carriageway for construction of two lanes and a hard shoulder in each direction;

b) A replacement bridge to the south of the existing A494 River Dee Bridge;

c) An improved active travel facility long the westbound carriageway

d) A re-configured access from the A494 westbound carriageway to the traveller site and pump station area; and,

e) Partial removal of the existing bridge with river piers remaining in-situ.

1.1.5 Due to the Scheme crossing the River Dee and in close proximity to several designated European sites, which now form part of the United Kingdom (UK) National

[1] 'Offline' refers to works that take place outside of the existing highway boundary, typically on adjacent land.

Site Network (NSN) (formerly known as Natura 2000 sites, prior to the UK leaving the European Union (Brexit)), it is necessary to undertake a Habitats Regulations Assessment (HRA) to establish whether the proposed works have the potential for Likely Significant Effects (LSE) on the qualifying features of these sites and, if so, if LSE will have an Adverse Effect on Integrity (AEoI) of the site.

1.1.6 This report to inform a HRA has been carried out in parallel with the Environmental Statement but does not form an appendix of the Environmental Statement. It has been undertaken in line with the Design Manual for Roads and Bridges LA 115[2] guidance for HRAs where applicable.

1.1.7 A "Statement to Inform an Appropriate Assessment" (doc ref: 395318-0066) for the proposed A494 River Dee Bridge Improvement Scheme at Key Stage 3 to 4 was provided to Natural Resources Wales (NRW) and the Local Planning Authority (Flintshire County Council) for consultation as part of the overall public consultation on the Environmental Statement in 2019. It summarised consultations with an Environmental Liaison Group (including NRW) in June and October 2018 and April 2019. NRW concurred with the conclusion of the screening stage that it should progress to stage 2 Appropriate Assessment.

1.2. Scheme location

1.1.8 The Scheme is located on the A494 road corridor at Queensferry in the county of Flintshire, North Wales, where it crosses the River Dee, approximately 7km northwest of Saltney on the outskirts of Chester, and 20km southeast of the Port of Mostyn on the south bank of the Dee Estuary (Figure 1). The total length of the Scheme, including the approaches to the bridge, is approximately 1.25km and lies entirely within Wales.

1.1.9 The Scheme runs from the Queensferry Interchange in the southwest, northeast along the A494 road corridor and across the River Dee, to rejoin the existing A494 south of the village called Garden City, in an area of Flintshire called Sealand. The surrounding area is predominantly urban, with a combination of heavy industry and

[2] Standards for Highways 2020. DMRB LA 115 – Habitats Regulations assessment. Available from: e2fdab58-d293-4af7-b737-b55e08e045ae

residential areas to the north and west, and industrial estates to the south. To the east the area is primarily low-lying agricultural land.

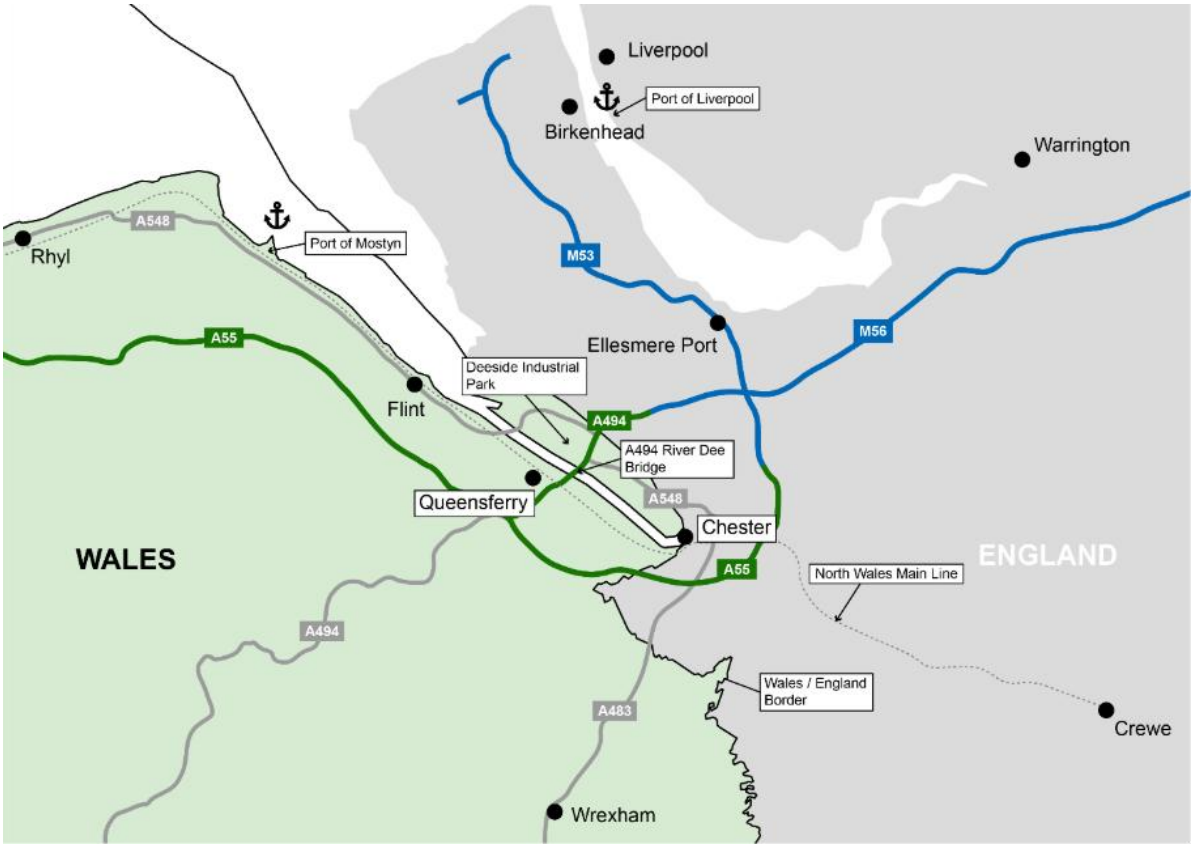


Figure 1 Scheme location.

River Dee and Dee Estuary characteristics

1.1.10 The Scheme is located on a canalised, tidal section of the River Dee. The River Dee is a statutory main river that originates in Snowdonia, Wales and flows through the Vale of Llangollen and the city of Chester downstream before discharging into the Dee Estuary and the Irish Sea.

1.1.11 The entire length of the River Dee is notified as a Site of Special Scientific Interest (SSSI) ('River Dee SSSI') and SAC ('River Dee and Bala Lake SAC'), extending from its source downstream just beyond the Flintshire/A548 Bridge to the start of the Dee Estuary (British National Grid Reference [BNGR]: SJ 28906 71135). It is primarily designated for its range of habitats and multiple species of migratory fish. The River Dee is tidally influenced up to the Chester Weir fish trap (BNGR: SJ 40797 65841). Although tidal, and habitat for estuarine and marine species, reference to the

benthic environment of the River Dee within the Scheme footprint will hereafter be referred to as ‘riverbed’.

1.1.12 The Dee Estuary is a large, funnel-shaped, sheltered estuary, which flows northwest from the River Dee into Liverpool Bay. The Estuary extends from the mouth by Talacre, North Wales, on the southwestern bank (BNGR: SJ 12104 84589) and Red Rocks Nature Reserve, England, on the northeastern bank (BNGR: SJ 20306 88464), just past Harwarden railway bridge (BNGR: SJ 31415 69115). The Dee Estuary is a designated Ramsar site, Special Area of Conservation (SAC) and Special Protected Area (SPA).

1.1.13 For the purposes of this report, the use of the ‘River Dee’ and ‘Dee Estuary’ will follow the extents defined in the aforementioned designations.

2. Baseline Conditions

1.1.14 This section summarises the baseline conditions at the Scheme location and relevant to this assessment. It includes information derived from desk-based studies and on-site surveys. Additional detail of all baseline habitats and species present is included within respective ES Chapter 8 Terrestrial Biodiversity and ES Chapter 16 Marine Environment, including tables, figures and appendices.

Terrestrial species and habitats

Protected and notable species

Otter

1.1.15 A desk study found two recorded field signs for otter within 2km of the Scheme within the last ten years. The closest was within 1.3km, a spraint (faeces) noted on a bank by a culvert of Shotwick Brook, and the second was a road casualty. A visual assessment of Shotwick Brook on Google Earth did not identify any hydrological connection to the River Dee, which indicates either movement across land or via the culvert pipe (if sufficiently large enough). Spraint was recorded further inland along Shotwick Brook, on a ledge beneath a culvert.

1.1.16 Previous monitoring surveys for otters in Wales showed a continued trend of recovery for the otter[3]. However updated monitoring surveys conducted by NRW, Cardiff University and volunteers using the same methods showed a substantive decline in their populations for the first time since the 1970s, from around 90% occupancy in 2010 to 70% in 2015 to 2018[4].

1.1.17 In North Wales the otter has continued to consolidate its range and is now widespread in the hydrometric areas of Glaslyn and Lleyn, Conwy and Clwyd, and Dee. Recent monitoring of the River Dee highlighted a 9% decline in the number of sites where otter signs were found since the last survey in 2009 to 2010. However, this was not a statistically significant decline and the change is within what could be considered normal variation. Otters are qualifying feature of the SAC and are known to breed throughout the SAC and so maintain favourable conservation status with population and range trending upwards[5].

1.1.18 Evidence of otters has previously been found along the River Dee during surveys for this Scheme (Figure 8.8, ES Volume 2), including feeding remains, spraint and footprints. However, suitable secure breeding sites are absent from the Scheme footprint, although there are suitable rest-up areas within trees and scrub. No evidence of otters was recorded from the camera trap. Otters are considered to be of ***National*** significance.

Habitats

1.1.19 The terrestrial habitats recorded within the site and adjacent areas are described herein and displayed in Figures 8.3A-F in Volume 2 of the ES. The main terrestrial habitats identified (including JNCC Phase 1 Category Codes[6]) were:

a) Woodland broadleaved plantation A1.1.2
b) Woodland – Mixed plantation A1.3.2
c) Scrub dense and continuous A2.1 and scattered A2.2

[3] NRW, 2015. *Otter Survey of Wales 2009 – 2010*. Available from: https://naturalresources.wales/media/4590/osw-5-english-24-06-2015.pdf
[4] Kean, E.F. and Chadwick, E.A., 2021. Otter Survey of Wales 2015-2018. NRW Report No: 519, NRW. Available from https://cdn.cyfoethnaturiol.cymru/694539/osw-6th-report-final.pdf
[5] Mathews, F., Smith, B., Harrower, C., and Coomber. F., in association with the Wales Mammal Biodiversity Action Forum, 2020. The State of Mammals in Wales. A report by the Mammal Society for Natural Resources Wales, produced in association with Wales Mammal Biodiversity Action Forum. The Mammal Society: London, UK.
[6] JNCC, 2016. Handbook for Phase 1 Habitat Survey. A technique for environmental audit. JNCC: Peterborough, UK. Available from: Handbook for Phase 1 habitat survey

d) Parkland/scattered trees – broadleaved A3.1
e) Neutral grassland – semi-improved B2.2
f) Improved grassland B4
g) Tall herb and fern – tall ruderal C3.1
h) Marginal and inundation – inundation vegetation F2.2
i) Running water G2
j) Cultivated disturbed land – arable J1.1
k) Cultivated disturbed land – introduced shrub J1.4
l) Boundaries – hedge intact species poor J2.1.2
m) Built up areas – building J3.6 and caravan site J3.4
n) Bare ground J4
o) Standing water G1.

The habitats relevant to this Assessment are:

Running water (G2)

1.1.20 The Queensferry Drain is located between the A494 and the wastewater treatment works. The southern end of the drain emerges as a canalised, concrete-sided drain from a long culvert beneath the Chester-Holyhead railway. The northern end of the drain enters a culvert below the track to the caravan park, leading to the NRW Queensferry Land Drainage Pumping Station (BNGR: SJ 3228 6846) and out into the River Dee.

1.1.21 The drain section between these culverts is approximately 260m long. The banks of the drain comprise soft earth and boulders/stones. The bank profile is about 45º either side of the drain, with a berm. Poaching of the ground on the eastern side of the drain is evident. The drain is approximately 2m wide at the invert, with less than 0.5m water depth over a similar depth of silt. The flow is sluggish, discharging by gravity to the River Dee at low states of the tide. A tidal flap restricts tidal inflow but, during field surveys, water from the River Dee was observed to enter the drain at high tide.

1.1.22 A pumping station to the north of the drain operates to pump water

1.1.23 o a higher-level outfall to the River Dee when levels rise during high tides.

Standing water (G1)

1.1.24 In addition to the lagoon, six additional ponds were noted.

1.1.25 One of the ponds is located within the Scottish Power Complex (RMLP6) and is within 226m of the proposed 3m wide shared use path from Chemistry Lane to the Riverside Gypsy Travellers site and construction compound. A further pond (RMLP7) is within 160m of RMLP6. This pond is within 365m of the proposed shared use path from Chemistry Lane.

1.1.26 Other ponds included in the habitat appraisal include RMLP2, RMLP3, RMLP4, RMLP5 a large attenuation pond and the Queensferry Drain.

1.1.27 During the updated habitat appraisal conducted in 2022 ponds RMLP3, RMLP6 and RMLP5 were dry. During the habitat appraisal in 2022, RMLP1, RMLP3, RMLP5, RMLP6 and the Pentre Retail attenuation pond were all dry. Access was restricted to RMLP4, RMLP6 and RMLP7 in 2024, RMLP3 and RMLP5 were dry.

Marine species and habitats

Protected and notable species

Fish

1.1.28 For the purposes of this assessment, species have been grouped into the following categories:

a) Migratory fish species protected under the Wildlife and Countryside Act 1981: ***High*** sensitivity

b) Other fish species: ***Low to Negligible*** sensitivity

1.1.29 The desk study identified four records within a 2.0km search radius within the last ten years. These comprised brown/sea trout (*S. trutta)*, bullhead and European eel (*Anguilla anguilla*), all within Wepre Brook, located approximately 1.75km from the Scheme location and allis shad (*Alosa alosa*) have been recorded in the River Dee.

1.1.30 The Dee Estuary also supports several migratory fish species including river lamprey, sea lamprey, Atlantic salmon, brown/sea trout, twaite shad (*Alosa fallax*), European smelt (*Osmerus eperlanus*), and European eels.

1.1.31 Bullhead are a feature of interest of the River Dee and Bala Lake SAC. However, this species is a freshwater fish confined to the river above the tidal limit at

Chester Weir (located 11km upstream of the Scheme) and will not be affected by the proposed Scheme.

1.1.32 Brown/sea trout is listed as a species of least concern on the International Union for Conservation of Nature (IUCN) Red List[7]. Allis shad and European eel are listed as Critically Endangered[8,9]. All three species are Section 7 species.

1.1.33 European eel will likely feed and be resident in the channelised section of the tidal River Dee. In addition, river lamprey primarily reside in estuaries feeding on estuarine fish, such as herring (*Clupea harengus*) and flatfish (Pleuronectidae) (Maitland 2003)[10] and are expected to be present migratory fish within the Dee Estuary.

1.1.34 European smelt are a feature of both the River Dee and Dee Estuary SSSI. NRW provided records of locations where European smelt were netted/trawled. European smelt is listed on the IUCN Red List as Least Concern.

1.1.35 Fish species that migrate through the River Dee and under the location of the existing and proposed bridges include those which are features of interest of the designated sites. These are Atlantic salmon, sea lamprey, river lamprey and European smelt. Information regarding sea lamprey, brook lamprey, Atlantic salmon, brown/sea trout and European smelt has been obtained from NRW.

1.1.36 Artificial light at night from illuminated bridges can reach aquatic habitats, such as rivers, which in turn can threaten the river's natural heterogeneity and alter the behavioural responses of migratory fish. An Environmental Lighting Impact Assessment (ELIA) for the Scheme was completed in August 2025 (Doc ref: 395318-MMD-00-XX-RP-E-0009), with three receptor locations adjacent to the River Dee (E03, E04 and H02).

[7] Freyhof, J. 2011. *Salmo trutta. The IUCN Red List of Threatened Species*: T19861A9050312. Available from: http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T19861A9050312.en.
[8] Ford, M. 2024. *Alosa alosa (Europe assessment)*. *The IUCN Red List of Threatened Species* 2024: e.T903A221184262. Available from: https://dx.doi.org/10.2305/IUCN.UK.2024-2.RLTS.T903A221184262.en.
[9] Pike, C., Crook, V. & Gollock, M. 2023. *Anguilla anguilla (Europe assessment)*. *The IUCN Red List of Threatened Species* 2023: e.T60344A216177498.
[10] Maitland, P.S., 2003. Ecology of the river, brook and sea lamprey. Conserving Natura 2000 Rivers Ecology Series No. 5. Peterborough (English Nature).

Anadromous and marine fish species

Lamprey species

1.1.37 Based on the Chester Weir fish trap data[11], peak migration for sea lamprey is between May and July, with river lamprey migration occurring from February to April, with peak numbers observed in February. Brook lamprey has not been considered in this assessment as they do not descend into the tidal zone and are therefore deemed not to be affected by the Scheme.

Atlantic salmon and brown/sea trout

1.1.38 Results of fish catches for Atlantic salmon and brown/sea trout (2009 to 2025) provided by NRW indicate both species generally have their peak migration periods from June to August. Outside of this period, autumn was notable for the passage of smolts (juveniles), though these were limited in numbers, with the exception of Atlantic salmon from 2009 to 2012 where numbers were comparable to the previous months. The peak migration period for smolts is in April and May.

1.1.39 Atlantic salmon and brown/sea trout are considered to be of international importance due to their ecological role as indicators of freshwater and marine health, and their significant socio-economic value through fisheries and tourism. They are protected under international conventions like the United Nations Convention for the Conservation of Salmon and OSPAR convention, reflecting their global significance[12].

European eel

1.1.40 The Dee Estuary and River Dee also supports European eel. They may also inhabit Queensferry Drain. None were observed during terrestrial ecology surveys for water voles and otters, however as a standard precautionary measure and due to their critically endangered status and migratory life cycle, presence should be assumed within the River Dee.

[11] Natural Resources Wales (2022) Dee Stock Assessment Programme. Angler Report 2022: 16pp.
[12] EA, 2020. New cross border byelaws to protect salmon and sea trout. [online] Available from: UK Government (2020) New cross border byelaws to protect salmon and sea trout.

Habitats

1.1.41 A habitat survey along the banks of the River Dee was undertaken in March 2025 and highlighted the presence of saltmarsh communities. However, its extent is limited, in particular at the location under the bridge and to the south of the bridge location. The banks to the north contain abundant sea purslane (*Sesuvium portulacastrum*), which is a typical species of Atlantic salt meadow.

1.1.42 Habitats are summarised from the intertidal survey report (Doc ref: 395318-RML-00-XX-RP-L-0014) using the JNCC Marine Habitats Classification[13], and a summary is provided in the following paragraphs. Though saltmarsh has been recorded, the survey was not conducted at an optimal time of the year for saltmarsh surveys. As such, further surveys took place in July 2025 with a survey report (Doc. Ref: 395318-RML-00-XX-RP-L-0012).

1.1.43 The intertidal habitats within the study area on the south side of the tidal River Dee (west abutment of the existing bridge) comprises steep banks with saltmarsh and scrub on the upper littoral (saltmarsh LS.LMp.Sm). However, directly under the existing bridge structure, the upper littoral comprises littoral mud (LS.LMu). The absence of saltmarsh is likely due to the shading effect of the existing bridge.

1.1.44 The subtidal habitat includes substrate from the mid to lower littoral comprised of fine sandy mud with scattered rocks and debris, forming the biotope type Polychaete/oligochaete-dominated upper estuarine mud shores (LS.LMu.UEst). Directly under the existing bridge structure, the lower littoral features muds with gravels and cobbles forming littoral mixed sediment (LS.LMx).

1.1.45 The northeastern bank of the River Dee is also backed by saltmarsh, dominated by sea purslane, followed by common saltmarsh-grass (*Puccinellia maritima*), which is interspersed with Babington's orache (*Atriplex glabriuscula*) and sea plantain (*Plantago maritima*). This is bordered from above by common couch (*Elytrigia repens*) or sea couch (*E. atherica*) (or a combination of the two) interspersed with sea aster (*Tripolium pannonicum*) and sea beet (*Beta vulgaris subsp. Maritima*).

[13] Connor, D.W., Allen, J.H., Golding, N., Howell, K.L., Lieberknecht, L.M., Northen, K.O., and Reker, J.B., 2004. The Marine Habitat Classification for Britain and Ireland Version 04.05. JNCC: Peterborough, UK. Available from: JNCC Marine Habitat Classification

Mown semi-improved neutral grassland borders this upper saltmarsh. The upper to mid littoral comprises a mosaic of sandy mud (littoral sandy mud LS.LMu). Consistent with the south side of the river, saltmarsh is absent beneath the existing bridge structure on the north side.

1.1.46 The existing bridge structure is concrete and features tubular green seaweeds, brown algae and barnacles on the existing bridge piers below the MHWS tidal mark.

1.1.47 At the location of the proposed new bridge, the northeastern bank of the River Dee is dominated by tall common couch or sea couch (or a hybrid of the two), with abundant sea purslane dominating towards the lower saltmarsh zone with intertidal mud below that. The southern bank of the River Dee and the Queensferry Drain outflow are dominated by scrub and intertidal mud, with scattered saltmarsh species in between.

Fish spawning and nursery grounds

1.1.48 The subtidal zone of the Dee Estuary is an important breeding, sheltering and nursery area for coastal fish species[14], however, this is in the outer areas closer to the mouth of the river where there is coarse sand and gravel substrate.

1.1.49 The outer Dee Estuary, which is 10 to 15km away from location of the Scheme, is a spawning area for sprat (May to August)[15]. The estuary is also a low intensity spawning area for cod (*Gadus morhua*), whiting (*Merlangius merlangus)*, mackerel (*Scomber scombrus),* plaice (*Pleuronectes platessa*) and sole *(Solea solea*).

1.1.50 The Dee Estuary is also a nursery area for herring, whiting, plaice (low intensity) and sole (high intensity). The estuary is also a low intensity nursing ground for tope shark (*Galeorhinus galeus*), thornback ray (*Raja clavata*), spotted ray (*Raja montagui*), angler/monk fish (*Lophius piscatorius*) and sand eel. It is a high intensity nursing ground for herring, cod and whiting[16].

[14] JNCC, 2013. Ramsar Additional Material. [online] Available from: https://rsis.ramsar.org/RISapp/files/30642347/documents/GB298_lit161209.pdf
[15] Coull, K., Johnstone, R. and Rogers, S., 1998. Fisheries sensitivity maps in British Waters. UKOOA Ltd, Aberdeen, pp. 63
[16] Ellis, J., Milligan, S.P., Readdy, L., Taylor, N. and Brown, M.J., 2012. Spawning and nursery grounds of selected fish species in UK waters. Science Series Technical Report, Cefas Lowestoft, pp. 147:56.

1.1.51 The Dee Estuary SSSI is significant for being one of the few remaining areas in the UK where European smelt spawn and breed. The Dee Estuary (≥1km away from proposed works) provides crucial spawning and nursery grounds for this species[17].

1.1.52 Habitats further upstream in the River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC, particularly in the proposed works area, comprise of subtidal mud. It is important to note that this is not a suitable substrate for fish spawning grounds. Species such as herring, European smelt, and elasmobranch species, such as tope shark and thornback rays, typically use gravel, gravelly sand or sand substrate in the outer Dee Estuary as their suitable spawning ground habitat.

Priority habitats

1.1.53 Table 1 lists the marine habitats found within or adjacent to the Scheme and whether these habitats are listed as Priority Habitats in Section 7 of the Environment (Wales) Act 2016. A value for their ecological significance has also been assigned.

Table 1 Summary of priority habitat classifications (with UK Hab reference codes) and value of resource importance.

Habitat Ref Codes	Habitat description	Priority Habitat	Value/justification
G2	Running water	Yes	**International -** the Tidal River Dee is a priority habitat as well as being designated as a SAC/SSSI. **Local -** the Queensferry Drain provides biodiversity within an urban context as well as meeting other planning biodiversity objectives.
H1.1	Intertidal mud/sand	Yes	**National -** although limited in its extent at the location of the Scheme, intertidal mud/sand is a feature of the River Dee SSSI. It is a priority habitat and an Annex I habitat of the Dee Estuary SAC 1km downstream (mudflats and sand flats not covered by sea water at low tide).
H2.6	Saltmarsh	Yes	**National -** although limited in its extent at the location of the Scheme, saltmarsh is a feature of the River Dee SSSI. It is a priority habitat and an Annex I habitat of the Dee Estuary SAC 1km downstream (saltmarsh is covered within Atlantic salt meadows).

Source: Section 7 of the Environment (Wales) Act 2016.

[17] NE, 2025. Developing eDNA approaches for the detection of European smelt on the River Wyre. [online] Available from: https://www.britishecologicalsociety.org/applied-ecology-resources/document/20240116144/

Ornithology

1.1.54 Overwintering bird surveys have been conducted by Mott MacDonald specialists. The survey programme consisted of low-tide counts and wintering bird surveys conducted once a month between November 2018 and March 2019, which were updated in November 2020 to February 2021,and September 2024 to March 2025. Details of the bird surveys conducted in 2018 and 2019 are provided in the ES Chapter 8 Appendix 8.E, and Appendix 8.H for the updated surveys conducted in 2020 to 2021 and 2024 to 2025.

1.1.55 The patterns of distribution and the significance of the site for non-breeding species is not thought to have changed since the initial overwintering report. The assemblage of non-breeding birds should be considered important at the county level for conservation, though recorded numbers of species designated under the SPA/Ramsar site were low. Priority species were found in low (<10) to moderate numbers (10 to 100) across the survey area and it is considered that more suitable and higher quality habitats are available beyond the extent of the survey area.

3. Proposed scheme

3.1. Proposed construction programme

1.1.56 The programme is based on an initial contract award in March 2026 to commence detailed design, followed by the award of the construction stage contract in August 2027. It has been assumed that the construction will be carried out in three main stages:

a) Advance works and mobilisation, including detailed design;
b) Construction of the new river bridge and approaches; and
c) Demolition of the existing bridge, completion of finishing works and demobilisation.

1.1.57 The current construction programme is dependent on several key constraints, such as the diversion of utilities and any seasonal limits for works in the River Dee that may be imposed by NRW.

1.1.58 Advance works to establish construction compounds, access points and to divert utilities are likely to begin before the main works. The construction activities and programme would be subject to modification during both the detailed design and the construction phases and informed by pre-construction surveys as stated in the Environmental Statement.

1.1.59 The timings are indicative and reflect the current best estimates. The key dates and timelines for construction are currently indicated, as follows:

a) Early site works, mobilisation, and key diversions – October 2026 to April 2028;
b) Main construction works – December 2027 to June 2029;
c) New A494 road open to traffic – autumn 2029; and
d) Existing A494 River Dee Bridge removed – completed by spring 2030.

1.1.60 Maintenance and aftercare of the environmental aspects of the Scheme including management and establishment maintenance of the soft estate would remain the responsibility of the contractor for five years after the completion of construction.

Working hours

1.1.61 The working day would vary between the seasons. It would typically be Monday – Friday 07:00 to 19:00 in the summer months and 07:00 to 17:00 in the winter. Saturday working hours would be 07:00 to 13:00. In certain circumstances, specific works may have to be undertaken outside the normal working hours.

1.1.62 Night working would also be required in some cases. This would include work to be carried out during limited periods for works requiring lane or carriageway closures to minimise disruption to road users. These instances would be kept to a minimum and require agreement with the Welsh Government, NRW, and NMWTRA beforehand.

1.1.63 In-river piling activity working hours would be limited to between 08:00 to 17:00, with no night working, and all works to take place in the 3 hours leading up to high tide at Chester weir (as previously agreed with NRW for Marine Licensing 6 May 2022).

1.1.64 Any working outside the normal hours would be agreed with the local authority's Public Protection Officer (or equivalent) and residents would be informed in advance.

3.2. Scheme overview

Replacement bridge

1.1.65 The Scheme is for the replacement of the existing bridge with a span of approximately 140m and an increased width of 36.5m. The new bridge deck will be approximately 7.3m above the Mean High-Water Spring (MHWS) tidal level, due to the need for reconnecting to the existing A494 road corridor on both sides of the river. There would be two lanes of traffic in each direction, as with the current bridge, and a new hard shoulder on both the east and westbound carriageway. A new shared use path for active travel provision would run along the southern side of the bridge. The bridge would be supported by two river piers. Each river pier would be constructed using 12 piles approximately 1.5m in diameter. The river piers would be in a similar orientation and distance from the top of each riverbank as the existing bridge piers, but approximately 6m further upstream to the southeast. There will be change to the operational speed limit (50mph) once the new bridge is constructed and in use.

A494 road corridor

1.1.66 There would be improvements to the existing A494 road corridor either side of the replacement bridge to connect to the existing east and westbound carriageways. The existing highway network would be modified at the tie-ins, where the proposed realigned carriageway would re-join the existing carriageway.

1.1.67 A new 'left in, left out' (LILO) access from the westbound carriageway of the A494 to the Riverside Gypsy Travellers' site, commercial properties, and to a new river pumping station. Throughout the construction period, all the existing highway routes would remain open, and access would be maintained to all properties along the route.

Active travel and shared use routes

1.1.68 Up to 3km of new and improved walking and cycling routes are proposed as part of the Scheme. The improvements include a new full traffic free route for cyclists and pedestrians over the River Dee connecting the Wales Coast Path east of the River to Queensferry Interchange and the centre of Queensferry in the west. New and improved links are also proposed to Station Road and Factory Road.

1.1.69 The new routes will provide safer, new connections between communities and places of interest and works, facilitating alternative journey options to using cars for local journeys and for longer distance journeys, with connections to the Wales Coast Path and National Cycle Route 568.

1.1.70 The active travel proposals will create more opportunities for Flintshire County Council (FCC) to increase and expand active travel routes in future years and speed up delivery of active travel facilities in the surrounding areas. A traffic free route over the River Dee will allow people and businesses on both sides of the river to connect to one another more sustainably.

Lighting

1.1.71 The existing bridge lies within the built-up area of Queensferry that is generally well lit with the lighting environment classified as having a medium district brightness ('E3 Suburban'[18]), typical of small town centres or suburban locations. The existing A494 road corridor is also lit either side of the existing bridge, although there is currently no lighting along its length. In contrast, the proposed new bridge would be lit throughout its length in accordance with current highway lighting standards and to make connections with the existing road corridor and footpath network.

1.1.72 The sources of lighting during the operation of the Scheme are:

a) Lighting of the A494 dual carriageway and junction with Riverside Way;
b) Lighting to ensure adequate levels of illumination on suitable sections of proposed shared-use pathways;

[18] Institution of Lighting Professionals, 2021. Guidance Note 1 for the reduction of obtrusive light. [online] Available from: Guidance Note 1 for the reduction of obtrusive light 2021 | Institution of Lighting Professionals

c) Vehicle lighting; and,

d) Operational and maintenance lighting associated with the proposed Queensferry Drain Pumping station.

3.3. Pre-construction activities

Temporary land take

1.1.73 To carry out the construction works, it is essential that land is acquired for the duration of the works for use as site compounds (for offices, stores, accommodation areas, and car parking), construction working areas (including for temporary works and haul routes), topsoil and other construction storage areas (machinery/plant), and utility diversion working areas. Land for the temporary storage of unsuitable (including contaminated) material awaiting removal for recycling or disposal would also be required.

1.1.74 One or more batching plants for the preparation of concrete may be needed to minimise the road haulage of concrete and ensure that concrete is available at work locations precisely when required. These would be located in the site compounds (See Constructability report; Appendix 18A of ES; Doc Ref: 395318-MMD-00-XX-RP-Z-0034).

Site compounds

1.1.75 Two compounds have been identified and included in the Draft Orders for the Scheme. Site Compound Area 1 would accommodate the site offices and provide access to the assembly area for the replacement bridge components. The site is located off Chester Road East, close to the Riverside gypsy and traveller site and the use of this site:

a) allows vehicle access to and from the A494 with minimal additional use of the local road network or from Chester Road East;

b) connects directly to the bridge construction area in the former FCC depot and so avoids the need to use further public roads to distribute plant and materials;

c) avoids taking ‘greenfield’ land or other land that may serve as public amenity space;

d) would be available throughout the construction period, as it is outside the permanent works boundary; and,

e) would allow the cleared and restored site to be returned for new use at the end of the Scheme.

f) Security lighting is often required to deter crime in site compounds where plant and materials are stored overnight. Lighting used for security is assumed to be centred around the compounds and offices. Lighting is likely to be provided from lighting columns and/or building mounted floodlights and will typically be restricted to an 8m mounting height.

1.1.76 Site Compound Area 2 would accommodate plant, materials, and staff for the river bridge works and provide lay-down space as well as access to the works for large cranes and similar equipment. The site is located on the northern bank of the River Dee, on the eastern side of the existing A494 embankment.

1.1.77 The land is currently in agricultural use for arable crops. The access would therefore be kept away from Ferrybank Farm. The cycle and pedestrian route along the base of the A494 embankment would be temporarily diverted to a new route between Foxes Lane and the River Dee Path. The use of this site:

a) allows vehicle access directly off the westbound A494 via a short length of temporary road;

b) gives direct access needed for construction of the replacement bridge;

c) is large enough for the assembly and placing of large bridge components;

d) is not adjacent to residential or other public amenity space, apart from the riverside path (which is unavoidable);

e) would be available throughout the construction period, as it is outside the permanent works boundary; and,

f) would allow the cleared site to be restored and returned to its current use at the end of the Scheme, subject to agreement with landowner.

Diversions to Public Rights of Way (PRoW) and Private Means of Access (PMA)

1.1.78 Existing PRoWs (e.g. footpaths, bridleways) and PMAs that would be affected by the Scheme would be suitably diverted during the works and reinstated upon completion.

3.4. Key construction activities

Replacement bridge construction

1.1.79 The construction of the replacement bridge would be a complex operation, subject to a detailed works execution plan prepared by the contractor. The following sets out the anticipated activities required:

a) The existing Queensferry Drain, River Pumping Station and Outfall will be relocated to a new position to the south, including the construction of new culverts, demolition of existing culverts and maintenance of existing culvert sections.

b) Other services (utilities including sewage, electricity cables, gas supply and telecommunications) within the banks will have been protected or diverted.

c) Excavation to formation level (approximately 2.6m AOD, subject to detailed design of the bridge) which will require the installation of temporary steel sheet piles into the riverbank to maintain flood bank level of integrity.

d) Installation of piles within formation and cropping of the pile heads to receive bridge abutment (a structure to support the lateral pressure at ends of a bridge).

e) Formwork installation followed by casting of abutment concrete and construct bearings.

f) Backfill the abutment ready for placement of bridge beams.

g) Bank survey to check regrading and emoval of the temporary riverbank support piles and regrading of the riverbank (including bank survey to check regrading).

h) Construction of earthwork embankment approaches to new abutments. Note, the earthwork embankments are land-based works and no in-river works are anticipated.

i) Construction of temporary crane support platforms either on or immediately to the rear of the new bridge abutments.

j) Placement of steel side-span bridge beams in pairs spanning from abutments to beyond the piers, using crane(s) positioned on each bank.

k) Lifting of the central span beams by crane from barge or from the banks, using crane(s) positioned on bank and splice to complete each girder.

l) Fixing of the permanent formwork to beams, placement of reinforcement, and pumping concrete to form the new bridge deck incorporating pre-cast edge beams.

m) Waterproofing activities for the new deck using a spray-applied bitumen system, application of bitumen-macadam/asphalt carriageway surfacing and lining and installation of barriers. Installation of services and street lighting columns.

These construction activities are further detailed in the outline CEMP/Constructability Report (Doc Ref: 395318-MMD-00-XX-RP-Z-0034)

Site clearance

1.1.80 The initial activities following site establishment would be fencing site clearance, the installation of pre-earthworks drainage and topsoil strip under archaeological supervision, where identified as required.

Mobilisation

1.1.81 Mobilisation would commence once the contractor has been appointed and the detailed design and necessary approvals are in place to undertake the works, including the approval of any statutory licences, consents and permits. The extent of mobilisation works would be determined by the contractor; however, it is expected to include the following:

a) Possession of the land and demolition of the remaining structures to the south of the A494 between the railway bridge and Queensferry Interchange to provide a material storage area during the next stage;

b) Construction of the revised local highway arrangement to access the traveller site and main compound area, this would include all necessary utility diversions, drainage, kerbing and pavement;

c) Construct the new pumping station and associated outfall for the Queensferry Drain, divert the Queensferry Drain main river through the new infrastructure (this would be phased with the utility diversions);

d) Implement temporary walking and cycling route diversions, it will be necessary to provide temporary routes whilst the permanent routes are implemented from the traveller site to the Queensferry Interchange;

e) Establish main office and stores compound within the existing hard standing area to the west of the traveller site;

f) Install a new temporary access from the A494 to the east of the River Dee to gain access to the satellite stores, office and welfare facility;

g) Commence works on the eastern crane platform and temporary jetty to facilitate mobilisation of the jack-up barge and service the in-river operations;

h) Diversion of rising main sewers, either fully or temporarily at points of conflict with the proposed bridge abutments;

i) Diversion of 33kV overhead electricity cables located to the northeast of the river; and,

j) Environmental mitigation works.

Public Rights of Way (PRoW) improvements

1.1.82 The following PRoW would require modification:

a) Section of the Welsh Coast Path (cycleway/footpath/wheelchair path) (BUDIP7)[19,20] between B5441 Station Road and River Dee, alongside the A494 eastbound carriageway, passing between Territorial and Army Volunteer Reserve Centre and Lindop Toyota, would be improved to cater for all users;

b) Cycleway and footpath (SAN 16)[19,20] on southwestern bank of River Dee beneath existing bridge would be connected to the new path across the River Dee;

c) Cycleway and footpath (SAN 16)[19,20] alongside the westbound carriageway, northeast of the River Dee, would be modified to connect to the new shared use route across the river on the new bridge; and,

d) Two PRoW between Chemistry Lane/Factory Road junction and the River Dee (Footpaths 517 and 2106) would be maintained as part of the proposed new access road.

Highway drainage and works to watercourses

Queensferry Drain

1.1.83 The Queensferry Drain (classified as a 'main river' by Natural Resources Wales (NRW)) currently flows in a culvert below the existing A494 (west of the railway line) and in open channel (east of the North Wales Coast railway line) immediately to the southeast of the A494. Works relating to the Queensferry Drain include:

[19] Flintshire County Council Active Travel Network Interactive Map, 2025. Available from: https://datamap.gov.wales/maps/active-travel-network-maps/view?center=-3.315437400423601,53.20554627458074&zoom=5#/ [Accessed: 13/08/2025]
[20] Flintshire County Council PRoW Interactive Map, 2025. Available from: https://fccmapping.flintshire.gov.uk/connect/analyst/mobile/#/main?mapcfg=publicrightsofway

a) diversion to enable the construction of the replacement bridge and the A494 road corridor;

b) new sections of open channel will be provided either side of the railway with a section of existing culvert beneath the railway line being retained;

c) new drainage outfall to the River Dee will be created to replace the existing as this currently falls within the construction footprint of the Scheme; and,

d) new Queensferry Drain Pumping Station facility would be provided to the southwest of the River Dee at the end of Chester Road East in Riverside.

1.1.84 To the west of the North Wales Coastline railway, existing gullies/outfalls along with run-off from the new active travel route will discharge into a newly created open channel (ditch) that replaces a length of the existing Queensferry drain between Chester Road East and the railway bridge.

1.1.85 At the northern end of the open channel, a new pipe will then connect to the existing culvert that sits within the southern verge of the A494 and passes below the railway bridge. The existing culvert will be extended, and its outfall relocated on the north side of the railway to outfall to a further length of open channel that will replace the existing Queensferry ditch alignment running northwards towards Riverside Way. The ditch will be designed to accommodate the existing and proposed highway drainage, and the existing watercourse flows. The ditch will outfall to a new culvert which would then pass through a new pumping station and outfall at the River Dee. The discharge rate from the pumping station would be agreed with NRW as this will replace their existing pumping station.

Highway drainage

1.1.86 Due to the scale of the changes in the alignment of the carriageway, the existing drainage network along the A494 between the North Wales Coastline railway and the River Dee will be replaced. New surface water carrier drains will be installed east of the railway up to the replacement bridge within the north and south verge of the new carriageway. A new drainage swale (shallow channel designed to manage and direct water flow) is proposed to the north of the new road for attenuation and treatment of surface water drainage.

1.1.87 Surface water runoff from both the proposed new carriageway and existing re-profiled carriageway will be collected and disposed of using a combination of

underground piped drainage systems and open ditches. Surface water collection on the new bridge would be in the form of a bridge deck drainage system which will discharge to the highway drainage system. The surface water collection on the carriageway will be in the form of traditional kerbs and gullies.

1.1.88 An existing swale located to the south of the A494 (north of the River Dee) is to be reprofiled as part of the scheme proposals. Where no carriageway modifications will be undertaken, the existing drainage will be retained and any existing outfalls will be incorporated into the new network.

1.1.89 To protect the Queensferry Drain, River Dee, and Manor Drain in the event of an accident or spillage on the carriageway, penstocks will be fitted to the swales at the point of discharge to the surface watercourses. Spillages and/or contaminated water could then be isolated for controlled removal or treatment. The swales would also provide attenuation and biological treatment of contaminants, as well as settlement/filtration of particulate matter, from the highway before the run-off reaches the watercourses.

Fencing

1.1.90 Fencing would be provided where there is a requirement to discourage pedestrian access and to delineate the Welsh Government land ownership. Further fences would be required to discourage access to hazardous locations such as culverts, the tops of retaining walls and steep slopes.

Lighting

1.1.91 Certain activities during the construction of the Scheme would operate 24 hours a day, therefore lighting would be required during the hours of darkness to fulfil health and safety requirements.

1.1.92 During construction of the Scheme there will likely be temporary lighting required including:

a) Lighting of temporary compounds;
b) Lighting on plant and equipment e.g. cranes;

c) Construction vehicle lighting;

d) Lighting of parking facilities; and,

e) Temporary lighting structures to illuminate working areas.

1.1.93 Lighting details (locations, duration of use, lighting types) will be agreed between the Applicant and their Principal Contractor during the detailed design stage. Where details are not currently fixed owing to the stage of the project reasonable worst-case assumptions have been developed for the Scheme's Environmental Lighting Impact Assessment.

1.1.94 Floodlighting is assumed to be used to provide construction phase task lighting and is assumed to be restricted to a 10m mounting height. This type of lighting is often portable and will range in height depending on the type of tasks being undertaken. The redundant existing lighting columns and cabling will be removed, and temporary lighting towers used where required. Where lighting in the main construction areas is required for health and safety purposes, lighting levels are assumed to be in accordance with BS EN 12464-2:2024[21] and/or BS 5489-1:2020[22] dependant on the tasks being undertaken.

1.1.95 Mitigation measures have been recommended in the Environmental Lighting Impact Assessment (ELIA) for the Scheme (Doc ref: 395318-MMD-00-XX-RP-E-0009) and is part of the Scheme's commitments, such as lighting on the central area of the road (with forward facing integral light shields), rather than on the outer areas of the bridge to reduce light spillage into the River, also lower colour temperatures and rear light shields on the proposed lighting for the active travel routes under the bridge.

1.1.96 Security lighting is often required to deter crime in both site compounds or other areas where plant and materials are stored overnight. Lighting used for security is assumed to be centred around the compounds and offices. Lighting is likely to be provided from lighting columns and/or building mounted floodlights and will typically be restricted to an 8m mounting height.

[21] British Standards Institute (BSI), 2024. BS EN 12464-2:2024 – TC. Light and lighting. Lighting of work places – outdoor work places. [online] Available from: BS EN 12464-2:2024 - TC | 30 Nov 2024 | BSI Knowledge
[22] BSI, 2020. BS 5489-1:2020. Design of road lighting. Part 1: Lighting of roads and public amenity areas – Code of practice. [online] Available from: BS 5489-1:2020

1.1.97 The construction compounds are assumed to be lit in accordance with BS EN 12464-2:2024[21] and/or BS 5489-1:2020[22] dependant on the tasks being undertaken and will typically be restricted to a 10m mounting height.

Signs and communication

1.1.98 The proposed section of road would incorporate signs in relation to junctions and destinations. Subject to further design, provision would be made for the installation of Intelligent Transport Systems[23] on the Scheme.

Utilities

1.1.99 The main utility companies with assets in the area are Dŵr Cymru Welsh Water, Wales and West Utilities, Scottish Power Energy Networks, and BT Openreach. Key utility diversions within this Scheme include:

a) Diversion of existing rising mains currently on the Dee Bridge (to be demolished) and along the A494. These mains would be diverted under the River Dee, to the southeast of the bridge (Dŵr Cymru Welsh Water).
b) Diversion of 33kV cables to the north of Dee bridge, across the A494 (Scottish Power Energy Networks).
c) Diversion of a medium pressure gas main to the south of the Dee bridge, across the A494 (Wales and West Utilities).
d) Diversion of 11kV and low voltage cables across the scheme (Scottish Power Energy Networks).
e) General British Telecom (BT Openreach) diversions across the Scheme.

1.1.100 The diversion works are anticipated to be undertaken directly by the utility companies and include gas mains, water and sewer mains, electricity and communications cables. The Welsh Government and the appointed contractor may carry out additional protection works and other civil engineering works to assist the utility companies.

[23] Intelligent transport systems are an interconnected network of technology to optimise movement, minimise disruption and improve safety. In this context, they may include measures such as variable message displays, or queue detection systems.

Soft estate

1.1.101 Existing areas of soft estate north of the existing A494 that have developed since the road was constructed in the 1960s now contain well established trees and other vegetation. This would be retained and protected. New areas of soft estate would be integrated within the Scheme with earthworks and areas including wildflower verges, swales, native woodland plantations, and amenity grassland.

1.1.102 These areas are limited to the southeastern sides of the Scheme where new embankments are needed to support the new sections of the A494 as they rise on the approaches to the new bridge. The northeastern bank of the River Dee beneath the existing bridge is a concrete revetment devoid of any vegetation. This would be either removed or adapted to encourage a growing medium to form and support natural recolonisation of plants from the adjacent riverbanks. An area of intertidal habitat classified as saltmarsh on the northeastern bank would be overshadowed by the new bridge. Further information on proposed planting plans can be found in the Environmental Masterplans (ES Chapter 2; Vol 2).

Traffic management

1.1.103 Traffic management and restrictions would be needed to provide safe access and working areas for the construction workforce and their vehicles, plant and equipment and to permit safe passage of vehicles and non-motorised users, such as pedestrians and cyclists, through and adjacent to the works. Full overnight closures of the A494 may be required for short periods to allow the lifting of bridge beams and other works directly over or alongside the carriageway. These would be planned and publicised well in advance.

Long-term management

1.1.104 On completion of the construction phase, there would be a five-year aftercare period to ensure the establishment of the landscape and ecological elements of the Scheme which will be set out in an Environmental Monitoring and Management Plan (EMMP) at pre-construction stage.

1.1.105 At completion of the five-year period, responsibility for management of the soft estate and environmental mitigation measures would pass to the North and Mid Wales Trunk Road Agent (NMWTRA).

Demolition of property and existing bridge

Demolition of properties

1.1.106 The following properties would be demolished as a result of the Scheme:

a) Haulage business workshop, building and yard situated immediately southeast of the existing A494 and on the southwest bank of the River Dee;

b) NRW pumping station and Scottish Power sub-station (within the same building) situated to the northeast of the existing Riverside Way road junction;

c) Old Flintshire Depot and storage yard on Chester Road East, adjacent to the railway line; and,

d) Four former residential properties, known as 1 – 4 Bridge Houses, located on Chester Road East, approximately 200m east of Queensferry Interchange. These properties have been vacant since approximately 2006 to 2008 and are substantially vandalised despite being boarded up.

Demolition and removal of existing bridge

1.1.107 Following completion of the replacement bridge and opening to traffic, the existing bridge deck would be removed but the existing river piers would remain *in-situ*. A temporary ‘crash deck’ platform would be installed under the existing bridge, mounted on existing abutments and piers and steel beams, to capture any loose materials during removal of the deck. This would involve breaking out the concrete from the centre of the span towards the abutments, with materials removed for recycling.

1.1.108 The crash deck located beneath the beams would then be dismantled, although sections around the piers and abutments would be retained. Working from a jack-up barge, the existing pier concrete crossheads would be demolished and removed. The existing river piers would remain *in-situ* and may be modified to improve their aesthetic appearance, and minor remedial works may be required, such as concrete repairs.

1.1.109 The existing gantry that spans the A494 road corridor on the east side of the Bridge would also be removed, along with the existing carriageway. The bridge abutments would also be demolished, and the adjacent embankments regraded to tie in with the surrounding landscape.

1.1.110 Demolition works would be undertaken by a specialist demolition contractor, in accordance with method statements approved by the regulator and the local planning authority. Pre-demolition surveys would be undertaken as required. Demolition audits would be undertaken to identify any materials that could be recovered for re-use or recycling. Any structures that are known to support bat roosts would be demolished in accordance with a European Protected Species Licence, and any associated conditions, issued by NRW. A bat roost was identified in 3 Chester Road East and so demolition of this building would be limited to the period April – October and in accordance with a European Protected Species Licence.

3.5. Construction methodology

In-river piers

1.1.111 It is assumed that the works will be undertaken using a 400 tonne (t) jack-up barge equipped with a 160t crawler crane and a 120t piling drill rig. The jack-up barge will be supported by additional marine craft, including flattop vessels for material transport/storage and low-draft multi-cats for vessel manoeuvring. All in-river works will be subject to a Marine Licence application to NRW. The following outlines the anticipated construction methodology for the river-based works, subject to refinement during detailed design and stakeholder consultation.

Stage 1 – Mobilisation and initial setup

1.1.112 Mobilisation of the jack-up barge will be partially completed offsite (e.g., at a dry dock on the River Mersey) due to headroom and tidal depth constraints under the downstream approach bridges. Final assembly, including attachment of jack-up legs, will occur at the project site. Navigation to the site will require careful planning to mitigate risks such as sandbanks, tidal conditions, and bridge clearances. Stakeholder consultation will be required with:

a) NRW;
b) Dee Conservancy Harbour Master;
c) Network Rail (Hawarden Bridge);
d) FCC (B5441 Bascule Bridge); and
e) NMWTRA (A494 River Dee Bridge).

Stage 2 – Crane platform and temporary moorings

1.1.113 A crane pad will be constructed on the eastern riverbank to accommodate a 360t crawler crane for final barge assembly/disassembly and equipment transfer. The works may require diversion of existing utilities, including 33kV power lines, and will need to consider impacts on the River Dee flood bund. A Flood Risk Activity Permit (FRAP) will need to be sought from NRW. Temporary moorings will be installed to secure the jack-up barge during operations.

Stage 3 – Temporary jetty construction

1.1.114 A temporary jetty will be constructed adjacent to the bridge site to facilitate transfer of the 160t crawler crane and piling rig onto the jack-up barge. The jetty will also serve as a working platform during piling operations. Utility diversions and flood bund impacts will be considered, and any support piles projecting into the river channel will require NRW consent.

Stage 4 – Drilling fluid batching and recycling plant construction

1.1.115 A concrete base measuring approximately 15m by 20m with 250mm high containment edges will be constructed on the eastern bank of the river. A drilling fluid batching and recycling plant will be installed on this base.

Stage 5 – Pile installation

1.1.116 The jack-up barge will be positioned and stabilised using its legs. A flattop support barge will deliver materials including steel casings and reinforcement cages. The 160t crane will install steel casings into the riverbed to a depth of up to 15m into glacial till (a type of sediment deposited by glaciers) to a sufficient depth to achieve stability and a seal to minimise water ingress and contain disturbed silts. The steel tubes would be lifted from a floating support barge by crane, and lowered vertically to position, then oscillated or driven in with vibration methods.

1.1.117 Once the casings are in place, the piling rig will drill within them to a depth of approximately 34m using a rotary bore. Excavated spoil will be collected in skips and transferred to land for disposal via the support barge, minimising any loss of material into the river. During drilling, bentonite or an equivalent polymer-based drilling fluid will be pumped from the landside batching plant into the borehole to support the excavation.

1.1.118 Steel reinforcement cages will be spliced and lowered into the drilled hole using the 160t crane. Concrete will be placed via a tremie (watertight) pipe, displacing the drilling fluid, which will be pumped back to the landside batching plant for recycling.

1.1.119 Concrete will be supplied from a mobile pump on the riverbank and conveyed via a pipe system supported by pontoons or with a large mobile pump. An overpour of approximately 1m above the cut-off level is expected to ensure structural integrity. The jack-up barge will then relocate and repeat the process for all 24 piles. It is anticipated that the piles will be installed in groups of four and that the jack up barge will be repositioned for each group to maintain an even spread of load from cranes on the deck of the barge.

Stage 6 – Pile cap installation

1.1.120 Using the jack-up barge as an access platform, temporary formwork or precast caissons (watertight enclosure used in construction, to create a dry work area in a usually wet environment) will be installed around the piles above riverbed level. Piles will be broken down as required and reinforcement will be fixed, and concrete pumped to form continuous pile caps and piers. This process will be repeated for both river piers.

Stage 7 – Demobilisation of all plant and equipment

1.1.121 Demobilisation will follow the reverse sequence of Stages 1 to 3. Temporary platforms will be dismantled, and the site reinstated.

Bridge beam and deck

1.1.122 The bridge beam installation can be carried out several different ways depending on the contractor's preference but typically would be expected to follow a similar sequencing as to the following:

a) Side span beams would be brought to site in small sections and assembled into larger sections adjacent to the crane lifting area. The beams would be installed in pairs spanning from the abutments and oversailing beyond the pier. The beams would be lifted into position from each respective abutment using a large capacity crane.

b) The central span bridge beam sections would be transported to the site and lifted into place from the east abutment using a large capacity crane.

c) Permanent formwork would be placed between the installed bridge beams, followed by reinforcement and concrete deck incorporating precast edge beams. The

materials required to construct the bridge deck would be installed using smaller cranes positioned at the abutments.

d) Waterproofing, surfacing, lighting and barriers would be installed thereafter – substantially completing the new River Dee Bridge.

Earthworks

1.1.123 The Scheme would require new embankments and bridge abutments to be built to achieve the required vertical road alignment, for the approaches to the new bridge. The abutments would be set back from the top of the riverbank to allow for the provision of active travel routes along both banks and for the retention of riverbanks. Other movements of natural earth and made ground would be needed to construct the new drainage system, including ditches and a swale, and for the construction of new structures. There would also be a requirement for earth movement for initial site clearance e.g. stripping and storing topsoil and for final landscaping throughout the works area.

1.1.124 Topsoil would be stripped using tracked excavators and possibly a dozer in the one agricultural field. It is anticipated that dump trucks would transport material to temporary topsoil stockpile locations where it would be stored no greater than 4m high. Bulk earthmoving operations would typically be carried out using large excavators, articulated dump trucks, dozers, and heavy compaction plant.

1.1.125 On completion of the earthworks and landscape fill areas, topsoil would be placed and planting carried out, in accordance with the specified landscape design. Further works of ecological mitigation would be carried out and a period of establishment and aftercare would be implemented. For more information, please refer to the environmental management plans and outline CEMP/constructability report (395318-MMD-00-XX-RP-Z-0034).

Road pavement construction

1.1.126 Road pavement construction requires sizeable items of specialist plant, such as paving machines and heavy rollers, and the delivery to site of significant volumes of construction materials such as asphalt. In addition, it is likely that some pavement

works will need to be completed at night due to traffic management requirements when tying the new road surface into existing highways.

1.1.127 The installation of road restraint systems, road signs and lighting in the highway verges may be carried out during normal daytime working hours, as some of the last activities in each Section. They are unlikely to have any significant impacts on the local environment. Road marking may require some night-time working to tie into the existing road network, but this will be localised, of short duration, and is unlikely to have any significant impact on the local environment.

3.6. Demolition methodology

Superstructure removal sequence

a) Remove/plane off surface and remove all precast concrete kerbs.

b) Install crash deck/access platform to bottom flanges of beams – this will progress at same time as parapet removal. It will not be possible to board out within the central spans due to the presence of the rising mains and limited space.

c) Parapet stringcourse (horizontal moulding projecting from the face of a man-made structure) removal will involve:

   a. Removing vehicular barrier in verge and central reserve, if feasible, plane or break out the mass fill concrete infill to the verge;

   b. Removing steel parapet railings (leaving posts) installing temporary pedestrian guardrail to posts and vehicular stop blocks along kerbline;

   c. Circular sawing using a cantilever perpendicular to the bridge deck, span to spacing that suits, lifting out with a small crane on the deck up to main beam top flange. Core two holes through cantilevers at centre of gravity to allow lifting eyes to be fitted.

   d. Removing the central pre-cast slabs and saw cut the cantilevers in a similar way to the parapet cantilevers, in parallel with the removal of the adjacent stringcourse.

   e. Supporting section on crane and saw cut longitudinally along the outside line of main beam top flange to release unit. Lift out and repeat operation along the bridge. Pedestrian guardrail and stop blocks to be installed to protect edge as works progress.

d) Bridge deck removal - all steelwork bracing is to remain in place. For both options presented, the central span concrete and rising mains will be removed up to the half joints first prior to undertaking the same operation on the side spans.

a. Option 1 – lift-out sections:

    i. Progressively saw cut longitudinally at a 50mm offset to the edge of the top flanges to retain 50mm bearing on the flange for the length of panel to be removed starting at the central span between expansion joints.

    ii. Attach lifting points or core through for attachment of lifting eyes.

    iii. Attach crane and saw cut laterally to remove each deck section and lift out the section. Repeat operation until all sections are removed.

    iv. This will leave the steel beams with a section of slab in place where there are shear studs/plates. If these are not present, then a single longitudinal cut will be needed along the centreline of each beam instead of two

b. Option 2 – break out the deck:

    i. Starting from the centre progressively break out the bridge deck using concrete shears and breakers allowing debris to collect on the crash deck below.

    ii. As works progress clear debris from the crash deck as loading of these will be limited.

e) Remove the bridge steelwork using a crane situated on the eastern bank first to remove the central sections and the eastern side spans. Move the crane to the western side and remove the western steelwork side spans.

f) Break out the abutment ballast walls and cover the existing abutments with fill material and topsoil (assumes that abutment will remain in place).

3.7. Demobilisation

1.1.128 Demobilisation is anticipated to occur for approximately ten days and involve the main compound removal and localised finishing and snagging.

4. Purpose of this report

1.1.129 This report will inform an HRA carried out by the Competent Authority (in this case Welsh Ministers) to establish whether the Scheme has the potential for LSE and if any identified LSE have AEOI on designated sites either alone or in combination with other plans or projects. It consolidates all relevant information for the Competent Authority to undertake an HRA from Stage 1 Screening through to Stage 2 Appropriate Assessment and Stage 3 Derogation, as necessary (Section 5)., as required by Regulation 63(1) of the Conservation of Habitats and Species Regulations 2017 (as amended) (the Habitats Regulations).

1.1.130 The process followed is described in Section 5. This includes outlining information to allow an informed decision to be made by the Competent Authority on the intended Scheme and implementation of any suitable mitigation or enhancements where required.

5. HRA Framework and methodology

5.1. The HRA process

1.1.131 The requirement for HRA arises in the UK under the Conservation of Habitats and Species Regulations 2017 (as amended) (hereafter referred to as 'the Habitats Regulations'). The 2019 amendments to the Habitats Regulations transferred SACs and SPAs previously within the Natura 2000 network into a UK NSN[24] of designated sites. Ramsar sites are not part of the UK NSN, however these sites, as well as possible and candidate SACs (pSAC and cSAC, respectively), and potential SPA (pSPA) sites, and any confirmed HRA compensatory habitat should be included as part of an assessments in line with government advice. For the purpose of this report, NSN sites and Ramar sites are collectively referred to as 'designated sites'.

1.1.132 Nearby non-designated land that is functionally important or linked to a designated feature (e.g., supporting roosting or feeding area outside a designated site), must also be considered as part of the HRA process and is referred to as 'functionally linked land'.

1.1.133 Although the 2017 Regulations have been amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, due to the UK's exit from the EU, the effect of these amendments is largely related to wording, and requirements and processes remain the same, as protection levels remain unchanged. As such, existing EU guidance[25] and preceding case law from the European Court of Justice[26,27,28] remains valid as a source of direction and interpretation of the requirements of the legislation, although it should be noted that much of the case law has now been incorporated into guidance and/ or best practice.

a) SACs are designated in the UK under the Conservation of Habitats and Species Regulations 2017 (as amended) under the Habitats Directive (92/43/EEC) and are

[24] The 2019 (EU Exit) amendments to the Habitats Regulations transferred Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) site previously within the Natura 2000 network into a UK National Network of protected sites (designated sites).
[25] Managing Natura 2000 Sites - The provisions of Article 6 of the 'Habitats' Directive 92/43/CEE (European Communities 2020).
[26] Landelijke Vereniging tot Behoud van de Waddenzee case/ Nederlandse Vereniging tot Bescherming van Vogels, European Court of Justice, Case C-127/02 'Waddenzee 2002'.
[27] Sweetman et al v An Bord Pleanala, European Court of Justice, Case C-258/11 'Sweetman 2011'.
[28] People over Wind/Sweetman v Coiltte Teorante, European Court of Justice Case C-323/17 'People over Wind 2017'.

notified for particular habitats (Annex 1) and/or species (Annex II) identified as being of European importance.

b) SPAs are classified under the Wildlife & Countryside Act 1981 (as amended), the Conservation (Natural Habitats, & c.) Regulations 2010 (as amended) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) (hereafter referred to as 'the Habitats Regulations'). These were designated for the protection of wild birds and their habitats (including particularly rare and vulnerable species listed in Annex 1 of the European Council Directive 'on the conservation of wild birds' (2009/147/EC) (the 'Wild Birds Directive'), and migratory species).

c) Ramsar sites support internationally important wetland habitats and are listed under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention, 1971).

1.1.134 Under Regulation 63 of the Habitats Regulations, where a plan or project is not directly connected with, or necessary to, the management of a designated site which may give rise to significant effects upon the site, a Competent Authority must make an assessment of the potential effects on the designated site and its conservation objectives, prior to consent for the plan or project being granted. Recent national guidance has condensed the HRA process from the four to three stages[29]:

a) Stage 1 Screening;
b) Stage 2 Appropriate Assessment; and,
c) Stage 3 Derogation.

1.1.135 This report will follow updated national guidance and comprise up to three stages as necessary.

Stage 1: Screening

1.1.136 During Stage 1 Screening, the possible effects of the construction or operation are assessed alone and in-combination with other projects to determine if these will have LSE on any of the designated sites, candidate/potential designated sites, functionally linked land or their interest features. At Stage 1, mitigation measures

[29] UK Government, 2021. *Habitat Regulations Assessments, protecting a European Site.* [online] Available from: Habitats regulations assessments: protecting a European site - GOV.UK

are not taken into consideration when assessing LSE, rather, mitigation measures are only taken into consideration at Stage 2. If the assessment identifies that there will be no LSE, Stages 2 to 3 are not required, and the report will conclude at Stage 1.

1.1.137 In undertaking this HRA, several steps were undertaken to identify the relevant information to inform the assessment. Information gathered to inform the screening included the identification of:

a) Any SPA/SAC/pSPA/pSAC/cSAC/Ramsar sites, including any marine or marine elements of these sites within the potential Zones of Influence (ZoI), and any known areas of land outside the Red Line Boundary (RLB) itself, which plays an important role in supporting the site and its qualifying features (functionally linked land);
b) Potential effects resulting from the plan or project;
c) The ZoI of these effects, noting this may extend some distance from the site itself, it is not confined to activities on or adjacent to the site;
d) Any viable pathways for the project (or plan) to the receptor (designated site itself or functionally linked land);
e) The qualifying features of the designated site(s) in question; and,
f) The Conservation Objectives of the designated site, including any site sensitivities given within any supplementary advice, site improvement plan, or equivalent document published by the relevant Statutory Nature Conservation Body (SNCB).

1.1.138 For most HRA assessments, the screening process will also use Sites of Specific Scientific Interest (SSSI) Impact Risk Zones (IRZ) to determine potential risks from a project on a SSSI or ‘Compensation sites’ which underpin the interest features of a designated site. However, this method does not currently cover the potential risks from coastal or harbour projects with guidance recommending that NRW be consulted in these circumstances. As the proposed works are impacting marine designations, SSSI IRZs have not been used to inform this HRA[30].

1.1.139 The above information was reviewed in respect of each feature of interest and potential development effect/impact pathway to inform an assessment of any LSE. Key aspects and terms used in this assessment are defined below:

a) **Likelihood:** Where an effect was considered to be potentially significant, then the assessment of its of occurrence was based on the likelihood of it occurring and not

[30] Natural England, 2024. Natural England’s Impact Risk Zones for Sites of Special Scientific Interest v5.3, issue date 21 May 2024. [online] Available from: sssi irz user guidance magic.pdf

certain that it would occur. Effects are scoped in unless there was evidence to the contrary, demonstrating that they would not occur, for example, there being no valid pathway or the absence of the species in that area, at that time.

b) **Significance:** The significance of any effect is considered objectively, against the scale and nature of the impact in relation to those of that particular feature or condition, and in relation to the extent of that feature or condition over the entire designated site. A significant effect within this assessment is one which, if it occurred, would lead to a decline in the quality or status of the habitats or distribution, abundance, etc. of qualifying feature(s).

c) **In-combination:** The assessment of in-combination effects considers projects or plans which:

    i. are currently in operation

    ii. those which are actually proposed – defined by being a valid live planning application, or any referenced with a local plan where there is a strong likelihood of them being undertaken within a reasonable time period, specified within that plan.

1.1.140 In line with People Over Wind ruling[31], this assessment is undertaken in the absence of mitigation (including measures embedded into the Scheme where these are intended for the avoidance of effects). Mitigation will only be considered as part of the Stage 2 Appropriate Assessment; however, as per the 2023 ruling, Eco Advocacy CLG v An Bord Pleanála (Planning Board, Ireland)[32], any elements that are incorporated into the design of a project that are standard conditions required for all projects of a similar type and not specifically aimed at reducing impacts on a European site do not need to be ignored when determining any LSE.

1.1.141 Where LSE are identified, the assessment will need to take these effects through to Stage 2 Appropriate Assessment.

Stage 2: Appropriate Assessment

1.1.142 If LSE are identified at Stage 1, a Stage 2 Appropriate Assessment will be undertaken to assess the LSE on the integrity of the designated site's Conservation Objectives. The information given must be extensive enough to allow the Competent Authority to undertake an Appropriate Assessment. Conservation Objectives for the designated site, the conservation status of qualifying features, and the potential effects

[31] See paragraph 009 Reference ID: 65-009-20190722 [online] available from Appropriate assessment - GOV.UK (www.gov.uk) and see original European Union's Court of Justice judgement [online] available from: CURIA - Documents (europa.eu).
[32] Eco Advocacy CLG v An Bord Pleanála, 2023, Case C 721/21 [online] available from: CURIA - Documents

of the project on the designated site must be included. Stage 2 Appropriate Assessment also includes measures to avoid/mitigate impacts and outlines any residual effects if AEOI are considered likely.

Test the integrity of the site

1.1.143 Stage 2 Appropriate Assessment demonstrates whether AEOI can be ruled out. Integrity can be adversely affected if the proposed works could, for example:

a) destroy, damage, or significantly change all or part of a designated Annex I habitat;
b) significantly disturb the population of a designated Annex II species, for example, breeding birds or hibernating bats;
c) harm the site's ecological connectivity with the wider landscape, for example, harm a woodland that helps to support the designated species from a nearby designated site;
d) harm the site's ecological function, or its ability to survive damage, and reduce its ability to support a designated species;
e) change the site's physical environment, for example, by changing the chemical makeup of its soil, increasing the risk of pollution, or changing the site's hydrology;
f) restrict access to resources outside the site that are important to a designated species, for example, food sources or breeding grounds; and,
g) prevent or disrupt restoration work, or the potential for future restoration, if it undermines the site's Conservation Objectives.

1.1.144 The Stage 2 Appropriate Assessment must rule out all reasonable scientific doubt that the proposed works would not have an adverse effect on the integrity (AEOI) of the site before they can go ahead.

How to assess effects on site integrity

1.1.145 To assess effects on site integrity, the following will be considered:

a) the ecological requirements, conservation objectives, and the current conservation status (if known) of the site's designated features that might be affected by the proposal;
b) each potential effect on the designated site, including the risk of combined effects with other proposals, and how they might impact on the site's conservation objectives;
c) the scale, extent, timing, duration, reversibility and likelihood of the potential effects;
d) the certainty of the effects occurring;

e) mitigation measures that have been proposed or conditions attached to avoid or limit the effects; and,

f) the confidence that mitigation measures will be effective over the whole lifetime of the proposal, for example, the effects of construction, operation, and decommission[33].

1.1.146 The relevant SNCB should be consulted, and the advice received considered. If the proposed works fail the integrity test because AEoI cannot be ruled out, permission cannot be granted. The work cannot go ahead or the plan cannot be adopted unless it can pass three legal tests and be granted an exception, known as a 'derogation'.

Stage 3: Derogations

1.1.147 In certain circumstances, a proposal that fails the integrity test to go ahead, is known as derogation. If the Stage 2 avoidance or mitigation measures identified are insufficient, then the three following legal tests **must** apply to assess is the proposal qualifies for derogation to be granted:

a) There are no feasible alternative solutions that would be less damaging or avoid damage to the site.

b) The proposal needs to be carried out for Imperative Reasons of Overriding Public Interest (IROPI).

c) The necessary compensatory measures can be secured.

1.1.148 All findings must be recorded including any failed tests.

Test 1: Consider alternative solutions

1.1.149 Firstly, it must be decided that there is no alternative solution. Alternative solutions might include the consideration of:

a) Whether the works could happen at a different location;

b) Using different routes across the site;

c) Changing the scale, size, design, method or timing; and,

[33] The design life of the Bridge is 120 years and when it comes to the end of its design life, it will need to be replaced. No other decommissioning commitments have been agreed.

d) Alternatives need to meet the original objectives of the proposal. An alternative solution is acceptable if it:

   i. achieves the same overall objective as the original proposal;
   ii. is financially, legally and technically feasible; and
   iii. is less damaging to the designated site and does not have an adverse effect on the "integrity" of this or any other designated site.

1.1.150 The Office of the Deputy Prime Minister[34] inferred "integrity" to mean "the coherence of the site's ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified".

1.1.151 If there are, or appear to be, one or more alternative solutions, the original proposed works cannot be granted a derogation and must be rejected. If there are no alternative solutions, the proposal passes test 1 and can progress to test 2.

Test 2: Consider Imperative Reasons of Overriding Public Interest (IROPI)

1.1.152 If there are no feasible alternative solutions, imperative reasons of overriding public interest (IROPI) must be shown. These must justify the proposal, despite the damage it will or could cause to the designated site.

1.1.153 The proposed work must be assessed to determine if it is:

a) imperative - it's essential that it proceeds for public interest reasons;
b) in the public interest - it has benefits for the public, not just benefits for private interests; and,
c) overriding - the public interest outweighs the harm, or risk of harm, to the integrity of the designated site that has been determined by the Appropriate Assessment

1.1.154 National strategic plans, policy statements and major projects are more likely to have a high level of public interest and be able to show they are imperative and overriding. Plans or projects that only provide short-term or very localised benefits are less likely to be able to show IROPI.

[34] Office of the Deputy Prime Minister, 2005. Government Circular: Biodiversity and Geological Conservation-Statutory Obligations and Their Impact Within the Planning System 1 Office of the Deputy Prime Minister. Available from: odpm-circ-0605.qxd

1.1.155 As part of this stage, SACs with priority habitats or species must be assessed. If the Appropriate Assessment has shown that the proposal has failed the integrity test on a SAC and a priority habitat or species would be affected, only consider the following reasons of public interest:

a) human health;
b) public safety; and,
c) important environmental benefits.

1.1.156 If considering other reasons of overriding public interest such as economic or social benefits, then an opinion from the Department for Environment, Food and Rural Affairs (Defra) if in England and the Biodiversity Policy Team if in Wales[35] must be sought by the Competent Authority. If the proposal has IROPI, it passes Test 2 and can be progressed to Test 3. If the proposal does not have IROPI, derogation cannot be granted, and the proposed work must be refused.

Test 3: Secure compensatory measures

1.1.157 If there are no feasible alternative solutions and there are IROPI, then compensatory measures will need to be provided. These measures must fully offset the damage which will or could be caused to the designated site.

1.1.158 To identify, design and secure suitable conservation measures, conversations with the relevant SNCB should be carried out and any compensatory measures paid for by the proposers. The compensatory measures themselves must not have a negative effect on the UK NSN, despite the negative effects of the proposal on an individual designated site.

1.1.159 Compensatory measures can include creating or restoring the same or very similar habitat on areas of little or no conservation value:

a) within the same site, if it exists; or,
b) at a suitable location outside the site.

[35] Competent authorities in Wales should contact the Welsh government by emailing bio.diversity@gov.wales and add 'FAO Welsh Ministers: IROPI opinion request' to the subject field of the email.

1.1.160 If the area providing compensatory measures is not within the designated site, it should become designated as part of the designated site. Until that happens, it's protected by government National Planning Policy Framework[36]. All compensatory measures will go ahead as agreed and will remain in place for the duration that they are required, which in most cases will be indefinitely. These measures should be included in the conditions attached to the permission. All the necessary legal, technical, financial, and monitoring arrangements should be in place. Compensatory measures should usually be in place and effective before the negative effect on a designated site is allowed to occur.

Give permission under derogation

1.1.161 If the proposed work passes all three tests, it can go ahead under an HRA derogation. Before giving permission for a project, carry out a project or adopt a plan, the Secretary of State (SoS) for the relevant UK government department or Welsh Government must be notified. They should be sent:

a) a summary of the proposal;
b) details about the designated sites affected;
c) how the decision has been reached that the proposed work will or could have an AEoI of the designated sites;
d) evidence to show that there are no alternative solutions;
e) evidence to show that there are IROPI for the proposal to go ahead;
f) details of the compensatory measures and evidence to show that they will work; and,
g) advice received from the SNCB and other stakeholders, and how it has been considered.

1.1.162 This should be submitted using the HRA derogation notice form[37].

5.2. Method

1.1.163 All available information about the proposed Scheme is outlined in Section 1. This information has been reviewed to assess whether it is considered that LSE will

[36] Ministry of Housing, Communities and Local Government, 2012. National Planning Policy Framework. Paragraphs 187 to 201. Available from: National Planning Policy Framework - 15. Conserving and enhancing the natural environment - Guidance - GOV.UK
[37] Defra, NE, Welsh Government, NRW, 2021. Habitats Regulations Assessment: Derogation Notice form. Available from: Habitats regulations assessment: derogation notice - GOV.UK

arise on any designated sites, or their associated features which could potentially lead to an AEoI of that site. This assessment has been undertaken in an iterative and objective manner following the above stages, with reference to best practice guidance and relevant case law[26,27,28] to inform the interpretation and therefore correct application of the terms 'likelihood, 'significance' and 'in combination'.

Assessing potential impacts

1.1.164 The aim of the HRA Screening process is to determine whether the proposed works could result in LSE on any features of a designated site and, therefore, if a Stage 2 Appropriate Assessment is required. Its interpretation is well established in law and guidance and embraces the precautionary principle. Whether the proposed works have the potential to have a significant effect on a designated site depends on the occurrence of:

a) Any potential impact pathways[38];
b) Land take and habitat removal for the works;
c) A risk of altering the hydrodynamic regime;
d) A risk of an increase in air, noise, and light pollution;
e) A risk of a reduction in water quality; and,
f) Physical disturbance to international designated sites and/or their designated qualifying features.

1.1.165 This information was then reviewed in respect of each qualifying feature and potential development effect/impact pathway to inform an assessment of any LSE.

1.1.166 Determination of whether there will be an impact from the proposed works on a designated site will be determined using professional judgement using the best readily available information. This information can include evidence from previous similar projects that have impacted designated sites and any gathered ecological survey data.

[38] Defined here as 'the sequence that links the client's actions and their effects on the natural environment'. Can be direct, indirect or cumulative, and be positive or negative. Impact Management Platform. Impact and the impact pathway. [online]. Available from: Impact and the impact pathway — Impact Management Platform

Identification of designated sites to be included

1.1.167 The proposed works have the potential to impact on ecological features, such as habitats and/or species beyond the confines of the working area itself. A Zone of Influence (ZoI) has been used to define the study area for this screening assessment and the potential impacts on designated sites are defined as:

a) Areas where there is physical disturbance to designated sites and/or their designated qualifying features;
b) Areas where there will be land take and habitat removal for the works;
c) Areas where there is a risk of altering the hydrodynamic regime;
d) Areas where there is a risk of an increase in air, noise, and light pollution; and,
e) Areas where there is a risk of a reduction in water quality.

1.1.168 ZoIs have been defined for the red line boundary of the Scheme. These have been defined using guidance provided by the Chartered Institute of Ecology and Environmental Management (CIEEM)[39] and have been informed using professional judgement.

1.1.169 A precautionary distance of 2km is considered for all identified designated sites for the effects of visual disturbance and increases in noise. This 2km buffer was chosen based on knowledge of the site and anticipated effects from the proposed construction methodology. However, sites hydrologically connected to the proposed works could be affected by changes to water quality in the absence of appropriate mitigation measures (e.g., the waterbody itself could act as an impact pathway). The Screening exercise therefore took account of relevant hydrologically connected designated sites within a 12km radius, the extent of which was based on twice the length of closest tidal excursion[42,40] (6km).

1.1.170 Additionally, sites designated for mobile species such as bats, birds, and marine mammals could be affected by the Scheme if those species for which the sites are designated rely on functionally linked land beyond the boundaries of the site and the ZoI.

[39] CIEEM, 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland (Terrestrial, Freshwater, Coastal and Marine) [online] Available at: https://cieem.net/wp-content/uploads/2019/02/Combined-EclA-guidelines-2018-compressed.pdf
[40] A single tidal excursion only accounts for a single direction of tidal movement, and so doubling the tidal excursion accounts for movement in the reverse direction and so accounts for the full range of influence, as well as incorporating other factors such as wind forcing, adiabatic flow and basin shape. Further, doubling the excursion ensures that indirect or cumulative effects are not underestimated, and supports the precautionary principle about the extent of the potential impact.

A further search for designated sites where bats are a primary qualifying feature within 30km of the Site, and where marine mammals are a qualifying feature within 10km was therefore undertaken in line with CIEEM and DMRB guidance. The ZoIs have been provided in Table 2 and visually displayed in Figure 2.

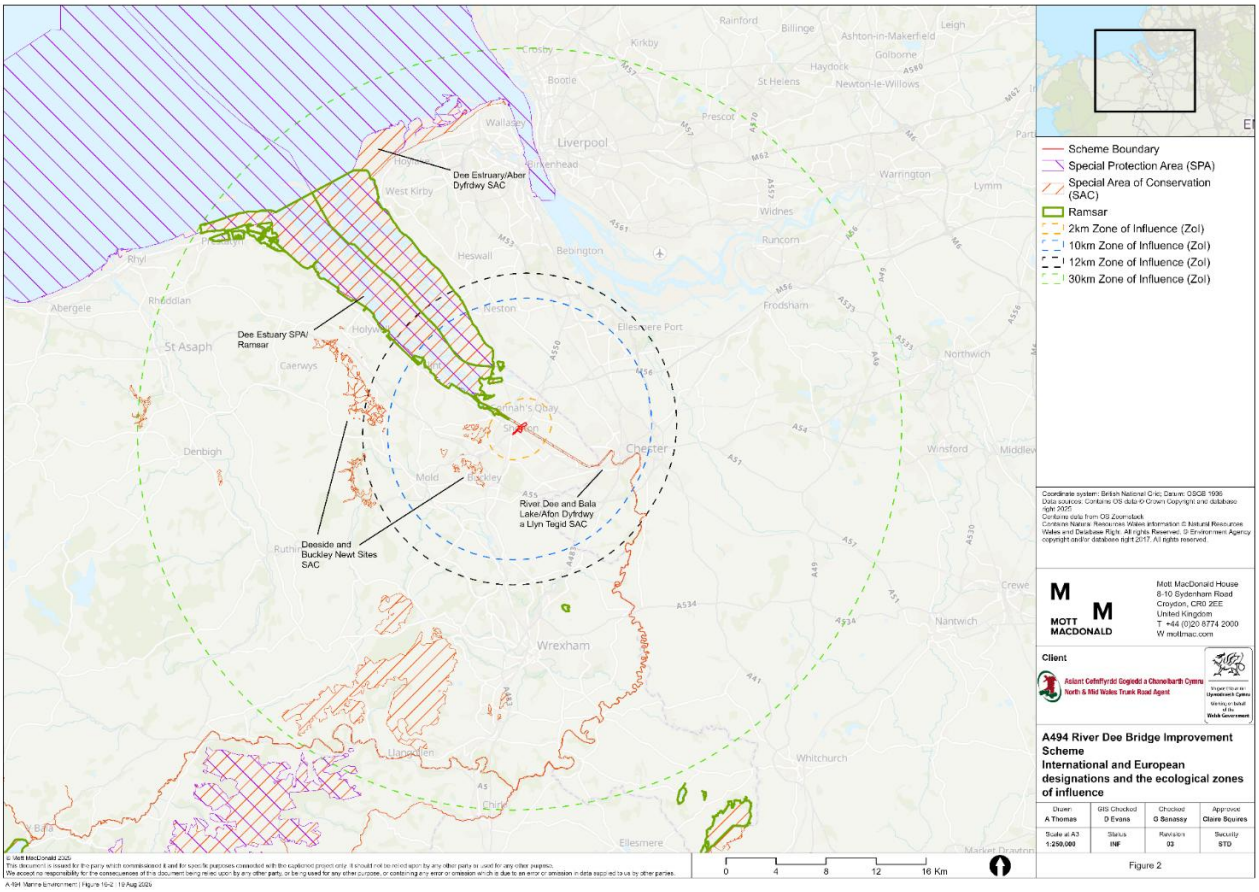


Figure 2 Designated sites and zones of influence around the proposed Scheme.

Table 2 Zones of Influence.

ZoI	Type of site	Justification
2km	All designated sites	Based upon the methodology of the intended works it is felt that this reflects a precautious distance within which designated features may be affected. This is in line with requirements for assessment of impacts against the Water Framework Directive[41].

[41] Environment Agency, 2017. Water Framework Directive assessment: estuarine and coastal waters. [online] Available at: www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters

10km	Sites designated for marine mammals.	This distance is anticipated as the point at which designated marine mammals would frequently transit into range of the works and could be affected by them.
12km	Hydrologically connected statutory designated sites (marine)	Were any deleterious substances to enter the water, it is felt that this distance covers the potential maximum dispersion. This is based on twice the length of the closest tidal excursion[42].
30km	Designated sites where bats are a primary qualifying feature	This distance is anticipated as the point at which designated bats would frequently transit into range of the works and could be affected by them.

Information gathering on designated sites

1.1.171 Information on each designation, including the qualifying features, the designated site citation, conservation objectives and Site Improvement Plans were obtained from the Natura 2000 Standard Data Forms, Joint Nature Conservation Committee (JNCC) and Ramsar Information Sheets. Protected Site Strategies were reviewed as appropriate[43].

In-combination assessment methodology

1.1.172 In-combination effects have been determined following a review of likely impacts resulting from incremental changes caused by other present or foreseeable plans or projects together with the proposed works. This includes projects which have the potential to impact on the same designated sites as the Scheme.

5.3. Limitations and assumptions

1.1.173 The report to inform the HRA has been undertaken using project-specific baseline reports, construction information, and all publicly available data sources, where they exist, to make evidence-based judgements. Information provided by third-parties, including publicly available information and databases, is correct at the time of

[42] ABPmer. UK Renewables Atlas. Tidal ellipses layer. [online] Available from: Explore the ABPmer UK Renewables Atlas
[43] Environment Act, 2021. Section 110(10) "A person must have regard to a protected site strategy so far as relevant to any duty which the person has any the Conservation of Habitats and Species Regulations 2017". Available from: Environment Act 2021

publication. The conclusions drawn from this are necessarily limited by the age, type, coverage and availability of data. Any uncertainties and the limitations of the assessment process are acknowledged and highlighted with a precautionary[44], worst case approach applied to account for uncertainties. Due to the dynamic nature of the environment, conditions may change in the period between the preparation of this report, and when the proposed works have been completed.

1.1.174 It should be noted that this report to inform the HRA has been produced based on proposed works information available at the time of writing (21 August 2025). The construction methodology described in Section 3.5 is indicative and not prescriptive; the final methodology will be determined by the appointed contractor at pre-construction stage. Therefore, should any aspects of the proposed works change (including construction methodology and programme), this HRA report must be revisited to re-assess any potential effects.

Limitations

a) No site-specific surveys were undertaken for migratory fish and therefore the baseline is informed by desk study only. In addition, the results of fish catches at Chester Weir for sea and river lamprey (*Petromyzon marinus* and *Lampetra fluviatilis*, respectively), and monthly run estimates for adult Atlantic salmon (*Salmo salar*) and brown/sea trout (*Salmo trutta*), were provided by NRW.

b) The distance at which underwater and airborne noise and vibration may propagate is unknown, as well as the frequency (Hertz) or volume (decibels) of the noise at source. The impact of underwater noise produced during pile driving operations has not been modelled, and therefore the assessment of effects on migratory fish species is based on existing literature and professional judgement, which is an established and effective means of assessing impacts which will not limit the assessment.

c) The distance or area of suspended sediments caused by in-river construction activity and the level and duration of the turbidity changes caused is unknown. Furthermore,

[44] The precautionary principle shall be applied in reporting through all HRA stages. Recourse to the precautionary principle may be relevant when there are potentially negative effects or insufficient data. Site Conservation Objectives prevail where there is uncertainty. Adverse effects are reported in the absence of evidence to the contrary.

the distance or area of resuspended contaminated sediments from in-river construction activity is also unknown, as well as the concentration levels of contaminants or duration of persistence. In the absence of detailed information to inform the assessment of significant effects, a precautionary approach assumes a worst-case scenario. Specifically, effects from underwater and airborne noise, suspended sediments and resuspension of contaminated sediments could be both likely and significant.

Assumptions

a) It is anticipated that, following the demolition of the existing bridge deck, remedial and aesthetic work will need to be undertaken to the piers and pilings that will be remaining *in-situ*. Ongoing studies are evaluating the need for any remedial works and exploring opportunities to improve the visual integration of these structures, as well as their potential to support ecological enhancements.

b) The current programme for the Scheme includes 30 days of in-river works for remedial/aesthetic works of the existing piers, which are assumed to include concrete repair works. For the purposes of this HRA report, and as a precautionary worst-case scenario, it is assumed that in-river working to facilitate remedial/aesthetic works will involve the same vessels/temporary in-river structures as the construction of the new bridge pilings and piers. It is assumed to be unlikely that remedial/aesthetic works will involve activities that result in greater impacts than those incurred from the given in-river pier construction methodology, therefore ensuring that any impacts from undefined remedial/aesthetic works will be adequately addressed within this HRA report.

Scheme information

1.1.175 The following Scheme documents and correspondence have been used to inform this HRA:

- Email from Sion Williams, NRW, to Jon Stoddard, Richards, Moorehead and Laing Ltd., on 8 April 2025. Subject: '*RE: Scoping - A494 River Dee Bridge Replacement Scheme (Scoping) - NRW Response NRW:01115243 – Fisheries'*. The email provides mitigation advice.
- Mott MacDonald. A494 River Dee Bridge Replacement Key Stage 3-4; Construction, Buildability and Phasing Report. 24 January 2025. Revision E, 16 May 2025. Document reference: B

- Mott MacDonald. Environmental Statement. Volume 1: Technical Assessment Report. Chapter 11: Air Quality. July 2025. Revision P02. Document reference: 395318 | MMD-00-XX-RP-Z-0000 | Rev P02
- Mott MacDonald. A494 River Dee Bridge Replacement; River Dee Surface Water Quality Baseline Report. July 2025. Revision R01. Document reference: 395318 | MMD-00-XX-RP-Z-0000 | Rev
- Mott MacDonald. A494 River Dee Bridge Replacement; Environmental Statement. Volume 1: Technical Assessment Report. Chapter X: Hydrodynamic and sediment transport modelling. February 2025. Revision D. Document reference: 395318 | MMD-00-XX-RP-Z-0000 | Rev
- Mott MacDonald. A494 River Dee Bridge Replacement; Environmental Statement. Volume 1: Technical Assessment Report. Chapter 8: Terrestrial Biodiversity. July 2025. Revision P01. Document reference: 395318 | MMD-00-XX-RP-Z-0801 | Rev A
- Mott MacDonald. A494 River Dee Bridge Replacement; Environmental Statement. Volume 1: Technical Assessment Report. Chapter 16: Marine Environment. July 2025. Revision P01. Document reference: 395318 | MMD-00-XX-RP-Z-0000
- Mott MacDonald. A494 River Dee Bridge Improvement Scheme; Breeding Bird Technical Report. January 2024. Revision 1.0. Document reference: 395318-0175
- Mott MacDonald. A494 River Dee Bridge NRW Tracker 2025.
- Mott MacDonald. A494 River Dee Bridge Replacement; Environmental Statement. Volume 1: Technical Assessment Report. Chapter 12: Noise and Vibration. May 2025. Revision P01. Document reference: 395318 | MMD-00-XX-RP-Z-0000 | Rev
- Mott MacDonald. A494 River Dee Bridge Replacement; Environmental Statement. Volume 1: Technical Assessment Report. Chapter 7: Road Drainage and Water Environment. Document reference: 395318 | MMD-00-XX-RP-Z-0000
- Mott MacDonald. A494 River Dee Bridge Replacement; Environmental Statement. Volume 1: Technical Assessment Report. Appendix 18A: Outline Construction Environmental Management Plan. Document reference: 395318 | MMD-00-XX-RP-Z-0000 | Rev
- Mott MacDonald. A494 River Dee Bridge Replacement; Environmental Statement. Volume 1: Technical Assessment Report. Chapter 17: Cumulative Effects. January 2025. Document reference: 395318 | MMD-00-XX-RP-Z-0000 | Rev
- Mott MacDonald. A494 River Dee Bridge Replacement Scheme. Construction, Buildability and Phasing Report. 12 August 2025. Revision P01. Document reference: 100395318 | 395318-MMD-00-XX-RP-Z-0034
- Mott MacDonald. A494 River Dee Bridge Replacement Scheme. Non-Breeding Bird Survey Report. 20 July 2025. Revision P01. Document Reference: 395318-RML-00-XX-RP-L-0011
- Mott MacDonald. A494 River Dee Bridge Replacement Scheme. Breeding Bird Survey Report. 20 August 2025. Revision P01. Document Reference: 395318-RML-00-XX-RP-L-0010
- Mott MacDonald. A494 River Dee Bridge Replacement Scheme. Environmental Lighting Impact Assessment (ELIA). August 2025. Revision P01. Document Reference: 395318-MMD-00-XX-RP-E-0009
- Red7Marine. A494 River Dee ECI A494 Bridge Pier Installation Method Statement. 01 May 2025. Document reference: R7M-522027-MST-004.
- Red7Marine. A494 River Dee ECI Outline Mobilisation Method Statement. 15 April 2025. Document reference: R7M-522027-MST-005.
- Red7Marine. A494 River Dee Spud Cans Installation Sketches. 21 April 2025. Document reference: R7M-522027-SKH-015

6. Stage 1 – Screening

1.1.176 The purpose of Screening is to identify any LSE that arise from the interaction between the Scheme and designated sites and their associated qualifying features, defined as ‘impact pathways’.

6.1. Identification of sites

1.1.177 The designated sites and qualifying features identified as being within 2km of the Scheme include the following and are outlined in Table 3.

a) River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC;
b) Dee Estuary Ramsar site;
c) Dee Estuary SPA;
d) Dee Estuary/Aber Dyfrdwy SAC; and
e) Deeside and Buckley Newt Sites SAC.

1.1.178 No additional marine sites were designated within 10km or 12km of the Scheme and no sites designated for bats were found within 30km of the Scheme. These designated sites are also visually displayed in Figure 3.

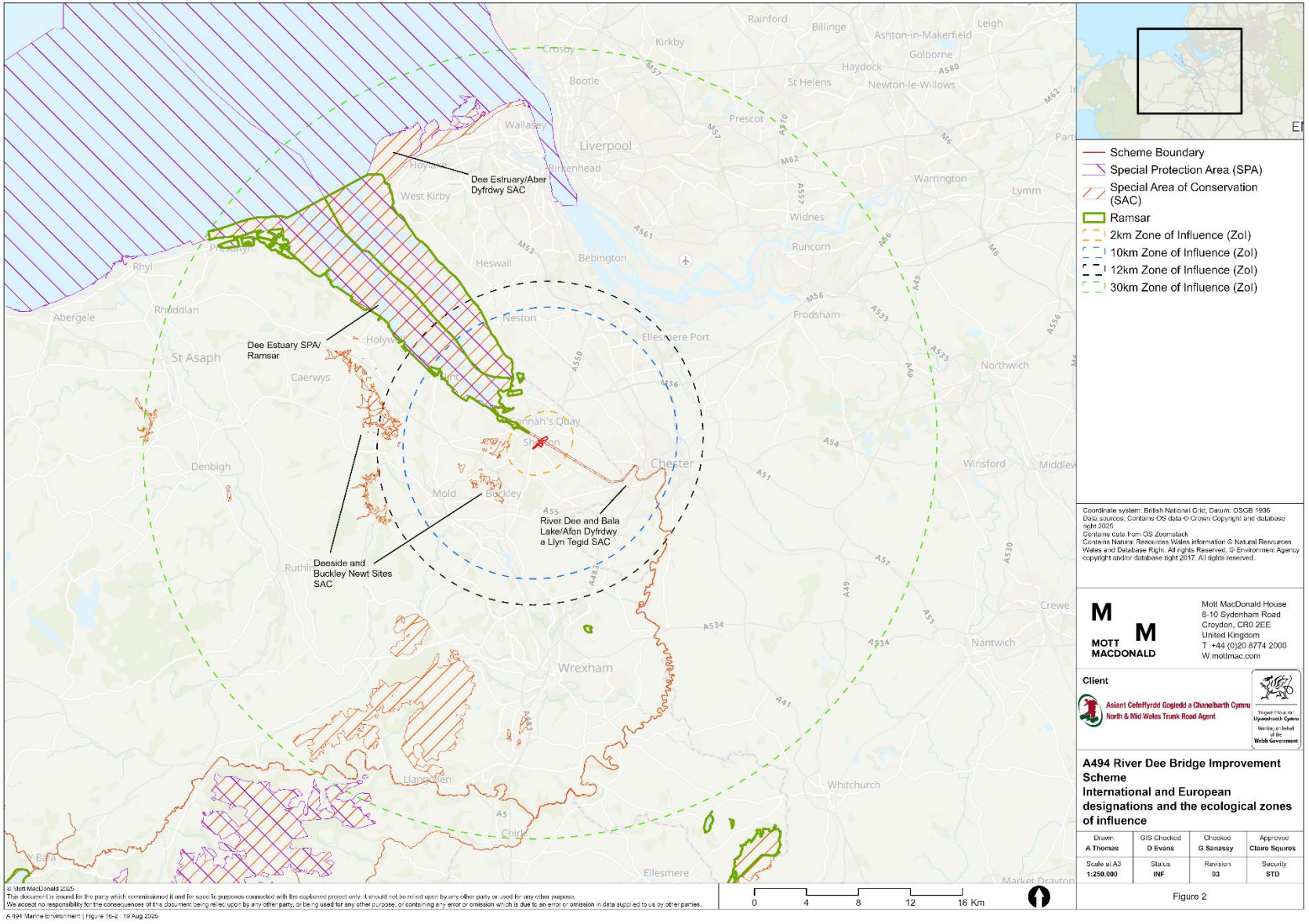


Figure 3 Designated sites and the Zones of Influence (ZoI) for qualifying features.

Table 3 Designated sites and qualifying features within the ZoI for the Scheme.

Designated site details	Qualifying features and description (adapted from citations)
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (UK0030252)[45] *Designated in 2003 and updated in 2015* Area: 1,271.32ha Marine area: 0% Scheme is within the SAC	Annex I habitats that are a primary reason for selection of this site: • 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation. Annex II species that are a primary reason for selection of this site: • 1106 Atlantic salmon (*Salmo salar*) • 1831 Floating water-plantain (*Luronium natans*) Annex II species present as a qualifying feature, but not a primary reason for site selection • 1095 Sea lamprey (*Petromyzon marinus*) • 1096 Brook lamprey (*Lampetra planeri*) • 1099 River lamprey (*Lampetra fluviatilis*) • 1163 Bullhead (*Cottus gobio*) • 1355 Otter (*Lutra lutra*)
Dee Estuary Ramsar site[46] *Designated in 1985 and updated in 2009* Area: 14,302ha 0.9km northwest (downriver) of the Scheme	**Criterion 1:** It contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographical region. The following Annex I features are also supported: • H1130 Estuaries • H1140 Mudflats and sandflats not covered by seawater at low tide • H1210 Annual vegetation of drift lines • H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts • H1310 Salicornia and other annuals colonising mud and sand • H1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • H2110 Embryonic shifting dunes

[45] JNCC, 2025. River Dee And Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC. [online] Available from: UK0030252.pdf
[46] JNCC, 2025. Information Sheet on Ramsar Wetlands – Dee Estuary/ [online] Available from: Information Sheet on Ramsar Wetlands (RIS)

Designated site details	Qualifying features and description (adapted from citations)
	• H2120 Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") • H2130 Fixed dunes with herbaceous vegetation ("grey dunes") • H2190 Humid dune slacks. **Criterion 2**: Breeding colonies of the natterjack toad (*Epidalea calamita)*. **Criterion 5:** Internationally important wetland for waterbirds (>20,0000 individuals) **Criterion 6:** Contains >1% of the regions waterfowl Sub features include: rocky shores, shingle banks, saltmarsh, Intertidal mudflats and sandflats and estuary channels.
Dee Estuary SPA (UK9013011)[47] *Designated in 1985, updated in 2009.* Area: 14,291.56ha 0.9km northwest (downriver) of the Scheme	This site qualifies as an SPA under Article 4.1 of the Directive for the Conservation of Wild Birds (79/409/EEC: a/b) by supporting populations of European importance of the following species listed on Annex I of the Directive: • Common tern (*Sterna hirundo*) - breeding, 277 pairs • Little tern (*Sterna albifrons*) - breeding, 56 pairs • Sandwich tern (*Sterna sandvicensis*) - passage migrant, 818 individuals • Bar-tailed godwit (*Limosa lapponica*) - wintering 1,013 individuals This site also qualifies under Article 4.2 of the Directive for the Conservation of Wild Birds by supporting populations of European importance of the following migratory species: • Redshank (*Tringa tetanus*) - passage migrant, 8,451 individuals; wintering, 5,293 individuals • Black-tailed godwit - wintering, 1,739 individuals • Curlew (*Numenius arquata*) - wintering, 4,028 individuals • Dunlin (*Calidris alpina*) - wintering, 22,479 individuals • Grey plover (*Pluvialis squatarola*) - wintering, 2,193 individuals • Knot (*Calidris canutus islandica*) - wintering, 21,553 individuals • Oystercatcher (*Haematopus ostralegus*) - wintering, 28,434 individuals • Pintail (*Anas acuta*) - wintering, 6,498 individuals

47 Natural England, 2014. European Site Conservation Objectives for Dee Estuary SPA (UK9013011). Available from: European Site Conservation Objectives for Dee Estuary SPA - UK9013011

Designated site details	Qualifying features and description (adapted from citations)
	• Shelduck (*Tadorna tadorna*) - wintering, 6,827 individuals • Teal (*Anas crecca*) - wintering, 5,918 individuals The area qualifies under Article 4.2 of the Directive for the Conservation of Wild Birds (79/409/EEC: a/b) by regularly supporting at least 20,000 waterfowl.
Dee Estuary/Aber Dyfrdwy SAC (UK0030131)[48] *Designated in 2007 and updated in 2015* Area: 15,805.27ha Marine area: 97.7% 0.9km northwest (downriver) of the Scheme	The site is designated under article 4(4) of the Directive (92/43/EEC). Annex I habitats that are a primary reason for selection of this site: • 1140 Mudflats and sandflats not covered by seawater at low tide • 1310 Salicornia and other annuals colonising mud and sand • 1330 Atlantic salt meadows (including saltmarsh) Annex I habitats that are present as a qualifying feature, but not a primary reason: • 1210 Annual vegetation of drift lines • 2110 Embryonic shifting dunes • 1130 Estuaries • 2190 Humid dune slacks • 2130 Fixed dunes with herbaceous vegetation (“grey dunes”) *Priority feature • 2120 Shifting dunes along the shoreline with *A. arenaria* (“white dunes”) • 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts Annex II present as a qualifying feature, but not a primary reason for site selection: • 1395 Petalwort (*Petalophyllum ralfsii*) • 1099 River lamprey (*L. fluviatilis*) • 1095 Sea lamprey (*P. marinus*)

[48] JNCC, 2025. Dee Estuary/Aber Dyfrdwy SAC [online] Available at: Dee Estuary/ Aber Dyfrdwy - Special Areas of Conservation

Designated site details	Qualifying features and description (adapted from citations)
Deeside and Buckley Newt Sites SAC (UK0030132)[49] *Designated in 2001 and updated in 2004.* Area: 2016.19ha Marine area: 0% 1.7km west of the Scheme (no hydrological connectivity)	Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: • 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles Annex II species that are a primary reason for selection of this site: • 1166 Great crested newt (*Triturus cristatus*)

Source: Mott MacDonald 2025, JNCC, Natural England (NE).

[49] Natural Resources Wales (previously CCW), 2008. Core management plan and conservation objectives for Deeside and Buckley Newt Sites SAC [online] Available at: 2013 02 06 Deeside & Buckley Newt Sites SAC Management Plan _Eng_

6.2. Activities with the potential to impact designated sites

1.1.179 A summary of activities and the potential impacts on the qualifying features for each designated site for construction is shown in Table 4 and for operation in Table 5. Each of these has been assessed as having an impact pathway[38].

Table 4 Activities with the potential to impact designated sites (construction).

Activities	Receptors potentially affected	Justification for assessing effect within HRA
Pollution event in-river, in the intertidal, or functionally linked land	All designated sites and qualifying features (habitats and species)	Construction of the Scheme involves the use of plant, vessels, vehicles, machinery and equipment, materials, and personnel both in the terrestrial and marine environment. As a result, this poses the risk of pollution spills e.g., through refuelling practices, accidental spillages of fuel/oil/coatings/paints/resins/cement/concrete, grease from plant. If these spills occurred on land, there is a small risk they could be washed into the river from precipitation, or if they leach into a hydrologically connected watercourse. If spills occur on functionally linked land, it may also directly affect the populations of qualifying species. Additionally, if these spills occurred in the marine environment, the impacts could be over extensive geographic areas.
Underwater noise and vibration	Qualifying species (otter, fish and diving/dabbling birds)	The construction would be carried out in terrestrial areas and intertidal areas during low tide conditions (and no piling work to take place in the 3 hours leading up to high tide at Chester weir). Rotary drilling of 24 piles (12 piles per pier), use of vessels (jack up barges) and plant in the water will occur and generate underwater noise and vibration. Elevated underwater noise and vibration could potentially affect otter, diving/dabbling bird species and fish through disturbance. Disturbance may induce adverse behavioural reactions, such as fleeing, which may result in additional energy expenditure as they move away from the source of the disturbance. In some cases, elevated noise and/or vibration may cause injury to qualifying species including Atlantic salmon and bullhead).

Activities	Receptors potentially affected	Justification for assessing effect within HRA
Airborne noise and vibration	Qualifying species (birds and otter)	The use of plant and piling activity has the potential to generate above ground noise exceeding ambient conditions, which can disturb sensitive receptors. Some wading bird species are particularly prone to disturbance from noise given the limited roosting and feeding areas near water. However, for underwater qualifying features (e.g. fish) the airborne noise is almost completely reflected from the water surface and does not contribute significantly to the underwater noise level. Airborne noise disturbance could impact on any foraging or commuting otter.
Visual disturbance (including lighting)	Qualifying species (birds, migratory fish and otter)	Presence of plant, machinery, and personnel (especially in high-vis PPE clothing) could result in visual disturbance to qualifying species such as birds and otter. Temporary construction lighting may also disturb both birds and otter. Disturbance may induce adverse behavioural reactions, such as flushing (birds) and fleeing (wading birds and otter), which may result in additional energy expenditure as they move away from the source of disturbance, or reduced energy intake from disrupted feeding/foraging. Specifically, wading birds are particularly prone to disturbance from visual presence and noise given the limited roosting and feeding areas near water. Disturbance to fish (e.g. river and sea lamprey, Atlantic salmon) could occur from lighting during hours of darkness, when migrating during the night. (Note: Peak migration for sea lamprey is between May and July, with river lamprey migration occurring from February to April, with peak numbers observed in February; see Section 2: Baseline conditions for more information).
Permanent habitat loss	Qualifying species (fish, otter)	Permanent intertidal saltmarsh and riverbed habitat loss will occur where the footprint of the new bridge abutments are placed, as well as the area subject to shading by the new bridge overhead. The relocation of Queensferry Drain will lead to permanent habitat loss of the existing drain. Subtidal benthic habitat (sandy mud) below the new bridge structure will be permanently lost in the footprint of the two bridge piers, through the installation of 24 piles, 1.5m in diameter. The existing bridge piers will be left *in situ* resulting in a net loss of approximately 42.4m^2 of riverbed[50] (the

[50] Calculated as 1 pile (1.5m diameter) = 1.77m^2. Therefore, 24 piles (12 piles per pier) = 42.4m^2

Activities	Receptors potentially affected	Justification for assessing effect within HRA
		piers sit above the riverbed so do not occupy riverbed footprint). This functionally linked land could indirectly impact on species reliant on the riverbed habitat for foraging, such as qualifying fish and bird species. Furthermore, the new bridge will permanently shade the underlying saltmarsh habitat and may lead to permanent alteration in habitat types or functioning, such as the loss of vegetated substrate, and any reliant species.
Temporary habitat loss	Qualifying species (fish, otter)	The use of plant and excavation works, along with site compounds and the temporary jetty, have the potential to remove or temporarily replace habitats directly associated with or functionally linked to designated sites. It may also create barriers between habitats or migration of species.
Air quality changes	Qualifying species (fish, otter, birds)	Use of plant and excavation activities may generate fine particulates (dust) in the air that may settle in a layer on the ground and vegetation. These can smother, harm, or alter growth of vegetation which can negatively affect qualifying species or habitats. Additionally, if produced in large enough volumes, this can settle on the surface of waterbodies where following deposition and may shade and smother marine designated habitats that marine designated features may also be reliant on for shelter or food sources. Use of plant, vehicles, vessels and generators may increase greenhouse gas emissions that elevate local levels of harmful or acidic compounds, such as nitrogen and sulphur oxides, above safe thresholds.
Increases in suspended sediment and sediment deposition	Qualifying species (birds, otter and fish).	There will be disturbance to sediment within the riverbed as a result of installation of the temporary jetty and installation of the pilings. Suspended sediments may present a barrier to fish migration, or indirect effects to habitats supporting designated fish and bird species and otter. Given the Scheme is in a tidal environment, effects could extend downstream into hydrologically connected marine areas. Deposition of disturbed and resuspended sediment resulting from installation of the temporary jetty, pilings and the movement of the jack-up barge and service barge could smother marine habitats, indirectly impacting on qualifying species including birds, fish and otter through impacts to their food source and functionally linked land.

Activities	Receptors potentially affected	Justification for assessing effect within HRA
Introduction of Invasive and Non-Native Species (INNS)	All designated sites and qualifying features within the ZoI	Where construction operations may traverse different areas (off-site and within the Scheme site), personnel/plant/vessels/vehicles may introduce species from different regions into new areas. Further, the disturbance activities may allow INNS already in the area to out-compete native species that may be more sensitive to disturbance by intended activities.
Localised resuspension of contaminated sediments	Qualifying species (birds, otter and fish).	Deposition of disturbed and resuspended sediment as a result of installation of the temporary jetty, pilings and the movement of the jack-up barge and service barge could disturb and resuspend sediments that may be loaded with contaminants. Contaminants ingested by designated marine species (otter, birds, fish) may cause physical harm or alter their behaviour or reproductive capacity. Contaminants ingested by prey organisms may bioaccumulate within the food web, leading to higher concentrations being ingested by designated marine species, increasing the likelihood of harmful/toxic effects.
Injury/mortality of qualifying species from falling objects during demolition	Qualifying species (birds, otter and fish).	The demolition activities outlined in section 3.5 may result in the falling of material from the removal of the existing bridge, causing injury or death.

Table 5 Activities with the potential to impact designated sites (operation).

Activities	Receptors potentially affected	Justification for assessing effect within HRA
Pollution event	All designated sites and qualifying features	No direct operational impacts on qualifying features were identified. However, indirect effects from road operations may include contaminants in surface water runoff.
Underwater noise and vibration	Qualifying species (birds, otter and fish).	No direct operational effects on the qualifying features were identified. The Scheme will not affect traffic flow, speed or composition (Environmental Statement Chapter 11 Air Quality) and so it is unlikely there would be higher levels of vibration, increasing disturbance on fish and diving birds.
Airborne noise and vibration disturbance	Qualifying species (birds, otter and fish).	No direct operational effects on the qualifying features were identified. However, there may be indirect effects from the operation of the road, such as increased public access which could lead to higher levels of disturbance from noise if not properly mitigated.
Visual disturbance (including lighting)	Qualifying species (birds, otter and fish).	Potential direct operational effects on the qualifying features include the new lighting of pathways that pass under the new A494 bridge, introducing lighting at night where previously there was none. There may also be indirect effects resulting from the operation of the road, such as permanent highway lighting. If not properly mitigated, this lighting could lead to increased disturbance due to light pollution on qualifying species such as birds and otter.
Permanent habitat loss	Qualifying species (birds, otter and fish).	There is potential permanent loss of fish and otter habitat, and habitat on which their prey rely, due to the new bridge piers, the relocation of the Queensferry Drain and loss of riparian habitat/vegetation.
Air quality changes	Qualifying species (birds, otter and fish).	No direct operational effects on the qualifying features were identified. The Scheme will not affect traffic flow or composition (Environmental Statement Chapter 11 Air Quality). Therefore, traffic emissions will not change significantly. Their impact may shift 40m southeast, but air quality effects are not expected.
Introduction of Invasive and Non-Native Species (INNS)	All designated sites and qualifying features within the ZoI	No direct operational effects on the qualifying features were identified.

6.3. Conservation Objectives

1.1.180 The screening for LSE considers the implications of the Scheme in view of the Conservation Objectives for the designated sites screened in. Links to the Conservation Objectives are shown in Table 6 and listed in full in 9.2 Appendix II. There are no Conservation Objectives for Ramsar sites, however, overlapping SAC/SPA Conservation Objectives are considered appropriate and relevant. Ramsar information sheets have been included in Table 6 for completeness, as well as any relevant Site Improvement Plans or Conservation Advice Packages.

Table 6 Designated sites and their corresponding references detailing the conservation objectives within the ZoI.

Designated site	Reference
Dee Estuary Ramsar site	JNCC, 2009. Information Sheet. Available from: Information Sheet on Ramsar Wetlands (RIS)
Dee Estuary SPA	NE, 2018. Conservation Objectives. Available from: European Site Conservation Objectives for Dee Estuary SPA - UK9013011
Dee Estuary/Aber Dyfrdwy SAC	NE, 2018. Conservation Objectives. Available from: European Site Conservation Objectives for Dee Estuary SAC - UK0030131
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC	NE, 2018. Conservation Objectives. Available from: European Site Conservation Objectives for River Dee and Bala Lake SAC - UK0030252 NRW, 2022. Core Management Plan including Conservation Objectives. Available from: CONSERVATION OBJECTIVES FOR N2K SITES
Deeside and Buckley Newt Sites SAC	Countryside Council for Wales (CCW), 2008. Core Management Plan including Conservation Objectives. Available from: 2013 02 06 Deeside & Buckley Newt Sites SAC Management Plan _Eng_

Designated site	Reference
Dee Estuary/Aber Dyfrdwy & Mersey Narrows	NRW, 2015. Site Improvement Plan (SIP056). Available from: Site Improvement Plan: Dee Estuary/Aber Dyfrdwy & Mersey Narrows - SIP056
Dee Estuary European Marine Site comprising the Dee Estuary Ramsar site/SPA/SAC	NE and CCW, 2010. European Marine Site Regulation 33 Conservation Advice Package. Available from: https://publications.naturalengland.org.uk/file/3947690
Dee River Basin Management Plan 2021 to 2027	Defra, NRW, Welsh Government, Environment Agency, 2022. Dee River Basin Management Plan 2021-2027 Summary. Available from: Dee RBMP 2021-2027 Summary

6.4. Screening for Likely Significant Effects (LSE)

1.1.181 The Screening for LSE will consider the implications of the Scheme in view of the Conservation Objectives (9.2; Appendix II) for the designated sites which have been screened.

1.1.182 This section details any potential mechanisms and pathways of effect that could form LSE. The results of this screening for LSE are presented in Table 7 for the construction phase of the Scheme and Table 8 for the operational phase.

Table 7 The LSE as assessed for the potential effects from the proposed Scheme on designated sites and their qualifying features during construction phase.

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC Scheme is within SAC	**Pollution event** All qualifying Annex I habitats All qualifying Annex II species	**No**	Pollution hazards for the construction includes leak of oil/grease/fuel from plant/vessels/vehicles, and the accidental spillage of cement/liquid concrete/bentonite/coatings and resins/drilling fluid during the drilling and construction of the pilings. These may occur in the terrestrial environment, on functionally linked land or on areas where precipitation may wash pollutants into watercourses/the estuary, or in the marine environment and the wider hydrologically connected area. Both the habitat 'Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation' and the plant species floating water-plantain are restricted to freshwater watercourses and will be limited to upriver extents of the SAC. In general, the physical habitat typified by *Ranunculion fluitantis* and Callitricho-Batrachion communities is one of clean substrate and swift to moderate flow. Except for the channel margins (and localised deposits associated with macrophytes) the substrate should be predominantly free of silt. The River Dee along this canalised section of the SAC has a high silt content and is very turbid. This habitat, and the qualifying freshwater species floating water-plantain, is considered to be out of hydrological/tidal range from any potential spills or leaks from the Scheme, particularly due to physical barriers, such as Chester Weir upriver and no impact pathways are expected. Therefore these habitats and the freshwater floating water-plantain are not considered further in this screening. There is a risk qualifying fish species and otter may come into contact with contaminants from pollution events, in addition to prey on which qualifying species rely. However, the disturbance presented by the Scheme is likely to act as a deterrent, limiting any potential exposure to contaminants. If species are affected, effects will be limited to a small number of individuals as opposed to the population as a whole and not conflict with the overall Conservation Objectives. Further, bullhead can tolerate brackish water (up to 7ppt[51]) and so are more likely to be found further upstream of Chester Weir, away from the Scheme area where salinity is consistently lower; salinity at the Scheme site ranges up to 31ppt. Therefore, bullhead are not considered further in this screening. Standard construction pollution prevention measures will be implemented as part of the outline Construction Environmental Management Plan (outline CEMP and constructability report; 395318-MMD-00-XX-RP-Z-0034) and full CEMP (to be completed at pre-construction stage) and standard operating procedures (SOP). These are well known, and none are considered bespoke to the Scheme. Displaced drilling fluid (containing polymer or bentonite) will be pumped out for recycling. Drilling tools will be emptied or spun off into collection skips on the jack up barge, and the skips will be collected and disposed of appropriately. This is embedded within the

[51] Kontula, T. and Vainola, R., 2001. Postglacial colonization of Northern Europe by distinct phylogeographic lineages of the bullhead, *Cottus gobio*. *Molecular Ecology*, 10, 1983-2002.

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
			pile construction methodology. As such, it is considered that pollution risks and events will be well managed and constitute a low risk and therefore, **no LSE are identified for the qualifying features of the SAC.**
	Underwater noise and vibration **Annex II species:** Atlantic salmon Sea lamprey River lamprey Otter	**Yes** for qualifying fish and otter	Activities capable of producing underwater noise are related to the construction of the pilings and piers and include the use of a jack-up barge, installation of steel casing using vibratory hammer, rotary boring activity, boring of any existing underarms using rock augers, and use of service barge/tug for transport of construction materials. The underwater noise and vibration from these activities is unlikely to impact sea lamprey, which predominantly migrate at night and so will avoid the daytime activity. In addition, these fish do not possess swim bladders (as with bullhead) and so are not prone to harm/injury from vibrations. However, otter and Atlantic salmon in the vicinity may exhibit avoidance or fleeing behaviour, impacting their ability to forage or access prey. Further, vibrations or underwater noise may cause similar avoidance/fleeing behaviour in prey species on which these species rely, resulting in a change to their normal foraging/hunting areas and an increase in energetic cost. Breeding behaviour or rearing young may be affected where underwater noise disturbance is prolonged and frequent, coupled with the cumulative effects of airborne noise for otter that spend time both underwater and out of the water. It is unknown the distance at which the noise and vibration may propagate, nor the frequency (Hertz) or volume (decibels) of the noise at source. In the absence of detailed information, a precautionary approach assumes a worst-case scenario where effects from noise and vibration will be both likely and significant. Effects may include significant disturbance to potentially large numbers of local migratory (Atlantic salmon) or resident otter, inhibiting normal behaviours and affecting both short- and long-term reproductive success, recruitment and survival. Atlantic salmon have a much greater capacity to overcome obstacles than sea lamprey but are still affected by any obstacle in the path of migrating fish. This may result in a migration bottleneck of fish at certain points in the river and leave them more vulnerable to predation. There may also be risks of physical and behavioural harm, injury, and in the worst-case scenario, mortality of several individuals, potentially affecting the overall population. This would be counter to the conservation objectives for the SAC. **Therefore, LSE are identified for qualifying fish and otter.**
	Airborne noise and vibration **Annex II species:** Otter	**Yes** for otter	Airborne noise transmits poorly to water, and the majority of sound is reflected from the water surface and is therefore unlikely to affect underwater receptors (fish) significantly. Otter are likely to be affected by airborne noise and their use of the Scheme location has been confirmed by surveys conducted in 2018, 2020, 2022 and 2024, which found evidence of their presence (e.g. faeces, also referred to as 'spraint', feeding remains and footprints), though suitable secure breeding sites (natal dens) are absent from the Scheme footprint. The locality of the Scheme is urbanised and the Dee River is used by vessels, and so there will be a degree of habituation for ambient urban noise. However, the airborne noise from plant and large vessels, piling activity and plant and vehicle movement will be greater than ambient noise. It is unknown the distance at which the noise may propagate, nor the frequency (Hertz) or volume (decibels) of the noise at source. As mentioned for the 'underwater noise and vibration' impact pathway, breeding behaviour or rearing young may be affected where underwater noise disturbance is prolonged and frequent, coupled with the cumulative

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
			effects of underwater noise for otter that spend time both underwater and out of the water. If there are nearby holts (a den or refuge used by otters), airborne noise may result in their abandonment. Effects may include significant disturbance to transient or resident otter, inhibiting normal and essential behaviours and potentially affecting both short-term and long-term reproductive success and survival. There may be physical and behavioural harm to hearing, injury if fleeing, and in the worst-case scenario, mortality of several individuals, potentially affecting the overall population. This would be counter to the conservation objectives for the SAC. **Therefore, LSE are identified for otter.**
	Visual disturbance (including lighting) **Annex II species:** Atlantic salmon Sea lamprey River lamprey Otter	**Yes** for otter	As mentioned in 'airborne noise and vibration' impact pathway, the surrounding urbanised area presents an ambient level of visual disturbance through vessels, vehicles and public use of riverside footpaths. However, the Scheme will include vessels, vehicles, plant and personnel that will exceed this. The in-river piling operations will involve the use of a jack-up barge, a service/spud barge, tugboat, crane, drilling rig, temporary jetty, and pontoons to support tubes for concrete pumped from the riverbank. Plant will be used in the construction of abutments and overhead works to construct the new gantry/deck and demolition of existing deck will also be above and beyond ambient visual disturbance. Use of temporary construction lighting used for night-time working in hours of darkness will be in areas not currently lit, and therefore additive to the ambient environment. The nighttime temporary construction lighting, although additive, is unlikely to cause disturbance above and beyond that of the existing urban environment, as the adjacent bridge (Jubilee/Blue Bridge, not involved in this Scheme) is already floodlit throughout the night. Atlantic salmon, lamprey species, and otter are likely to be disturbed by the presence of large vessels/jack up barges in the river. Nocturnal migrants, such as sea lamprey, are the least likely to be disturbed as piling works are to be undertaken during daytime hours, and so the movement of vessels/barges/pontoons will be limited to those times. Otter is likely to be disturbed the most, as the works crossover the underwater and above surface environment, causing visual disturbance across their range of habitat use. The cumulative effect of visual disturbance, along with underwater and airborne noise and vibration, has the potential to cause avoidance behaviours, inhibiting normal and essential behaviours of potentially large numbers of transient or resident otter. This would be counter to the conservation objectives for the SAC. **Therefore, LSE are identified for otter.**
	Permanent habitat loss **Annex II species:** Atlantic salmon Sea lamprey River lamprey Otter	**Yes** for otter	As mentioned in Table 4, up to 42.4m^2 (0.00424ha) of subtidal riverbed will be permanently lost in the footprint of the new bridge through the installation of pilings, as the existing bridge pilings will be left *in situ*, leading to a net loss of riverbed. The habitat for which this SAC is designated is not situated within the Scheme boundary and will not be lost to the construction of the new pilings. The riverbed is predominantly comprised of sand/mud which may directly support feeding/foraging for the designated fish species, or support lower trophic levels of which their prey species rely (functionally linked land). However, given the size of the area being lost (42.4m^2), and the extent of the SAC (1,271.32ha) with 6% of the SAC habitat being tidal rivers, estuaries, mudflats, sandflats, 4% of lagoons, and 2% being saltmarshes, salt pastures and salt steppes, this equates to 76.279ha. Therefore, the area of loss represents just 0.006% of

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
			the relevant SAC habitat[52]. Given that no qualifying habitat loss is occurring, and an extremely small area of potentially functionally linked land is being lost within the riverbed, it is extremely unlikely that reliant designated fish species are significantly affected. Otters present in the Scheme area may be affected by permanent habitat loss of functionally linked riparian land. There would be permanent loss of the open channel which currently forms Aston Quay inlet/Queensferry Drain outfall, an area of approximately 0.035ha, representing 0.003% of this habitat type within the wider SAC. The drain would be relocated approximately 18m to the east of its current location to accommodate the replacement bridge, and the existing open channel would be filled in and replaced with the approach embankment to this bridge. The new outfall would directly exit the riverbank via a pipe, rather than first entering an open channel. **Therefore, LSE are identified for otter.**
	Temporary habitat loss **Annex II species:** Atlantic salmon Sea lamprey River lamprey Otter	**Yes** for otter	Temporary habitat loss is likely to occur where disturbance of the riverbed occurs through the placement of jack-up barge legs/spud feet and the footprint of those anchors/feet. There will also be a temporary jetty *in situ* for the duration of the Scheme construction. However, as mentioned in 'permanent habitat loss' impact pathway, the habitat for which this SAC is designated is not situated within the Scheme boundary and will not be temporarily lost to the construction of the new pilings. The temporary jetty will intersect the upper intertidal zone of the river as well as the riverbank. Fish are unlikely to be significantly impacted by the temporary habitat loss, given the minor footprints and the upper intertidal extent of the temporary jetty. However, otter present in the Scheme area may suffer from temporary loss of functionally linked land. Construction activities that might result in such temporary impacts include the realignment of the Queensferry Drain channel, as well as the installation of temporary jetties and platforms in the river to facilitate piling for new bridge foundations. The movement of construction plant and machinery on riverbanks and the riverbed, coupled with excavation works, could further disturb these areas. These disruptions might lead to otters experiencing obstruction to their movement along the riverbanks, potentially forcing them to find alternative routes. Furthermore, the use of temporary construction lighting, especially during night-time operations, could deter otters, which are largely nocturnal, from using their established passage and foraging routes along the River Dee. **Therefore, LSE are identified for otter.**
	Air quality changes **Annex II species:** Atlantic salmon Floating water-plantain Sea lamprey River lamprey Otter	**No**	The use of vessels, vehicles, plant, generators and machinery to undertake earthworks, excavate soil and sediment, demolition of existing bridge, and working with fine particulate materials (e.g., cements) may produce both airborne dust and particulate matter as well as greenhouse gas emissions from the combustion of fossil fuels, smothering designated habitats or functionally linked land. Further, traffic management measures (road or lane closures/diversions/speed restrictions) will mean changes in existing traffic flow across the current A494 bridge may lead also to changes in greenhouse gas emissions. The surrounding area of the Scheme is an urban environment, with significant traffic flow that already uses the existing A494 bridge. Therefore, it is unlikely that changes in ambient concentrations caused by the construction phase of the Scheme would cause a new exceedance of an air quality threshold or exacerbate an

[52] Land take of 0.0042ha of subtidal and intertidal habitat for bridge piers. Total River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SAC area is 1271.32Ha (tidal rivers, estuaries, mudflats and sandflats comprise 6% of the SAC, lagoons 4%, and saltmarshes, salt pastures, salt steppes 2%, which equates to 76.279 ha). (0.0042ha/76.279ha)*100 = 0.006%.

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
			existing exceedance and therefore changes in air quality would not be significant. An increase in vehicle emissions caused by speed limit reductions on the existing A494 bridge would be more than offset by reduction in traffic flows. Roadside pollutant concentrations are likely to decrease in the vicinity of the existing A494 bridge during the construction phase. The distances from dust emission source at which significant construction dust effects are likely to occur are dependent on prevailing wind conditions and rainfall. However, effects from construction activities that generate dust are generally limited to within 200m of the construction site boundary. The habitat for which the SAC is designated is not within the 200m range of air quality risks associated with Scheme. Settlement of dust on functionally linked land or the water surface is likely to be both minimal and temporary, resulting in no significant effects. Standard construction air quality management measures will be implemented as part of the CEMP and standard operating procedures as per the Design Manual for Roads and Bridges[53]. These are well known and none are considered bespoke to the Scheme. As such, it is considered that air quality hazards (dust, greenhouse gas emissions) will be well managed and constitute a low risk and therefore, **no LSE are identified.**
	Increases in suspended sediment and sediment deposition **Annex II species:** Atlantic salmon Sea lamprey River lamprey Otter	**No**	Through the construction of the piles, and the movement of vessels and machinery in the river, there is a risk that the riverbed will be disturbed, suspending sediment. The hydrodynamic and sediment transport modelling report concluded the operation of the Scheme will likely impact hydrodynamics or sediment transport patterns. There may be localised changes in erosion and deposition (especially near the bridge piles), but this will not significantly impact the overall sediment dynamics. This suggests that while the Scheme will affect suspended solids, it will be localised and is unlikely to have a significant impact on levels in the River Dee. Although changes in suspended sediments will be localised, there is a risk that increased turbidity will extend across the width of the river, potentially creating a barrier to migratory fish, or precluding successful foraging/hunting behaviour (fish, otter). However, baseline suspended solids within the River Dee are considered high, and samples taken as part of baseline water quality monitoring for the scheme ranged from 140mg/l to 380mg/l, exceeding the 78mg/l reference proxy threshold[54]. In this monitoring, water quality samples were collected during high tide, which likely contributed to the higher observed concentrations of suspended solids. Suspended solid concentrations in tidally influenced environments are strongly governed by tidal dynamics. During high tide, increased tidal energy can resuspend fine sediments, resulting in elevated turbidity levels. As the turbidity of the River Dee is already quite high, it is unlikely that a temporary increase in suspended sediments from construction activity will significantly affect the species for which this site is designated. Therefore, **no LSE are identified.**

[53] Standards for Highways, 2024. Design Manual for Roads and Bridges. LA 105 Air quality (vertical barriers) version 0.1.0. [online] Available from: HTML Document View
[54] Mott MacDonald, 2025. A494 River Dee Bridge Replacement. Technical Appendix 7.A. Volume 3: Technical Assessment Report. River Dee Surface Water Quality Baseline Report. Document reference: 395318 – MMD-00-XX-RP-Z-0021.

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
	Introduction and spread of INNS All Annex I qualifying habitats All Annex II qualifying species	**No**	There is a possibility of the spread and introduction of INNS through the mobilisation of vessels, vehicles, plant and site personnel. This could lead to INNS outcompeting native species, smothering or altering functionally linked land/riverbed or outcompeting prey species on which qualifying fish species and otter rely. Terrestrial INNS species within 2km of the scheme were identified during a desk study and site survey and included Japanese knotweed (*Fallopia japonica*), giant hogweed (*Heracleum mantegazzianum*), montbretia (*Crocosmia pottsii x aurea = C. x crocosmiflora*) and Himalayan balsam (*Impatiens glandulifera*). A desk study identified one marine INNS within 2km of the Scheme: the Chinese mitten crab (*Eriocheir sinensis*) at Chester Weir. However, no marine INNS were identified during an intertidal walkover survey of the Scheme site. No INNS have been identified in the area of Queensferry drain outfall/Aston Quay inlet. As such the proposed infilling of this area, and relocation of the outfall, is not expected to result in the spread of INNS. The presence of additional hard structures within the River Dee may act as a "stepping stone" for sessile marine INNS but none were identified during the intertidal walkover survey. Further, the Scheme area is significantly canalised with hard structures running the length of the river section, so the introduction and spread of INNS is not likely to be exacerbated by the presence of new pilings. An INNS management plan will be developed and implemented as standard operating practice and integrated into the CEMP. INNS management plans are well known and not considered bespoke to the Scheme. As such, it is considered that INNS risks will be well managed and constitute a low risk and so are not considered further in this assessment. Therefore, **no LSE are identified.**
	Localised resuspension of contaminated sediments **Annex II species:** Atlantic salmon Sea lamprey River lamprey Otter	**No**	Due to the mix of industrial, urban/residential and agricultural land in the Dee catchment, heavy metals may have settled within the sediment. Through the construction of the piles, and the movement of vessels and machinery in the river, there is a risk that the riverbed will be disturbed, leading to the resuspension of contaminated sediments. Copper, zinc, chromium and arsenic determinands measured as part of the water quality monitoring[55] for the Scheme. It was unclear if the source of these determinands was from resuspension of bed load sediments or from industrial/wastewater discharge or road runoff. Arsenic and copper did not exceed the Environmental Quality Standards (EQS) thresholds, however chromium and zinc did. Contaminants can indirectly affect designated species (fish and otter) by bioaccumulating in their tissues through the consumption of contaminated prey species or incidental ingestion of contaminated water. Although the Scheme will lead to an increase suspended solids, it will be localised and temporary and is unlikely to have a significant impact on levels in the River Dee. Therefore, any localised resuspension of contaminated sediments is likely to also be minor and temporary. Therefore, **no LSE are identified.**
	Injury/mortality **Annex II species:**	**No**	The demolition of the existing bridge involves the potential for material/debris to fall from height into the River Dee and onto the riverbanks. As a result, there is the potential for falling debris to cause injury or mortality.

[55] Mott MacDonald, 2025. A494 River Dee Bridge Replacement. River Dee Surface Water Quality Report. Document reference: 395318 | MMD-00-XX-RP-Z-0021

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
	Atlantic salmon Sea lamprey River lamprey Otter		It is unlikely that falling debris would strike migratory fish, as the demolition activity will be undertaken during the day and the majority of migratory fish will undertake their migration at night. However, there is a risk that otter may be in proximity during the demolition activity, presenting the risk of direct strike from falling debris. The likelihood of otter being in proximity to demolition activity is extremely low, given the visual and acoustic disturbance presented by the activity likely triggering avoidance/fleeing behaviour. Further, the likelihood of debris landing on the precise location of an individual otter is similarly low. Crash decks will be used in accordance with best practice guidance and their use is not bespoke to this project (see Register of Environmental Actions and Commitments (REAC) table; ES Appendix 18B). Therefore, **no LSE are identified.**
Dee Estuary Ramsar site 0.9km northwest (downriver) of the Scheme	**Pollution event** **Criterion 1:** Annex I habitats **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Underwater noise and vibration **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	The underwater noise and vibration will not impact Annex I habitats under Criterion 1. The Ramsar site is listed under Criterion 2 for natterjack toad, but there is no hydrological connectivity with the aquatic habitats used by this species, so no underwater noise transmission is possible and no potential impact pathway. However, Criterion 5 and 6 are listed for waterfowl receptors, including bird species that either dive (little tern, common tern, sandwich tern – summer; cormorant (*Phalacrocorax carbo carbo*), great crested grebe (*Podiceps cristatus* - winter)) or dabble (teal, shelduck, pintail, wigeon (*Anas penelope*) – winter) and so are potentially vulnerable to underwater noise and vibration. Further, the vibration or underwater noise may cause similar avoidance/fleeing behaviour in prey species on which designated birds rely, resulting in a change to their normal foraging/hunting areas and an increase in energetic cost. There may be cumulative effects with airborne noise for bird species that spend time both underwater and out of the water. The Ramsar site boundary is 0.9km northwest and downriver of the Scheme, but the Scheme site may be used as functionally linked land. Breeding bird surveys and reports for the Scheme completed in 2023 and 2025 identified that the river and riverbank habitat, particularly during low tide, may provide an important commuting, foraging and roosting area for various waterbirds. Cofnod data (2008 to 2018) used in the report indicated the designated species that dive/dabble close to the Scheme site include shelduck (250m from Scheme) and cormorant (within the Scheme). A 2025 non-breeding bird survey further highlighted the importance of the river and riverbanks as an important habitat for commuting, foraging and roosting waterbirds. In the non-breeding season, these habitats support a moderate number of species including one qualifying diving species (cormorant). Total numbers of diving/dabbling species were not considered to be significant however as they contribute to less than 1% of the Ramsar's water bird assemblage. The majority of waterbird species within the survey areas were wading species that are unlikely to be affected by underwater noise and vibration. It is unknown the distance at which the noise and vibration may propagate, nor the frequency (Hertz) or volume (decibels) of the noise at source. In the absence of detailed information, a precautionary approach assumes a worst-case scenario that effects from noise and vibration will be likely. Effects may include disturbance to small numbers of birds, inhibiting normal and essential behaviours and affecting survival, though this is not

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
			considered significant due to low the numbers of birds onsite which may be affected. **Therefore, no LSE are identified.**
	Airborne noise and vibration **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**Yes** for bird species under Criterion 5 and 6	The airborne noise and vibration will not impact Habitats under Criterion 1. For natterjack toad, the distance to suitable habitats coupled with the fact that the surrounding urban environment will ameliorate any propagated airborne sound, no impact pathways are considered possible. However, Criterion 5 and 6 are listed for waterfowl receptors sensitive to noise disturbance. Airborne noise effects may include disturbance to potentially large numbers of foraging/resting/loafing qualifying birds, resulting in temporary displacement to alternative areas and inhibiting normal and essential behaviours and potentially affecting both short-term and long-term reproductive success and survival. Cofnod data (2008 to 2018) used in the reports and Mott MacDonald survey data indicated the qualifying species that may be found in close proximity to the Scheme site include shelduck (250m from Scheme), cormorant (adjacent to Scheme), oystercatcher (within the Scheme site), redshank (within the Scheme site) and teal (within the Scheme site). The TIDE toolbox Waterbird Disturbance and Mitigation Toolkit[56] assessed disturbance sensitivity of 16 waterbird species commonly occurring in estuaries. The tool concluded that shelduck and redshank are both considered highly sensitive to disturbance, and oystercatcher moderately sensitive. It is unknown the distance at which the noise and vibration may propagate, nor the frequency (Hertz) or volume (decibels) of the noise at source. In the absence of detailed information, a precautionary approach will assume a worst-case scenario that effects from noise and vibration will be both likely and significant. Effects may include significant disturbance to potentially large numbers of designated birds, inhibiting normal and essential behaviours and affecting survival and distribution. **Therefore, LSE are identified.**
	Visual disturbance (including lighting) **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**Yes** for bird species under Criterion 5 and 6	Visual disturbance will not impact Habitats under Criterion 1 or natterjack toad as the distance and surrounding urban environment precludes the possibility of any visual disturbance. However, Criterion 5 and 6 are listed for waterfowl receptors sensitive to noise disturbance. As with airborne and underwater noise, effects may include disturbance to potentially large numbers of foraging/resting/loafing designated birds, resulting in temporary displacement to alternative areas and inhibiting normal and essential behaviours and potentially affecting both short-term and long-term reproductive success and survival. As mentioned in the 'visual disturbance' impact pathway for the 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC', the nighttime temporary construction lighting, although additive, is unlikely to cause disturbance above and beyond that of the existing urban environment. All designated bird species are likely to be disturbed by the presence of large vessels/jack up barges in the river causing visual disturbance across their range of habitat use. The cumulative effect of visual disturbance, along with airborne noise and vibration, has the potential to cause avoidant behaviours, inhibiting normal and essential behaviours of potentially large numbers of waterfowl. **Therefore, LSE are identified.**

[56] TIDE Toolbox Waterbird Disturbance and Mitigation Toolkit. Available from: TIDE toolbox - TIDE tools

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
	Permanent habitat loss **Criterion 1:** Annex I habitats **Criterion 2:** Natterjack toad **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	Permanent habitat loss will not impact Criterion 1 Habitats, as the Ramsar site boundary is 900m away from the Scheme. Natterjack toad does not use the Scheme site as functionally linked land and so there is no risk of permanent habitat loss for this species. However, waterfowl (Criteria 5 and 6) have been recorded in the Scheme boundary. As mentioned in Table 4, up to 42.4m^2 of subtidal riverbed will be permanently lost in the footprint of the new bridge through the installation of pilings. Although the Ramsar site is not situated within the Scheme boundary the riverbed may constitute functionally linked land by directly support feeding/foraging for the designated birds or support lower trophic levels of which their prey species rely. However, given limited extent of the area being lost compared to the Ramsar site (14,302ha), this loss represents a negligible portion (0.00003%) of potentially functionally linked land. Given that no loss of qualifying habitat is occurring, and an extremely small area of potentially functionally linked land is being lost within the riverbed, no LSE are anticipated. The clearance of vegetated riverbank is likely to be insignificant compared with the wider resource available as functionally linked land. Therefore, **no LSE are identified.**
	Temporary habitat loss **Criterion 1:** Annex I habitats **Criterion 2:** Natterjack toad **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	Temporary habitat loss is likely to occur where disturbance of the riverbed occurs through the placement of jack-up barge legs/spud feet and the footprint of those anchors/feet. There will also be a temporary jetty *in situ* for the duration of the Scheme construction. However, as mentioned in 'permanent habitat loss' impact pathway, the Ramsar site is not situated within the Scheme boundary and will not be temporarily lost to the construction of the new pilings or temporary jetty. Qualifying bird species are unlikely to be significantly impacted by the temporary habitat loss, as stated above for permanent losses. Therefore, **no LSE are identified.**
	Air quality changes **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Increases in suspended sediment and sediment deposition **Criterion 1:** Annex I habitats **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. In addition to this, the Ramsar site is tidal and subject to highly mobile sediment dynamics and so the sediment resuspension from the Scheme 900m upstream is unlikely to adversely affect the Criterion for which the site is designated, including the qualifying habitats and bird species. Further, many of the designated habitats are formed and benefited by sediment accretion, and unlikely to be adversely affected by suspended sediments or their deposition. There is no hydrological connectivity to the natterjack toad population and no impact pathway. Waterfowl using the Scheme site as functionally linked land may be unable to use the site for foraging when suspended sediments are high, but it does not preclude them from using the site to rest/loaf/commute. Further, the area affected in relation to the wider resource of functionally linked land and Ramsar site is minimal. Therefore, **no LSE are identified.**

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
	Introduction and spread of INNS **Criterion 1:** Annex I habitats **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Localised resuspension of contaminated sediments **Criterion 1:** Annex I habitats **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. Further, many of the designated habitats are formed and benefited by sediment accretion, and so may be adversely affected by the deposition of contaminated sediments. There is no hydrological connectivity to the natterjack toad and so no pathway of effect. See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Injury/mortality **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
Dee Estuary SPA 0.9km northwest (downriver) of the Scheme	**Pollution event** All qualifying bird species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Underwater noise and vibration All qualifying bird species	**No**	See justification for 'Dee Estuary Ramsar'. **No LSE identified.**
	Airborne noise and vibration All qualifying bird species	**Yes** for all bird species	See justification for 'Dee Estuary Ramsar'. **LSE identified for all qualifying bird species.**
	Visual disturbance (including lighting)	**Yes**	See justification for 'Dee Estuary Ramsar'. **LSE identified for all qualifying bird species.**

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
	All qualifying bird species	for all bird species	
	Permanent habitat loss All qualifying bird species	**No**	See justification for 'Dee Estuary Ramsar'. **No LSE identified.**
	Temporary habitat loss All qualifying bird species	**No**	See justification for 'Dee Estuary Ramsar'. **No LSE identified.**
	Air quality changes All qualifying bird species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Increases in suspended sediment and sediment deposition All qualifying bird species	**No**	See justification for 'Dee Estuary Ramsar'. **No LSE identified.**
	Introduction and spread of INNS All qualifying bird species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Localised resuspension of contaminated sediments All qualifying bird species	**No**	See justification for 'Dee Estuary Ramsar'. **No LSE identified.**
	Injury/mortality	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
	All qualifying bird species		
Dee Estuary/Aber Dyfrdwy SAC 0.9km northwest (downriver) of the Scheme	**Pollution event** All Annex I habitats All Annex II species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Underwater noise and vibration Annex II lamprey species	**Yes** for lamprey	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **LSE identified for lamprey.**
	Airborne noise and vibration Annex II lamprey species	**No**	See justification for fish under 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. The habitats for which this SAC is designated will not be affected by airborne noise, nor will lamprey as the majority of airborne noise is reflected off the water surface and will be produced during daytime hours when lamprey are unlikely to be in proximity due to their preference for nocturnal migration. Therefore, **no LSE identified.**
	Visual disturbance (including lighting) Annex II lamprey species	**No**	The habitats for which this SAC is designated will not be affected by visual disturbance or lighting. Lamprey are unlikely to be significantly affected as the river is already subject to significant light pollution in hours of darkness, including the adjacent existing Jubilee/Blue Bridge which is floodlit throughout the night. Therefore, **no LSE identified.**
	Permanent habitat loss Annex II lamprey species	**No**	See justification for 'Dee Estuary Ramsar'. **No LSE identified.**
	Temporary habitat loss Annex II lamprey species	**No**	See justification for 'Dee Estuary Ramsar'. **No LSE identified.**
	Air quality changes Annex II lamprey species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Increases in suspended sediment and sediment deposition Annex II lamprey species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
	Introduction and spread of INNS Annex II lamprey species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Localised resuspension of contaminated sediments Annex II lamprey species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Injury/mortality Annex II lamprey species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
Deeside and Buckley Newt Sites SAC 1.7km west of the Scheme (no hydrological connectivity)	**Pollution event** Annex II newt species	**No**	This SAC is terrestrially based 1.7km away from the Scheme with no connectivity to the habitat or hydrological connectivity to the watercourses potentially used by the designated species great crested newt, and so there is no pathway of effect for this SAC. **No LSE identified.**
	Underwater noise and vibration Annex II newt species	**No**	This SAC is terrestrially based 1.7km away from the Scheme with no connectivity to the habitat or hydrological connectivity to the watercourses potentially used by the designated species great crested newt, and so there is no pathway of effect for this SAC. **No LSE identified.**
	Airborne noise and vibration Annex II newt species	**No**	This SAC is terrestrially based 1.7km away from the Scheme with no connectivity to the habitat with significant urban development screening any airborne or visual disturbance, and so there is no pathway of effect for this SAC. **No LSE identified.**
	Visual disturbance (including lighting) Annex II newt species	**No**	This SAC is terrestrially based 1.7km away from the Scheme with no connectivity to the habitat with significant urban development screening any airborne or visual disturbance, and so there is no pathway of effect for this SAC. **No LSE identified.**
	Permanent habitat loss Annex II newt species	**No**	Habitat lost in the Scheme is not designated under this SAC, and the SAC is 1.7km from the Scheme boundary. The Scheme site is not used as functionally linked land for the populations of great crested newt for which the site is designated. **No LSE identified.**
	Temporary habitat loss Annex II newt species	**No**	Habitat temporarily lost in the Scheme is not designated under this SAC, and the SAC is 1.7km from the Scheme boundary. The Scheme site is not used as functionally linked land for the populations of great crested newt for which the site is designated. **No LSE identified.**
	Air quality changes	**No**	This SAC is 1.7km from the Scheme, well beyond the 200m buffer for dust and emissions. See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
	Annex II newt species		
	Increases in suspended sediment and sediment deposition Annex II newt species	**No**	This SAC is 1.7km from the Scheme, and not hydrologically connected so there is no pathway of effect. **No LSE identified.**
	Introduction and spread of INNS Annex II newt species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Localised resuspension of contaminated sediments Annex II newt species	**No**	This SAC is terrestrially based 1.7km away from the Scheme with no connectivity to the habitat or hydrological connectivity to the watercourses potentially used by the designated species great crested newt, and so there is no pathway of effect for this SAC. **No LSE identified.**
	Injury/mortality Annex II newt species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**

Source: Mott MacDonald, 2025.

Table 8 The LSE as assessed for the potential effects from the proposed Scheme on designated sites and their qualifying features during operational phase.

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC Scheme is within SAC	**Pollution event** All qualifying Annex I habitats All qualifying Annex II species	**No**	Pollution hazards for the operation includes leak of oil/grease/fuel from vehicles using the new bridge, and the accidental spillage of harmful substances from road traffic collisions. These may occur on the bridge where precipitation may wash pollutants into watercourses/the estuary, or in the marine environment and the wider hydrologically connected area. Any oil/fuel leaks from vehicles are unlikely to be of a sufficiently harmful quantity. Fish species and otter may encounter pollution runoff from the new bridge, but it is not anticipated to be greater than pollution from the existing bridge. There are not expected to be any changes in traffic flow or composition (number of vehicles or speed) as the Scheme is a like for like replacement of the existing A494 River Dee Bridge. Therefore, **no LSE are identified.**
	Underwater noise and vibration **Annex II species:** Atlantic salmon Sea lamprey River lamprey Otter	**No**	Indirect effects from road operations include vibration from traffic using the new bridge, resulting in disturbance on fish and otter. As the Scheme is a like for like replacement of the existing A494 River Dee Bridge, **no LSE are identified.**
	Airborne noise and vibration **Annex II species:** Atlantic salmon Sea lamprey River lamprey Otter	**No**	Airborne noise transmits poorly to water, and the majority of sound is reflected from the water surface and is therefore unlikely to affect underwater receptors (fish). Otter are likely to be affected by airborne noise and their use of the Scheme location has been confirmed via surveys conducted in 2018, 2020, 2022 and 2024. The locality of the Scheme is urbanised and the Dee River is used by vessels, and so there will be a degree of habituation for ambient urban noise, including from the vehicle use of the existing bridge. As the Scheme is a like for like replacement of the existing A494 River Dee Bridge, **no LSE are identified.**
	Visual disturbance (including lighting) **Annex II species:** Atlantic salmon Sea lamprey River lamprey Otter	**Yes** for otter	There are not expected to be any changes in traffic composition (number of vehicles or speed) as the Scheme is a like for like replacement of the existing A494 River Dee Bridge. However, there will be lighting across the length of the new bridge deck, which is additional to the baseline that currently exists as the existing A494 bridge deck is not lit. The lighting will be along the centre of the bridge deck, as opposed to the sides, limiting light spillover onto the river below. The nighttime lighting, although additive, is unlikely to cause disturbance above and beyond that of the existing urban environment, as the adjacent bridge (Jubilee/Blue Bridge, not involved in this Scheme) is already floodlit throughout the night. The footpath that runs between Riverside Way and Station Road, and under the existing bridge, is currently unlit and the baseline environmental lighting survey, conducted on 12 February 2025, found the area to be very dark. The scheme includes the installation of an active travel route along this footpath, which will be lit to a P3 lighting

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
			classification[57]. This is assessed as representing a "major adverse" change in the operational lighting levels for this currently dark area. Evidence of otters has been found along the sand margin either side of this location and, without mitigation, this may impact its viability as a functionally linked habitat. Therefore, **LSE have been identified.**
	Permanent habitat loss **Annex II species:** Atlantic salmon Sea lamprey River lamprey Otter	**No**	There is permanent habitat loss associated with the construction phase (Table 7) which adequately captures the LSE from this impact pathway. There is no additional habitat loss associated with the operational phase. Therefore, **no LSE have been identified.**
	Air quality changes **Annex II species:** Atlantic salmon Sea lamprey River lamprey Otter	**No**	There are not expected to be any changes in traffic composition (number of vehicles or speed) as the Scheme is a like for like replacement of the existing A494 River Dee Bridge. Therefore, **no LSE are identified.**
	Introduction and spread of INNS **Annex II species:** Atlantic salmon Sea lamprey River lamprey Otter	**No**	Table 7 adequately captures the potential effects associated with this impact pathway. There is no additional INNS introduction or spread risk associated with the operational phase. Therefore, **no LSE are identified.**
Dee Estuary Ramsar site 0.9km northwest (downriver) of the Scheme	**Pollution event** **Criterion 1:** Annex I habitats **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**

[57] 'P' refers to lighting for pedestrian areas, and '3' refers to the category of luminosity, which has an average horizonal lux of 7.5 for P3. This lighting class is appropriate for "moderate night-time use by pedal cyclists or pedestrians". Fotios, S. 2020. A review of design recommendations for P-class road lighting in European and CIE documents – part 1: parameters for choosing a lighting class. *Lighting Research and Technology,* 52 (5). Available from: A review of design recommendations for P-class road lighting in European and CIE documents - part 1 : parameters for choosing a lighting class

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
	Underwater noise and vibration **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Airborne noise and vibration **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Visual disturbance (including lighting) **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Permanent habitat loss **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Air quality changes **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Introduction and spread of INNS **Criterion 5:** Wetland for waterbirds **Criterion 6:** Waterfowl	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
Dee Estuary SPA 0.9km northwest (downriver) of the Scheme	**Pollution event** All qualifying bird species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Underwater noise and vibration All qualifying bird species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Airborne noise and vibration All qualifying bird species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Visual disturbance (including lighting) All qualifying bird species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Permanent habitat loss All qualifying bird species	**No**	See justification for 'Dee Estuary Ramsar'. **No LSE identified.**
	Air quality changes All qualifying bird species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Introduction and spread of INNS All qualifying bird species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
Dee Estuary/Aber Dyfrdwy SAC 0.9km northwest (downriver) of the Scheme	**Pollution event** Annex II lamprey species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Underwater noise and vibration Annex II lamprey species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
	Airborne noise and vibration Annex II lamprey species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Visual disturbance (including lighting) Annex II lamprey species	**No**	The habitats for which this SAC is designated will not be affected by visual disturbance or lighting. Lamprey are unlikely to be significantly affected as the river is already subject to significant light pollution in hours of darkness, including the adjacent existing Jubilee/Blue Bridge which is floodlit throughout the night. Therefore, **no LSE identified.**
	Permanent habitat loss Annex II lamprey species	**No**	See justification for 'Dee Estuary Ramsar'. **No LSE identified.**
	Air quality changes Annex II lamprey species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Introduction and spread of INNS Annex II lamprey species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
Deeside and Buckley Newt Sites SAC 1.7km west of the Scheme (no hydrological connectivity)	**Pollution event** Annex II newt species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Underwater noise and vibration Annex II newt species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Airborne noise and vibration Annex II newt species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Visual disturbance (including lighting)	**No**	This SAC is terrestrially based 1.7km away from the Scheme with no connectivity to the habitat with significant urban development screening any airborne or visual disturbance, and so there is no pathway of effect for this SAC. **No LSE identified.**

Designated site	Potential effect and relevant receptors	LSE identified?	Justification
	Annex II newt species		
	Permanent habitat loss Annex II newt species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Air quality changes Annex II newt species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**
	Introduction and spread of INNS Annex II newt species	**No**	See justification for 'River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC'. **No LSE identified.**

Source: Mott MacDonald, 2025.

6.5. Assessment of in-combination effects

1.1.183 There is no legal definition of what constitutes a plan or project for the purposes of the Habitats Regulations. In the absence of any Welsh guidance reference is made to the Projects on the National Infrastructure's (PINS) Advice Note Ten[58] which sets out that the following plans/projects should be taken into account:

a) projects under consultation;
b) permitted application(s) not yet implemented;
c) submitted application(s) not yet determined;
d) PINS programme of projects; and,
e) projects identified in the relevant development plan (and any emerging development plans – with appropriate weight being given as they move closer to adoption), recognising that much information on any relevant proposals will be limited and the degree of uncertainty which may be present.

Chapter 18 Cumulative Effects of the ES identified a long list of 51 Plans or Projects. From the long list, 17 Plans or Projects were shortlisted and have been integrated into this HRA for consideration of in-combination effects. These undergo screening in Table 9.

[58] Advice Note 10; Habitats Regulations Assessment relevant to nationally significant infrastructure projects. [Online] Available from: Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects | National Infrastructure Planning (planninginspectorate.gov.uk)

Developments considered for cumulative effects

Table 9 Screening of projects for potential in-combination effects

Plan or Project (including reference and distance from Scheme)	**Plan or Project Description**	**Screened in?**	**Justification for screening decision**
The Northern Gateway Reference: 0501250 2.0km	Northern Gateway is a large strategic mixed use site with employment, housing, community and retail facilities with a green infrastructure network. The principal outline permission (issued 07/01/2013) relates to the redevelopment of a strategic brownfield site for an employment led mixed use development infrastructure including flood defences and landscaping. The mixed-use site provides for 1,325 new homes and will include affordable housing. A total of 72.4ha has been allocated for employment land and includes an Amazon warehouse (approved 08/01/20 under 060222), storage and distribution unit (approved 09/03/23 under RES/000385/22) and a paper processing plant (approved 30/03/22 under 063721). The site includes multiple planning permissions and allocated within the FCC Unitary Development Plan (UDP) for employment led development.	**No**	According to the Flintshire Local Development Plan Annual Monitoring Report 2024[59], of the 11 housing sites, two are complete, one is under construction, one has works commencing, and seven are at various stages of planning. A peak of completions (587 housing units) is expected in 2025/26 with completions remaining relatively high for a further 2 years before tailing off and completing in 2030. The Northern Gateway is in close proximity to the Scheme and has temporal overlap with the construction and operation phase. However, an Appropriate Assessment conducted for the Northern Gateway and the former Corus Garden City[60] sites concluded that both Projects are '*not likely to engender significant environmental effects on the integrity of any Natura 2000 site*[61]' provided that the recommended mitigation measures were in place. These measures included the retention of a buffer zone of habitats adjacent to the River Dee, retention and enhancement of relevant habitats within the development, (i.e. Shotwick Brook for otters), creation of additional open water habitat to improve foraging resource, sensitive timing of works to avoid the migration season for designated fish species, and pollution control

[59] Flintshire County Council, 2024. Flintshire Local Development Plan 2015-2030, Annual Monitoring Report 1 01/04/23-31/03/24. Available from: Annual Monitoring Report 2024 AMR1
[60] Middlemarch Environmental Ltd, 2012. Former RAF Sealand (south) Deeside, Flintshire. Appropriate Assessment Stage 1: Screening. Report Number RT-MME-109736 RevA
[61] Middlemarch Environmental Ltd, 2012, Proposed Development at Northern Gateway Deeside, Flintshire, Appropriate Assessment Stage 1: Screening. Report Number RT-MME-111750 RevA

			measures. The in-combination effect highlighted within the Northern Gateway was the potential for increased recreation at Deeside and Buckley Newt Sites SAC as a result of the Northern Gateway and the Croes Atti development (which includes 600 dwellings). There is no pathway or effect on the Deeside and Buckley Newt Sites SAC arising from this Scheme and so no 'in-combination' effect applies to this designated site. The overall conclusion of the Stage 1 Screening Assessments for both of these Projects was that there was no need to carry out a Stage 2 Appropriate Assessment. As the Northern Gateway and Corus Garden City site assessments have concluded no-significant in-combination effects with each other, it is likely that this Scheme would also have no 'in combination' effects. Therefore, this project has been screened out for in-combination effects.
Former Corus Garden City site Reference: 0501250 1.7km	Planning permission for employment-led mixed-use development, incorporating Logistics and Technology Park with residential, local retail centre, hotel, training and skills centre, new parkland; conversion of buildings, demolition of barns; and associated infrastructure comprising construction of accesses, roads, footpaths/cycle paths, earthworks and flood mitigation/drainage works, with a number of planning conditions.	**No**	According to the Flintshire Local Development Plan Annual Monitoring Report 2024, 17 housing units had been completed by March 2024, and a further 666 yet to be constructed. See justification for the '*Northern Gateway*' Plan or Project. This project has been screened out for in-combination effects.
Connah's Quay Low Carbon Power Reference: 4.5km	Combined Cycle Gas Turbine Generating Plant fitted with Carbon Capture Plant on land at, and in the vicinity of, the existing Connah's Quay Power Station (Kelsterton Road, Connah's Quay, Flintshire, CH6 5SJ), North Wales. Likely to commence construction by 2026 and operation by 2031. Then second phase commences construction in 2031.	**No**	The Connah's Quay project, located 4.5km downstream, is a redevelopment on a brownfield industrial site, meaning it does not involve new incursion into natural habitats. The significant intervening distance and the downstream location preclude any plausible impact pathways from direct habitat loss, hydrological pollution, or atmospheric deposition affecting the bridge area. While mobile species like otters and birds may range between the locations, the localised

			nature of the works at Connah's Quay, combined with the existing industrial baseline to which wildlife is already habituated, means no significant population-level cumulative effects are anticipated for the distinct terrestrial species at the bridge site (Chapter 18 paragraph 17.7.63). Although there will be temporal overlap between the Scheme and this Project, there is not expected to be spatial overlap and the distance from the Scheme precludes any in-combination impacts. Therefore, this Project has been screened out.
Crump's Yard Reference: 060765; 061812 2.9km	Allocated in the UDP as potential area for waste management facilities. Recent permission for extension to workshop and proposal screening for wastewater pipelines. Solar farm approved and constructed, and reallocation of substation approved in 2020. No planning permission application for wastewater pipelines.	**No**	There is no spatial or temporal overlap of this Project with the Scheme and the distance precludes any overlap with potential designated receptors. Therefore, this Project has been screened out.
Redevelopment and expansion of former UPM Shotton Paper Mill Reference: FUL/000011/22 3.6km northwest of Scheme	Three 're- development' and new 'development' stages. August 2022 planning permission for piling works at the paper machine for redevelopment and expansion of existing. October 2022 planning permission for the redevelopment and expansion of former UPM Shotton Paper Mill site comprising of 82 hectares of new paper factory buildings and processing plant. Planning application documents state the current employment numbers at the site as 190 and proposed total employees as approximately 853. Estimated sequential construction for the site estimated over a four year period, commencing September 2022. Planning application submitted June 2024 for new buildings to extend paper mill facilities for tissue machine. Permission granted (November 2024) to be completed	**No**	There is temporal overlap with this Project and related Shotton Paper Mill Projects in this in-combination screening. There is no spatial overlap of this Project with the Scheme. Planning and Environment Decisions Wales highlighted the need for considerations for construction and operation noise and vibrations, both human population and ecological receptors and these included in the Project's final Environmental Impact Assessment (EIA). However, given the distance between the Scheme and this Project, it has been screened out for in-combination effects.

	within 5 years. Construction expected to be completed by 2026.		
Construction and operation of a waste management facility Reference: 058270 2.6km northwest of Scheme	Northern and southern portions constructed as waste to energy facility (Parc Adfer) and high-voltage direct current converter station. For construction and operation of a waste management facility for the management of municipal, commercial and industrial waste, comprising: a waste reception hall with ground level pit tipping area, sorting hall with associated equipment for separation. Approved (October 2018). Approval of conditions subsequently issued.	**No**	Construction for Parc Adfer waste to energy facility has been completed and operation commenced in 2019. It processes up to 232,000 tonnes of residual waste and produces enough energy to power more than 45,000 homes. Given that the Project is now operational, and has no spatial overlap with the Scheme, it has been screened out for in-combination effects.
Construction of an anaerobic digestion plant for the purposes of waste treatment and generation of 500kW renewable energy Reference: 050249; 053712 0.5km south of the Scheme	Construction of an anaerobic digestion plant for the purposes of waste treatment and generation of 500kW renewable energy consisting of a reception building, two digestion tanks, a digestate product storage tank, three delivery storage tanks, two pasteurisers, Combined Heat and Power generation equipment including an exhaust stack, electrical grid connection infrastructure, an auxiliary shielded flare, odour management equipment and concrete bunding walls. Site 10A remains with pending planning application, for approval of details in connection with planning permission code 050249 for the construction of an anaerobic digestion plant, submitted May 2015.	**No**	At the time of writing, this Project has not been constructed and there is no anticipated programme for construction. Further, the Project site is relatively small and, despite being in close proximity to the Scheme, is within an industrial site. Given the lack of programme for this Project, and its relatively small scale and lack of spatial overlap, it has been screened out for in-combination effects.
Port of Mostyn Extension: Reference: CML2283 21km northwest of scheme	Work consisting of construction of a new quay wall and the reclamation of approximately 4.5ha of land behind the new sea wall. Dredging works will be required for the creation of new berths, and the deepening of existing berths and approach channel and will be	**No**	Given the distance of this Project from the Scheme, particularly as it is greater than two tidal excursions, there is unlikely to be any in-combination effects. Therefore, this project is screened out.

	required for future maintenance activities. Dredging works to be completed for operation in 2027.		
Port of Mostyn maintenance dredging Reference: 21km	Maintenance dredging activity by means of cutter suction hopper dredger at Mostyn Harbour which will be pumped through a floating pipeline directly into the Mostyn Breakwater disposal site. Deepening channel by 4m and removing 450,000m3 annually for three years.	**No**	Given the distance of this Project from the Scheme, particularly as it is greater than two tidal excursions, there is unlikely to be any in-combination effects. Therefore, this project is screened out.
Tidal Lagoon in Dee Estuary Mostyn Dock Reference: 21km northwest of the Scheme	Proposals for a tidal lagoon in the outer Dee Estuary. The design includes a 6.7km boundary wall extending from the Port of Mostyn to the Point of Ayr at the estuary mouth. It will produce enough low-carbon electricity to power 82,000 homes in North Wales. It will create 300 jobs during the construction period as well as permanent jobs during its operational phase. It will also provide flood protection to a hinterland that includes homes and businesses as well as the A548 Coast Road and the North Wales coast railway line.	**No**	The proposed Tidal Lagoon at Mostyn Dock is located 21km downstream and is an entirely marine and coastal engineering project. This geographical separation and the fundamentally different nature of the project eliminate any direct impact pathways on the terrestrial habitats and species at the Dee Bridge. The project's primary effects are on marine hydrodynamics in the outer estuary, which would have an imperceptible influence on the fluvial-dominated river section 21km upstream. The only potential, albeit weak, pathway for cumulative effects would be through highly mobile species such as otters or estuarine birds. However, the vast scale of the wider Dee Estuary provides extensive alternative habitats, and the bird species most likely to be affected by the lagoon are ecologically distinct from the terrestrial bird communities identified as important at the bridge scheme. Therefore, due to the substantial distances and the absence of any functional ecological connectivity, neither project is expected to result in significant cumulative adverse effects (Chapter 18 paragraph 17.7.74). Consent has not been provided for this Project and therefore it is unlikely to overlap temporally with the Scheme. Therefore, this Project is screened out for cumulative effects.

Combined Heat and Power (CHP) Facility, Shotton Paper Mill Reference: DNS/3279559 3km northwest of the Scheme	One of the largest development sites with planning permission approved for the redevelopment of this site in October 2022 and acknowledges that routes to the site are within the vicinity of the Scheme. A project to redevelop the mill to process wastepaper and manufacture card and packaging materials, CHP Facility relating to redevelopment and expansion of Shotton Paper Mill. The generation capacity of the CHP Facility will be 69MWe. A Development of National Significance (DNS) application, separate to the Local Planning Authority process, is identified under the DNS category of development by PEDW with a 'notice of intention to submit an application' submitted on the 14 September 2021. Inspectors Report submitted to Planning Directorate of WG 3 January 2025.	**No**	This Project does not overlap spatially with the Scheme and is unlikely to overlap temporally with the Scheme construction phase. Therefore, this Project is screened out for in-combination effects.
Hydrogen Ready Gas Plant at Deeside Power Station Reference: EPR/XP3131VK/V002 3.5km northwest of the Scheme	Former building to be used as a Hydrogen-ready Gas Peaking Plant. The Operator is now proposing to supply electricity to the National Grid via 11 gas reciprocating engines for a maximum of 2000 hours per annum. The engines will be fuelled by natural gas to generate 4.5Mwe (9.896MWth) per engine for a stated aggregate export capacity of 49.5Mwe and a net rated thermal input of 108.856MWth. Construction is anticipated to begin in June 2025. The facility also incorporates provisions for future hydrogen conversion and energy storage integration.	**No**	This Project does not overlap spatially with the Scheme and the distance is likely to preclude any potential overlapping effects occurring during concurrent construction phases. Therefore, this Project is screened out for cumulative effects.

HyNet Carbon Dioxide Pipeline Reference: EN070007 0.8km southeast of the Scheme	A new build CO_2 pipeline that will transport CO_2 produced and captured by future hydrogen producing facilities and existing industrial premises in Northwest England and North Wales for offshore storage. The CO_2 pipeline will comprise both newbuild and existing pipelines (and newbuild and existing above-ground installations (AGI) to allow operation and maintenance works in relation to the pipeline, including the newbuild Proposed Flint AGI) that will be covered under the Development Consent Order (DCO). When complete it will run from the Ince AGI in Cheshire to Talacre Beach in North Wales. A decision on the application for a DCO was taken on 20 March 2024, with construction set to commence in August 2025 and last approximately 16 months. A correction order came into force on October 2024. May only be operational from 2031 or later.	**No**	The Project's HRA[62] concluded that based on mitigation measures secured, any AEOI of any designated site could be excluded in-combination with other plans and projects. It was noted in the Project Applicant's HRA report[63] that other developments each either have their own mitigation strategies or are at the pre-application stage so will secure a mitigation strategy as part of their own consenting process. Therefore, this Project has been screened out of the in-combination assessment.
Heidelberg Plant Spur Pipeline Reference: SCO/000250/24 5.5km	Site at Padeswood Hynet Carbon Dioxide Spur Pipeline 10km linear route from Heidelberg Materials Plant (Padeswood to Northop Hall). A new build CO_2 pipeline that will transport CO_2 produced and captured by future hydrogen producing facilities and existing industrial premises in Northwest England and North Wales for offshore storage. The CO_2 pipeline will comprise both newbuild and existing pipelines (and newbuild and existing above-ground installations (AGI) to allow operation and maintenance works in relation to the	**No**	This Project does not overlap spatially with the Scheme and the distance is likely to preclude any potential overlapping effects occurring during concurrent construction phases. Therefore, this Project is screened out for cumulative effects.

[62] Department for Energy Security and Net Zero, 2024. Habitats Regulations Assessment for an Application Under the Planning Act 2002. Hynet Carbon Dioxide Pipeline. [online]. Available from: EN070007-003075-HYCO - Habitats Regulations Assessment (hold).pdf
[63] WSP, Liverpool Bay CCS Ltd, 2022. Habitats Regulations Assessment – Information to inform an appropriate assessment. [online] Available from:Habitats Regulations assessment – Information to inform an appropriate assessment

	pipeline, including the newbuild Proposed Flint AGI) that will be covered under the DCO. When complete it will run from the Ince AGI in Cheshire to Talacre Beach in North Wales. EIA Scoping decision issued May 2024.		
Padeswood Carbon Capture and Storage Reference: 6.5km	The Padeswood Carbon Dioxide Spur Pipeline Proposed Development forms part of the wider HyNet Project and is focused on Carbon Capture and Storage. The objectives of HyNet are to reduce carbon dioxide emissions from industry and support economic growth in North Wales and the Northwest of England. Approximately 10km in length, connecting the Heidelberg Materials (formerly known as Hanson) cement works in Padeswood (Flintshire) with the HyNet Carbon Dioxide Pipeline at the Northop Hall AGI in Flintshire. The route options for the pipeline are under consideration, with statutory consultations in spring 2025, planning application to be submitted the same year. Construction is planned for 2026 to 2028.	**No**	This Project does not overlap spatially with the Scheme and the distance is likely to preclude any potential overlapping effects occurring during concurrent construction phases. Therefore, this Project is screened out for cumulative effects.
Sealand Manor Solar Farm Reference: Overlapping/adjacent	Sealand Manor Solar Farm and battery energy storage system on land to the northeast of the existing River Dee A494 Bridge. Off Manor Road, CH5 2SB. Covering an area of approximately 94ha on Grade 2 agricultural land. To generate 89MW of renewable energy with a 40MW battery storage system.	**Yes**	At the time of writing, an informal consultation was hosted by Renewable Connections, the Project applicant, in March and April 2025, and Renewable Connections were in the process of preparing an application to submit to Planning and Environment Decision Wales. A formal consultation is anticipated to occur later in 2025. Construction is anticipated to commence from 2029[64], which overlaps with the latter end of this Scheme's programme which is expected to complete with the removal of the existing bridge in spring 2030. Further, the proposed Project overlaps with the Scheme, and therefore its

[64] Renewable Connections, 2025. Sealand Manor Farm and BESS. [online] Available from: https://renewableconnections.co.uk/our-sites/sealand-manor-solar-farm-and-battery-energy-storage-system/

			terrestrial and avian ecological receptors. Therefore, this Project is screened in for in-combination effects.
A55/A494/A548 Flintshire Corridor infrastructure project Reference: Adjacent	The Welsh Government's proposed A55/A494/A548 Flintshire Corridor infrastructure project linking Deeside Park Interchange to the Flintshire Bridge and Northop, west of the scheme.	**No**	The Welsh Government's proposed A55/A494/A548 Flintshire Corridor infrastructure project could represent an additional, significant transport development within the same locality. This could contribute towards further changes and impacts but following the Welsh Governments publication of their investment plan, this Project is unlikely to proceed in the same timescale at the Scheme.

Source: Mott MacDonald, 2025.

1.1.184 The in-combination assessment (Table 9) identified Sealand Manor Solar Farm, overlapping the extent of the Scheme, to be assessed for LSE (Table 10) on the designated sites and qualifying features in-combination with the Scheme.

Table 10 Assessment of LSE for in-combination effects.

Plan or Project	LSE identified?	Justification
Sealand Manor Solar Farm Reference: N/A Overlapping/adjacent with the Scheme	**No**	The current solar farm red line boundary[65] appears to intersect that of the A494 Scheme site boundary and includes a spatial overlap of where the new A494 road footprint will be. Further, there will be temporal overlap, with Project construction anticipated to commence from 2029 onwards for approximately 39 weeks, and this Scheme is expected to conclude in spring 2030 with the demolition of the existing A494 bridge. The project's riverside location means that it will potentially affect some of the same designated sites (River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC, Dee Estuary Ramsar/SPA) and features (otter, birds – it is assumed in this HRA that in-river works for the solar farm are not required due to the nature of the development and the current red line boundary) as this Scheme through visual and acoustic disturbance during construction and operation. Construction includes the installation of the panels, small electric cabins located amongst the panels linked by a network of crushed stone pathways, and Battery Energy Storage System (BESS), which comprises a total of 94ha.

[65] Renewable Connections, 2025. Sealand Manor Solar Farm and BESS. [online] Available from: Sealand Manor Solar Farm and Battery Energy Storage System | Renewable Connections

	The scale of the construction works, based on current information given above, is expected to be minimal, and there are potential plans for land between and beneath panels to be used for biodiversity enhancement. To date, the Project highlights that hedge planting and screening will be implemented, which will attenuate visual disturbance. The majority of the land use will be for the solar panels, and the BESS is anticipated to comprise half a hectare[66] of the 94ha and so use of plant, if required, is likely to be limited to the site of the BESS. The Sealand Manor Solar Farm will be required to define and secure their own mitigation strategy as part of the consenting process. Due to the likely small scale of the works, and the requirement for mitigation to be identified and agreed prior to construction, it is unlikely there will be significant effects arising from the combination of this Project and the Scheme. **Therefore, no LSE are identified.**

Source: Mott MacDonald, 2025.

[66] Renewable Connections, 2025. Company Brochure. [online] Available from: Renewable-Connections-Company-Brochure-web-July-2025.pdf

6.6. Stage 1 Screening summary

Alone

Construction phase

1.1.185 The 'alone' assessment at Stage 1 Screening for the construction phase identified potential impacts to the designated sites shown in Table 11.

1.1.186 Note that any impact pathways, designated sites or qualifying features not included in Table 11 have been screened out. No LSE were identified for impact pathways for the Deeside and Buckley Newt Sites SAC.

Table 11 Screened-in designated sites, qualifying features and the impact pathways affecting them for the construction phase.

Impact pathway	Designated site and qualifying features for which LSE have been identified
Underwater noise and vibration	River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC – specifically qualifying fish species and otter Dee Estuary/Aber Dyfrdwy SAC – specifically qualifying fish
Airborne noise and vibration	River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC – specifically otter Dee Estuary Ramsar – specifically Criterion 5 and 6 (waterbirds) Dee Estuary SPA – specifically qualifying birds
Visual disturbance (including lighting)	River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC – specifically otter Dee Estuary Ramsar – specifically Criterion 5 and 6 (waterbirds) Dee Estuary SPA – specifically qualifying birds
Permanent habitat loss	River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC – specifically otter
Temporary habitat loss	River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC – specifically otter

Source: Mott MacDonald, 2025.

Operational phase

1.1.187 The ‘alone’ assessment at Stage 1 Screening for the operational phase identified potential visual disturbance to otter, a qualifying feature under the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC.

1.1.188 No LSE were identified for impact pathways for the Dee Estuary Ramsar site/SPA, Dee Estuary/Aber Dyfrdwy SAC, or Deeside and Buckley Newt Sites SAC, or other impact pathways for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC.

In-combination

Construction phase

1.1.189 The in-combination assessment at Stage 1 Screening for the construction phase identified Sealand Manor Solar Farm for assessment of LSE (Table 9).

1.1.190 The assessment of LSE found no LSE for Sealand Manor Solar Farm in-combination with this scheme (Table 10).

6.7. Stage 1 Screening conclusion

1.1.191 LSE were identified for the designated sites in Table 7 and Table 8. As LSE have been identified, a Stage 2 Appropriate Assessment is required to outline mitigation for the proposed works to avoid affecting the integrity of the designated sites.

7. Stage 2 – Appropriate Assessment

7.1. Background

Consultation

1.1.192 As the SNCB, NRW were consulted to understand the potential effects to be considered with the HRA. A response to the Scheme's EIA Scoping report was been received from NRW (31 January 2025). Details of additional consultation responses, including date, consultee, issue raised and response, can be found in Chapter 8 Terrestrial Biodiversity of the ES, Table 8-7, which has been reproduced in Table 12 for completeness.

Table 12 Previous consultation responses.

Date	Consultee and issue raised	Response
11 June 2018 (Environmental Liaison Group (ELG) meeting)	Amanda Davies FCC/Bat Roost Features in the form of wooden planks reported anecdotally to be set within the Dee Bridge.	Inspections of the bridge have been carried out. No Bat Roost Potential noted on the sub structure, bat transect survey focused on the bridge with 5-minute stopping points.
	Amanda Davies FCC and NMWTRA. Water voles noted in the Queensferry Drain in 2007. NMWTRA have conducted surveys, no records noted. Water voles noted on Sealand side in ditches.	New surveys for water voles in the Queensferry Drain were conducted for this assessment, no evidence noted. Reasonable avoidance measures to be considered.
	Amanda Davies FCC confirmed that there is a migratory fish route under the River Dee Bridge.	SAC feature. NRW count data for salmonids and lamprey obtained
	Amanda Davies FCC, the river corridor should be retained as a 'dark corridor' with no light spill from any lighting required for the road. Daubenton's bats have been seen along the river.	Sensitive lighting designs will be considered as part of the detailed design process.
	Amanda Davies FCC suggested that pollution control measures should be specified and included in the Habitat Regulations Assessment.	Noted and included.
	Amanda Davies FCC confirmed that hedges around the Scheme are not species rich.	Confirmed during the Phase 1 habitat survey.
9 October 2018 (Technical Working Group (TWG) meeting)	Matthew Ellis NRW. Deeside and Buckley Newt Sites SAC scoped out of the HRA. Consideration to be given to other designated sites.	Designated sites and features of interest will be considered as part of this and the HRA assessment. Deeside and Buckley Newt Sites SAC scoped out.
	Fisheries NRW. No major concerns about siltation effects, main concern is timing of works within River Dee.	Works will be timed to avoid sensitive periods for migratory fish. NRW to advise further once Scheme develops.
	Matthew Ellis NRW. Consideration of INNS, including the Chinese mitten crab.	Phase 1 habitat surveys to identify location of INNS. Biosecurity risk assessments to be produced and measures to be included in the CEMP.

10 October 2018 (ELG)	Amanda Davies FCC and Mark Watson-Jones (NMWTRA) enquired about translocating saltmarsh that will be lost by the proposed Scheme.	Translocation of saltmarsh may increase the disturbance area. Minimal saltmarsh would be lost due to the Scheme. Work which improves condition elsewhere could be acceptable mitigation.
	Amanda Davies FCC highlighted that barn owls use the Dee corridor and feed on the marsh. Pink-footed geese have increased in population along the River Dee corridor.	Overwintering bird surveys will be conducted. Consultation with RSPB. Scheme will consider effects on Schedule 1 birds.
NRW response to Scoping (email 19 Sept 2018)	NRW requested modelling and calculations in order to assess the impacts to saltmarsh habitat, salmon, sea/river lamprey and common tern.	The effects will be assessed within the ES and Statement to Inform Appropriate Assessment (SIAA).
FCC response to Scoping	N/A	No response but advice and comments received during the ELG which are detailed above.
2 May 2019	NRW - The potential for the creation and/or enhancement of habitats to compensate for the loss of a small area of saltmarsh were discussed over the phone with NRW.	NRW state that potential sites will be investigated as to their suitability for management and habitat creation/enhancement.
19 June 2019	NRW – Highlighted three potential areas as compensation for the loss of a small area of saltmarsh	These areas were discussed with NMWTRA and the Welsh Government to develop proposals (see para 8.5.30).
21 June 2019	NRW – Review of the draft Environmental Statement.	Various comments which were taken into consideration and applied to the finalising of this ES.
10 August 2021 (ELG)	NRW – Species Officer highlighted the need for a derogation licence for great crested newt	A Ghost Licence has been prepared.
26 May 2022 ELG #6	ELG meeting to provide general update on scheme proposals since last ELG on 16 August 2021	Sites for saltmarsh mitigation being explored. Draft orders have been prepared for the Scheme.
5 December 2024 ELG #7	Main purpose of ELG was to review the revised and updated Environmental Objectives that have been drafted to be more aligned with Llwybr Newydd I Natur.	New EOs agreed at the ELG.
25 March 2025 ELG Site Visit	ELG site visit to gain a general understanding of the most recent scheme proposals (Option E).	The site visit presented the opportunity for the ELG to meet face to face and discuss issues on site.
27 March 2025 ELG #8	ELG to record feedback from site visit and discuss any matters arising following the visit.	The ELG (Welsh Government, NMWTRA and FCC) would like the design team to explore more opportunities for improving biodiversity and connectivity.
14 May 2025 TWG	TWG held to discuss opportunities for improving biodiversity and connectivity.	Design team to look at feasibility of increasing connectivity through provision of mammal underpasses and longer sections of open culvert along Queensferry Drain.

Source: Mott MacDonald, 2025.

1.1.193 NRW identified three key environmental considerations:

a) Activities that generate noise and vibration;

b) Disturbance and mobilisation of silt; and,

c) Night-time operation that may affect migrating fish.

1.1.194 Following consultation, NRW confirmed that potential impacts on the river environment had been mitigated as far as reasonably practicable. Consequently, NRW lifted a previous constraint that restricted in-river works between September and February. This decision was based on NRW's understanding that:

a) Percussion piling will not be used;
b) The working method aligns with the described approach; and
c) Time limits for piling activities will be adhered to.

8. Appropriate Assessment

1.1.195 This section only considers those impacts identified as having LSE. The assessment is presented in order of the designated sites and their qualifying features. The following mitigation for each of the designated sites and qualifying features provided addresses both the construction and operational phases of the Scheme (where relevant). Where SPA and Ramsar sites overlap (Dee Estuary) and are designated for similar interest features, these are assessed together to avoid duplication.

1.1.196 The following mitigation measures will be implemented to ensure the Scheme does not have the potential to adversely affect the Conservation Objectives of the designated sites and qualifying features. Mitigation has been considered as an intrinsic and iterative part of the Scheme design process including measures to reduce adverse effects which include 'mitigation by design' which are integral to the Scheme. The 'mitigation hierarchy'[67] of avoid, mitigate/reduce, compensate/remediate, and enhance has been adopted as part of the process.

8.1. River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC

1.1.197 The following impacts have been flagged as potentially resulting in LSE on the on the qualifying features of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC:

a) Construction phase:

a. Underwater noise and vibration – qualifying fish and otter
b. Airborne noise and vibration – otter
c. Visual disturbance (including lighting) – otter
d. Permanent habitat loss – otter
e. Temporary habitat loss – otter

b) Operational phase:

a. Visual disturbance (including lighting) – otter

[67] CIEEM, 2018. Guidelines for ecological impact assessment in the UK and Ireland. Terrestrial, freshwater, coastal and marine. Available from: Combined-EclA-guidelines-2018-compressed.pdf

Underwater noise and vibration

Conservation Objectives

1.1.198 The River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC Core Management Plan and Conservation Objectives[68] identifies noise and vibration as a hydromorphological barrier to the migration of sea and river lamprey. The Management Plan suggests that when noise and vibration arise from construction or development related activities it may be necessary to restrict the timing of such activities.

1.1.199 Noise and vibration is not specifically listed as a threat to otter or Atlantic salmon within the plan but identifies that artificial barriers in river morphology may prevent significant numbers of adults from reaching existing and historical spawning grounds, and smolts from reaching the sea. As with river and sea lamprey, underwater noise and vibration can pose a hydromorphological barrier by inducing avoidant/fleeing behaviour. The Management Plan identifies that otters are sensitive to human disturbance, especially sudden changes in activity, particularly female otters with cubs. The Management Plan suggests no significant increase in disturbance to otters. Recommendations for managing otter in the river include fencing of riverbanks with a suitable buffer, which will reduce disturbance.

Assessment of effects

1.1.200 It is anticipated that the in-river piling works could take up to 12 months, depending on the contractor's detailed construction methodology and programme (ES Chapter 2: The Project). Noise and silt disturbance would arise from inserting the steel casing tubes into the riverbed to a depth.

1.1.201 Other associated noise or silt disturbance may arise from the permanent installation of the sheet piles to the riverbank to maintain flood bank level of integrity during construction. Chapter 12 of the ES presents the vibration data associated with vibration arising from rotary bored piling operations occurring in-river for the construction of the bridge piers. Receptors located approximately 3m or less from the

[68] NRW, 2022. CORE MANAGEMENT PLAN INCLUDING CONSERVATION OBJECTIVES FOR River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC. Available from: https://naturalresources.wales/media/673374/river_dee___bala_lake_32_plan.pdf

rotary bored piling works are predicted to experience a Peak Particle Velocity (PPV) greater than 1.0mm/s (Chapter 12; paragraph 12.6.14).

1.1.202 Temporary sheet piling will be installed for the construction of the temporary jetty. Receptors located approximately 42m or less from the vibratory sheet piling works may experience a PPV greater than 1.0mm/s (ES Chapter 12 paragraph 12.6.18). Vibratory compaction will be used for the construction of pavements on the carriageways and cycleways. Receptors located approximately 16m or less from the vibratory sheet piling works may experience a PPV greater than 1.0mm/s (ES Chapter 12 paragraph 12.6.22).

1.1.203 In NRW's response (dated 21 June 2018) to the 'Draft Environmental Statement for A494 River Dee Bridge Improvement Scheme' they received on 21 February 2018, they stated that otter are "likely to use the site for at least dispersal purposes" and that "suitable breeding sites are not likely". A technical note (7 September 2018, reference 3094-11) appended to the 'Environmental Statement' determined that Cofnod data showed two records of otter (tracks in mud), both from 2006, within 500m of the existing bridge. Field surveys carried out in July and September in 2018 found otter prints in the mud on the south bank of the River Dee. No confirmed otter holts were recorded, though it was noted that suitable rest up areas were available. A search of NBN Atlas and NBN Atlas Wales using a polygon to cover the River Dee between Chester Weir upstream in the southeast to Flintshire Bridge downstream in the northwest yielded no results for recordings of otter.

1.1.204 The presence of evidence of otter within the Scheme boundary during surveys demonstrates their use of the site and therefore, potential LSE remain necessitating mitigation.

1.1.205 A search of NBN Atlas and NBN Atlas Wales using a polygon to cover the River Dee between Chester Weir upstream in the southeast to Flintshire Bridge downstream in the northwest yielded the following results for Atlantic salmon and lamprey species, as identified from seine netting surveys on behalf of NRW:

a) One river lamprey in September 2022
b) Two sea lamprey in September 2012

c) Atlantic salmon in July and October 2005, September 2007, May 2008, May 2011, May 2012, May and September 2013, May 2014 and May 2015.

1.1.206 According to the Dee Stock Assessment Programme[69], 2,209 Atlantic salmon (fish of all sea ages) were trapped at Chester Weir in 2023. This was the second lowest record in the 30-year time-series.

1.1.207 Due to the low numbers of river and sea lamprey, and the absence of brook lamprey records, it has been assessed that there are no LSE for all qualifying lamprey species. However, Atlantic salmon have been recorded during annual surveys more frequently, and so the likelihood of underwater noise disturbance remains greater. As time-series data suggest Atlantic salmon are declining in the River Dee, it is pertinent to avoid disturbance that may further contribute to any decline. Therefore, potential LSE remain for Atlantic salmon, necessitating mitigation.

Mitigation

1.1.208 Chapter 12 of the ES (Noise and Vibration) describes the approach for controlling and mitigating construction noise. Typical means by which noise and vibration will be minimised (as per Chapter 12 paragraph 12.5.11) relevant to this HRA include:

a) Selecting quiet equipment;
b) Ensuring equipment is maintained in good working order and is used, in accordance with the manufacturer’s instructions;
c) Members of the construction team trained and advised by a competent ecologist during 'toolbox’ talk briefings on quiet and discreet working methods;
d) Equipment not to be left running unnecessarily;
e) Equipment fitted with silencers or mufflers;
f) Plant enclosures/screens used whenever feasible to minimise acoustic and visual disturbance;
g) Careful orientation of plant with directional features;
h) Materials lowered instead of dropped from height;
i) Managing deliveries to prevent queuing of site traffic at access points; and

[69] NRW, 2023. Dee Stock Assessment Programme Angler Report. Available from: DEE STOCK ASSESSMENT PROGRAMME

j) Using adjustable, directional audible vehicle reversing alarms or alternative warning systems (for example white noise alarms).

1.1.209 Construction vibration is not anticipated to exceed Peak Particle Velocity levels of 1.0mm/s at sensitive receptors, however vibration mitigation will also be set out within the CEMP. Additional vibration mitigation measures (Chapter 12 paragraph 12.5.14) relevant to this HRA include:

a) Utilising low vibration working methods;
b) Replacement of plant that is causing significant levels of vibration with other plant; and
c) Consideration of alternative methods.

1.1.210 The Scheme's Construction and Buildability Report identified the following mitigation measures as stipulated within BS:5228[70] *Code of practice for noise and vibration control on construction and open sites* (Part 1 and 2):

a) The use of 'best practicable means' during all construction activities;
b) Switching off plant and equipment when it is not in use for longer periods of time;
c) Establish agreement with the local authority on appropriate controls for undertaking significantly noisy works or vibration-causing operations close to receptors;
d) Programming works so that the requirement for working outside normal working hours is minimised;
e) Use of low noise emission plant where possible;
f) Where feasible piling would be bored to protect sensitive sites;
g) The use of temporary noise screens around particularly noisy activities; and
h) Regular plant maintenance.

1.1.211 Chapter 16 Marine Environment of the ES lists primary, secondary and tertiary mitigation measures to reduce any potential environmental effects. The primary mitigation measures are those which are embedded in the Scheme design to avoid or reduce environmental effects (ES Chapter 16, Section 16.7).

1.1.212 Reasonable avoidance measures would be used where protected species or their habitats would likely be affected, the works will be carried out in accordance with the methods detailed in the Outline CEMP/constructability report (395318-MMD-00-XX-

[70] British Standards Institute, 2014. BS 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites.

RP-Z-0034), or as agreed with a qualified marine ecologist, subject to consents, licences (e.g. Marine Licence, Water Framework Directive assessment) and conditions within those licences. Reasonable avoidance measures relevant to this impact pathway and SAC would include:

a) The installation of pile casings will be undertaken between 0800 and 1700hrs, with no work undertaken in the three-hour period leading up to high tide at Chester weir (as previously agreed with NRW Marine Area Advice and Management Team to reduce risk of disturbance to migrating fish).
b) Boring within the pile casings minimises noise and removes risk of material loss as silt into the River Dee.
c) Concrete works will be carried out with containment to prevent loss of concrete to the River Dee.

1.1.213 Secondary mitigation measures to reduce adverse effects include the following ‘mitigation by design’, which are integral to the Scheme:

a) Piling activities will be undertaken only in daylight hours to provide suitable windows of opportunity for migratory fish species (i.e. Atlantic salmon) to pass through the River Dee undisturbed on their migratory routes, as agreed by NRW during consultation.
b) Soft-start procedure to be implemented prior to commencement of piling activities to allow suitable time for fish, mammals, waterbirds, and other mobile species to move away and avoid areas of increased noise levels, thereby largely reducing the risk of injury and/or stress to these species.

1.1.214 Chapter 16 Marine Environment identified that the noise and vibration associated with piling to form the foundations for the replacement bridge may have a direct moderate adverse effect on salmonid species if conducted during their migration seasons and at nighttime. The migratory seasons for all the key species in the Dee Estuary range from February to April for river lamprey and May to September for sea lamprey and salmonids, therefore it is difficult to avoid all species peak seasons. For this reason, as secondary and tertiary mitigation measures implemented in the scheme and agreed with NRW (consultation regarding Marine Licensing, 6 May 2022) that the in-river working using a jack-up barge or pontoons could be carried out at any time of the year subject to the following restrictions:

a) Working hours restricted to daylight hours, between 8am and 5pm with a soft-start approach to minimise the risk of disturbance to migrating fish
b) No piling work to take place in the 3 hours leading up to high tide at Chester weir

1.1.215 If the above mitigation measures are not achievable, then in-river working would be restricted to between early March and November, to avoid overwintering bird season and which is a major constraint on construction operations that could potentially lead to significant risk of delays to the construction programme and that should be avoided. With the secondary and tertiary mitigation in place, the effect of noise and vibration disturbance on migratory fish is considered to be a minor adverse impact, which is not significant.

1.1.216 Chapter 8 Terrestrial Biodiversity within the ES identified that the predominant effects on otter were disturbance, obstruction to their movement on the riverbank, and use of temporary lighting at nighttime. The adoption of residual avoidance measures, as those listed above from Chapter 16 Marine Environment within the ES, in addition to briefing site personnel on the need to avoid disturbance of otters, resulted in a neutral residual impact. The Scheme is not likely to be detrimental to the maintenance of the favourable conservation status of otters at a local, county, regional or UK spatial scale.

Airborne noise and vibration (construction phase)

Conservation Objectives

1.1.217 The Conservation Objectives for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC given for the impact pathway ‘Underwater noise and vibration’ are also relevant for this impact pathway.

Assessment of effects

1.1.218 The assessment conclusions under 1.1.204 for ‘Underwater noise and vibration’ are also relevant for this impact pathway.

Mitigation

1.1.219 The following mitigation measures would be implemented to ensure that the project does not have the potential to adversely affect the conservation objectives for otter:

a) Pre-construction site walkovers to identify any possible holts, refuges and resting–up areas used by otters.

1.1.220 The same mitigation measures identified above for 'Underwater noise and vibration' for this SAC will equally address the same potential impacts on otter.

Visual disturbance (construction phase)

Conservation Objectives

1.1.221 A Conservation Objective for the otter includes:

a) All known or potential access or dispersal routes within the catchment for otters that might be considered part of the SAC population should be maintained such that their function is not impaired including the incorporation of measures or features required to avoid disturbance.

Assessment of effects

1.1.222 Although largely nocturnal, otters may nevertheless be disturbed by construction and demolition phases of the Scheme, including during any such activities adjacent to the River Dee. Their movement along the riverbank may be obstructed by construction materials or activities, in particular any works which involve disturbance to the existing riverbanks. Whilst the River Dee itself would still be available for the passage of otters (Chapter 8 Terrestrial Biodiversity in the ES; paragraph 8.7.38), there may be requirement for some nighttime operations.

1.1.223 There is an existing and significant floodlight source at Scottish Power Energy Networks (SPEN) on the southwest bank of the River Dee that currently illuminates the river at night all year round. Therefore, there may be a degree of habituation to artificial light at night, but the extent of the Scheme lighting will be additive to the area.

1.1.224 During the construction period, the two temporary site compounds are likely to be floodlit at night for security, and such lighting may be required for the construction of the bridge. Artificial lighting may, therefore, discourage otter from using the River Dee as a means of passage. Road lighting was removed from the existing bridge as a result of deterioration, but some nearby lighting still spills onto the River Dee corridor.

1.1.225 Connectivity is critical for otter habitat use, and disruption of this can affect otter dispersal, behaviour and population dynamics[71,72]. The occupation of riparian land by the Scheme and in-river works may present a physical and visual barrier to movement and have an adverse effect on otter dispersal.

1.1.226 As per paragraph 1.1.203 and 1.1.204, otter are known to use the Scheme site. Given the breadth of the Scheme area across the river, the visual disturbance may pose a barrier to movement. Therefore, LSE remain and necessitate further mitigation.

Mitigation

1.1.227 Additional night-time lighting will be used only where and when it is essential for safety. Lighting for health and safety will be required where work takes place during periods of diminishing ambient light, particularly during the winter months or when night working is undertaken, in line with the proposed construction programme. This lighting should be operational only during active working hours and will be switched off outside of these periods. Lighting would only be directed to where it is required and set at a low intensity where practical. Spillage of light onto the river and banks would be minimised.

1.1.228 During the construction period, the two temporary site compounds are likely to be floodlit at night to allow for night-time working and for security reasons. Lighting within the site compounds will support general logistical operations typical with the types of work being undertaken such as access, vehicle movements, and temporary storage operations etc. To avoid AEOI, the lighting needs to minimise spill and upward light onto the habitats used for foraging and commuting, and should be inactive outside of operational hours.

1.1.229 Security lighting will be operational during the night with the location, levels of light and hours of operation being dependent on the individual security concerns of the construction site. Security lighting is normally concentrated towards the perimeter and entrances to the construction site. It is anticipated that lighting for security will be

[71] Leoncini, F., Semenzato, P., Di Febrraro, M., Loy, A. and Ferrari, C., 2023. Come back to stay: landscape connectivity analysis for the Eurasian otter (*Lutra lutra*) in the Western Alps. *Biodiversity Conservation*, 32, 653-669. Available from: Come back to stay: landscape connectivity analysis for the Eurasian otter (Lutra lutra) in the western Alps | Biodiversity and Conservation
[72] Hong, S., Kim, D.-K, Do., Y., Kim, J.Y., Kim, Y.-M, Cowan, P. and Joo, G.-J., 2018. Stream health, topography, and land use influences on the distribution of the Eurasian otter *Lutra lutra* in the Nakdong River Basin, South Korea. *Ecological Indicators,* 88, 241-249. Available from: https://doi.org/10.1016/j.ecolind.2018.01.004

required as this will primarily be used to support a CCTV system/patrolling guarding and response. External security lighting shall consider the use of both motion sensors and infra-red spectrum lighting with 30-minute timers.

1.1.230 It is anticipated that temporary but obtrusive light emissions produced during construction activities is anticipated but will be controlled through the implementation of embedded mitigation measures within the CEMP. The measures incorporated within the CEMP will be informed by reference to Institution of Lighting Professionals (ILP) GN01:2021[73] and GN08/18:2018[74] guidance notes and will include prevention measures as appropriate and set out requirements for ongoing monitoring and liaison with the local community and FCC. The effectiveness of lighting mitigation measures will be monitored with surveys that measure lighting levels following best practice guidance provided within ILP PLG04[75]. Improvements will be carried out where necessary, legally compliant, practicable and safe to do so**.** ILP guidance note GN08/18:2018[74] is to be used to inform the detailed design process in collaboration with suitable biodiversity specialists. Specification of supplementary photometric control methods shall be used as a last resort, and can include accessories such as baffles, hoods or louvres that can be used to reduce light spill and direct light only to where it is needed.

1.1.231 An ecologist will conduct a site walkover and inspection before site clearance of any scrub or vegetation along the River Dee and site personnel will be briefed on the potential for otter presence and actions to take to avoid impacts. Additionally, all excavations should be made inaccessible to avoid killing or injury of wildlife.

1.1.232 In summary, following a detailed assessment with specific regard to the conservation objectives of the River Dee SAC, it is concluded that the proposed Scheme will not result in adverse effects on the integrity of the site in respect of otter alone. Mitigation measures, including the restriction of overnight working and the avoidance of artificial lighting along the riverbanks as set out above, are designed to

[73] ILP, 2021. Guidance Note GN01/21. The Reduction of Obstrusive Light. [online] Available from: Guidance Note 1 for the reduction of obtrusive light 2021 | Institution of Lighting Professionals
[74] ILP, Bat Conservation Trust, 2023. Guidance Note GN08/23. Bats and Artificial Lighting at Night. [online] Available from: Guidance Note 8 Bats and Artificial Lighting | Institution of Lighting Professionals
[75] ILP, 2013. PLG04 Guidance on Undertaking Environmental Lighting Impact Assessments. [online] Available from: PLG04 GUIDANCE ON UNDERTAKING ENVIRONMENTAL LIGHTING IMPACT ASSESSMENTS | Institution of Lighting Professionals

prevent disturbance to otters, particularly in relation to their breeding and resting places, and to maintain habitat connectivity.

1.1.233 The same mitigation measures identified above for both 'Underwater noise and vibration' and 'Airborne noise and vibration' for this SAC will equally address disturbance impacts on otter.

Temporary and permanent habitat loss (construction phase)

Conservation Objectives

1.1.234 Conservation Objectives for otter relevant to this impact pathway include:

a) There will be no loss of otter breeding or resting sites other than by natural means (such as naturally occurring river processes) within the SAC or its catchment.
b) There should be no reduction of fish biomass within the SAC or its tributaries except for that attributable to natural fluctuations
c) All man-made structures within or likely to be used by otters from the SAC population must incorporate effective measures to facilitate the safe movement and dispersal of otters.

Assessment of effects

1.1.235 As per paragraphs 1.1.203, evidence of otter within the Scheme have been found within the Scheme area. In accordance with the Conservation Objectives, man-made structures within the SAC must incorporate measures to facilitate safe movement dispersal of otters. Although NRW consultation and field surveys have confirmed that the Scheme area is not being used for breeding, there may be temporary loss of resting sites through the use of riparian habitat/land for the Scheme construction or ancillary use, such as compounds. Therefore, LSE remain for temporary habitat loss necessitating mitigation.

1.1.236 Integral to the Scheme design is the planting of linear hedgerow and trees which will provide cover and shelter habitat for otter (ES Chapter 8, paragraph 8.5.8). This will likely offset the permanent habitat loss of a narrow strip of saltmarsh habitat along the riverbank. As per the Conservation Objectives, there would be no permanent net loss of otter resting sites. Therefore, no LSE remain for permanent habitat loss and additional mitigation is not required.

Mitigation

1.1.237 Temporary habitat loss effects on otters would occur in the short term, for the construction of the new bridge, shared use paths and for the formation of the outlets for Queensferry Drain and maintenance access. However, passage for otters within the River Dee would be maintained. All habitat along the Dee will be reinstated. The habitat to be created once the existing bridge abutments have been removed would provide additional cover, once established (ES Chapter 8, paragraph 8.6.18).

1.1.238 Otter movement along the riverbank may be obstructed by construction materials or activities, in particular any works which involve disturbance to the existing riverbanks. However, the River Dee itself would still be available for the passage of otters. Reasonable avoidance measures for otters include the installation of a means of escape to any deep excavations (>0.5 m) left open overnight and the maintenance of access within the River Dee. An ecologist will conduct a site walkover and inspection before site clearance of any scrub or vegetation along the River Dee and site personnel will be briefed on the need to avoid disturbance of otters (Chapter 8 paragraph 8.7.43).

1.1.239 The Outline CEMP/constructability report includes an Outline Ecological Management Plan, which lists measures to protect the ecology of the Scheme site. Of those relevant to this impact pathway:

a) The contractor is to establish a programme of site inspection to ensure that passage along the River Dee banks for otters is maintained and the site is kept free of litter or discarded food items.

Visual disturbance (including lighting) (operational phase)

Conservation Objectives

1.1.240 The Conservation Objectives for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC given for the impact pathway ‘Visual disturbance (construction phase)’ are also relevant for this impact pathway.

Assessment of effects

1.1.1 The Scheme's ELIA has assessed that the lux at ground level for the pathway passing under the existing and new bridge will increase from 0.02 lux (baseline measurement) to 0.4 lux (calculated light level) due to the addition of P3 class[57] lighting along the pathway. The pathway will be lit with luminaires mounted post-top on 6m columns except for the section passing beneath the new bridge deck, where mounting height is restricted and so at least five bollards will be used instead.

1.1.2 This additional lighting represents a major adverse change to operational light levels without mitigation, and is a permanent additive light source to the River Dee at night. Therefore, LSE remain and necessitates mitigation.

Mitigation

1.1.3 The same mitigation measures identified above for 'Visual disturbance (construction phase)' impact pathway for this SAC will address some the operational phase permanent visual disturbance impacts on otter.

1.1.4 Further mitigations identified by the Scheme's ELIA relevant to otter include:

a) Considerate working practices will ensure that routine maintenance in the external environment of the proposed Queensferry Drain Pumping Station should not be carried out in the hours of darkness.

b) Selection of appropriate lighting standard from relevant British and European standards to ensure lighting is appropriate to the task being undertaken, the area being lit, and that areas are not over lit.

c) Constant Light Output luminaires have been specified for all NMWTRA luminaires to the reduced initial lighting levels provided with this type of luminaire. This will prevent over lighting at the beginning of the installation life cycle, and thus will reduce levels of all parameters of obtrusive light and the effects on human centric and ecology receptors.

d) Integral optical shielding of NMWTRA adoptable luminaires where practicable and safe to do so and to cause no detrimental effect to required lighting levels.

e) Where required, luminaires have been specified with permanent dimming to reduce the potential for over lighting.

f) ILP GN01 – The Reduction of Obtrusive Light (ILP, 2021) utilised to inform the design process.

g) Only luminaires with an upward light ratio of 0% and/or Darksky International approved shall be used.

h) Alternative luminaries supplied with an integral back light shield shall be considered for proposed FCC lighting. As a last resort supplementary photometric control (rear light shields) shall be supplied and fitted onto FCC lighting.

1.1.5 Following these mitigations, the ELIA consider that all receptors within the Scheme have an overall predicted impact of none/negligible.

1.1.6 ES Chapter 16 Marine Environment stipulated that mitigation measures recommended for lighting will be part of the Scheme's commitments, and includes rear light shields on the proposed lighting for the active travel routes under the bridge to minimise light spill onto the river. Considering the floodlit Jubilee bridge north of the existing A494 bridge, the light spill from this has not created a barrier, potentially due to the high turbidity of the water, so lit bollards with rear light shields is unlikely to also create a barrier.

Conclusion (River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC)

1.1.7 It is concluded that, with the appropriate mitigation, none of the activities planned as part of the Scheme (both construction and operation) will have an adverse effect on the integrity of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC.

8.2. Dee Estuary Ramsar Site/SPA

1.1.8 The following potential impacts have been flagged as potentially resulting in LSE on the qualifying bird species of the Dee Estuary Ramsar site/SPA:

a) Construction phase:

a. Airborne noise and vibration; and

b. Visual disturbance (including lighting).

b) Operational phase:

a. None

Airborne noise and vibration (construction phase)

Conservation Objectives

1.1.9 Noise is listed as a non-physical disturbance of SPA/Ramsar site interest features in The Dee Estuary Marine Site advice package.

Assessment of effects

1.1.10 Chapter 16 Marine Environment in the ES uses the TIDE Toolbox[56] which identifies that waterbird sensitivity to in-river stimuli (personnel on mudflat, plant and personnel on crest, piling noise, regular noise, movement of crane) is moderate to high. However, within the context of the Scheme, overwintering bird surveys conducted 2024 to 2025 recorded non-significant numbers (<1% of the national population) of a handful of qualifying species (redshank, teal, oystercatcher), which use the Scheme footprint as functionally linked land (ES Chapter 8 and Chapter 16). Breeding bird surveys in 2023 for the Scheme recorded redshank (four individuals), oystercatcher (26 individuals), curlew (1 individual), and dunlin (1 individual). It was noted there is better quality habitat outside of the Scheme footprint. Furthermore, the Scheme area is already subject to significant disturbance, given the surrounding urbanised area, and the frequent use of the riverside path for activities such as dog walking.

1.1.11 Although some of the qualifying species are highly sensitive to disturbance, as they are present in very low abundances on poor quality functionally linked habitat, their redistribution to the SPA/Ramsar site or other areas of functionally linked land is

unlikely to cause significant effects to the population as a whole or Conservation Objectives. Therefore, there are no LSE and mitigation is not required.

Visual disturbance (construction phase)

1.1.12 Visual presence is listed as a non-physical disturbance of SPA/Ramsar interest features in The Dee Estuary Marine Site advice package.

1.1.13 The same Conservation Objectives and assessment of effects as listed for 'Airborne noise and vibration' adequately addresses the same potential impacts on qualifying bird species/assemblages. Therefore, no LSE are identified, and no mitigation is required.

Conclusion (Dee Estuary Ramsar site/SPA)

1.1.14 It is concluded that, based on the non-significant abundances of a small number of qualifying species on poor-quality functionally linked habitat within the Scheme, none of the activities planned as part of the Scheme will have an adverse effect on the integrity of the Dee Estuary Ramsar/SPA alone.

8.3. Dee Estuary/Aber Dyfrdwy SAC

1.1.15 The following potential impacts have been flagged as potentially resulting in LSE on the qualifying lamprey species of the Dee Estuary/Aber Dyfrdwy SAC:

a) Construction phase:

a. Underwater noise and vibration

b) Operational phase:

a. None

Conclusion (Dee Estuary/Aber Dyfrdwy SAC)

1.1.16 As per the assessment of effects for 'Underwater noise and vibration' for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (paragraphs 1.1.205 and 1.1.207), the abundances of recorded river and sea lamprey in the Scheme area are very low. Therefore, in addition to their migratory patterns being nocturnal and most in-river works occurring during the daytime, it is considered that there are no LSE, and

none of the activities planned as part of the Scheme (both construction and operation) will have an adverse effect on the integrity of the Dee Estuary/Aber Dyfrdwy SAC. No mitigation is required.

Summary

1.1.17 Following completion of assessments to support Stage 2: Appropriate Assessment, this report to inform a HRA considers that, with adherence to the proposed mitigation where relevant, including regulatory requirements, the construction works and operational activity associated with the Scheme will not result in AEOI for the designated sites and their qualifying features either alone or in combination with other plans, policies or projects.

1.1.18 It should be noted that this report has been produced based on the proposed works information available at the time of writing (19 September 2025). Therefore, should any aspects of the proposed works change (including construction methodology and programme), this HRA report should be revisited to re-assess potential effects.

9. Appendices

9.1. Appendix I. Design drawings

Figure A1.1 – Proposed land acquisition and usage.

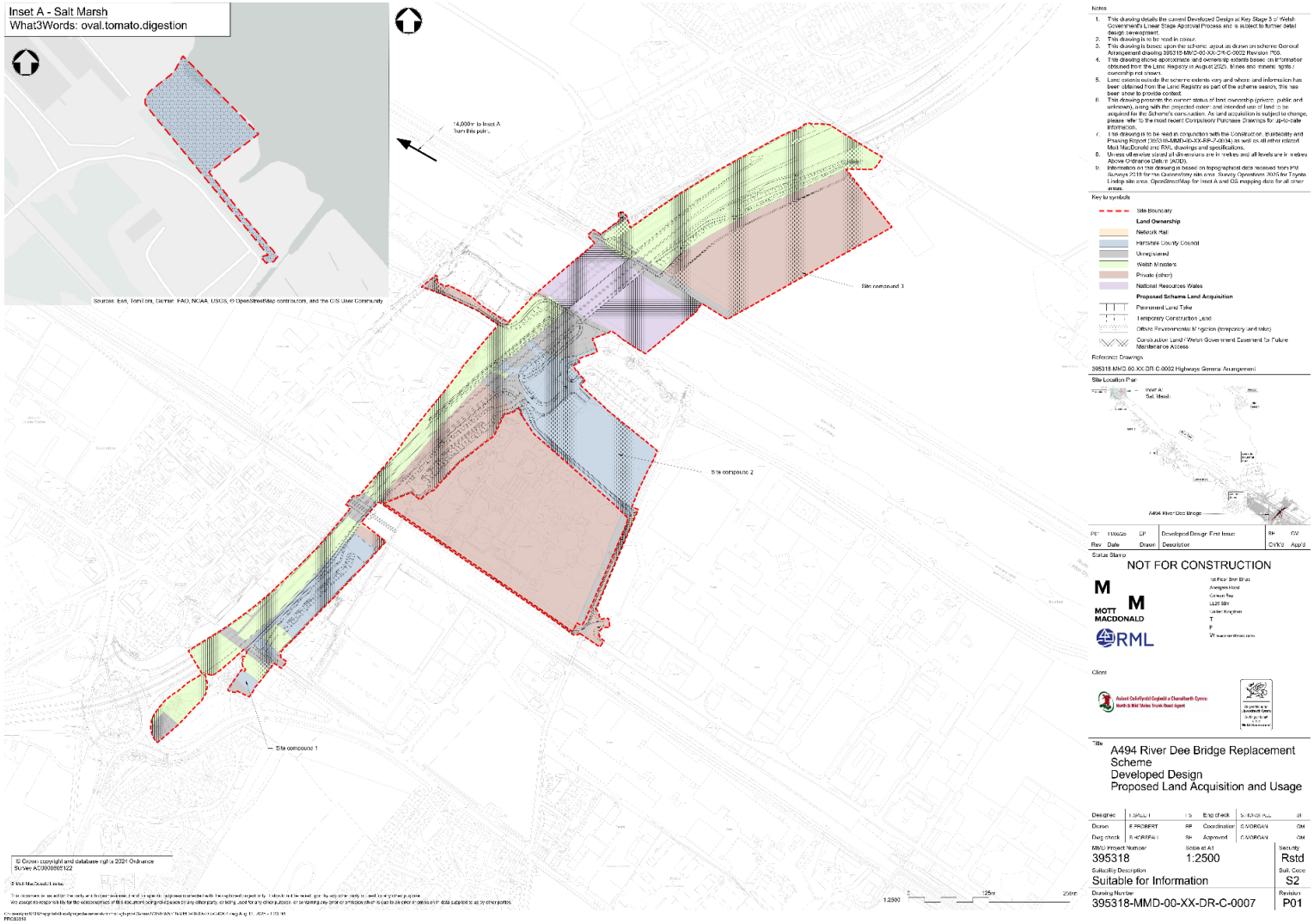
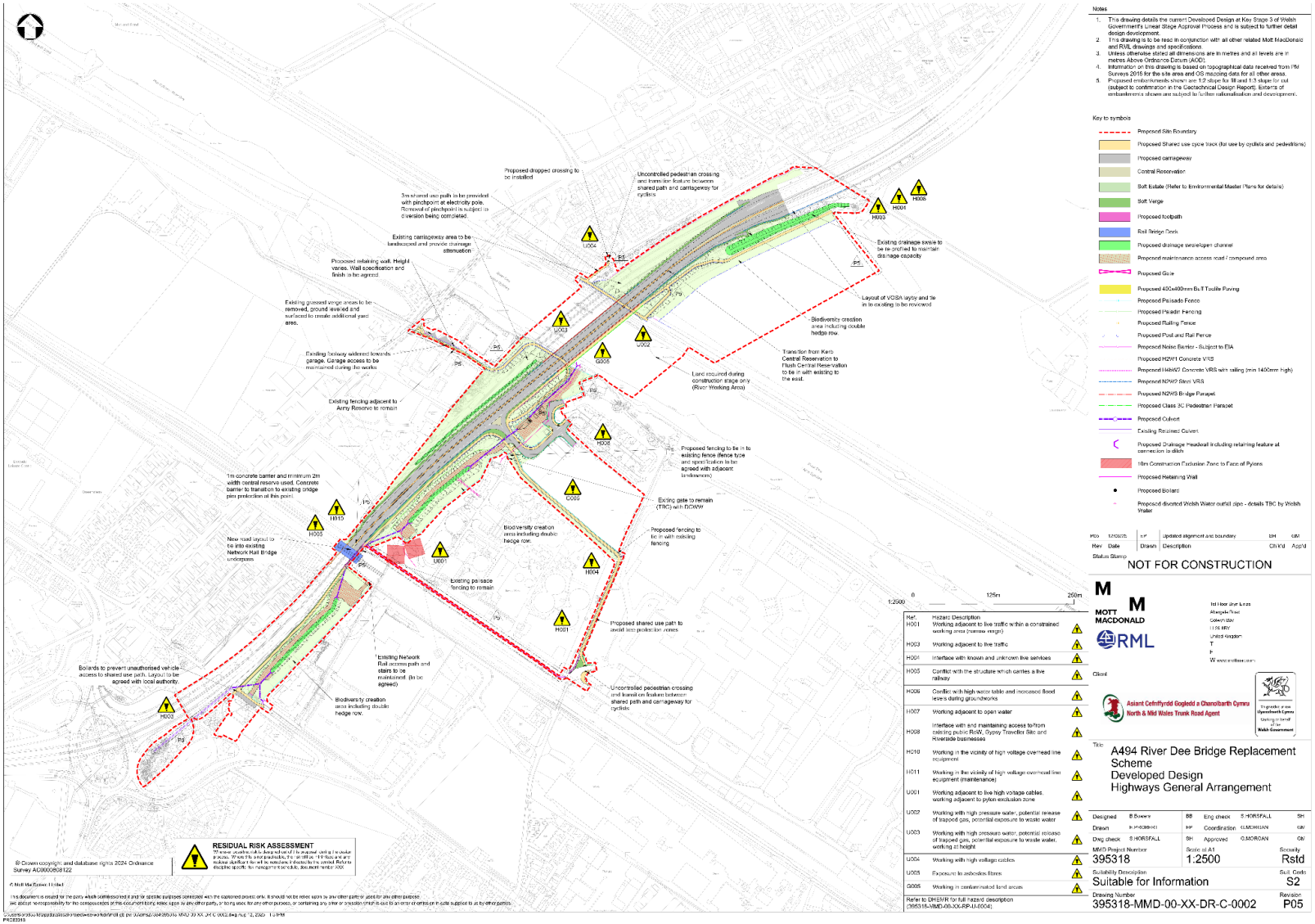


Figure A1.2 – Highways general arrangement.



9.2. Appendix II. Designated sites characteristics, qualifying features, and conservation objectives

Dee Estuary Ramsar (UK11082)

1.1.19 Designated on 17 July 1985, with additional area (1,217.17ha) designated from 10 December 2009. The total area of the Ramsar is 14,302.02ha. The Ramsar encompasses the five existing protected areas, all SSSIs:

a) Dee Estuary/Aber Afon Dyfrdwy SSSI (England/Wales)
b) Inner Marsh Farm SSSI (England/Wales)
c) Shotton Lagoons and Reedbeds SSSI (Wales)
d) Gronant Dunes and Talacre Warren SSSI (Wales)
e) Red Rocks SSSI (England)

Qualifying Features

1.1.20 **Criterion 1**: Extensive intertidal mud and sand flats (20km by 9km) with large expanses of saltmarsh towards the head of the estuary. Habitats Directive Annex I features present include:

a) H1130 Estuaries
b) H1140 Mudflats and sandflats not covered by seawater at low tide
c) H1210 Annual vegetation of drift lines
d) H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts
e) H1310 *Salicornia* and other annuals colonising mud and sand
f) H1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

g) H2110 Embryonic shifting dunes
h) H2120 Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”)
i) H2130 Fixed dunes with herbaceous vegetation (“grey dunes”)
j) H2190 Humid dune slacks

1.1.21 **Criterion 2**: It supports breeding colonies of the vulnerable Natterjack toad (*Epidalea calamita*). Following the decline and loss of the species in the early 1990’s at Red Rock SSSI, the species was successfully reintroduced utilising spawn strings from the nearby Sefton coast and the site now supports a breeding population of the species. In addition, the species has also been successfully reintroduced to the Talacre Warren and Gronant Dunes SSSI in Wales.

1.1.22 **Criterion 5**: Assemblages of international importance. Species with peak counts in winter. Non-breeding season regularly supports 120,726 individual waterbirds (5 year peak mean 1994/1995 to 1998-1999).

1.1.23 **Criterion 6**: species/populations occurring at levels of international importance:

a) Species with peak counts in spring/autumn:
    a. Redshank (*Tringa totanus*) – 8,795 individuals, representing an average of 5.9% of the Eastern Atlantic population.
b) Species with peak counts in winter:
    a. Teal (*Anas crecca*) – 5,251 individuals, representing an average of 1.3% of the population.
    b. Shelduck (*Tadorna tadorna*) – 7,725 individuals, representing an average of 2.6% of the population.
    c. Oystercatcher (*Haematopus ostralegus*) – 22,677 individuals, representing an average of 2.5% of the population.
    d. Curlew (*Numenius arquata*) – 3,899 individuals, representing an average of 1.1% of the population.
    e. Pintail (*Anas acuta*) – 5,407 individuals, representing an average of 9.0% of the population.
    f. Grey plover (*Pluvialis squatarola*) – 1,643 individuals, representing an average of 1.1% of the population.
    g. Knot (*Calidris canutus islandica*) – 12,394 individuals, representing an avaerage of 3.5% of the population.

h. Dunlin (*Calidris alpina alpina*) – 27,769 individuals, representing an average of 2.0% of the population.
i. Black-tailed godwit (*Limosa limosa islandica*) – 1,747 individuals, representing an average of 2.5% of the population.
j. Bar-tailed godwit (*Limosa lapponica*) – 1,150 individuals, representing an average 1.2% of the population
k. Redshank (*Tringa totanus*) – 5,293 individuals, representing an average of 3.5% of the population

Conservation Objectives

1.1.24 There are no Conservation Objections for Ramsar sites and therefore the connecting Dee Estuary SPA Conservation Objectives will be used.

Dee Estuary SPA (UK9013011)

1.1.25 Designated in July 1985, and updated in 2015. The total area of the SPA is 14,294.95ha, with a marine area of 80.9%.

Qualifying Features

a) A048 Common shelduck (Non-breeding)
b) A052 Eurasian teal (Non-breeding)
c) A054 Northern pintail (Non-breeding)
d) A130 Eurasian oystercatcher (Non-breeding)
e) A141 Grey plover (Non-breeding)
f) A143 Red knot (Non-breeding)
g) A149 Dunlin (Non-breeding)
h) A156 Black-tailed godwit (Non-breeding)
i) A157 Bar-tailed godwit (Non-breeding)
j) A160 Eurasian curlew (Non-breeding)
k) A162 Common redshank (Non-breeding)
l) A191 Sandwich tern (Non-breeding)
m) A193 Common tern (Breeding)
n) A195 Little tern (Breeding)
o) Waterbird assemblage

Conservation Objectives

1.1.26 The NE European Site Conservation Objectives for Dee Estuary SPA[76] are thus:

1.1.27 “With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified, and subject to natural change;

1.1.28 Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

a) The extent and distribution of the habitats of the qualifying features
b) The structure and function of the habitats of the qualifying features
c) The supporting processes on which the habitats of the qualifying features rely
d) The population of each of the qualifying features, and,
e) The distribution of the qualifying features within the site.”

1.1.29 The SPA is part of the Dee Estuary European Marine Site. These Conservation Objectives should be used in conjunction with the Conservation Advice document for the European Marine Site.

[76] NE, 2019. European Site Conservation Objectives for The Dee Estuary Special Protection Area Site Code: UK9013011. Available from: https://publications.naturalengland.org.uk/file/5008539580104704

Dee Estuary/Aber Dyfrdwy SAC (UK0030131)

1.1.30 Designated in December 2009 and updated in December 2015. The total area of the SAC is 15,805.27ha, with a marine area of 97.7%.

Qualifying Features

1.1.31 Annex I habitats that are a primary reason for selection of this site:

a) **1140 Mudflats and sandflats not covered by seawater at low tide**
   Species occurrence description not yet available.
b) **1310 *Salicornia* and other annuals colonising mud and sand**
   The Dee Estuary is representative of pioneer glasswort *Salicornia* spp. saltmarsh in the northwest of the UK. *Salicornia* spp. saltmarsh forms extensive stands in the Dee, especially on the more sandy muds where there is reduced tidal scour. It mainly occurs on the seaward fringes as a pioneer community, and moving landwards usually forms a transition to common saltmarsh-grass *Puccinellia maritima* saltmarsh (SM10). There is also a low frequency of *Salicornia* spp. extending well inland. Associated species often include annual sea-blite *Suaeda maritima* and hybrid scurvy grass *Cochlearia x hollandica*.
c) **1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)**
   The Dee Estuary is representative of H1330 Atlantic salt meadows in the nortwest of the UK. It forms the most extensive type of saltmarsh in the Dee, and since the 1980s it has probably displaced very large quantities of the non-native common cord-grass *Spartina anglica*. The high accretion rates found in the estuary are likely to favour further development of this type of vegetation. The saltmarsh is regularly inundated by the sea; characteristic salt-tolerant perennial flowering plant

species include common saltmarsh-grass *P. maritima*, sea aster *Aster tripolium*, and sea arrowgrass *Triglochin maritima*. In a few areas there are unusual transitions to wet woodland habitats.

1.1.32 Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site (* denotes a priority natural habitat or species):

a) 1130 Estuaries
b) 1210 Annual vegetation of drift lines
c) 1230 Vegetated sea cliffs of the Atlantic and Baltic coasts
d) 2110 Embryonic shifting dunes
e) 2120 Shifting dunes along the shoreline with *Ammophila arenaria* (“white dunes”)
f) 2130 Fixed dunes with herbaceous vegetation (“grey dunes”)*
g) 2190 Humid dune slacks

1.1.33 Annex II species present as a qualifying feature, but not a primary reason for selection of this site:

a) 1095 Sea lamprey (*Petromyzon marinus*)
b) 1099 River lamprey (*Lampetra fluviatilis*)
c) 1395 Petalwort (*Petalophyllum ralfsii*)

Conservation Objectives

1.1.34 The NE European Site Conservation Objectives for Dee Estuary/Aber Dyfrdwy SAC[77] are thus:

[77] NE, 2018. European Site Conservation Objectives for The Dee Estuary/Aber Dyfrdwy Special Area of Conservation Site Code: UK0030131. Available from: https://publications.naturalengland.org.uk/file/5834949009866752

1.1.35 “With regard to the SAC and the natural habitats and/or species for which the site has been designated, and subject to natural change;

1.1.36 Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

a) The extent and distribution of qualifying natural habitats and habitats of qualifying species
b) The structure and function (including typical species) of qualifying natural habitats
c) The structure and function of the habitats of qualifying species
d) The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
e) The populations of qualifying species, and,
f) The distribution of qualifying species within the site.”

1.1.37 The SAC is part of the Dee Estuary European Marine Site. These Conservation Objectives should be used in conjunction with the Conservation Advice document for the European Marine Site.

River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (UK0030252)

1.1.38 Designated in April 2005, and updated in December 2015. The total area of the SAC is 1,271.32ha.

Qualifying Features

1.1.39 Annex I habitats that are a primary reason for selection of this site:

a) 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

Species occurrence description not yet available.

1.1.40 Annex II species that are a primary reason for selection of this site:

a) **1160 Atlantic salmon (*Salmo salar*)**

Habitat occurrence description not yet available.

b) **1831 Floating water-plantain (*Luronium natans*)**

Habitat occurrence description not yet available.

1.1.41 Annex II species present as a qualifying feature, but not a primary reason for selection of this site:

a) 1095 Sea lamprey
b) 1096 Brook lamprey (*Lampetra planeri*)
c) 1099 River lamprey
d) 1163 Bullhead (*Cottus gobio*)
e) 1355 Otter (*Lutra lutra*)

Conservation Objectives

1.1.42 The NE European Site Conservation Objectives for River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC[78] are thus:

1.1.43 “With regard to the SAC and the natural habitats and/or species for which the site has been designated, and subject to natural change;

1.1.44 Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

a) The extent and distribution of qualifying natural habitats and habitats of qualifying species
b) The structure and function (including typical species) of qualifying natural habitats
c) The structure and function of the habitats of qualifying species
d) The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
e) The populations of qualifying species, and,
f) The distribution of qualifying species within the site.”

[78] NE, 2018. European Site Conservation Objectives for River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid Special Area of Conservation Site Code: UK00301252. Available from: https://publications.naturalengland.org.uk/file/5851750921928704

Deeside and Buckley Newt Sites SAC (UK0030252)

1.1.45 Designated in December 2004, and updated in December 2015. The total area of the SAC is 206.19ha.

Qualifying Features

1.1.46 Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:

a) 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

1.1.47 Annex II species that are a primary reason for selection of this site:

a) **1166 Great crested newt (*Triturus cristatus*)**

This composite site in north-east Flintshire is on coastal slopes overlooking the Dee estuary. Waterbodies created by the extraction of clay, sand and coal, as well as for agricultural purposes, provide breeding habitat for one of the largest populations of great crested newt *T. cristatus* in Great Britain. Some ponds on the site have been created for nature conservation purposes following post-industrial reclamation. Terrestrial habitat is rich and varies from neutral and acid grasslands, through *Molinia* mires to scrub and mature broad-leaved woodland. The site also supports considerable numbers of all the widespread amphibian species.

Conservation Objectives

1.1.48 The NRW European Site Conservation Objectives for the Deeside and Buckley Newt Sites SAC [79] are thus:

Conservation Objective for Fea

ure 1 – great crested newt.

1.1.49 The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

a) No less than 600 great crested newts will be present on the site
b) At least 50 display/breeding ponds will be found throughout the entire site
c) Great crested newt larvae will be found in 25 or more of the breeding ponds
d) Half of the display/breeding ponds on the site will have a water depth of 10cm of more during the summer months.
e) Native macrophytes will cover at least half of the pond surface yet some of the water surface (40%) will still remain open.
f) Aquatic marginal vegetation will be present around the ponds
g) Breeding/display ponds will not be heavily shaded by surrounding vegetation
h) Algal blooms and surface sheens will be absent from display/breeding ponds
i) Fish will not be present in breeding/display ponds which support great crested newts
j) Only small numbers of water and wildfowl will be seen on the ponds

[79] NRW, 2008. Core Management Plan including Conservation Objectives for Deeside and Buckley Newt Sites Special Area of Conservation. Available from: www.naturalresources.wales%2Fmedia%2F671740%2FDeeside_and_Buckley_WES32_Plan_English.pdf&usg=AOvVaw3FXwU5hHqWs2oan5pyjJPe&opi=89978449

k) The terrestrial habitat surrounding breeding ponds will comprise of refuge areas for newts, foraging areas, areas of hibernacula and corridors which will aid the dispersal of great crested newts
l) Off-site habitats that function as stepping stone or corridors located between SAC compartments will be maintained for migration, dispersal, foraging and genetic exchange purposes
m) Off-site features that impact on successful dispersal, such as roadside gully-pots, will not be subject to future construction
n) Non-native aquatic species will not be present
o) Amphibian chytridiomycosis will not be present
p) All factors affecting the achievement of the foregoing conditions are under control.

Conservation Objective for Feature 2 – Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles.

1.1.50 The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

a) Old sessile oak woodland will occupy at least 10% of the total site area
b) The woodland is maintained as far as possible by natural processes
c) The trees and shrubs are mainly native broadleaved species dominated by oak with some, birch, alder and ash
d) The occasional sycamore may be present but will not become dominant anywhere in the canopy or the under-storey
e) Beech and conifer species will be largely absent from the canopy, under-storey and the woodland as a whole
f) The abundance of individual native tree species will vary throughout the woodland. There may be dense stands of one species or mixture of several species occupying a given area at any one time
g) Existing canopy gaps which occur over great crested newt ponds will be maintained, and supplemented by a changing patchwork of naturally occurring pattern of gaps and temporary glades which will give rise to structural diversity
h) The woodland will contain trees and shrubs of all ages and sizes, as a mixture or in single aged groups
i) Plentiful native tree seedlings throughout the site will develop into saplings in the open glades

j) The field and ground layers will contain such species as ivy, bramble, honeysuckle, broad-buckler fern, male fern and greater wood-rush
k) Exotic species such as rhododendron and cherry laurel will not be tolerated within the woodland
l) There will be abundant dead and dying trees with holes and hollows, rot columns, torn off limbs and rotten branches throughout the woodland
m) All factors affecting the achievement of these conditions are under control